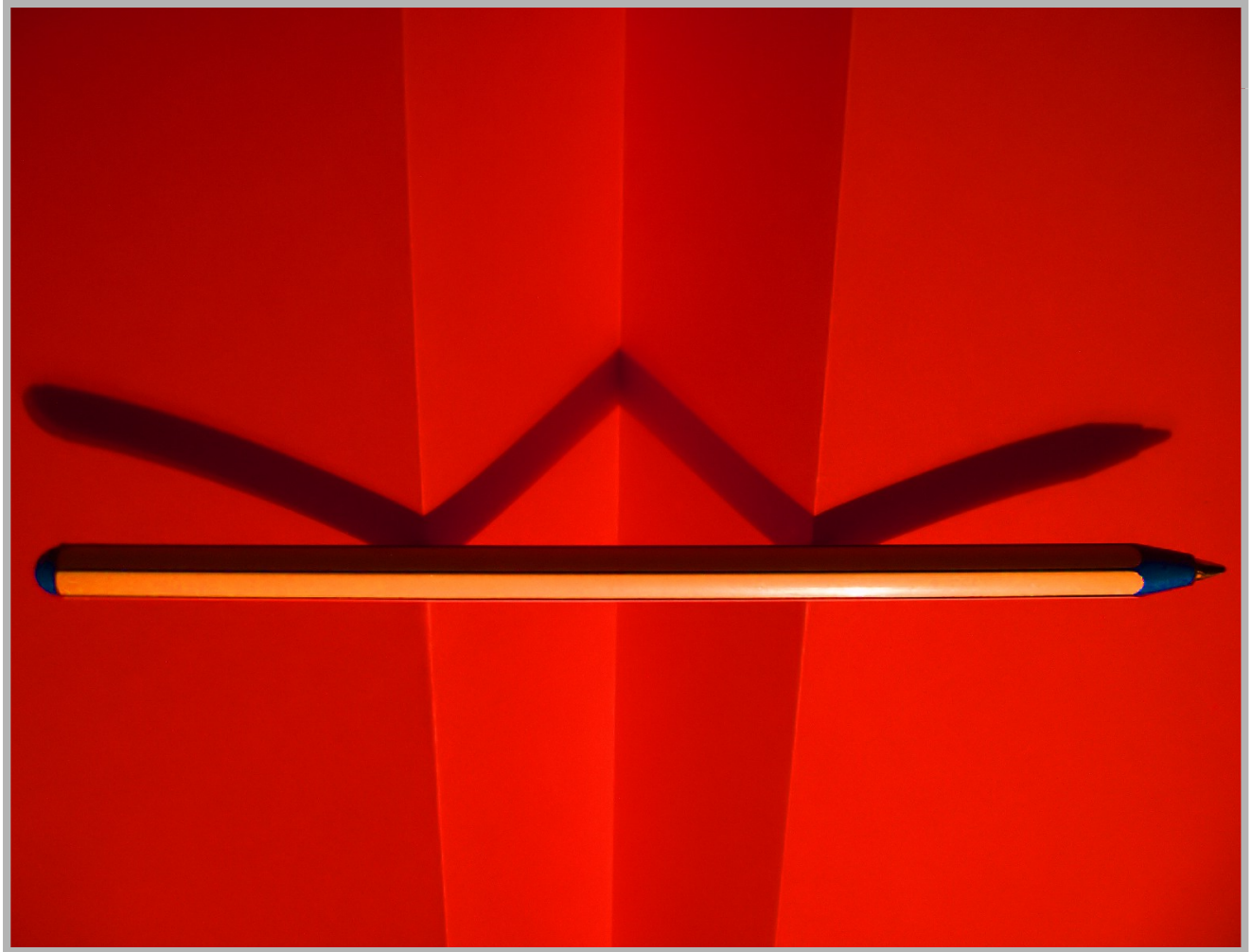
Karlsruhe Institute of Technology

Module Handbook Information Engineering and Management (M.Sc.) ER 2006

Summer term 2009
Long version
13.03.2009

Faculty of Economics and Business Engineering
Fakultät für Informatik



KIT - the cooperation of the Forschungszentrum Karlsruhe GmbH and the Univeristät Karlsruhe (TH)

Forschungszentrum Karlsruhe
in der Helmholtz-Gemeinschaft

Universität Karlsruhe (TH)
Research University · founded 1825

Publishers:

Universität Karlsruhe (TH)
Fakultät für Wirtschaftswissenschaften

Faculty of Economics and Business Engineering
Universität Karlsruhe (TH)
76128 Karlsruhe
www.wiwi.uni-karlsruhe.de

Fakultät für Informatik
Universität Karlsruhe (TH)
76128 Karlsruhe
www.ira.uka.de

Photographer of cover picture: Arno Peil

Inhaltsverzeichnis

Table of Contents **3**

1 Structure of the Master Programme in Information Engineering and Management **7**

2 Helpful information **10**

3 Actual Changes **13**
3.1 Changes regarding modules . . . 13
3.2 Changes regarding courses . . . 13

4 Mandatory Modules **15**
4.1 All Subjects . . . 15
IW4WWIW1- Information Engineering and Management 1 . . . 15
IW4WWIW2- Information Engineering and Management 2 . . . 16
IW4WWOR- Stochastic Models in Information Engineering and Management . . . 17
IW4INJURA- Contract Drafting and Internet Law . . . 18
IW4IWSEM- Interdisciplinary Seminar . . . 19
IW4IWMATHESIS- Master Thesis . . . 20

5 Elective Modules **21**
5.1 Informatics . . . 21
IW4INAALG- Advanced Algorithms . . . 21
IW4INECOLL- e-Collaboration . . . 22
IW4INIAPP- Complex Internet Applications . . . 23
IW4INLIKM- Large-Scale Information and Knowledge Management . . . 24
IW4INLIKM1- Advanced Concepts of Information and Knowledge Management . . . 26
IW4INNET- Advanced Infrastructures . . . 27
IW4INOS- System Software . . . 28
IW4INSW- Software Systems . . . 29
IW4INSER- Service Technologies . . . 30
5.2 Economic Sciences . . . 31
IW4WWFERM- Finance, Econometrics, and Risk Management . . . 31
IW4WWIMSE- Information, Market, and Service Engineering . . . 32
IW4WWIMSE1- Information and Market Engineering . . . 34
IW4WWIMSE2- Service Engineering . . . 35
IW4WWSER1- Service Management . . . 36
IW4WWMAR- Marketing . . . 37
IW4WWMAR1- Marketing Research . . . 38
IW4WWMAR2- Quantitative Marketing and OR . . . 39
IW4WWMAR3- Behavioral Approaches in Marketing and Data Analysis . . . 40
IW4WWMAR4- Strategy, Innovation and Data Analysis . . . 41
IW4WWOQM1- Stochastic Methods in Economics and Engineering . . . 42
IW4WWORG- Business Organization: Theory and Management Perspective . . . 43
IW4WWORG1- Strategy and Organization . . . 44
IW4WWORM- Operational Risik Management . . . 45
IW4WWSSMI- Stochastic Modeling and Optimization . . . 46
5.3 Law . . . 47
IW4INJUINWI- Law of the Information Economy . . . 47
IW4INJURDIG- Law of the Information Society . . . 48
IW4INJURDIU- Law for Information Companies . . . 49

6 Courses **51**
6.1 Mandatory . . . 51
26500- Business Administration in Information Engineering and Management . . . 51
26450- Principles of Information Engineering and Management . . . 53
25679- OR Methods and Models in Information Engineering and Management . . . 54
24501- Internet Law . . . 55

24671- Law of Contracts . . . 56
26530- Interdisciplinary Seminar in Information Engineering and Management . . . 57
6.2 Elective . . . 58
24071- System Architecture . . . 58
24074- Telematics for Information Management and Engineering . . . 59
24074p- Practical Course in Telematics . . . 60
24074s- Seminar in Telematics . . . 61
24075- Software Architecture . . . 62
24079- Algorithm Design . . . 63
24079p- Practical Course in Algorithm Design . . . 64
24082- Public Media Law . . . 65
24104- Wireless Sensor-Actuator-Networks . . . 66
24110- High Performance Communication . . . 67
24111- Workflow Management Systems . . . 68
24112- Multicore Computers and Computer Clusters . . . 69
24118- Data Warehousing and Mining . . . 70
24121- Copyright . . . 71
24124- Web Engineering . . . 72
24127- Power Management . . . 73
24128- Telematics . . . 74
24132- Multimedia Communication . . . 75
24136/24609- Trademark and Unfair Competition Law . . . 76
24141- Information Integration and Web Portals . . . 77
24146- Ubiquitous Computing . . . 78
24149- Network and IT-Security Management . . . 79
24153/24604- Advanced Web Applications . . . 80
24156- Moving Objects Databases . . . 81
24167- Employment Law I . . . 82
24168- Tax Law I . . . 83
24171- Randomized Algorithms . . . 84
24181- Power Management Praktikum . . . 85
24304- Practical Course: Web Technologies . . . 86
24372s- Advanced Systems - Seminar . . . 87
24574- Communication and Database Systems . . . 88
24601- Network Security: Architectures and Protocols . . . 89
24605- Datenschutz und Privatheit in vernetzten Informationssystemen . . . 90
24612- Computer Contract Law . . . 91
24614- Algorithms for Planar Graphs . . . 92
24621- Algorithms for Visualization of Graphs . . . 93
24622- Algorithms for Cellular Automata . . . 94
24625- Model Driven Software Development . . . 95
24626- Component Based Software Engineering . . . 96
24632- Telecommunications Law . . . 97
24643- Mobile Communication . . . 98
24646- Tax Law II . . . 99
24650- Civil Law for Advanced . . . 100
24654- Algorithms for Ad-hoc and sensor networks . . . 101
24660- Software Development for modern, parallel platforms . . . 102
24661- Patent Law . . . 103
24666- European and International Law . . . 104
24668- Employment Law II . . . 105
24669- Simulation of Computer Networks . . . 106
24674- Next Generation Internet . . . 107
24806- Aktuelle Probleme des Patentrechts . . . 108
24874- Practical Course Data Warehousing and Mining . . . 109
25055- Principles of Insurance Management . . . 110
25070p- Advanced Lab Applied Informatics . . . 111
25070s- Seminar in Applied Informatics . . . 112

25154- Modern Market Research . . . 113
25156- Marketing and Operations Research . . . 114
25158- Corporate Planning and Operations Research . . . 115
25160- e-Business & electronic Marketing . . . 116
25162- Information Technology and Business Information . . . 117
25164- International Marketing . . . 118
25165- Marketing and Innovation . . . 119
25166- Strategic and Innovative Decision Making in Marketing . . . 120
25167- Behavioral Approaches in Marketing . . . 121
25170- Entrepreneurship and Marketing . . . 122
25171- Data Analysis and Operations Research . . . 123
25192- Master Seminar in Marketing . . . 124
25193- Master Seminar zu Marktforschung . . . 125
25194- Master Seminar in Quantitative Marketing and OR . . . 126
25331- Stochastic Calculus and Finance . . . 127
25353- Statistical Methods in Financial Risk Management . . . 128
25357- Portfolio and Asset Liability Management . . . 129
25359- Financial Time Series and Econometrics . . . 130
25369- Game Theory II . . . 131
25381- Advanced Econometrics of Financial Markets . . . 132
25598- Operations Management . . . 133
25653- Markovian Decision Processes . . . 134
25656- Quality Management I . . . 135
25659- Quality Management II . . . 136
25662- Simulation I . . . 137
25665- Simulation II . . . 138
25687- Optimization in a Random Environment . . . 139
25690- Stochastic Processes . . . 140
25702- Algorithms for Internet Applications . . . 141
25704- Organic Computing . . . 142
25706- Nature-inspired Optimisation . . . 144
25708- Distributed Algorithms . . . 145
25722- Distributed Database Systems: Basic Technology for e-Business . . . 146
25724- Database Systems and XML . . . 147
25735- Document Management and Groupware Systems . . . 148
25740- Knowledge Management . . . 149
25742- Knowledge Discovery . . . 150
25748- Semantic Web Technologies I . . . 151
25750- Semantic Web Technologies II . . . 152
25760- Complexity Management . . . 153
25762- Intelligent Systems in Finance . . . 155
25764- IT Complexity in Practice . . . 157
25770 - Service-oriented Computing 1 . . . 158
25772- Service-oriented Computing 2 . . . 159
25774- Web Service Engineering . . . 160
25784- Management of IT-Projects . . . 161
25788- Strategic Management of Information Technology . . . 162
25810- Practical Seminar Knowledge Discovery . . . 163
25820- Lab Class Web Services . . . 164
25900- Management and Strategy . . . 165
25902- Managing Organizations . . . 166
25904- Organization Theory . . . 167
25907- Special Topics in Management: Management and IT . . . 168
25912- Value-Based Instruments of Corporate Strategy . . . 169
25915- Seminar: Management and Organization . . . 170
25916- Seminar: Management and Organization . . . 171
26291- Managing New Technologies . . . 172
26326- Enterprise Risk Management . . . 173

26328- Multidisciplinary Risk Research . . . 174
26353- International Risk Transfer . . . 175
26354- Risk Management of Microfinance and Private Households . . . 176
26355- Public Sector Risk Management . . . 177
26452- Management of Business Networks . . . 178
26454- eFinance: Information Engineering and Management for Securities Trading . . . 179
26456- Business Models in the Internet: Planning and Implementation . . . 180
26460- Market Engineering: Information in Institutions . . . 181
26466- eServices . . . 182
26468- Service Innovation . . . 183
26470- Seminar Service Science, Management & Engineering . . . 184
26478- Practical seminar Information Engineering and Management . . . 185
26484- Business and IT Service Management . . . 186
26502- Electronic Markets (Principles) . . . 187
26504- Electronic Markets: Institutions and Market Mechanisms . . . 189
26506- Personalization and Recommender Systems . . . 192
26508- Customer Relationship Management . . . 194
26510- Master Seminar in Information Engineering and Management . . . 195
26510p- Practical Course in Information Engineering and Management (Master) . . . 196
26518- Social Network Analysis in CRM . . . 197
26550- Derivatives . . . 199
26560- Fixed Income Securities . . . 200
26565- Credit Risk . . . 201
26580- Seminar in Financial Engineering . . . 202
CC- Cloud Computing . . . 203
SWT2- Software Engineering II . . . 204
SemIW- Seminar Information Engineering and Management . . . 205
TV- Transaction Management . . . 206
db_impl- Database Implementation and Tuning . . . 207
dbe- Deployment of Database Systems . . . 208
dbprakt- Practical Course Database Systems . . . 209
praktvd- Practical Course Distributed Data Management (former Practical Course Database Systems) 210
semis- Seminar Information Systems . . . 211
vert_dh- Distributed Data Management . . . 212
xAlgoEng- Algorithm Engineering . . . 213
xGraphAlgo- Graph Algorithms . . . 214
xParallAlgo- Parallel Algorithms . . . 215

7 Appendix: Study- and Examination Regulation (30/04/2006, in German) 217

Index 233

1 Structure of the Master Programme in Information Engineering and Management

The Master programme in *Information Engineering and Management* has 4 terms.
The terms 1 to 3 (7 - 9 when counting consecutively) of the programme 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, operations research, and law should be studied in the first two terms of the programme.
- The interdisciplinary seminar should be taken in the third term of the programme.
- 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 programme.
- The 4-th term (the 10-th term when counted consecutively) is reserved for the Master's thesis in which the student proves his ability for independent scientific research in informatics, the economic sciences, and law.

Figure 1 shows a summary of this recommendation with the structure of the disciplines and with credit points allocated to the modules of the programme.

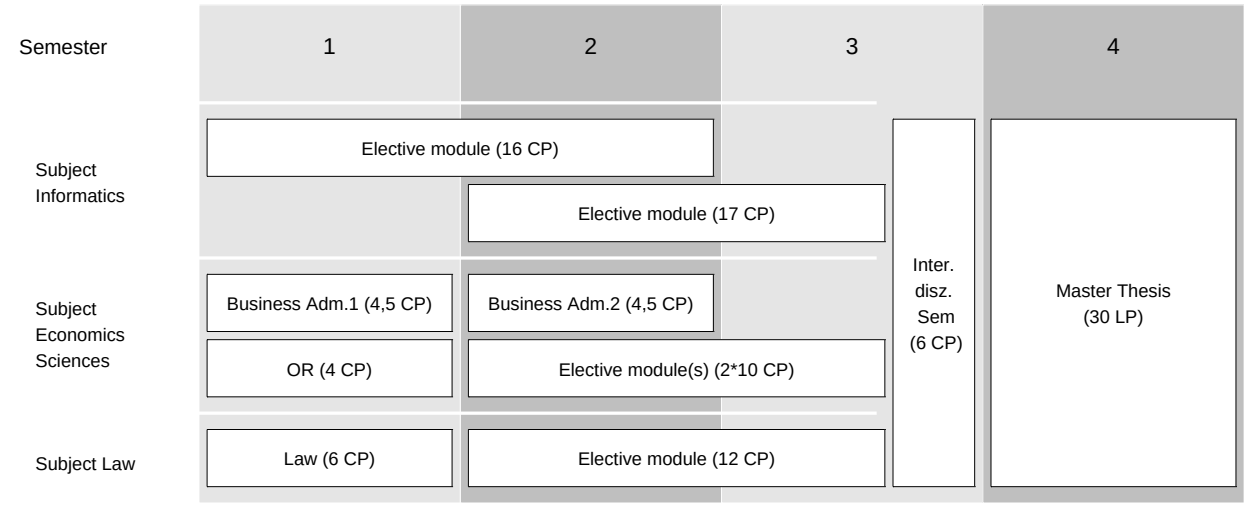


Abbildung 1: Structure of the Master Programme in Information Engineering and Management (Recommendation)

Mandatory Modules (25 CP)

The mandatory part of the programme consists of the following modules:

ModuleID	Module	Subject	Coordinator	CP
IW4WWIW1	Information Engineering and Management 1	Business Administration	Weinhardt	4.5
IW4WWIW2	Information Engineering and Management 2	Business Administration	Geyer-Schulz	4.5
IW4WWOR	Stochastic Models in Information Engineering and Management	Operations Research	Waldmann	4
IW4INJURA	Law	Law	Dreier	6
IW4IWSEM	Interdisziplinary Seminar		Dreier	6
	Summe			25

Tabelle 1: Mandatory Modules

Elective Modules: Business Administration/OR/Economics/Statistics

The elective programme in the economic sciences consists either of one module with 20 CP or 2 modules with 10 CP each, which must be selected from the following table:

ModulID	Module	Coordinator	CP
IW4WWIMSE	Information, Market, and Service Engineering	Weinhardt, Geyer-Schulz	20
IW4WWIMSE1	Information and Market Engineering	Weinhardt, Geyer-Schulz	10
IW4WWIMSE2	Service Engineering	Weinhardt, Geyer-Schulz	10
IW4WWSER1	Service Management	Weinhardt, Satzger	10
IW4WWFERM	Finance, Econometrics and Risk Management	Rachev, Uhrig-Homburg	20
IW4WWFERM1	Derivatives	Rachev, Uhrig-Homburg	10
IW4WWORM	Operative Risk Management	Werner	10
IW4WWMAR	Marketing	Gaul	20
IW4WWMAR1	Marketing Research	Gaul	10
IW4WWORG	Management and Organization	Lindstädt	20
IW4WWORG1	Management and Organization: Strategy and Leadership	Lindstädt	10
IW4WWSSMI	Stochastic and Strategic Models in Information Engineering and Management	Berninghaus, Waldmann	20
IW4WWSSMI1	Stochastic Models in Information Engineering and Management	Berninghaus, Waldmann	10
IW4WWSSMI2	Strategic Models in Information Engineering and Management	Berninghaus, Waldmann	10
IW4WWOQM	Operations- and Quality Management	Waldmann/Neumann	20
IW4WWOQM1	Management of Operations	Waldmann/Neumann	10
IW4WWOQM2	Qualitaty Management	Waldmann/Neumann	10

Tabelle 2: Elective Modules in the Economics Sciences

Elective Modules: Informatics

The student has to choose one module with 16 CP and one module with 17 CP from the following list of modules:

ModulID	Module	Coordinator	CP
IW4INECOLL	e-Collaboration	Oberweis	16
IW4INIAPP	Complex Internet-Applications	Schmeck	16
IW4INAALG	Advanced Algorithms	D. Wagner	16
IW4INLIKM	Large Scale Information and Knowledge Management	C. Böhm	17
IW4INSW	Large Scale Software Systems	Tichy	17
IW4INOS	Operating Systems	Bellosa	16
IW4INBP	Flexible Business Processes and Learning Organisations	Oberweis, Schmeck	17
IW4INNET	Advanced Infrastructures	Zitterbart	17
IW4INROB	Robotic	Dillmann	16
IW4INAUT	Automation Technologies	Wörn	16

Tabelle 3: Elective Modules: Informatics

Elective Modules: Law

The student can choose law modules with at least 12 CP from the following table 4:

ModulID	Module	Coordinator	CP
IW4INJURDIU	Law for the Information Company	Sester	12
IW4INJURDIG	Law for the Information Society	Kühling	12
IW4INJUINWI	Law for the Information Economy	Dreier	12

Tabelle 4: Elective Modules: Law

Notice

For all modules of this degree program, the following rules apply:

- The admission to the master programme in *Information Engineering and Managment* is the precondition for accessing any module of this degree programme.
- A single course can be included in only one module within the degree programme.
- A course may only be included in a module, if this course or a comparable course was not examined within a previous, completed study programme (e.g. bachelor in Information Engineering and Management).

2 Helpful information

Module Handbook

The programme exists of several **subjects** (e.g. business administration, economics, operations research). Every subject is split into **modules** and every module itself exists of one or more interrelated **courses**. 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 programme, 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 programme according to personal needs, interest and job perspective. The **module handbook** describes the modules belonging to the programme, their structure and extent (in CP), their dependencies, their learning outcomes, their learning control and examinations. Therefore it serves as a necessary orientation and as a helpful guide throughout the studies. The module handbook does not replace the **course catalogue**, which provides important information concerning each semester and variable course details (e.g. time and location of the course).

Begin and completion of a module

Every module and every course is allowed to be credited only once. The decision whether the course is assigned to one module or the other is made by the student at the time of signing in for the corresponding exam. The module is **succeeded**, if the general exam of the module and/or if all of its relevant partial exams have been passed (grade min 4.0).

General exams and partial exams

The module exam can be taken in a general exam or several partial exams. If the module exam is offered as a **general exam**, the entire content of the module will be reviewed in a single exam. If the module exam exists of **partial exams**, the content of each course will be reviewed in corresponding partial exams. The registration for the examinations in the bachelor programme takes place online via the self-service function for students. The following functions can be accessed on https://zvwgate.zvw.uni-karlsruhe.de/sb/ by means of the access information of the student card (FriCard):

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

For further and more detailed information also see https://zvwgate.zvw.uni-karlsruhe.de/download/leitfaden_studierende.pdf
For students of the master programme the registration currently takes place at the **advisory service** of the faculty or at the respective institutes. Further information available on http://www.wiwi.uni-karlsruhe.de/studium/pruefung/anabmelden/.

Repeating exams

Principally, a failed exam 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. Requests for a second repetition of an exam require the approval of the examination committee. A request for a second repetition has to be made without delay after loosing the examination claim. A counseling interview is mandatory. For further information see http://www.wiwi.uni-karlsruhe.de/studium/hinweise/.

Bonus accomplishments and additional accomplishments

Bonus accomplishments can be achieved on the basis of entire modules or within modules, if there are alternatives at choice. Bonus accomplishments can improve the module grade and overall grade by taking into account only the best possible combination of all courses when calculating the grades. The student has to declare a Bonus accomplishment as such at the time of registration for the exams. Exams, which have been registered as Bonus accomplishments, are subject to examination regulations. Therefore, a failed exam has to be repeated. Failing the repeat examination implies the loss of the examination claim.
Additional accomplishments are voluntarily taken exams, which have no impact on the overall grade of the student

and can take place on the level of single courses or on entire modules. It is also mandatory to declare an additional accomplishment as such at the time of registration for an exam. Up to 2 modules with a minimum of 9 CP may appear additionally in the certificate. After the approval of the examination committee, it is also possible to include modules in the certificate, which are not defined in the module handbook. Single additional courses will be recorded in the transcript of records. Courses and modules, which have been declared as bonus accomplishments, can be changed to additional accomplishments.

Further information

More detailed information about the legal and general conditions of the programme can be found in the examination regulation of the programme.

Used abbreviations

LP/CP	Credit Points/ECTS	Leistungspunkte/ECTS
LV	course	Lehrveranstaltung
RÜ	computing lab	Rechnerübung
S	summer term	Sommersemester
Sem.	semester/term	Semester
SPO	examination regulations	Studien- und Prüfungsordnung
SQ	key qualifikation	Schlüsselqualifikationen
SWS	contact hour	Semesterwochenstunde
Ü	excercise course	Übung
V	lecture	Vorlesung
W	winter term	Wintersemester

3 Actual Changes

Important changes are pointed out in this section in order to provide a better orientation. Although this process was done with great care, other/minor changes may exist.

3.1 Changes regarding modules

e-Collaboration [IW4INECOLL] (S. 22)

remarks

The lecture and *Computational Economics* [26458] is not offered any longer. Students, already taking part in this component examination within the module examination, are able to complete this module within this lecture.

System Software [IW4INOS] (S. 28)

remarks

The modul is offered in the winter term 2008/2009 for the last time. Students who have already started this particular modul can finish it regulary.

Software Systems [IW4INSW] (S. 29)

remarks

The lecture *Softwaretechnik* will not be offered after the summer term 09. The exam of the lecture will be offered in the summer term 2010 for the last time.

Operational Risik Management [IW4WWORM] (S. 45)

remarks

[...]
The lecture *Principles of Insurance Management* [25055] will be held additionally in the summer term 2009.

3.2 Changes regarding courses

Principles of Insurance Management [25055] (S. 110)

remarks

This lecture will be held additionally in the summer term 2009.

Algorithm Engineering [xAlgoEng] (S. 213)

remarks

The lecture will be offered again in the winter term 09/10.

Parallel Algorithms [xParallAlgo] (S. 215)

remarks

The lecture will be offered again in the winter term 09/10.

4 Mandatory Modules

4.1 All Subjects

Module: Information Engineering and Management 1 Module key: [IW4WWIW1]

Subject: Business Administration (obligatory)
Module coordination: Christof Weinhardt
Credit points (CP): 4.5

Learning Control / Examinations
The overall grade is determined by the result of the course “Principles of Information Engineering and Management”.

Prerequisites
None.

Conditions
The course “Principles of Information Engineering and Management” must be chosen.

Learning Outcomes
The compulsory module “Information Engineering and Management 1” introduces students to basic knowledge and skills in the field of Information Engineering and Management. 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
The module “Information Engineering and Management 1” comprises the lecture “Principles of Information Engineering and Management”. There, a clear distinction of information as a production, competitive, and economic good is introduced. The central role of information is explained through the concept of the “information lifecycle”. The single phases from existence/generation through allocation and evaluation until the distribution and usage of information are analyzed from the business administration perspective and the microeconomic perspective. 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.

Courses in module *Information Engineering and Management 1* [IW4WWIW1]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
26450	Principles of Information Engineering and Management (S. 53)	2/1	W	4,5	Weinhardt, Kraemer

Remarks
None.

Module: Information Engineering and Management 2 Module key: [IW4WWIW2]

Subject: Business Administration (obligatory)
Module coordination: Andreas Geyer-Schulz
Credit points (CP): 4.5

Learning Control / Examinations
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft and of assignments during the course as an "Erfolgskontrolle anderer Art" following §4, Abs. 2, 3 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
Basic knowledge from Operations Research (linear programming) and from decision theory are expected.

Conditions
None.

Learning Outcomes
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 the module *Information Engineering and Management 2*, 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.

Courses in module *Information Engineering and Management 2* [IW4WWIW2]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
26500	Business Administration in Information Engineering and Management (S. 51)	2/1	S	4,5	Geyer-Schulz

Module: Stochastic Models in Information Engineering and Management Module key: [IW4WWOR]

Subject: Operations Research (obligatory)
Module coordination: Karl-Heinz Waldmann
Credit points (CP): 4

Learning Control / Examinations
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

Prerequisites
None.

Conditions
None.

Learning Outcomes
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

Courses in module *Stochastic Models in Information Engineering and Management* [IW4WWOR]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25679	OR Methods and Models in Information Engineering and Management (S. 54)	2/1/2	W	4	Waldmann

Module: Contract Drafting and Internet Law — Module key: [IW4INJURA]

Subject: Law (obligatory)
Module coordination: Thomas Dreier
Credit points (CP): 6

Learning Control / Examinations
The assessment of this module consists of:

1. a written examination (§ 4(2), 1 of the SPO) for the course “Law of Contracts” (see also the transition rule until the winter semester 2008/9)
2. a written examination (§ 4(2), 1 of the SPO) for the course “Internet Law” (see also the transition rule until the winter semester 2008/9)

The grade of the module is a credits weighted average of the grades.

Prerequisites
The oblgatory module law builds upon the legal lectures of the bachelor study course. The courses can be followed parallel to the courses of the elective moduls.

Conditions
The courses of the oblgatory module law whall introduce the students to the most important areas of information law.

Learning Outcomes
The Students should be enabled to analyse and draft contracts, and to get acquainted with current legal issues that are raised by the use of the internet.

Content
The obligatory module law depends the understanding of students of the legal issues of the information society.

Courses in module *Contract Drafting and Internet Law* [IW4INJURA]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
24671	Law of Contracts (S. 56)	2/0	S	3	Sester
24501	Internet Law (S. 55)	2/0	S	3	Dreier

Remarks
Please note the following:
- During the transition period until the winter semester 2008/09 students can also replace the course “Law of Contracts” by the course “Computer contract law” (2 SWS, Semester: SS, 3 CP, lecturer Bartsch, Michael).

Module: Interdisciplinary Seminar — Module key: [IW4IWSEM]

Module coordination: Andreas Geyer-Schulz, Martina Zitterbart, Andreas Oberweis
Credit points (CP): 6

Learning Control / Examinations
The assessment in this module is regulated by § 4 (2) 3, of the examination regulation for the Master Information Engineering and Management. Further details will be defined for each interdisciplinary seminar separately.

Prerequisites
Students should have experience with literature search in informatics, economics, business administration, and law. They should know the methods of scientific work, presentation techniques for scientific presentations, as well as the form requirements of scientific publications (guide line for authors) and review processes for scientific publications.
The interdisciplinary seminar should be taken as last course of the compulsory program in the 3rd term of the Master programme.

Conditions
Regulated in §14 of the examination regulation for the Master programme Information Engineering and Management.

Learning Outcomes

- In the interdisciplinary seminar Information Engineering and Management students investigate a recent topic in Information Engineering and Management with the scientific methods of the disciplines of the the degree programme.
- They develop interdisciplinary solution approaches on the base of the state-of-the art in the disciplines.
- They present selected solution approaches and methods on an expert level and they defend and rationalize the selected solution approaches and methods in a discussion with scientific arguments.
- They write a seminar paper whose form is appropriate for a scientific journal.
- They revise their paper taking into account the reviews of their tutors in an appropriate manner.

Content
The Students will be coached by a group of tutors which consists in each case of an tutor of informatics, economics and law.

Courses in module *Interdisciplinary Seminar* [IW4IWSEM]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
26530	Interdisciplinary Seminar in Information Engineering and Management (S. 57)	2	W/S	6	Geyer-Schulz, Dreier

Remarks
Regulated in §14 of the examination regulation for the Master programme Information Engineering and Management.

Module: Master Thesis — Module key: [IW4IWMATHESIS]

Module coordination: Andreas Oberweis, Martina Zitterbart, Der Vorsitzende des Prüfungsausschusses
Credit points (CP): 30

Learning Control / Examinations
Examination by two examiners from the two faculties. For details refer to examination regulation.

Prerequisites
None.

Conditions
Regulated in §15 of the examination regulation.
The requirements for the examiner are described in §6 (2) of the examination regulation.

Learning Outcomes
The student

- investigates a topic in Information Engineering and Management autonomously in a scientific manner at the state-of-the-art of the research in the field.
- shows a comprehensive understanding of the methods and approaches relevant for the investigation of the topic chosen.
- selects appropriate scientific methods and he uses them in a correct way. If necessary, he modifies methods in a suitable way or he develops them.
- compares his results with competing approaches critically and he evaluates his results.
- communicates his results clearly and in a scientific form in his master thesis.

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 (Faculty of Informatics, Faculty of Economics and Business Engineering) 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 (Faculty of Informatics, Faculty of Economics and Business Engineering). 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.

5 Elective Modules

5.1 Informatics

Module: Advanced Algorithms — Module key: [IW4INAALG]

Subject: Informatics
Module coordination: Dorothea Wagner
Credit points (CP): 16 oder 17

Learning Control / Examinations
The assessment is described individually for each lecture within this module. The overall grade of the module will be the rounded average of the courses selected weighted by their respective credits.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The Student should be able to evaluate the computational complexity of problems from different fields and apply appropriate solution algorithms. Besides algorithm design and theoretical analysis of algorithms with respect to running time and space consumption also issues like parallelism, different models of computation, implementation and experimental evaluation should be taken into account.

Content
In this module, modern and efficient algorithms and their design and analysis are presented in the context of various applications such as visualization, networks, parallel algorithms, distributed algorithms, sensor- and ad-hoc networks, nature-oriented techniques, quantum computing, coding and computer algebra.

Courses in module *Advanced Algorithms* [IW4INAALG]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
24079	Algorithm Design (S. 63)	3/1	W	6	Wagner, Sanders
24171	Randomized Algorithms (S. 84)	2	W	4	Worsch
xAlgoEng	Algorithm Engineering (S. 213)	2	W/S	4	Sanders, Wagner
24621	Algorithms for Visualization of Graphs (S. 93)	2/1	S	5	Wagner, Nöllenburg
xGraphAlgo	Graph Algorithms (S. 214)	2	W/S	4	Wagner
xParallAlgo	Parallel Algorithms (S. 215)	2	W/S	4	Sanders
25708	Distributed Algorithms (S. 145)	3	W/S	5	Schmeck
25706	Nature-inspired Optimisation (S. 144)	2/1	W	5	Mostaghim
24622	Algorithms for Cellular Automata (S. 94)	2/1	S	5	Worsch
24079p	Practical Course in Algorithm Design (S. 64)	4	W/S	5	Sanders, Wagner
24614	Algorithms for Planar Graphs (S. 92)	2/1	S	5	Wagner, Rutter
24654	Algorithms for Ad-hoc and sensor networks (S. 101)	2	S	4	Katz

Remarks
Currently, the course *Graph Algorithms* is not lectured.

Module: e-Collaboration — Module key: [IW4INECOLL]

Subject: Informatics
Module coordination: Andreas Oberweis
Credit points (CP): 16 oder 17

Learning Control / Examinations
Students select courses with 16 or 17 ECTS credits in total.
The assessment mix of each course of this module is defined for each course separately. The final mark for the module is the average of the marks for each course weighted by the credits of the course.

Prerequisites
None.

Conditions
- A maximum of one seminar can be chosen.
- A maximum of one practical course can be chosen.

Learning Outcomes
Students can use languages and methods for planning and design of eCollaboration. They are able to evaluate, select and to use appropriate tools taking into account the current situation.

Content
e-Collaboration covers all forms of cooperation and coordination in electronic networks, and is practiced in many forms. The ubiquitous availability of new information and communication technologies in increasingly becoming smaller and more powerful devices enables new forms of eCollaboration. These will not only change the business world and public administration, but will also change fundamentally the private lives of people. This module teaches methodological foundations of applied computer science for eCollaboration applications covering languages for modelling of structured and unstructured processes of eCollaboration and methods for the design and analysis of eCollaboration scenarios. In addition, this module imparts knowledge of software systems to support eCollaboration (e.g., groupware systems, workflow management systems, document management systems).

Courses in module *e-Collaboration* [IW4INECOLL]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25724	Database Systems and XML (S. 147)	2/1	W	5	Oberweis
25735	Document Management and Groupware Systems (S. 148)	2	S	4	Klink
25702	Algorithms for Internet Applications (S. 141)	2/1	W	5	Schmeck
25750	Semantic Web Technologies II (S. 152)	2/1	S	5	Hitzler, Agarwal
25722	Distributed Database Systems: Basic Technology for e-Business (S. 146)	2/1	S	5	Oberweis
24626	Component Based Software Engineering (S. 96)	2	S	3	Reussner
25760	Complexity Management (S. 153)	2/1	S	5	Seese
25788	Strategic Management of Information Technology (S. 162)	2/1	S	5	Wolf
25784	Management of IT-Projects (S. 161)	2/1	S	4	Schätzle
25770	Service-oriented Computing 1 (S. 158)	2/1	W	5	Tai
25070s	Seminar in Applied Informatics (S. 112)	2	W/S	4	Oberweis, Schmeck, Seese, Stucky, Studer, Tai
25070p	Advanced Lab Applied Informatics (S. 111)	2	W/S	5	Oberweis, Schmeck, Seese, Stucky, Studer, Tai
25764	IT Complexity in Practice (S. 157)	1/1	W	3	Kreidler

Remarks
The lecture and *Computational Economics* [26458] is not offered any longer. Students, already taking part in this component examination within the module examination, are able to complete this module within this lecture.

Module: Complex Internet Applications — Module key: [IW4INIAPP]

Subject: Informatics
Module coordination: Hartmut Schmeck
Credit points (CP): 16

Learning Control / Examinations
The control of success is discribed in the lectures of this module.
The final mark for the module is the average of the marks for each course weighted by the credits of the course.

Prerequisites
None.

Conditions
Selected courses have to add up to at least 16 or 17 credit points.
Besides the listed courses you may choose a seminar or advanced lab on the topics of this module offered by one the participating lecturers.

Learning Outcomes
The Student should become acquainted with challinging internet technology applications, and should be able to apply useful tools and techniques to design an internet application, according to the requirement of a concrete section of application.

Content
The lectures of this module, procure diverse knowlege about current techniques to configurate challinging applications in the internet and world wide web.

Courses in module *Complex Internet Applications* [IW4INIAPP]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
24153/24604	Advanced Web Applications (S. 80)	2/0	W/S	4	Abeck
25702	Algorithms for Internet Applications (S. 141)	2/1	W	5	Schmeck
24146	Ubiquitous Computing (S. 78)	2/0	W	4	Juling
25748	Semantic Web Technologies I (S. 151)	2/1	W	5	Studer, Hitzler, Rudolph, Rudolph
25750	Semantic Web Technologies II (S. 152)	2/1	S	5	Hitzler, Agarwal
24304	Practical Course: Web Technologies (S. 86)	2/0	W/S	4	Abeck
25704	Organic Computing (S. 142)	2/1	S	5	Schmeck, Mostaghim
24124	Web Engineering (S. 72)	2/1	W	4	Nußbaumer
24149	Network and IT-Security Management (S. 79)	2/1	W	5	Hartenstein

Remarks
The list of lectures is temporarily.

Module: Large-Scale Information and Knowledge Management Module key: [IW4INLIKM]

Subject: Informatics
Module coordination: Klemens Böhm
Credit points (CP): 16 oder 17

Learning Control / Examinations
The assessment is described individually for each lecture within this module. The overall grade of the module will be the rounded average of the courses selected weighted by their respective credits.

Prerequisites
This module presupposes knowledge on database systems and knowledge management, such as the content of lectures “Communications and Database Systems” and “Knowledge Management”. The courses in this module assume the following basic knowledge: data models, database design, relational algebra, database-application development and declarative query languages, transactions, ontology-based knowledge management, information retrieval, intelligent document management, communities of practice, skill management, personal knowledge management and case-based reasoning (CBR).
The students are strongly advised to select this module only if they are familiar with the topics mentioned. Alternatively, it is advised to select the module “Advanced Concepts of Information and Knowledge Management” which does not presuppose this knowledge.

Conditions
- This module cannot be chosen in combination with module “Advanced Concepts of Information and Knowledge Management”.
- At least one of the following lectures have to be selected: “Deployment of Database Systems”, “Data Warehousing and Mining”, “Database Implementation and Tuning”.
- No course can be chosen which has been absolved in the undergraduate studies
- Maximally one seminar can be chosen.
- Maximally one practical course can be chosen.
- You may not choose both “Data Warehousing and Mining” and “Knowledge Discovery”, only one of the two. Further, it is not possible to choose one of these lectures if you have chosen the other one within another module.

Learning Outcomes
The students should
- be able to work scientifically in the field of information and knowledge management and know the different aspects of this field,
- be able to develop complex database applications on their own,
- be able to manage and lead projects of unpredictable complexity in the field of information and knowledge management
- be able to explain and discuss non-trivial aspects of the topics covered in this module with other experts and people without a deep knowledge of information and knowledge management.

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

Courses in module *Large-Scale Information and Knowledge Management* [IW4INLIKM]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
dbe	Deployment of Database Systems (S. 208)	2/1	W	5	Böhm
24118	Data Warehousing and Mining (S. 70)	2/1	W	5	Böhm
vert_dh	Distributed Data Management (S. 212)	2/1	W	5	Böhm
db_impl	Database Implementation and Tuning (S. 207)	2/1	S	5	Böhm
24111	Workflow Management Systems (S. 68)	2	W	3	Mülle
24141	Information Integration and Web Portals (S. 77)	2	W	3	Mülle
25742	Knowledge Discovery (S. 150)	2/1	W	5	Studer
semis	Seminar Information Systems (S. 211)	2	W/S	4	Böhm
25810	Practical Seminar Knowledge Discovery (S. 163)	2	S	4	Studer
dbprakt	Practical Course Database Systems (S. 209)	2	W	4	Böhm
24874	Practical Course Data Warehousing and Mining (S. 109)	2	S	4	Böhm
praktvd	Practical Course Distributed Data Management (former Practical Course Database Systems) (S. 210)	2	W	4	Böhm
TV	Transaction Management (S. 206)	2/1		5	Böhm
24605	Datenschutz und Privatheit in vernetzten Informationssystemen (S. 90)	2	S	3	Buchmann
24156	Moving Objects Databases (S. 81)	2	W	3	Böhm

Module: Advanced Concepts of Information and Knowledge Management [IW4INLIKM1] Module key:

Subject: Informatics
Module coordination: Klemens Böhm
Credit points (CP): 16 oder 17

Learning Control / Examinations
The assessment is described individually for each lecture within this module. The overall grade of the module will be the rounded average of the courses selected weighted by their respective credits.

Prerequisites
None.

Conditions

- This module cannot be chosen in combination with module “Large-Scale Information and Knowledge Management”.
- The lectures “Communications and Database Systems” and “Knowledge Management” have to be selected if they have not yet been selected and assessed.
- Maximally one seminar can be chosen.
- Maximally one practical course can be chosen.
- You may not choose both “Data Warehousing and Mining” and “Knowledge Discovery”, only one of the two. Further, it is not possible to choose one of these lectures if you have chosen the other one within another module.

Learning Outcomes
The students should

- be able to work scientifically in the field of information and knowledge management and know the different aspects of this field,
- be able to develop complex database applications on their own,
- be able to manage and lead projects of unpredictable complexity in the field of information and knowledge management,
- be able to explain and discuss non-trivial aspects of the topics covered in this module with other experts and people without a deep knowledge of information and knowledge management.

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

Courses in module *Advanced Concepts of Information and Knowledge Management* [IW4INLIKM1]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
24574	Communication and Database Systems (S. 88)	4/2	S	4/8	Böhm, Zitterbart
25740	Knowledge Management (S. 149)	2/1	W	5	Studer
24118	Data Warehousing and Mining (S. 70)	2/1	W	5	Böhm
vert_dh	Distributed Data Management (S. 212)	2/1	W	5	Böhm
db_impl	Database Implementation and Tuning (S. 207)	2/1	S	5	Böhm
24111	Workflow Management Systems (S. 68)	2	W	3	Mülle
25742	Knowledge Discovery (S. 150)	2/1	W	5	Studer
25762	Intelligent Systems in Finance (S. 155)	2/1	S	5	Seese
semis	Seminar Information Systems (S. 211)	2	W/S	4	Böhm
25810	Practical Seminar Knowledge Discovery (S. 163)	2	S	4	Studer
24874	Practical Course Data Warehousing and Mining (S. 109)	2	S	4	Böhm
TV	Transaction Management (S. 206)	2/1		5	Böhm
24605	Datenschutz und Privatheit in vernetzten Informationssystemen (S. 90)	2	S	3	Buchmann

Module: Advanced Infrastructures — Module key: [IW4INNET]

Subject: Informatics
Module coordination: Martina Zitterbart
Credit points (CP): 16 oder 17

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 of the course.

Prerequisites
None.

Conditions
Courses for at least 16 or 17 credits have to be passed.

- One of the following lectures is mandatory if none of them has been attended for a Bachelor´s degree: the communication part (K-Teil) of the lecture *Communication and Database Systems* [24574] (4 CP) or the lecture *Telematics for Information Management and Engineering* [24074].
- The lecture *Telematics* [24128] is mandatory if it has not been attended for a Bachelor´s degree.
- The student can choose from the following lectures: *Multimedia Communication* [24132], *Next Generation Internet* [24674], *Mobile Communication* [24643], *Network Security: Architectures and Protocols* [24601], *High Speed Communication* [24110], *Network and IT Security Management* [24149], *Simulation of Computer Networks* [24669], *Ubiquitous Information Technologies* [24146], *Wireless Sensor-Actuator-Networks* [24104].
- A seminar or a practical work in the field of Telematics has to be attended (but not more than one).

Learning Outcomes
Students shall

- know design principles of communication systems and be able to apply them in a new context, but also to identify their weaknesses.
- be able to assess the performance of protocols, networks, and architectures.
- master advanced protocols, architectures, and algorithms of communication networks.

Content
This module discusses different aspects of communication networks in great detail. Besides the requirements of multimedia supporting, mobile and secure communication, this includes the controllability and practicability of large-scale communication networks and communication systems. An important focus lies in the ability to assess and handle deployed architectures, protocols, and algorithms. Current and future developments of telematics make up an important part of the courses in this module.

Courses in module *Advanced Infrastructures* [IW4INNET]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
24574	Communication and Database Systems (S. 88)	4/2	S	4/8	Böhm, Zitterbart
24074	Telematics for Information Management and Engineering (S. 59)	2/1	W	4	Juling
24128	Telematics (S. 74)	2/1	W	4	Zitterbart
24132	Multimedia Communication (S. 75)	2/0	W	4	Bless
24674	Next Generation Internet (S. 107)	2/0	S	4	Bless
24643	Mobile Communication (S. 98)	2/0	S	4	Zitterbart, Waldhorst
24601	Network Security: Architectures and Protocols (S. 89)	2/0	S	4	Zitterbart, Völker, Schöller
24149	Network and IT-Security Management (S. 79)	2/1	W	5	Hartenstein
24110	High Performance Communication (S. 67)	2/0	W	4	Zitterbart
24669	Simulation of Computer Networks (S. 106)	2/0	S	4	Hartenstein
24146	Ubiquitous Computing (S. 78)	2/0	W	4	Juling
24104	Wireless Sensor-Actuator-Networks (S. 66)	2/0	W	4	Zitterbart
24074s	Seminar in Telematics (S. 61)	2	W/S	4	Zitterbart, Hartenstein
24074p	Practical Course in Telematics (S. 60)	2	W/S	5	Zitterbart, Hartenstein

Remarks
A course can only be taken for credit, if this course or a similar one has not already been taken for credit for a Bachelor´s degree.

Module: System Software — Module key: [IW4INOS]

Subject: Informatics
Module coordination: Frank Bellosa
Credit points (CP): 16 oder 17

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 of the course.

Prerequisites
None.

Conditions

- The lecture Systemarchitektur [24071] has to be taken for credit if the lecture or a similar one was not taken for credit for a Bachelor´s degree.
- A seminar or a practical work of the area system architecture has to be taken for credit. (but not both).
- The practical work Powermanagement [24181] can only be visited in combination with the lecture on Power Management [24127].

Learning Outcomes
The student is familiar with

- common system architectures and components.
- basic mechanisms and policies of operating and runtime systems.
- requirements and solutions for parallel, distributed and energy critical systems.

Content
The module “System Software” presents various concepts, how to design and implement operating and runtime systems according to various objectives. The impact of design decisions on the performance will be predicted and evaluated.
The following topics will be covered: processes, address space and domains, synchronization, communication and cooperation on shared data, temporary and persistent data, methods of resource management. Non only individual system components are discussed, but also the interaction of these components and the impact of the interference of components on the behavior of the whole system.
Requirements and solutions for parallel, distributed and energy critical systems will be covered. Techniques and applications of multi-core systems and computing clusters will be discussed.

Courses in module *System Software* [IW4INOS]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
24071	System Architecture (S. 58)	4/2	W	8	Liefländer
24372s	Advanced Systems - Seminar (S. 87)	2	W	4	Bellosa
24112	Multicore Computers and Computer Clusters (S. 69)	2	W	4	Tichy
24127	Power Management (S. 73)	2	W	3	Bellosa
24181	Power Management Praktikum (S. 85)	2	W	3	Bellosa, Andreas Merkel

Remarks
The modul is offered in the winter term 2008/2009 for the last time. Students who have already started this particular modul can finish it regulary.

Module: Software Systems — Module key: [IW4INSW]

Subject: Informatics
Module coordination: Walter F. Tichy, Ralf Reussner
Credit points (CP): 16 oder 17

Learning Control / Examinations
See the assessment of each course of this module. The overall grade is computed by weighting the grade of each course with its credits and computing the average of the weighted grades.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The student will be enabled to systematically plan, build and maintain large software systems. To this end, suitable methods and tools will be presented.

Content
Subject of the module is the planing, development, and maintenance of large software systems.

Courses in module *Software Systems* [IW4INSW]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
24075	Software Architecture (S. 62)	2	W	4	Reussner
24626	Component Based Software Engineering (S. 96)	2	S	3	Reussner
24112	Multicore Computers and Computer Clusters (S. 69)	2	W	4	Tichy
24660	Software Development for modern, parallel platforms (S. 102)	2	S	3	Tichy, Pankratius
24625	Model Driven Software Development (S. 95)	2	S	4	Reussner
SWT2	Software Engineering II (S. 204)	3/1	W	6	Reussner, Tichy

Remarks
The lecture *Softwaretechnik* will not be offered after the summer term 09. The exam of the lecture will be offered in the summer term 2010 for the last time.

Module: Service Technologies — Module key: [IW4INSER]

Subject: Informatics
Module coordination: Stefan Tai
Credit points (CP): 17

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 of the course.

Prerequisites
None.

Conditions
The course *Service-oriented Computing 1* [25770] has to be attended.
It is recommended to combine the module *Service Technologies* with the modules *Service Engineering* and *Service Management*.

Learning Outcomes
The module introduces methods and technologies for implementing service-oriented architectures. Students will be able to structure, design, and engineer modern, Web-based service-oriented systems for enterprises and for business networks. Students will acquire knowledge about current standards and tools.

Content
The module Service Technologies covers knowledge about designing and implementing service-oriented architectures. In this context several different aspects are considered:

- The modules introduces basic concepts of a service-oriented architecture and discusses differences to traditional software development.
- The module introduces technologies for implementing service-oriented architectures, including technical standards in the area of Web Services. In addition, an overview of existing development methodologies and tools is given.
- The module introduces technologies for improving collaboration between service requesters and providers, and it gives use cases for applying these technologies.
- Concepts and technologies for the distributed realization of highly scalable Web Services are presented.

Courses in module *Service Technologies* [IW4INSER]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25770	Service-oriented Computing 1 (S. 158)	2/1	W	5	Tai
25772	Service-oriented Computing 2 (S. 159)	2/1	S	5	Tai, Studer
CC	Cloud Computing (S. 203)	2/1	W	5	Tai, Juling, Kunze
25774	Web Service Engineering (S. 160)	2/1	S	5	Zirpins
26470	Seminar Service Science, Management & Engineering (S. 184)	2	W/S	4	Tai
25820	Lab Class Web Services (S. 164)	2	W	4	Tai, Studer, Satzger, Zirpins

5.2 Economic Sciences

Module: Finance, Econometrics, and Risk Management Module key: [IW4WWFERM]

Subject: Economic Scienes
Module coordination: Svetlozar Rachev, Marliese Uhrig-Homburg
Credit points (CP): 20

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 of the course.

Prerequisites
None.

Conditions
The module consists of four courses:

- The lecture Financial Time Series and Econometrics [25359] is obligatory.
- From the lectures *Derivatives* [26560] and *Credit Risk* [26565], one must be chosen.
- Two more lectures from the course list must be selected that have not been chosen yet.

Learning Outcomes
See lecture descriptions.

Content
See lecture descriptions.

Courses in module *Finance, Econometrics, and Risk Management* [IW4WWFERM]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25359	Financial Time Series and Econometrics (S. 130)	2/1	W	5	Rachev
26550	Derivatives (S. 199)	2/1	S	5	Uhrig-Homburg
26565	Credit Risk (S. 201)	2/1	W	5	Uhrig-Homburg
25331	Stochastic Calculus and Finance (S. 127)	2/1	W	5	Rachev
25381	Advanced Econometrics of Financial Markets (S. 132)	2/1	S	5	Rachev
26560	Fixed Income Securities (S. 200)	2/1	W	5	Uhrig-Homburg
25357	Portfolio and Asset Liability Management (S. 129)	2/1	S	5	Rachev
25353	Statistical Methods in Financial Risk Management (S. 128)	2/1	W	5	Rachev
26580	Seminar in Financial Engineering (S. 202)	2	W	3	Uhrig-Homburg

Remarks

- From the summer term 2008 on, *Derivates* will be lectured during the summer term.
- From the summer term 2008 on, *Fixed Income Securities* will be lectured during the winter term.
- From the winter term 2008/2009 on, *Credit Risk* will be lectured during the winter term.

From the winter term 2008/2009 on, these lectures will be offered in a different form, thereby leading to a reduction of CP.

Module: Information, Market, and Service Engineering Module key: [IW4WWIMSE]

Subject: Economic Scienes
Module coordination: Andreas Geyer-Schulz, Christof Weinhardt
Credit points (CP): 20

Learning Control / Examinations
The assessment is described for every course in this module. The overall score of the module is composed of the single scores of the courses weighted with their credits.

Prerequisites
None.

Conditions

- The course *Market Engineering* [26460] has to be attended.
- No more than two of the courses *Management of Business Networks* [26452], *eFinance: Information Engineering and Management for Securities Trading* [26454] and *Customer Relationship Management* [26508] can be selected.
- The course [26510p] could only be selected additionally to the course [26510].
- The practical seminar [26478] is a supplement to the course seminar Information Engineering and Management [SemIW] and itcan only be chosen in conjunction with the course [26474].

Learning Outcomes
The student should learn to

- understand and analyze the role of information with its distinct facets (as digital information good, as competitive factor,...) and their impacts on entrepreneurial behaviour and economic developments
- develop and implement new products, services and markets in consideration of the technological progresses of information and communication technology and the increasing economic networking
- restructure and develop new business processes under those conditions
- design and construct innovative business models and new forms of organisation in companies and company networks
- understand and analyze the emergence of new forms of competition

Content
The module Information, Market, and Service Engineering treats different aspects of information (digitial economic good, competitive factor, ...) and puts them into a business and economic context. Furthermore, this module addresses the challenges of creating new kinds of products, services, markets, and market information services in the context of new developed information and communication technologies. These developments offer the opportunity to develop new and innovative business processes, business models, forms of organization, markets, and competition. These issues are addressed in the courses of this module.

Courses in module *Information, Market, and Service Engineering* [IW4WWIMSE]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
26460	Market Engineering: Information in Institutions (S. 181)	2/1	S	5	Weinhardt, Kraemer
26452	Management of Business Networks (S. 178)	2/1	W	5	Weinhardt, Kraemer
26454	eFinance: Information Engineering and Management for Securities Trading (S. 179)	2/1	W	5	Weinhardt, Riordan
26456	Business Models in the Internet: Planning and Implementation (S. 180)	2/1	S	5	Weinhardt, Holtmann
26502	Electronic Markets (Principles) (S. 187)	2/1	W	5	Geyer-Schulz
26504	Electronic Markets: Institutions and Market Mechanisms (S. 189)	2/1	S	5	Geyer-Schulz
26508	Customer Relationship Management (S. 194)	2/1	W	5	Geyer-Schulz
26506	Personalization and Recommender Systems (S. 192)	2/1	S	5	Geyer-Schulz
26518	Social Network Analysis in CRM (S. 197)	2/1	W/S	5	Hoser
26510	Master Seminar in Information Engineering and Management (S. 195)	2	W	3	Geyer-Schulz
26510p	Practical Course in Information Engineering and Management (Master) (S. 196)	0*	W	2	Geyer-Schulz
SemIW	Seminar Information Engineering and Management (S. 205)	2	W/S	4	Weinhardt
26478	Practical seminar Information Engineering and Management (S. 185)	0*	W/S	1	Weinhardt

Remarks
None.

Module: Information and Market Engineering — Module key: [IW4WWIMSE1]

Subject: Economic Scienes
Module coordination: Christof Weinhardt, Andreas Geyer-Schulz
Credit points (CP): 10

Learning Control / Examinations
The assessment is described for every course in this module. The overall score of the module is composed of the single scores of the courses weighted with their credits.

Prerequisites
None.

Conditions

- The course *Market Engineering* [26460] has to be attended.
- The course [26510p] could only be selected additionally to the course [26510].
- The practical seminar [26478] is a supplement to the course seminar Information Engineering and Management [26474] and itcan only be chosen in conjunction with the course [26474].

Learning Outcomes
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
- restructure and develop new business processes in markets under those conditions
- design and construct innovative business models and new forms of organisation for market provider or networks of market provider

Content
The courses of this module addresses the challenges of creating new kinds of markets and market information services in the context of new developed information and communication technologies. Innovative business processes, business models, form of organization and competition on and between market platforms are the major topics.

Courses in module *Information and Market Engineering* [IW4WWIMSE1]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
26460	Market Engineering: Information in Institutions (S. 181)	2/1	S	5	Weinhardt, Kraemer
26454	eFinance: Information Engineering and Management for Securities Trading (S. 179)	2/1	W	5	Weinhardt, Riordan
26502	Electronic Markets (Principles) (S. 187)	2/1	W	5	Geyer-Schulz
26504	Electronic Markets: Institutions and Market Mechanisms (S. 189)	2/1	S	5	Geyer-Schulz
26510	Master Seminar in Information Engineering and Management (S. 195)	2	W	3	Geyer-Schulz
26510p	Practical Course in Information Engineering and Management (Master) (S. 196)	0*	W	2	Geyer-Schulz
SemIW	Seminar Information Engineering and Management (S. 205)	2	W/S	4	Weinhardt
26478	Practical seminar Information Engineering and Management (S. 185)	0*	W/S	1	Weinhardt

Remarks
None.

Module: Service Engineering — Module key: [IW4WWIMSE2]

Subject: Economic Scienes
Module coordination: Christof Weinhardt, Andreas Geyer-Schulz
Credit points (CP): 10

Learning Control / Examinations
The assessment is described for every course in this module. The overall score of the module is composed of the single scores of the courses weighted with their credits.

Prerequisites
None.

Conditions

- It is recommended to combine the module *Service Engineering* with the module *Service Management* and the computer science module *Service Technologies*.
- It is recommended to attend course *Customer Relationship Management* [26508], if it has not already been attended during the bachelor studies.
- The course [26510p] could only be selected additionally to the course [26510].
- The practical seminar [26478] is a supplement to the course seminar Information Engineering and Management [26474] and itcan only be chosen in conjunction with the course [26474].

Learning Outcomes
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
- 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.

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. Real-world examples from e-Finance, personalized services, recommender systems and social platforms are presented in the courses.

Courses in module *Service Engineering* [IW4WWIMSE2]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
26508	Customer Relationship Management (S. 194)	2/1	W	5	Geyer-Schulz
26456	Business Models in the Internet: Planning and Implementation (S. 180)	2/1	S	5	Weinhardt, Holtmann
26460	Market Engineering: Information in Institutions (S. 181)	2/1	S	5	Weinhardt, Kraemer
26506	Personalization and Recommender Systems (S. 192)	2/1	S	5	Geyer-Schulz
26518	Social Network Analysis in CRM (S. 197)	2/1	W/S	5	Hoser
26510	Master Seminar in Information Engineering and Management (S. 195)	2	W	3	Geyer-Schulz
26510p	Practical Course in Information Engineering and Management (Master) (S. 196)	0*	W	2	Geyer-Schulz
SemIW	Seminar Information Engineering and Management (S. 205)	2	W/S	4	Weinhardt
26478	Practical seminar Information Engineering and Management (S. 185)	0*	W/S	1	Weinhardt
26470	Seminar Service Science, Management & Engineering (S. 184)	2	W/S	4	Tai

Remarks
None.

Module: Service Management — Module key: [IW4WWSER1]

Subject: Economic Scienes
Module coordination: Gerhard Satzger, Christof Weinhardt
Credit points (CP): 10

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 of the course.

Prerequisites
None.

Conditions

- The course *Business and IT Service Management* [26484] is mandatory.
- It is recommended to attend course *eServices* [26466], if it has not already been attended during the bachelor studies.
-
- The *practical seminar* [26478] is a supplement to the course *seminar Information Engineering and Management* [SemIW] and it can only be chosen in conjunction with the course.

Learning Outcomes
The student should learn to

- understand the basics of developing and managing IT-based services,
- understand and apply OR methods in service management,
- analyze and develop supply chain networks, 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 analyze and develop supply chain networks as well as to understand and analyze innovation processes in corporations. Current examples from research and industry demonstrate the relevance of the topics discussed in this module.

Courses in module *Service Management* [IW4WWSER1]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
26484	Business and IT Service Management (S. 186)	2/1	W	5	Satzger
26466	eServices (S. 182)	2/1	S	5	Weinhardt, Satzger
26452	Management of Business Networks (S. 178)	2/1	W	5	Weinhardt, Kraemer
25598	Operations Management (S. 133)	3	W	5	Schön
26468	Service Innovation (S. 183)	2/1	S	5	Satzger, Neus
26470	Seminar Service Science, Management & Engineering (S. 184)	2	W/S	4	Tai
SemIW	Seminar Information Engineering and Management (S. 205)	2	W/S	4	Weinhardt
26478	Practical seminar Information Engineering and Management (S. 185)	0*	W/S	1	Weinhardt

Module: Marketing

Module key: [IW4WWMAR]

Subject: Economic Scienes
Module coordination: Wolfgang Gaul
Credit points (CP): 20

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Courses in module *Marketing* [IW4WWMAR]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25154	Modern Market Research (S. 113)	2/1	S	5	Gaul
25156	Marketing and Operations Research (S. 114)	2/1	S	5	Gaul
25158	Corporate Planning and Operations Research (S. 115)	2/1	W	5	Gaul
25171	Data Analysis and Operations Research (S. 123)	2/1	W	5	Gaul
25160	e-Business & electronic Marketing (S. 116)	1	S	2,5	Gaul
25162	Information Technology and Business Information (S. 117)	2/1	S	5	Neibecker
25164	International Marketing (S. 118)	1	S	2,5	Gaul
25165	Marketing and Innovation (S. 119)	1/1	W	2,5	Gaul
25166	Strategic and Innovative Decision Making in Marketing (S. 120)	2/1	S	5	Neibecker
25167	Behavioral Approaches in Marketing (S. 121)	2/1	W	5	Neibecker
25170	Entrepreneurship and Marketing (S. 122)	1/1	W	2,5	Gaul
25192	Master Seminar in Marketing (S. 124)	2	W/S	4	Gaul

Module: Marketing Research

Module key: [IW4WWMAR1]

Subject: Economic Scienes
Module coordination: Wolfgang Gaul
Credit points (CP): 10

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Courses in module *Marketing Research* [IW4WWMAR1]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25154	Modern Market Research (S. 113)	2/1	S	5	Gaul
25171	Data Analysis and Operations Research (S. 123)	2/1	W	5	Gaul
25156	Marketing and Operations Research (S. 114)	2/1	S	5	Gaul
25158	Corporate Planning and Operations Research (S. 115)	2/1	W	5	Gaul
25160	e-Business & electronic Marketing (S. 116)	1	S	2,5	Gaul
25164	International Marketing (S. 118)	1	S	2,5	Gaul
25165	Marketing and Innovation (S. 119)	1/1	W	2,5	Gaul
25170	Entrepreneurship and Marketing (S. 122)	1/1	W	2,5	Gaul
25193	Master Seminar zu Marktforschung (S. 125)	2	S	4	Gaul

Module: Quantitative Marketing and OR

Module key: [IW4WWMAR2]

Subject: Economic Scienes
Module coordination: Wolfgang Gaul
Credit points (CP): 10

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Courses in module *Quantitative Marketing and OR* [IW4WWMAR2]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25154	Modern Market Research (S. 113)	2/1	S	5	Gaul
25156	Marketing and Operations Research (S. 114)	2/1	S	5	Gaul
25158	Corporate Planning and Operations Research (S. 115)	2/1	W	5	Gaul
25171	Data Analysis and Operations Research (S. 123)	2/1	W	5	Gaul
25194	Master Seminar in Quantitative Marketing and OR (S. 126)	2	S	4	Gaul

Module: Behavioral Approaches in Marketing and Data Analysis [IW4WWMAR3] Module key:

Subject: Economic Scienes
Module coordination: Bruno Neibecker
Credit points (CP): 10

Learning Control / Examinations
Assessment consist of a written module exam according to §4 Abs. 2, Nr. 1 of the Prüfungsordnung für Informationswirtschaft. The module exam has a duration of 120 min. and contains topics from the main lecture [25167] as well as from one of the chosen lectures [25154] and [25162].
The final mark for the module is the average of the marks for each course weighted by the credits of the course.

Prerequisites
None.

Conditions
- The lecture *Behavioral Approaches in Marketing* [25167] has to be attended.
- From the lectures *Modern Market Research* [25154] and *Information Technology and Business Information* [25162], one must be attended.
- At least 9 CP must be achieved.

Learning Outcomes
- To specify the key terms in marketing and communication management
- To identify and define theoretical constructs in marketing communication, based on behavioral theory
- To indentify the main research trends
- To analyze and interpret high level academic articles
- To learn interactive skills to work in teams and to follow a goal-oriented approach
- To gain understanding of methodological research to develop concrete plans for marketing decision-making

Content
Consumer behavior approaches in Marketing are seen as an important research area with a consumer-based perspective including a strong interdisciplinary and empirical orientation. My goal was to create a marketing module that presents a balanced coverage of both qualitative and quantitative material. That is, a practical, managerial perspective is discussed in relation to psychological, sociological and physiological (neuromarketing) approaches. It is examined how the individual receives information from his or her environment and how this material is learned, stored in memory, and used to form attitudes and to make decisions. A conprehensive understanding of marketing research and marketing data analysis is provided throughout the module, as for example in market segmentation or the definition of a target market a company decides to pursue.

Courses in module *Behavioral Approaches in Marketing and Data Analysis* [IW4WWMAR3]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25167	Behavioral Approaches in Marketing (S. 121)	2/1	W	5	Neibecker
25154	Modern Market Research (S. 113)	2/1	S	5	Gaul
25162	Information Technology and Business Information (S. 117)	2/1	S	5	Neibecker

Module: Strategy, Innovation and Data Analysis — Module key: [IW4WWMAR4]

Subject: Economic Scienes
Module coordination: Bruno Neibecker
Credit points (CP): 10

Learning Control / Examinations
Assessment consist of a written module exam according to §4 Abs. 2, Nr. 1 of the Prüfungsordnung für Informationswirtschaft. The module exam has a duration of 120 min. and contains topics from the main lecture [25166] as well as from one of the chosen lectures [25154] and [25162].
The final mark for the module is the average of the marks for each course weighted by the credits of the course.

Prerequisites
None.

Conditions
- The lecture *Strategic and Innovative Decision Making in Marketing* [25166] has to be attended.
- From the lectures *Modern Market Research* [25154] and *Information Technology and Business Information* [25162], one must be attended.
- At least 9 CP must be achieved.

Learning Outcomes
- To specify the key terms in strategic management and innovation research, based on methodological and behavioral approaches
- To apply statistical tools to analyze and interpret case specific problems in marketing
- To indentify the main research trends
- To analyze and interpret high level academic articles
- To learn interactive skills to work in teams and to follow a goal-oriented approach
- To gain understanding of methodological research to develop concrete plans for marketing decision-making

Content
The 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 success factors 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.

Courses in module *Strategy, Innovation and Data Analysis* [IW4WWMAR4]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25166	Strategic and Innovative Decision Making in Marketing (S. 120)	2/1	S	5	Neibecker
25154	Modern Market Research (S. 113)	2/1	S	5	Gaul
25162	Information Technology and Business Information (S. 117)	2/1	S	5	Neibecker

Module: Stochastic Methods in Economics and Engineering Module key: [IW4WWOQM1]

Subject: Economic Scienes
Module coordination: Karl-Heinz Waldmann
Credit points (CP): 10

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 of the course.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The students aquire the ability to master the modern use of statistical methods for quality control and improvement. This includes a sound understanding of the principles and the basis for applying those principles in a wide variety of both product and nonproduct situations.

Content
The courses Statistical Quality Control I and II are about the modern use of statistical methods for quality control and improvement. Main topics are statistical process control, acceptance sampling, process design and improvement with designed experiments, reliability theory. The course optimization in a random environment deals with the quantitative analysis of selected problems arising in economics, engineering, and applied sciences.

Courses in module *Stochastic Methods in Economics and Engineering* [IW4WWOQM1]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25656	Quality Management I (S. 135)	2/1/2	W/S	5	Waldmann
25659	Quality Management II (S. 136)	2/1/2	W/S	5	Waldmann
25687	Optimization in a Random Environment (S. 139)	2/1/2	W/S	5	Waldmann

Remarks
The lectures of the module are offered irregularly. The curriculum of the next two years is available online.
Credit from the voluntary computer lab in statistical quality control I and II is accounted for in the overall grade raising the exam grade by 1/3 each.

Module: Business Organization: Theory and Management Perspective [IW4WWORG]

Module key:

Subject: Economic Scienes
Module coordination: Hagen Lindstädt
Credit points (CP): 20

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 of the course.

Prerequisites
None.

Conditions
Students must attend the three courses [25902], [25904] and [25912] and the course [26291] or one seminar, [25915] or [25916] additionally.

Learning Outcomes
The module provides knowledge and skills about economic models and management frameworks in corporate organization, managing organizations, and organizational theory.
The module focuses on problem solving skills and understanding fundamental economic concepts in the area of management and organization.

Content
The module emphasises three aspects: The student will learn models and frameworks of the theory of organization. Additionally, the module deals with problems and questions concerning value based corporate management as an important part in strategic management. Finally, the module provides knowledge about concepts of organizational management and their practical application.

Courses in module *Business Organization: Theory and Management Perspective* [IW4WWORG]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25902	Managing Organizations (S. 166)	2/0	W	4	Lindstädt
25904	Organization Theory (S. 167)	2/1	W	6	Lindstädt
25907	Special Topics in Management: Management and IT (S. 168)	1/0	W/S	2	Lindstädt
25912	Value-Based Instruments of Corporate Strategy (S. 169)	2	W	4	Pidun, Wolff
26291	Managing New Technologies (S. 172)	2/1	S	5	Reiß
25915	Seminar: Management and Organization (S. 170)	2	S	4	Lindstädt
25916	Seminar: Management and Organization (S. 171)	2	W	4	Lindstädt

Remarks

- Die Vorlesung Organisationsmanagement [25902] findet im S 08 und dann ab W 08/09 jeweils immer im Wintersemester statt.

Module: Strategy and Organization — Module key: [IW4WWORG1]

Subject: Economic Scienes
Module coordination: Hagen Lindstädt
Credit points (CP): 10

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 of the course.

Prerequisites
None.

Conditions
Alle Veranstaltungen des Moduls müssen besucht werden.

Learning Outcomes
The module provides knowledge and skills about economic models and management frameworks in strategic management and managing organizations.
The module focuses on problem solving skills and understanding fundamental economic concepts in the area of strategy and organization.

Content
The module emphasises three aspects: The student will learn models and frameworks which are used in strategic management and managing organizations. In addition, the module provides knowledge about management concepts and their practical application.

Courses in module *Strategy and Organization* [IW4WWORG1]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25900	Management and Strategy (S. 165)	2/0	S	4	Lindstädt
25902	Managing Organizations (S. 166)	2/0	W	4	Lindstädt
25907	Special Topics in Management: Management and IT (S. 168)	1/0	W/S	2	Lindstädt

Remarks

- Die Vorlesung Organisationsmanagement [25902] findet im S 08 und dann ab W 08/09 jeweils immer im Wintersemester statt.

Module: Operational Risik Management — Module key: [IW4WWORM]

Subject: Economic Scienes
Module coordination: Ute Werner
Credit points (CP): 10

Learning Control / Examinations
The assessment is described for every course in this module. The overall score of the module is composed of the single scores of the courses weighted with their credits.

Prerequisites
Keine.

Conditions
One of the courses *Principles of Insurance Management* [25055] and *Multidisciplinary Risk Research* [26328] has to be chosen.

Learning Outcomes
Identifying specific risk concepts for various disciplines; comparative analysis of risks, depending on to the natural, technological and social environment; examining processes of risk perception, risk assessment and risk-taking behaviour by applying quantitative and qualitative methods; gaining insight into risk management from an individual, institutional and global perspective including strategies and instruments of risk management employed; understanding the particular importance of insurance for risk management and the economic principles of insurance business.

Content
Operational risks of institutions resulting from the interaction of human, technical, and organisational factors (internal risks) as well as from external natural, technical, social or political incidents; specific requirements, legal and economic framework of various risk carriers (private and public households, small and major enterprises), design of strategies and risk management instruments for coping with risks.

Courses in module *Operational Risik Management* [IW4WWORM]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
26328	Multidisciplinary Risk Research (S. 174)	3/0	S	4,5	Werner
25055	Principles of Insurance Management (S. 110)	3/0	W	4	Werner
26326	Enterprise Risk Management (S. 173)	3/0	W/S	4,5	Werner
26354	Risk Management of Microfinance and Private Households (S. 176)	3/0	W/S	4,5	Werner
26355	Public Sector Risk Management (S. 177)	2/0	W	2,5	Mechler
26353	International Risk Transfer (S. 175)	2/0	S	2,5	Schwehr

Remarks
The courses *Enterprise Risk Management* [26326] and *Risk Management of Microfinance and Private Households* [26354] are offered irregularly. For further information, see: http://insurance.fbv.uni-karlsruhe.de
The lecture *Principles of Insurance Management* [25055] will be held additionally in the summer term 2009.

Module: Stochastic Modeling and Optimization — Module key: [IW4WWSSMI]

Subject: Economic Scienes
Module coordination: Karl-Heinz Waldmann
Credit points (CP): 10

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 of the course.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The students aquire the ability to see and to analyse stochastic interrelations in their professional life. This includes a sound understanding of modeling, analysing and optimizing stochastic systems from an application-oriented point of view.

Content
The courses *Stochastic Processes* and *Markov Decision Processes* are build on the module *Stochastic Models in Information Engineering and Management* and extend the stochastic modeling and optimization to processes in continuous time. The course *Game Theory II* picks up the aspect of a decision under uncertainty and extends it to the situation of describing conficts of interest between people or groups of people. The course *Simulation I* gives an introduction to the simulation of stochastic systems. The main topics include the generation of random numbers, discrete event simulation, and the statistical analysis of simulated data. The course *Simulation II* considers variance reduction techniques, the simulation of stochastic processes, and case studies.

Courses in module *Stochastic Modeling and Optimization* [IW4WWSSMI]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
25690	Stochastic Processes (S. 140)	2/1/2	W/S	5	Waldmann
25653	Markovian Decision Processes (S. 134)	2/1/2	W/S	5	Waldmann
25369	Game Theory II (S. 131)	2/2	W	6	Berninghaus
25662	Simulation I (S. 137)	2/1/2	W/S	5	Waldmann
25665	Simulation II (S. 138)	2/1/2	W/S	5	Waldmann

Remarks
The lectures *Stochastic Processes* [25690]*, Markov decision processes* [25653], *Simulation I* [25662], and *Simulation II* [25665] are offered irregularly. The curriculum of the next two years is available online.
Credit from the voluntary computer lab in *Stochastic Processes* [25690]*, Markov decision processes* [25653], *Simulation I* [25662], and *Simulation II* [25665] is accounted for in the overall grade raising the exam grade by 1/3 each.

5.3 Law

Module: Law of the Information Economy — Module key: [IW4INJUINWI]

Subject: Law
Module coordination: Thomas Dreier
Credit points (CP): 12

Learning Control / Examinations
The module exam consists of 4 written exams of 45 minutes each (§ 4 (2) 1 SPO. Each of the 4 exams covers one of the four courses which the student has selected within this module.
The overall grade of the module is calculated on the basis of the 4 grades, each of them weighed according to their respective CPs.

Prerequisites
None.

Conditions
The students can freely choose four of the courses assigned to this module each comprising 3 CP.

Learning Outcomes
The student

- solves complex legal problems that appear in the information society.

Content
By chosing the module *Law of the Information Economy*, the Student should gain a broad overview. Contrary to the other two modules *Law of Information Companies* and *Law of the Information Society*, which both aim at greater profiling and depening of particular aspects, the module *Law of the Information Economy* aims at an all englobing overview. Students choosing this module shall be able to solve complex legal problems that appear in the information society.

Courses in module *Law of the Information Economy* [IW4INJUINWI]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
24167	Employment Law I (S. 82)	2	W	3	Hoff
24668	Employment Law II (S. 105)	2	S	3	Hoff
24168	Tax Law I (S. 83)	2/0	W	3	Dietrich
24646	Tax Law II (S. 99)	2/0	S	3	Dietrich
24650	Civil Law for Advanced (S. 100)	2/0	S	3	Sester
24612	Computer Contract Law (S. 91)	2/0	S	3	Bartsch
24121	Copyright (S. 71)	2/0	W	3	Dreier
24661	Patent Law (S. 103)	2/0	S	3	Geissler
24136/24609	Trademark and Unfair Competition Law (S. 76)	2/0	W/S	3	Matz, Sester
24082	Public Media Law (S. 65)	2	W	3	Kirchberg
24632	Telecommunications Law (S. 97)	2/0	S	3	Spiecker genannt Döhmann
24666	European and International Law (S. 104)	2/0	S	3	Spiecker genannt Döhmann
24806	Aktuelle Probleme des Patentrechts (S. 108)	2/0	S	3	Klaus-J. Melullis

Remarks
None.

Module: Law of the Information Society — Module key: [IW4INJURDIG]

Subject: Law
Module coordination: Thomas Dreier
Credit points (CP): 12

Learning Control / Examinations
The module exam consists of 4 written exams of 45 minutes each (§ 4 (2) 1 of the SPO). Each of the 4 exams covers one of the four courses which the student has selected within this module. The overall grade of the module is calculated on the basis of the 4 grades, each of them weighed according to their respective CPs.

Prerequisites
None.

Conditions
The modul *Law of the Information Society* builds on the mandatory lectures *Contracting* and *Internet Law*. Students can choose 4 courses (3 CP) that form part of the module.

Learning Outcomes
By chosing the module *Law of the Information Society*, the Student should gain a broad overview of the Law of the Information Society. Contrary to the module *Law of Information Economies* students can gain a profile and specialization on aspects which focus on the information society as a whole rather than on individual enterprises. Rather, the focus is on general issues and trends which are raised by the development of the informatin society as a whole and which can be discussed even before they become of practical importance for individual market participants. Students choosing this module shall be able to recognisze new trends and discuss their legal implications.

Content
The module comprises courses which which cover general legal aspects of the information economy and the information society. The focus is less on issues which affect individual businesses, but rather on general issues affecting the mechanisms and development of the information society as such. Here, the legal framework is determined by national, but also by European law. The complexity of legal questions raised in this respect therefore results less out of a close-up, detailed perspective, but rather from the broad effects which these issues and trends have with regard to the future of the information society as such.

Courses in module *Law of the Information Society* [IW4INJURDIG]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
24121	Copyright (S. 71)	2/0	W	3	Dreier
24661	Patent Law (S. 103)	2/0	S	3	Geissler
24136/24609	Trademark and Unfair Competition Law (S. 76)	2/0	W/S	3	Matz, Sester
24082	Public Media Law (S. 65)	2	W	3	Kirchberg
24632	Telecommunications Law (S. 97)	2/0	S	3	Spiecker genannt Döhmann
24666	European and International Law (S. 104)	2/0	S	3	Spiecker genannt Döhmann
24806	Aktuelle Probleme des Patentrechts (S. 108)	2/0	S	3	Klaus-J. Melullis

Remarks
None.

Module: Law for Information Companies — Module key: [IW4INJURDIU]

Subject: Law
Module coordination: Peter Sester
Credit points (CP): 12

Learning Control / Examinations
The module exam consists of 4 written exams of 45 minutes each according to § 4 (2) 1 SPO. Each of the 4 exams covers one of the four courses which the student has selected within this module.
The overall grade of the module is calculated on the basis of the 4 grades, each of them weighed according to their respective CPs.

Prerequisites
None.

Conditions
The module *Law for Information Companies* follows up on the compulsory courses *Form of Contract* and *Internet Law* and the courses which address the general legal basis of Corporate Law as well as the sector-specific problems of information enterprises. The students can freely choose four of the courses assigned to this module each comprising 3 CP.

Learning Outcomes
To begin with, the student should gain a general overview of the Corporate Law, as a great amount of legal problems related to the information enterprises are not sector-specific. Furthermore, the specific questions will be dealt with which follow from the character of the product information and transport as well as allocation of information. The student should be enabled to understand more complex legal and economic coherences in the area of the Law of information enterprises.

Content
The courses about the Law of information enterprises firstly cover the topic of Corporate Law in general, as a great part of the legal problems which arise in relation to information enterprises correspond with the general Corporate Law, which is mostly not sector-specific. Furthermore, the specific questions will be dealt with, which follow from the character of the product information and transport as well as allocation of information. The aim of the lectures on information enterprises is to give a basic understanding of the regulatory surrounding and the business structure within which the future alumni of the study course information enterprises will range in their everyday business life.

Courses in module *Law for Information Companies* [IW4INJURDIU]

ID	Course	SWS C/E/T	Term	CP	Responsible Lecturer(s)
24167	Employment Law I (S. 82)	2	W	3	Hoff
24668	Employment Law II (S. 105)	2	S	3	Hoff
24168	Tax Law I (S. 83)	2/0	W	3	Dietrich
24646	Tax Law II (S. 99)	2/0	S	3	Dietrich
24650	Civil Law for Advanced (S. 100)	2/0	S	3	Sester
24612	Computer Contract Law (S. 91)	2/0	S	3	Bartsch

Remarks
None.

6 Courses

6.1 Mandatory

Course: Business Administration in Information Engineering and Management Course key: [26500]

Lecturers: Andreas Geyer-Schulz
Credit points (CP): 4,5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Information Engineering and Management 2 [IW4WWIW2] (S. 16)

Learning Control / Examinations
Assessment consists of a written exam of 1 hour length following §4, Abs. 2, 1 SPO and by submitting written papers as part of the exercise following §4, Abs. 2, 3 SPO. The total grade for this lecture will consist to about 90% of the grade achieved in the written exam (maximum 100 points) and to about 10% of the written papers for the exercise (maximum 12 points). The written exam is considered successfully taken if at least 50 points are acquired.
The grades of this lecture are assigned following the table below. At least 50 points have to be acquired to pass the written exam. All additional points from excersise work will be added to the exam points once 50 points have been achieved:

Grade	Minimum points
1.0	104
1.3	98
1.7	92
2.0	86
2.3	80
2.7	74
3.0	68
3.3	62
3.7	56
4.0	50
4.7	40
5.0	0

Prerequisites
Basic knowledge from Operations Research (linear programming) and from decision theory are expected.

Conditions
None.

Learning Outcomes
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.

Basic 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].

Course: Principles of Information Engineering and Management Course key: [26450]

Lecturers: Christof Weinhardt, Jan Kraemer
Credit points (CP): 4,5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Information Engineering and Management 1 [IW4WWIW1] (S. 15)

Learning Control / Examinations
The assessment of this course is a written examination (following §4(2), 1 SPO) and by submitting written papers as part of the exercise (following §4(2), 3 SPO). The total grade for this lecture will consist to 70% of the grade achieved in the written examination and to 30% of the assignments during the exercises.

Prerequisites
None.

Conditions
None.

Learning Outcomes
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 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.

Media
- PowerPoint slides
- eLearning Platform Ilias

Basic literature
1. Shapiro, C., Varian, H., Information Rules: A Strategic Guide to the Network Economy. Harvard Business School Press 1999.
2. Stahlknecht, P., Hasenkamp, U., Einführung in die Wirtschaftsinformatik. Springer Verlag 7. Auflage, 1999.
3. Wirth, H., Electronic Business. Gabler Verlag 2001.

Course: OR Methods and Models in Information Engineering and Management Course key: [25679]

Lecturers: Karl-Heinz Waldmann
Credit points (CP): 4 **Hours per week:** 2/1/2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Stochastic Models in Information Engineering and Management [IW4WWOR] (S. 17)

Learning Control / Examinations
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by 0.3.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The lecture provides students with knowledge of modern techniques of stochastic modelling. Students are able to properly describe and analyze basic stochastic systems.

Content
Markov Chains, Poisson Processes, Markov Chains in Continuous Time, Queuing Systems

Media
Blackboard, Slides, Flash Animations, Simulation Software

Basic literature
Lecture Notes

Complementary literature
Waldmann, K.H. , Stocker, U.M. (2004): Stochastische Modelle - eine anwendungsorientierte Einführung; Springer

Course: Internet Law — Course key: [24501]

Lecturers: Thomas Dreier
Credit points (CP): 3 **Hours per week:** 2/0
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Contract Drafting and Internet Law [IW4INJURA] (S. 18)

Learning Control / Examinations
Written Exam 100% (§4, Abs. 2, 1 of the SPO).

Prerequisites
None.

Conditions
None.

Learning Outcomes
It is the aim of this course to give the students an overview of the legal rules that are touched upon when the Internet is used as a means of communications and for doing business. These legal rules range from the law governing domain names, issues concerning the electronic formation of contracts, distance and electronic commerce contracts, to the issue liability and questions of unfair competition. Students shall understand how the legal rules depend upon, and interact with, the economic background, legislative policy and information and communication technologies. Students shall learn about the rules of national, European and international copyright law and to apply these legal rules in practical cases.

Content
The course deals with the legal rules that are touched upon when the Internet is used as a means of communications and for doing business. These legal rules range from the law governing domain names, issues concerning the electronic formation of contracts, distance and electronic commerce contracts, to the issue liability and questions of unfair competition. Students shall understand how the legal rules depend upon, and interact with, the economic background, legislative policy and information and communication technologies. Students shall learn about the rules of national, European and international copyright law and to apply these legal rules in practical cases.

Media
Slides

Basic literature
Script, Internetrecht (Internet Law)

Complementary literature
Additional literature tba in class.

Remarks
It is possible that this course will be taught in the summer instead of the winter semester.

Course: Law of Contracts — Course key: [24671]

Lecturers: Peter Sester
Credit points (CP): 3 **Hours per week:** 2/0
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Contract Drafting and Internet Law [IW4INJURA] (S. 18)

Learning Control / Examinations
Assessment will consist of a written exam following §4, Abs. 2, 1 of the SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The course will provide an overview of the forming of an contract. The purpose is to translate legal and economic aspects in a contract to secure the volitional position. The course will also consider international questions.

Content
The purpose of the course is to provide students with an understanding of the legal basics of forming a business contract. By means of special examples an overview of typical corporate contracts will be given. The course discusses the Limited (GmbH), ordinary partnership (OHG), limited partnership (KG), European Economic Interest Grouping (EWIV), club (Verein) and the pubilc limited company (Aktiengesellschaft). In addition it will also focus on international relations.

Basic literature
Tba at the beginning of the course.

Course: Interdisciplinary Seminar in Information Engineering and Management Course key: [26530]

Lecturers: Andreas Geyer-Schulz, Thomas Dreier
Credit points (CP): 6 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Interdisciplinary Seminar [IW4IWSEM] (S. 19)

Learning Control / Examinations
The assessment for this module is conducted using a “Erfolgskontrolle anderer Art” following §4 (2), 3 of the “Prüfungsordnung des Master-Studiengangs Informationswirtschaft”. The exact form and composition of this assessment is defined for each Interdisciplinary Seminar seperately.

Prerequisites
Students should participate in the Interdisciplinary Seminar as last course of the compulsory program of the “Master-Studiengang Informationswirtschaft”.

Conditions
None.

Learning Outcomes
Participants of the Interdisciplinary Seminar in Information Engineering and Management should

- analyze a current issue of information engineering and management using the scientific methods of the participating disciplines and
- derive interdisciplinary approaches based on the state of the arts of the corresponding disciplines,
- justify the chosen solutions and methods during discussions using scientific arguments,
- and write down the results in a form appropriate to be published in a scientific journal.

Content
The Interdisciplinary Seminar is regulated in §14 of the “Prüfungsordnung des Master-Studiengangs Informationswirtschaft”. During the work on the interdisciplinary topic, students are supervised by a group of tutors. This group consists of one participant from computer science, one from business economics and one from law.

6.2 Elective

Course: System Architecture — Course key: [24071]

Lecturers: Gerd Liefländer
Credit points (CP): 8 **Hours per week:** 4/2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: System Software [IW4INOS] (S. 28)

Learning Control / Examinations
written exam 100%

Prerequisites
None.

Conditions
None.

Learning Outcomes
The student is familiar with common system architectures and components. He knows basic mechanisms and policies of operating and runtime systems.

Content
The following topics will be covered: processes, address space, synchronization, communication and cooperation on shared data, temporary and persistent data, methods of resource management.

Basic literature
Tanenbaum, Andrew Modern Operating SystemsMarkenrecht Verlag Prentice Hall International ISBN 978-0130926418

Course: Telematics for Information Management and Engineering Course key: [24074]

Lecturers: Wilfried Juling
Credit points (CP): 4 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Infrastructures [IW4INNET] (S. 27)

Learning Control / Examinations
A written exam of 60 minutes, according to §4 Abs. 2 Nr. 1 SPO.

Prerequisites
None.

Conditions
Dependencies according to the module.

Learning Outcomes
Goal of this lecture is to introduce the basic descriptions and methodologies of computer networks.

Content
The lecture introduces formal methods to describe communication in general. After a brief discussion covering the basics of signal processing as well as physical constraints of telecommunication technologies, the lecture follows the architectural pattern of the OSI Reference Model to point out its given systematics. Based on elementary network technologies like Ethernet and Token Ring the lecture outlines essential problems concerned with frame alignment, shared or controled medium access or error processing. Further topics deal with the realization of worldwide networks regarding protocols, technologies and alogrithms used to construct them. Particularly, technical solutions and algorithms from the TCP/IP stack of the Internet Reference Model are discussed. Furthermore, the functionality and application scope of modern components to interconnect heterogenous networks are presented. Finally dedicated communication technologies like ISDN and higher level application protocols like HTTP or SMTP are introduced to indicate the pervasion of network communication technologies towards people.

Media
Slides

Basic literature
- A.S. Tanenbaum, Computer Networks Prentice Hall, 4. Auflage, ISBN 0130661023, 2002.
- Larry L. Peterson, Bruce S. Davie, Computer Networks - A Systems Approach, 3rd ed., Morgan Kaufmann Publishers, 2003.

Complementary literature
- F. Halsall, Data Communications, Computer Networks and OSI, Addison-Wesley, 4. Auflage, ISBN 0-201-18244-0, 1997.
- J.F. Kurose, K.W. Ross, Computer Networking - A Top-Down Approach featuring the Internet. Addison-Wesley, 2005.

Course: Practical Course in Telematics — Course key: [24074p]

Lecturers: Martina Zitterbart, Hannes Hartenstein
Credit points (CP): 5 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Advanced Infrastructures [IW4INNET] (S. 27)

Learning Control / Examinations
The assessment of this course is according to § 4 Abs. 2 Nr. 3 SPO in form of a practical work (assignments and an implementation) and a presentation of the same.
Presentations and practical work are weighted in equal shares.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Students have the opportunity

- to understand and master a specific protocol or application of Telematics thoroughly.
- to implement protocols and applications of the computer network domain in a prevalent programming language.
- to work goal-oriented, independently, but also in a team, within a given topic and on a given assignment.

Content
The practical course specifies topics that were partly introduced in the respective lectures. A prior attendance of these lectures is helpful but not a prerequisite.
In the winter term, the following topic is covered:

- Mobile Communications (Presentations, configuration and programming tasks, covering the following topics: Wireless LAN, Mobile IP, Bluetooth and Mobile Ad hoc Networks)

In the summer term, following topics will be covered:

- Practical project “Wireless sensor network” (Work on a project of wireless sensor-aktor-networks)
- Practical project “Technologies of the future internet”
- Simulation of computer networks

Basic literature
Literature will be presented in each practical course.

Course: Seminar in Telematics — Course key: [24074s]

Lecturers: Martina Zitterbart, Hannes Hartenstein
Credit points (CP): 4 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Advanced Infrastructures [IW4INNET] (S. 27)

Learning Control / Examinations
The assessment of this course is according to § 4 Abs.2 Nr. 3 SPO in form of an examination of the written seminar thesis and a presentation.
The final mark is based on the examination of the written seminar thesis but can be upgraded or downgraded according to the quality of the presentation.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Students have the opportunity

- to do a literature research starting from a given subject to identify relevant literature and to review, and evaluate it.
- to identify independently issues that arise from subdomains of Telematics and to classify methods of resolution found in the literature.
- to generate scientific presentations. Techniques are introduced that help to present a subject before an audience in a proper way. Part of this is also to present the topic in a given time frame and to answer questions that may arise from the topic.
- to identify open questions of other presentations and to contribute them to a discussion that follows each presentation.
- to present the results of the literature research in a written document in a way that is common practice for scientific publications.

Content
In this seminar, the focus lies on specific subjects that were partly introduced in the respective lectures and aims to discuss them more in detail. The following subjects are addressed:

- Future Internet: The focus of the seminar is on concepts for enabling the internet to cope with current and future requirements, including, e.g., mobility support, quality of service, and security. The discussed approaches span from incremental improvements of the current internet to a clean slate approach.
- Sensor networks: The seminar covers different new research results, e.g. concerning sensor architecture, kommunication technologies, spezial routing procedures, data aggregation, safety and algorithms in in sensor networks etc.
- Design, evaluation and simulation of identity-related services in highly distributed environments. Personalized and authorized access on services in highly distributed environments demands a basic analysis and evaluation of the architectural design of the used security mechanisms. This seminar will clarify conceptual possibilities of identity and access management
  systems, evaluate authentication and authorization infrastructures and analyze how simulations can be used to quantify potential risks of newly developed services.

starting WS 10/11:

- Network Security and Hacking Prevention: Attacks aimed at the infrastructure and applications of the Internet are the subject of this seminar. Having a firm understanding of the weaknesses, the students will examine protocols, mechanisms, and tools which can be used to provide secure communication.

Course: Software Architecture

Course key: [24075]

Lecturers: Ralf Reussner
Credit points (CP): 4 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Software Systems [IW4INSW] (S. 29)

Learning Control / Examinations
The assessment consists of an oral exam following §4, Abs. 2, 2 of the SPO.

Prerequisites
Successful participation at the basic software engineering lecture series.

Conditions
can be combined with other lectures of this module

Learning Outcomes

Content

Course: Algorithm Design — Course key: [24079]

Lecturers: Dorothea Wagner, Peter Sanders
Credit points (CP): 6 **Hours per week:** 3/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Algorithms [IW4INAALG] (S. 21)

Learning Control / Examinations
Assessment will consist of a written exam (1h) accordimg to § 4 Abs. 2 Nr. 1 SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The students

- get a deep insight into the most important subareas of algorithmics,
- get a broad algorithmic understanding,
- get the ability to understand and determine the running times of algorithms,
- get the knowledge of fundamental algorithms and data structures, as well as the ability to apply them to new problems.

Content
The Lecture “Algorithm Design” (german name is “Algorithmentechnik”) deepens the most important subareas of algorithmics. This, for example, includes graph algorithms, advanced data structures, design principles for algorithms, algorithmic geometry, and combinatorial optimization. Moreover, different methodic approaches are deepened. For Example, randomized algorithms, approximation algorithms, parallel algorithms, online algorithms, and algorithm engineering.

Basic literature
None

Complementary literature

- K. Mehlhorn, P. Sanders. Algorithms and Data Structures – The Basic Toolbox. Springer, 2008, to appear.
- T. H. Cormen, C. E. Leiserson, R. L. Rivest u.a. Introduction to Algorithms / Algorithmen – eine Einführung. MIT Press, 1990-2001 / Oldenburg 2004.
- Thomas Ottmann und Peter Widmayer. Algorithmen und Datenstrukturen. Spektrum, Akad. Verl., 1990-2002.
- Uwe Schöning. Algorithmik. Spektrum Akademischer Verlag, 2001.
- Reinhard Diestel. Graph Theory. Springer-Verlag, 2005.
- D. Jungnickel. Graphen, Netzwerke und Algorithmen. BI-Wissenschaftsverlag, 1994.
- J. D. Horton A polynomial-time algorithm to find the shortest cycle basis of a graph. SIAM Journal on Computing Vol. 16, Issue 12, 1987.
- Leon Peeters. Cyclic Railway Timetable Optimization. Dissertation, 2003.
- R. G. Downey, M. R. Fellows, Parameterized Complexity. Springer, 1999.

Course: Practical Course in Algorithm Design — Course key: [24079p]

Lecturers: Peter Sanders, Dorothea Wagner
Credit points (CP): 5 **Hours per week:** 4
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Algorithms [IW4INAALG] (S. 21)

Learning Control / Examinations

Prerequisites
Lecture *Algorithmentechnik*

Conditions
None.

Learning Outcomes
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.

Content
In the practical course *Algorithm Engineering* the students are given miscallaneous questions from algorithmics, which they have to implement independently in small working groups. The main focus lies on object oriented programming with Java or C++. Linear programming may also occur.

Course: Public Media Law — Course key: [24082]

Lecturers: Christian Kirchberg
Credit points (CP): 3 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Law of the Information Economy [IW4INJUINWI] (S. 47), Law of the Information Society [IW4INJURDIG] (S. 48)

Learning Control / Examinations
Assessment will consist of a written exam following §4, Abs. 2, 1 of the SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
As the traditional media (print, radio, TV) the “new media” (online-services and the Internet) is governed by public law, yet with a different extent of regulation and with apparent effects on private law. The main influences for the media law are constitutional law and European community law. The lectures aims at providing an overview of the common grounds and differences of the current media law regime and of the conceivable perspectives of media convergence. Current developments in politics and economics, which are relevant for public media law, will be used as examples in the lecture. Besides, it is planned to attend a court hearing of the Federal Constitutional Court (Bundesverfassungsgericht) and/or the Federal Court (Bundesgerichtshof).

Content
Initially, the lecture will deal with the constitutional basis of the media law regime. i.e. the responsibilities of the Federal and the State legislatures, freedom of speech, freedom of information, constitutional media rights (Art. 5 para. 1 Constitutional Law) and its limitations by general laws, the ban on censorship and the counterstatement law. In addition, the European community principles on broadcasting and media law will be part of the lecture. Next will be an overview of the individual media laws, namely the broadcasting law (especially Rundfunkstaatsvertrag) the press law of the States and the statute on the so-called “telemedia” services. Finally, the protection of minors in the media will be dealt with (Act on Protection of Minors and Treaty on the Protection of Minors in the Media).

Basic literature
To understand the legal framework it is necessary for the students to have the relevant statutes, for example “Telemediarecht, Telekommunikations- und Multimediarecht”, beck-Texte im dtv , 7. Auflage 2007.
As an introduction it is recommended to read: Frank Fechner, Medienrecht, Verlag Mohr Siebeck, Verlag Mohr Siebeck, 8. Auflage 2007.

Course: Wireless Sensor-Actuator-Networks Course key: [24104]

Lecturers: Martina Zitterbart
Credit points (CP): 4 **Hours per week:** 2/0
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Infrastructures [IW4INNET] (S. 27)

Learning Control / Examinations
The assessment will consist of an oral exam (20 min) following § 4 Abs. 2 Nr. 1 SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The objective of this lecture is to present topics in research. As sensor networks are more and more becoming part of our daily-life, this lecture does not only focus on classical topics, such as time-synchronization and routing, but also on security and safety.

Content
Due to the emerging miniaturization of microcontrollers during the past years a new field of research established: wireless sensor networks. These are networks that consist of huge amounts of tiny, autonomous sensor nodes which are able to fulfill some assigned sensing task totally unattended and self-organizing. One important characteristic is their restricted ressources wrt/ computational power, memory and communication capacity, which is due to the node's scarce energy ressources. Under these conditions, traditional communication architectures and protocols seem to be not well suited. The lecture will cover essential concepts, protocols and architectures which were developed with respect to the special needs of those networks. Topics of the course will be: hardware platforms for sensornetworks, media access control protocols, naming and addressing, time synchronization, localization of sensor nodes, topology control, a bunch of specialized routing protocols, service- and data-centric view of communication, security, and robustness.

Media
Slides.

Basic literature
H. Karl, and A. Willig, *Protocols and Architectures for Wireless Sensor Networks*, Wiley and Sons, 2005, ISBN 0470095105.

Course: High Performance Communication — Course key: [24110]

Lecturers: Martina Zitterbart
Credit points (CP): 4 **Hours per week:** 2/0
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Infrastructures [IW4INNET] (S. 27)

Learning Control / Examinations
The assessment will consist of an oral exam (20 min.) following § 4 Abs. 2 Nr. 2 SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The goal of the course is to introduce the fundamental technologies of todays and future wide area networks.

Content
The main focus of this course are current developments in the area of network technologies. Part of this is the well-established Multi-Protocol Label Switching (MPLS) and the precursor ATM (Asynchronous Transfer Mode). Additionally, methods to support Quality of Service, signalling of requirements for Quality of Service, and the establishment of network-internal switching and routing systems are discussed. The lecture also goes into current developments in the domain of optical networks (SONET: Synchronous Optical Networking, WDM: Wavelength Division Multiplexing).

Media
Slides.

Basic literature
H. Perros. Connection-oriented Networks. John Wiley & Sons, 2005, ISBN 0-470-02163-2.

Complementary literature
- W. Haaß. Handbuch der Kommunikationsnetze. Springer-Verlag, 1996, ISBN 3-540-61837-3.
- J. Jahn. Photonik: Grundlagen, Komponenten und Systeme. Oldenbourg-Verlag, 2001, ISBN 3-486- 25425-1.
- D. Minoli, A. Alles. LAN, ATM and LAN Emulation Technologie. Artech-House, 1996, ISBN 0-89006- 916-6.
- E. Rathgeb, E. Wallmeier. ATM-Infrastruktur für die Hochleistungskommunikation. Springer-Verlag, 1997, ISBN 3-540-60370-0.
- G. Siegmund. ATM – Die Technik. 3. Auflage, Hüthig Verlag, 1997, ISBN 3-7785-2541-7.
- W. Stallings. High-Speed Networks. Prentice Hall, 1998, ISBN 0-13-525965-7.
- M. Zitterbart Hochleistungskommunikation, Band 1: Technologie und Netze. R. Oldenbourg Verlag, 1995, ISBN 3-486-22707-6.

Course: Workflow Management Systems — Course key: [24111]

Lecturers: Jutta Mülle
Credit points (CP): 3 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Large-Scale Information and Knowledge Management [IW4INLIKM] (S. 24), Advanced Concepts of Information and Knowledge Management [IW4INLIKM1] (S. 26)

Learning Control / Examinations
It will be announced in advance if the assessment consists of an 1h written exam following §4, Abs. 2, 1 of the Prüfungsordnung or of a 20 minute oral examination following §4, Abs. 2, 2 of the Prüfungsordnung.

Prerequisites
Knowledge about database systems, e.g. from the lecture “Communications and Database Systems”.

Conditions
None.

Learning Outcomes
A goal of the course is that the participants are able to model workflows, to explain modelling aspects and their relationships, to compare modelling methods, and to evaluate the usability of these methods in different application areas. They should understand the technical construction of workflow-management systems with the most important components and different architectures and implementation alternatives. Finally, the participants should have obtained an overview on actual relevant standardization proposals and how to use these approaches, and they should be aware of actual research topics.

Content
Workflow Management Systems (WFMS) support the management of business processes according to pre-defined process descriptions. Managing processes flexibly, i.e., handle deviations, e.g., in order to catch exceptions, adapt processes to modified process environments or to support ad-hoc workflows, becomes more and more important.
The course starts with discussing WFMS in the context of business-information systems and their relationship with the more common business-process modelling. Petri nets and pi-calculus are introduced as basic formalisms. Then, methods to model workflows and the design process for workflow-management applications are presented in detail and supplemented with exercises. An advanced aspect is new research in WFMS technology. In particular, the use of internet techniques like web services and standardization approaches for process modeling, orchestration, and choreography in service-oriented architectures will be presented. In the realization part of the course, various implementation techniques and architectural issues to realize workflow-management systems as well as diverse system types and concrete workflow-management systems are presented.

Media
Slides.

Basic 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

Complementary literature

- 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.

Course: Multicore Computers and Computer Clusters — Course key: [24112]

Lecturers: Walter F. Tichy
Credit points (CP): 4 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: System Software [IW4INOS] (S. 28), Software Systems [IW4INSW] (S. 29)

Learning Control / Examinations
Assessment consists of an oral exam (20 min.) following §4, Abs. 2, 1 of the SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Students are able to:

- explain the fundamental concepts of parallel computing;
- describe and apply parallel programing models;
- explain the basic definitions and properties of system architectures of multicore computers and computer clusters, including networks and system software;
- describe parallel algorithms and derive their complexity.

Content

- This course conveys the theory and practical aspects of multicore computers and computer clusters.
- System achitectures as well as programing concepts are covered.
- Network technology, selected high speed networks (e.g. Gigabit, Ethernet, Myrinet, Infiniband) and comunication libraries are surveyed.
- Ressource management, scheduling, distributed/parallel file systems, programing models (e.g. MPI, transactional memory, Javaparty), and parallel algorithms are introduced.

Media
Lecture presentations

Complementary literature
Additional literature will be announced in class.

Course: Data Warehousing and Mining — Course key: [24118]

Lecturers: Klemens Böhm
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Large-Scale Information and Knowledge Management [IW4INLIKM] (S. 24), Advanced Concepts of Information and Knowledge Management [IW4INLIKM1] (S. 26)

Learning Control / Examinations
It will be announced in advance if the assessment consists of an 1h written exam following §4, Abs. 2, 1 of the Prüfungsordnung or of a 20 minute oral examination following §4, Abs. 2, 2 of the Prüfungsordnung.

Prerequisites
Knowledge about database systems, e.g., from the lecture “Communications and Database Systems”.

Conditions
None.

Learning Outcomes
At the end of the lecture, the participants should be aware of – and able to explain – the necessity of data warehousing and of data mining concepts. They should be able to assess and compare different approaches of management and analysis of large datasets with respect to efficiency and applicability. The participants should have gained an insight into the current research issues in the area of data warehousing and data mining and should understand which problems are currently unsolved.

Content
Data warehouses and data mining raise much interest from practitioners with huge amounts of data, e.g., in retail, finance and the insurance sector. Both warehousing and mining are motivated by the desire for keeping track of large and possibly distributed datasets and for extracting interesting relations from such data, ideally with minimal effort. A data warehouse is a repository which is fed with data from one or more operational database systems. The data is preprocessed allowing for a fast evaluation of complex analytical queries (OLAP, Online Analytical Processing). In contrary, data mining provides techniques for discovering patterns in large datasets.

Media
Slides.

Basic literature
- Jiawei Han, Micheline Kamber: Data Mining: Concepts and Techniques. 2nd edition, Morgan Kaufmann Publishers, March 2006.

Complementary literature
Further literature will be mentioned at the end of each chapter in the lecture slides.

Course: Copyright — Course key: [24121]

Lecturers: Thomas Dreier
Credit points (CP): 3 **Hours per week:** 2/0
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Law of the Information Economy [IW4INJUINWI] (S. 47), Law of the Information Society [IW4INJURDIG] (S. 48)

Learning Control / Examinations
Written exam 100% (§4, Abs. 2, 1 of the SPO).

Prerequisites
None.

Conditions
none

Learning Outcomes
It is the aim of this course to provide students with knowledge in the area of copyright that builds upon, and goes beyond the knowledge the students have already acquired in the general lecture of “Industrial and intellectual property law”. Students shall understand how the legal rules depend upon, and interact with, the economic background, legislative policy and information and communication technologies. Students shall learn about the rules of national, European and international copyright law and to apply these legal rules in practical cases.

Content
The course deals with the subject matter of copyright, the rights of authors, licensing, limitations and exceptions to copyright, term of protection, neighbouring rights, enforcement and collective administration of rights. The course does not merely focus on German copyright law, but likewise puts European and international copyright law into perspective. Students shall understand how the legal rules depend upon, and interact with, the economic background, legislative policy and information and communication technologies. Students shall learn about the rules of national, European and international copyright law and to apply these legal rules in practical cases.

Media
transparancies

Basic literature
Schulze, Gernot Meine Rechte als Urheber Verlag C.H.Beck, current edition

Complementary literature
Additional literature tba in class.

Remarks
It is possible that this course will be taught in the summer instead of the winter semester.

Course: Web Engineering — Course key: [24124]

Lecturers: Martin Nußbaumer
Credit points (CP): 4 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Complex Internet Applications [IW4INIAPP] (S. 23)

Learning Control / Examinations
Assessment will consist of an oral exam (20 min) following §4, Abs. 2, 1 of the SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The goal of this course is to introduce the foundations, the methods and the techniques of web engineering. After this course, students have gained knowledge and insights of existing methods, technologies and system approaches and are enabled to design and evaluate such webbased systems.

Content
This course is designed as an introduction to the discipline of Web Engineering. This course will discuss the systematic production of Web-based applications and systems by focusing on the different phases and aspects of the Web application lifecycle. It will help you look at Web application phenomena, requirements, Web design and architecture, development and management from different perspectives - as Web designer, analyst, architect, component engineer, program manager, product manager or CIO for example. You will learn how to produce Web applications and agile systems from requirements engineering, concept, design, development, testing, deployment and up to operation, marketing, and evolution. Many examples will be shown and discussed - showing the need for expecting change and staying agile. This is not a programming course, you will only be introduced to the core technology aspects and are encouraged to consolidate the details.

Media
Slides

Basic literature
Gerti Kappel, Birgit Pröll, Siegfried Reich, Werner Retschitzegger (Hrsg.), Web Engineering - Systematische Entwicklung von Web- Anwendungen. dpunkt.verlag, ISBN:3-89864-234-8.
Thomas A. Powell, Web Site Engineering. Prentice Hall 1998.

Course: Power Management

Course key: [24127]

Lecturers: Frank Bellosa
Credit points (CP): 3 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: System Software [IW4INOS] (S. 28)

Learning Control / **Examinations**

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Course: Telematics — Course key: [24128]

Lecturers: Martina Zitterbart
Credit points (CP): 4 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Infrastructures [IW4INNET] (S. 27)

Learning Control / Examinations

Prerequisites
An assessment about the communication part of the lecture Communication and Database Systems [24574] is required.

Conditions
None.

Learning Outcomes
This course details selected protocols, architectures, techniques, and algorithms, which were already presented in the communications part of the course Communication and Database Systems [24574]. Thus, overall knowledge and knowledge about problems that occur within a world-wide and dynamic network as well as solutions that are applied in order to avoid these problems is imparted in this course.

Content
This course addresses protocols, architectures, techniques, and algorithms that are used, e.g., for Internet routing and establishing of reliable end-to-end communication associations. In addition to different media access control mechanisms in local area networks further communication systems, e.g. line-switched ISDN, are detailed. It is intended that students additionally understand which possibilities for network management and administration currently exist.

Media
Slides.

Basic 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

Complementary literature
- 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
- Selected journal arcticles

Course: Multimedia Communication — Course key: [24132]

Lecturers: Roland Bless
Credit points (CP): 4 **Hours per week:** 2/0
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Infrastructures [IW4INNET] (S. 27)

Learning Control / Examinations
The assessment will consist of an oral exam (20 min) following § 4 Abs. 2 Nr. 1 SPO.

Prerequisites
The communication part of Kommunikation und Datenhaltung (recommended).

Conditions
None.

Learning Outcomes
Objective of the lecture is to present techniques, procotols, and latest developments in Internet-based multimedia communications. Especially in the context of increasing amount of voice communications over the Internet (Voice over IP), key technologies and protocols such as RTP and SIP are intensively discussed so that their function and principles are understood in detail.

Content
This lecture describes techniques and protocols to transmit audio and video data over the Internet. Topics are audio/video conferences, audio/video transport protocols, Voice over IP SIP for signaling, establishment and control of multimedia sessions, RTP for transport of multimedia data over the Internet, RTSP for control of A/V streams, ENUM, A/V Streaming, Middleboxes and Caches, DVB, and Video on Demand.

Media
Slides. Protocol traces.

Basic literature
James F. Kurose, and Keith W. Ross *Computer Networking* 4th edition, Addison-Wesley/Pearson, 2007, ISBN 0-321-49770-8, Chapters 7.1–7.4.

Complementary literature
Stephen Weinstein *The Multimedia Internet* Springer, 2005, ISBN 0-387-23681-3
Alan B. Johnston *SIP – understanding the Session Initiation Protocol* 2nd ed., Artech House, 2004
R. Steinmetz, K. Nahrstedt *Multimedia Systems* Springer 2004, ISBN 3-540-40867-3
Ulrick Trick, Frank Weber: *SIP, TPC/IP und Telekommunkationsnetze*, Oldenbourg, 3.
Auflage, 2007

Course: Trademark and Unfair Competition Law Course key: [24136/24609]

Lecturers: Yvonne Matz, Peter Sester
Credit points (CP): 3 **Hours per week:** 2/0
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Law of the Information Economy [IW4INJUINWI] (S. 47), Law of the Information Society [IW4INJURDIG] (S. 48)

Learning Control / Examinations
Assessment will consist of an 1h written exam following §4, Abs. 2, 1 of the SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
It is the aim of this course to provide students with knowledge in the area of trademark rights in the national as well as the European and International context. The course deals with the structure of trademark rights, especially with the procedures of registration and the claims, that result from the infringements of trademark rights, as well as with the right of other marks in the MarkenG.

Content
The course deals with the subject matter of trademark rights: what is a trademark, how can I get the registration of a trademark, what rights and claims do owner of trademarks have, which other marks do exist? The students shall learn about the rules of national, European an international trademark law.

Basic literature

- Berlit, Wolfgang: Markenrecht, Verlag C.H.Beck, ISBN 3-406-53782-0, neueste Auflage.

Course: Information Integration and Web Portals — Course key: [24141]

Lecturers: Jutta Mülle
Credit points (CP): 3 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Large-Scale Information and Knowledge Management [IW4INLIKM] (S. 24)

Learning Control / Examinations
It will be announced in advance if the assessment consists of an 1h written exam following §4, Abs. 2, 1 of the Prüfungsordnung or of a 20 minute oral examination following §4, Abs. 2, 2 of the Prüfungsordnung.

Prerequisites
Knowledge about database systems, e.g. from the lecture “Communications and Database Systems”.

Conditions
None.

Learning Outcomes
The students obtain...

- Knowledge about state-of-the-art technologies (e.g., J2EE, JSF, .NET, XML) for building web applications and ability to evaluate their usage in concrete scenario.
- Proficiency in architectural approaches for building scalable web applications and integration of heterogeneous systems (e.g., multi-tier architectures, Model-View-Controller, mediator architectures, service-oriented architectures).
- Ability to analyze integration problems at different levels (presentation, services, information, technology).
- Proficiency in applying virtual and materialized integration approaches to concrete scenarios.
- Knowledge about core concepts and technologies for service-oriented architectures.
- Knowledge about potentials of ontologies for integration on service and information level.

Content
Building web portals, bundling an information offer from different information sources for a specific target group, serves as a showcase problem for the lecture. Using a fictional sample port, this problem is approached from different viewpoints within the three major parts of the lecture. The first part is dedicated to scalable and maintainable web applications. Multi-tier architectures and component frameworks (J2EE, .NET) are the main topics. In addition to that, the principle of separation of content, layout and behavior is illustrated for different web technologies (e.g., JSP, JSF, AJAX). The second part follows the theme of integration of autonomous systems, which are typically encountered in inter-organizational cooperation. Within this part, information integration approaches (virtual vs. materialized) and service-oriented integration are presented and assessed. Usage potentials of ontologies for integration scnearios complement this part. The third part is dedicated to recent developments and real-world systems and products, presented by company representatives in the areas of portal, web and integration technology.

Media

- Slides.
- Tutorial materials (Execution-Environment, Source-Code, Examples).

Basic literature

- Wassilios Kazakos, Andreas Schmidt, Peter Tomczyk: Datenbanken und XML. Konzepte, Anwendungen, Systeme, Heidelberg/Berlin: Springer, März 2002

Complementary literature

- Serge Abiteboul, Peter Buneman, Dan Suciu: Data on the Web: from Relations to Semistructured Data and XML, Morgan Kaufmann, 1999, ISBN: 155860622X
- N. Kassem. Designing Enterprise Applications with the Java 2 Platform: Enterprise Edition. Longman 2000

Course: Ubiquitous Computing — Course key: [24146]

Lecturers: Wilfried Juling
Credit points (CP): 4 **Hours per week:** 2/0
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Complex Internet Applications [IW4INIAPP] (S. 23), Advanced Infrastructures [IW4INNET] (S. 27)

Learning Control / Examinations
The assessment will consist of an oral exam (20 min) following § 4 Abs. 2 Nr. 1 SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The goal of this course is to introduce the foundations, the methods and the techniques of ubiquitous computing. After this course, students have gained knowledge and insights of existing ubiquitous computing systems and are enabled to design and evaluate such systems for the usage in everday life and industrial environments.

Content
The course starts with an survey on ubiquitous computing in general and introduces a selection of representative work in this field. Basic paradigms and concepts are introduced, which provide the methodological background for the analysis and evaluation of ubiquitous computing systems. The course continues with an in-depth examination of the requirements and the device technology for embedded ubiquitous systems, communication networks and standards (e.g. Zigbee, RFID). Further, ubiquitous computing middleware is considered. A major aspect is context-aware computing. The emphasis is on the investigation of architectures and algorithms for context recognition in respect to formal and practical aspects. Finally, new human-computer interfaces and possibilities of the human-computer interaction are presented and discussed.

Media
Slides

Basic literature
Mark Weiser The Computer of the 21st Century Scientific American, 1991
Weiser and Brown The Coming Age of Calm Technology Xerox PARC, 1996
Vannevar Bush As we may think The Atlantic Monthly, July 1945
J. Raskin Computers by the Millions An Apple Document from 1979

Complementary literature
- Cooperstock, J., Fels, S., Buxton, W. & Smith, K.C. Reactive environments: Throwing away your keyboard and mouse Communications of the Association of Computing Machinery (CACM), 40(9), 65-73.
- Want, R., Schilit,B. ,Adams, N., Gold, R., Petersen, K., Goldberg, D., Ellis, J., Weiser, M. The ParcTab Ubiquitous Computing Experiment Technical Report CSL-95-1, Xerox Palo Alto Research Center, March 1995.
- L. Hallanäs, J. Redström Abstract Information Appliances Symposium on Designing Interactive Systems 2004
- Gemperle, F., Kasabach, C., Stivoric, J., Bauer, M., Martin, R. Design for wearability Wearable Computers Second International Symposium on , 1998 Page(s): 116 -122
- Sinem Coleri Ergen ZigBee/IEEE 802.15.4 Summary September 10, 2004
- Frank Siegemund, Michael Rohs Rendezvous Layer Protocols for Bluetooth-Enabled Smart Devices Extended version. Personal and Ubiquitous Computing Journal, pp. 91-101, October 2003, Springer-Verlag

Course: Network and IT-Security Management — Course key: [24149]

Lecturers: Hannes Hartenstein
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Complex Internet Applications [IW4INIAPP] (S. 23), Advanced Infrastructures [IW4INNET] (S. 27)

Learning Control / Examinations
Oral exam of 30 minutes, according to §4 Abs. 2 Nr. 2 of the SPO.

Prerequisites
Basics in computer networks, according to the lectures *Kommunikation und Datenhaltung* [24574] and *Telematik für Informationswirte* [24074] respectively are required.

Conditions
Dependencies according to the module description.

Learning Outcomes
The goal of this lecture is to introduce the basics of network and IT-security management. Technical as well as underlying management concepts should are described.

Content
The lecture covers architectures, models, protocols and tools for controlling and monitoring of heterogeneous networks. Additionally, issues related to security and reliability are also covered. The lecture presents technical solutions as well as corresponding management concepts. The first part of the lecture introduces management architecture in particular the Internet management architecture based on the SNMP protocol. Afterwards corresponding tools, platforms, and operational implementations are presented. Furthermore public IP coordination and current trends are described. In the IT-Security management part of the lecture the concept of a security process is introduced based on the BSI Grundschutz. Additional topics are access and identity management as well as firewalls, intrusion detection and prevention. Besides theoretical method and concepts, practical examples are shown.

Media
Slides

Basic literature
Jochen Dinger, Hannes Hartenstein, Netzwerk- und IT-Sicherheitsmanagement : Eine Einführung, Universitätsverlag Karlsruhe, 2008.

Complementary literature
Heinz-Gerd Hegering, Sebastian Abeck, Bernhard Neumair, Integriertes Management vernetzter Systeme - Konzepte, Architekturen und deren betrieblicher Einsatz, dpunkt-Verlag, Heidelberg, 1999.
James F. Kurose, Keith W. Ross, Computer Networking. A Top-Down Approach Featuring the Internet, 3rd ed., Addison-Wesley Longman, Amsterdam, 2004.
Larry L. Peterson, Bruce S. Davie, Computer Networks - A Systems Approach, 3rd ed., Morgan Kaufmann Publishers, 2003.
William Stallings, SNMP, SNMPv2, SNMPv3 and RMON 1 and 2, 3rd ed., Addison-Wesley Professional, 1998.
Claudia Eckert, IT-Sicherheit. Konzepte - Verfahren - Protokolle, 4. Auflage, Oldenbourg, 2006.
Michael E. Whitman, Herbert J. Mattord, Management of Information Security, Course Technology, 2004.

Course: Advanced Web Applications — Course key: [24153/24604]

Lecturers: Sebastian Abeck
Credit points (CP): 4 **Hours per week:** 2/0
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Complex Internet Applications [IW4INIAPP] (S. 23)

Learning Control / Examinations
Assessment will consist of an oral exam (20 min) following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
Knowledge in the areas of communication systems (esp. Web technologies) and software engineering.

Conditions
None

Learning Outcomes
To understand the architecture of multi-layered and service-oriented applications.
To be able to model the software architecture of a Web application.
To understand the major principles of traditional application development and the corresponding software development process.
To comprehend how high-level process models are systematically refined in order to be mapped to a service-oriented architecture.
To understand what identity management comprises, especially the technologies, processes and techniques

Content
The course consists of the following course units:

- BASICS OF ADVANCED WEB APPLICATIONS: Multilayered application architectures, especially service-oriented architectures (SOA) and the development of both traditional and advanced, service-oriented Web applications based on current standards such as XML (Extensible Markup Language) and WSDL (Web Services Description Language) are described.
- HUMAN TASKS: This course unit deals with model-driven software development of advanced, human-centered Web applications based on UML (Unified Modeling Language) and MDA (Model-driven Architecture).
- PROCESS MANAGEMENT: The development process is extended by approaches for the mapping of business processes to service-oriented Web applications as well as the monitoring of these applications with respect to the achievement of business goals in terms of an integrated business process management.
- IDENTITY MANAGEMENT: The main functional components of identity management are introduced and the specific needs of a service-oriented solution are derived.

Media
(1) Learning material: Each course unit is covered by a course document (incl. short description, learning goals, index, glossary, references)
(2) Teaching material: slides (integral part of the course documents)

Basic literature
Thomas Erl: Service-Oriented Architecture – A Field Guide to Integrating XML and Web Services, Prentice Hall, 2004.

Complementary literature
(1) Ali Arsanjani: Service-Oriented Modeling and Architecture, IBM developer works, 2004.
(2) Frank Leymann, Dieter Roller, M.-T. Schmidt: Web Services and business process management, IBM Systems Journal (2002) 41, S. 198-211, 2002.
(3) Eric Yuan, Jin Tong: Attribute Based Access Control (ABAC) for Web Services, IEEE International Conference on Web Services (ICWS 2005), Orlando Florida, July 2005.

Course: Moving Objects Databases — Course key: [24156]

Lecturers: Klemens Böhm
Credit points (CP): 3 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Englisch
Part of the modules: Large-Scale Information and Knowledge Management [IW4INLIKM] (S. 24)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content
Advancements in the field of information technology have made it easy to collect huge amounts of data describing the movement of objects, e.g., vehicles, air planes, robots, cell-phone users, Georgian soldiers withdrawing, natural phenomena such as cyclones or snowstorms, historic developments (e.g., exact location of the Austrian empire), or – last but not least – body movements and processes within the human body. In consequence, the problem how to organize such data and how to analyze it comes to the fore. This lecture targets at exactly this subject matter.

Key words:

- query languages for temporal data (i.e., data where data objects are furnished with temporal information such as time-stamps),
- query languages for moving objects in the past and query languages for future movements,
- constraint databases,
- spatial data structures,
- data structures for past and for future movements.

The topic is important for many areas of business/industry such as (obviously) logistics, but also vehicle manufacturing, avionics and the aerospace industry, telecommunication and – last but not least – web search and is in line with other focal points/"Vertiefungsgebieten" of the Fakultät für Informatik such as robotics, anthropomatics and telematics. I.e., on the one hand, this lecture targets for students who are interested in such applications. On the other hand, another objective of this lecture is to generate a broader and deeper understanding of database technology and its mode of operation. I.e., strictly speaking, it is also of interest for students who are not particularly interested in this specific application domain from a database perspective ('moving objects'), but just want to delve more into database technology and learn more.
We are well aware of the fact that the issue of data privacy ("Datenschutz") is closely related to the content of this lecture. However, we plan to – largely – ignore this aspect in the context of this lecture. The reason is that we offer the separate lecture "Datenschutz und Privatheit in vernetzten Informationssystemen" the summer semester.

Course: Employment Law I — Course key: [24167]

Lecturers: Alexander Hoff
Credit points (CP): 3 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Law of the Information Economy [IW4INJUINWI] (S. 47), Law for Information Companies [IW4INJURDIU] (S. 49)

Learning Control / Examinations
The assessment consists of a written exam following §4, Abs. 2, 1 of the SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
It is the aim of this lecture to provide a solid insight into individual-related labour law. The students will understand the importance of labour law as an integral part of social market economy. They will be able to review contractual provisions in employment contracts and to evaluate labour law conflicts.

Content
Students will be introduced to all labour law regulations concerning the beginning, enforcement and termination of an employment. The lecture provides an introduction into procedural matters. A labour court´s trial will be attended.

Basic literature
tba at the beginning of the course.

Course: Tax Law I — Course key: [24168]

Lecturers: Detlef Dietrich
Credit points (CP): 3 **Hours per week:** 2/0
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Law of the Information Economy [IW4INJUINWI] (S. 47), Law for Information Companies [IW4INJURDIU] (S. 49)

Learning Control / Examinations
The assessment consists of a written exam following §4, Abs. 2, 1 of the SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The target of the lecture is an introduction to national business tax law. The legal norms, spread on several individual tax laws, which are decisive for the taxation of the companies and their owners, will be treated. The focus is on basic fiscal knowledge realizable in practice as a component of modern business economics.

Content
Except for a basic knowledge of the existing German company types and the annual financial statements (balance sheet, statement of earnings), no fiscal previous knowledge is required. The lecture intends to give a current global overview about the most important elements of law. The focus is on trade or business companies in the most common forms such like sole traders, partnerships and corporations.

Media
transparancies

Basic literature
- Grashoff Steuerrecht, Verlag C. H. Beck, last edition
- Tipke/Lang Steuerrecht, Verlag C. H. Beck, last edition

Course: Randomized Algorithms — Course key: [24171]

Lecturers: Thomas Worsch
Credit points (CP): 4 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Algorithms [IW4INAALG] (S. 21)

Learning Control / Examinations
Assessment will consist of an oral exam (20 min) following §4, Abs. 2, 2 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Students become acquainted with the basic important approaches to and techniques for applying randomization in algorithms and the tools for their analysis.
Students are able to identify and assess typical weak points in deterministic algorithms and to develop randomized alternatives to eliminate them.

Content
Randomized algorithms are not deterministic. Their behavior depends on the outcome of random experiments. This idea first became generally known due to Rabin's randomized primality test. Meanwhile randomized algorithms have been developed for quite a number of problems, and often they are faster (in one sense or another). Furthermore randomized algorithms sometimes are easier to understand and to implement than deterministic algorithms.
In the course not only different types of randomized algorithms (Las Vegas, Monte Carlo, ...) are present. In addition foundations and tools from probability theory are introduced as far as they are necessary for the analysis of the algorithms, and attention is given to further important concepts like Markov chains. Since stochastic methods are of importance in more and more fields in informatics, the usefulness of the course extends beyond the scope of randomized algorithms.
Contents:

- probabilistic complexity classes
- routing in hypercubes
- game theory
- random walks
- randomized graph algorithms
- randomized hashing
- randomized online algorithms

Media
lecture notes and slides in pdf format;

Basic 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

Complementary literature

- E. Behrends: Introduction to Markov Chains, Vieweg, 2000
- A. Borodin, R. El-Yaniv: Online Computation and Competitive Analysis, Cambridge Univ. Press, 1998

Course: Power Management Praktikum — Course key: [24181]

Lecturers: Frank Bellosa, Andreas Merkel
Credit points (CP): 3 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: System Software [IW4INOS] (S. 28)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Course: Practical Course: Web Technologies — Course key: [24304]

Lecturers: Sebastian Abeck
Credit points (CP): 4 **Hours per week:** 2/0
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Complex Internet Applications [IW4INIAPP] (S. 23)

Learning Control / Examinations
The assessment of this course consists of the documentation of the exercises and results of the practical course and various presentations as a “Erfolgskontrolle anderer Art” following §4, Abs. 2, 3 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
Participation in the lecture *Advanced Web Applications* [24153/24604]

Conditions
None

Learning Outcomes
To comprehend the Web technologies used in a real project environment.
To understand and to be able to formulate in one´s own words the task of the practical work.
To apply the Web technologies in order to solve the task.
The results can be documented and presented in a clear and comprehensible way.

Content
The student becomes a member of one of the project teams of the research group and receives a well-defined task, in which he/she develops a part of an advanced Web application using latest Web technologies.
Examples for such tasks are:

- Extension of a Web-based student support system using portal technologies
- Monitoring of an existing Web service implementation using the Java Framework
- Extension of an access control on a service-oriented web application using an existing identity management solution

Media
Templates to efficiently document the results of the practical work (e.g. project documents, presentation material)

Basic literature

- Team guidelines of the research group
- Lecture notes “Advanced Web Applications”

Complementary literature
Literature basis of the respective project team

Course: Advanced Systems - Seminar

Course key: [24372s]

Lecturers: Frank Bellosa
Credit points (CP): 4 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: System Software [IW4INOS] (S. 28)

Learning Control / **Examinations**

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Course: Communication and Database Systems — Course key: [24574]

Lecturers: Klemens Böhm, Martina Zitterbart
Credit points (CP): 4/8 **Hours per week:** 4/2
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Concepts of Information and Knowledge Management [IW4INLIKM1] (S. 26), Advanced Infrastructures [IW4INNET] (S. 27)

Learning Control / Examinations

Prerequisites
None.

Conditions
Lectures about system architecture and software engineering are recommended but not mandatory.

Learning Outcomes
The student

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

Media
Slides.

Basic literature

- W. Stallings: Data and Computer Communications. Prentice Hall, 2006.
- S. Abeck, P.C. Lockemann, J. Schiller, J. Seitz: Verteilte Informationssysteme. dpunkt-Verlag, 2003.
- Andreas Heuer, Kai-Uwe Sattler, Gunther Saake: Datenbanken — Konzepte und Sprachen, 3. Aufl., mitp-Verlag, Bonn, 2007
- Alfons Kemper, André Eickler: Datenbanksysteme. Eine Einführung, 6. Aufl., Oldenbourg Verlag, 2006

Complementary literature

- F. Halsall: Computer Networking and the Internet. Addison-Wesley, 2005.
- P. Lockemann, G. Krüger, H. Krumm: Telekommunikation und Datenhaltung. Hanser Verlag, 1993.
- R. Elmasri, S.B. Navathe: Fundamentals of Database Systems, 4. Auflage, Benjamin/Cummings, 2000.
- Gerhard Weikum, Gottfried Vossen: Transactional Information Systems, Morgan Kaufmann, 2002.
- C.J. Date: An Introduction to Database Systems, 8. Auflage, Addison-Wesley, Reading, 2003.
- J.F. Kurose, K.W. Ross: Computer Networking - A Top-Down Approach featuring the Internet, Addison-Wesley, 2007.

Course: Network Security: Architectures and Protocols — Course key: [24601]

Lecturers: Martina Zitterbart, Lars Völker, Marcus Schöller
Credit points (CP): 4 **Hours per week:** 2/0
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Infrastructures [IW4INNET] (S. 27)

Learning Control / Examinations
The assessment will consist of an oral exam (20 min) following § 4 Abs. 2 Nr. 1 SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The course aims at teaching fundamental concepts of the design of secure communication protocols. More advanced topics include existing security protocols of the internet and local networks.

Content
The lecture “Networksafety: Architectures and Protocols” considers challenges and technologies in the design of secure communication protocols, as well as topics of data security and privacy. Complex systems like Kerberos will be disussed explicitlly and their design decision considering safety aspects will be outlined.
A special focus is set on PKI-basics, -infrastructures, as well as on specific PKI-formats. Furthermore, an emphasis is set on the commonly used safety protocols IPSec, TLS/SSL, and protocols of infrastructure security.

Media
Slides.

Basic literature
Roland Bless et al. Sichere Netzwerkkommunikation. Springer-Verlag, Heidelberg, Juni 2005.

Complementary literature
- Charlie Kaufman, Radia Perlman, and Mike Speciner. Network Security: Private Communication in a Public World. 2nd Edition. Prentice Hall, New Jersey, 2002.
- Carlisle Adams and 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 and 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.

Course: Datenschutz und Privatheit in vernetzten Informationssystemen Course key: [24605]

Lecturers: Buchmann
Credit points (CP): 3 **Hours per week:** 2
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Large-Scale Information and Knowledge Management [IW4INLIKM] (S. 24), Advanced Concepts of Information and Knowledge Management [IW4INLIKM1] (S. 26)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Course: Computer Contract Law — Course key: [24612]

Lecturers: Michael Bartsch
Credit points (CP): 3 **Hours per week:** 2/0
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Law of the Information Economy [IW4INJUINWI] (S. 47), Law for Information Companies [IW4INJURDIU] (S. 49)

Learning Control / Examinations
Written exam (§ 4 (2) 2 of the SPO).

Prerequisites
None.

Conditions
None.

Learning Outcomes
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.

Content
The course deals with contracts from the following areas:

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

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

Media
transparancies

Basic 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

Complementary literature
tba in the transparencies

Course: Algorithms for Planar Graphs — Course key: [24614]

Lecturers: Dorothea Wagner, Ignaz Rutter
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Algorithms [IW4INAALG] (S. 21)

Learning Control / Examinations
Assessment will consist of an oral exam (20 min) following §4, Abs. 2, 2 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content
A planar graph is defined as a graph that can be drawn in the plane such that no edges intersect. Planar graphs have many interesting properties that can be used to solve several problems in a particularly simple, fast and elegant way. In addition, some problems that are (NP-)hard in general graphs can be efficiently solved in planar graphs. The lecture presents a selection of these problems and corresponding algorithmic approaches.

Course: Algorithms for Visualization of Graphs — Course key: [24621]

Lecturers: Dorothea Wagner, Martin Nöllenburg
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Algorithms [IW4INAALG] (S. 21)

Learning Control / Examinations
Assessment will consist of an oral exam (20 min) following §4, Abs. 2, 1 of the SPO.

Prerequisites
Lecture *Algorithmentechnik* [24079] is recommended.

Conditions
None.

Learning Outcomes
The students acquire a systematic understanding of algorithmic problems and solutions in the area of graph visualization, which builds upon existing knowledge in graph theory and algorithmics. The problems at hand are reduced to their algorithmic core and are subsequently solved efficiently – if possible from the complexity point-of-view. The students learn to apply the presented methods and techniques autonomously to related questions. They are enabled to work on current research questions in graph drawing.

Content
Networks are relational data that increasingly occur in various applications. Examples range from physical networks, for example, transport or supply networks, to abstract networks, for example, social networks. Network visualization is a basic tool to explore and understand such networks.

Mathematically, networks are modeled as graphs and the visualization problem reduces to the algorithmic core problem of finding a suitable graph layout, that is, determining the positions of vertices and edges in the plane. Depending on the application and the properties of the graph at hand different constraints and optimization criteria apply. The corresponding research area of graph drawing uses approaches from algorithmics, graph theory, and computational geometry.

In the course of the lecture, a representative selection of visualizationalgorithms is presented.

Media
Slides.

Course: Algorithms for Cellular Automata — Course key: [24622]

Lecturers: Thomas Worsch
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Algorithms [IW4INAALG] (S. 21)

Learning Control / Examinations
Assessment will consist of an oral exam (20 min) following §4, Abs. 2, 1 of the SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Students get acquainted with the basic and important approaches to and techniques for fine-grained parallel algorithms.
They are able to develop simple CA algorithms themselves which use these techniques and to asses the quality.

Content
Cellular automata are an important model for fine-grained parallelism, which was developed by John von Neumann using a suggestion by S. Ulam.
In the course important basic algorithms (e.g. for synchronization) and techniques for the design of efficient fine-grained algorithms are introduced. The application of these algorithms in different problem areas shown. Besides self-replication, which was von Neumann's motivation, pattern transformations and problem known from sequential algorithms like sorting, this also includes typical parallel problems like leader election and the modelling of real phenomena.
Contents:

- computational complexity
- pattern recognition
- self-reproduction
- sorting
- syncronization
- leader election
- discretization of continuous systems
- sandpile model

Media
lecture notes and slides in pdf format; computer demonstrations

Complementary literature

- 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

Course: Model Driven Software Development — Course key: [24625]

Lecturers: Ralf Reussner
Credit points (CP): 4 **Hours per week:** 2
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Software Systems [IW4INSW] (S. 29)

Learning Control / Examinations
The assessment consists of an oral exam (20 min) following §4, Abs. 2, 2 SPO.

Prerequisites
Software Engineering

Conditions
Software Engineering

Learning Outcomes

Content

Course: Component Based Software Engineering Course key: [24626]

Lecturers: Ralf Reussner
Credit points (CP): 3 **Hours per week:** 2
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: e-Collaboration [IW4INECOLL] (S. 22), Software Systems [IW4INSW] (S. 29)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Basic literature

- C. Szyperski, D. Gruntz, S. Murer, Component Software, Addison-Wesley, 2002, 2nd Ed.
- F. Griffel, Componentware, dPunkt Verlag, 1998

Course: Telecommunications Law — Course key: [24632]

Lecturers: Indra Spiecker genannt Döhmann
Credit points (CP): 3 **Hours per week:** 2/0
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Law of the Information Economy [IW4INJUINWI] (S. 47), Law of the Information Society [IW4INJURDIG] (S. 48)

Learning Control / Examinations
The assessment consists of an written exam (following §4(2), 1 SPO).

Prerequisites
None.

Conditions
None.

Learning Outcomes
Telecommunications is the technical basis of the Information Engineering and Management. In which way for example UMTS is regulated, is of relevant importance for the supply of services in the world of the mobile contents services. The central defaults of the telecommunications regulation are in the telecommunications law (TKG). This was completely amended due to community-legal defaults 2004. The lecture procures for apprehending the basics of legal framework of the information society the essential knowledge in telecommunication law.

Content
The lecture offers an overview of the new TKG. The whole range of the regulation is treated: Of the material-legal instruments of the competition-creative economic regulation (market -, entrance -, payment regulation as well as special supervision of abuse) and the non-economic regulation (customer protection; Broadcasting; Assignment of frequencies, numbers and rights of way; secrecy of telecommunications; Data security and public security) up to the institutional arrangement of the regulation. To assist in the understanding the technical and economic bases are clarified as well as community and constitutional default sat at the beginning of the lecture.

Media
Content structure

Basic literature
Since the law material is to be partly compiled in the discourse with the studying, a current version of the TKG is to be bring along to the lecture.
Further literature will be announced in the lecture.

Complementary literature
tba

Course: Mobile Communication — Course key: [24643]

Lecturers: Martina Zitterbart, Oliver Waldhorst
Credit points (CP): 4 **Hours per week:** 2/0
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Infrastructures [IW4INNET] (S. 27)

Learning Control / Examinations
Assessment will consist of an oral exam (20 min) following § 4 Abs. 2 Nr. 1 SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The goal of the course is to introduce the technical foundations of mobile communication systems (signal propagation, medium access, etc.). An additional focus is on topics of current research (Mobile IP, Ad hoc Networks, Mobile TCP, etc.).

Content
The course “Mobile Communication” uses prominent examples for systems of currently deployed mobile communication systems, to explain typical architectures of such systems, e.g. mobile telecommunication systems, wireless personal, local, and metropolitan area networks. Additional topics related to current research efforts include TCP/IP-based communication over mobile networks and positioning systems. The goal of the course is not to teach facts on particular architectures and standards, but to show typical problems in mobile communications and present typical solutions. The fundamental principles of digital wireless transmissions including the frequency bands, signal dispersion, modulation, and multiplexing are explained by application examples.

Media
Slides.

Basic literature
J. Schiller; Mobilkommunikation; Addison-Wesley, 2003.

Complementary literature
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

Course: Tax Law II — Course key: [24646]

Lecturers: Detlef Dietrich
Credit points (CP): 3 **Hours per week:** 2/0
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Law of the Information Economy [IW4INJUINWI] (S. 47), Law for Information Companies [IW4INJURDIU] (S. 49)

Learning Control / Examinations
The assessment consists of a written exam following §4, Abs. 2, 1 of the SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
It is the target of the lecture to provide extended knowledge in business administration related theory of taxation in the field of economics and law, based on the general lecture “introduction to corporate tax law”. The students obtain the basis for an economic examination of the fiscal prescriptions and are able to assess the impact on business decisions. The emphasis is on such tax law regulations which allow possibilities for action and decision to the taxpayer.

Content
The lecture requires basic knowledge of commercial law and company law as well as of earnings tax law. Basic and current questions of German corporate taxation are systematically prepared in topic blocs; foils, leaflets and supplementary references are distributed in the individual sessions. There is room for discussion. A recent text collection of the tax laws will be necessary.

Media
transparancies

Basic literature
- Grashoff, Steuerrecht, Verlag C.H. Beck, latest edition.
- 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

Course: Civil Law for Advanced — Course key: [24650]

Lecturers: Peter Sester
Credit points (CP): 3 **Hours per week:** 2/0
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Law of the Information Economy [IW4INJUINWI] (S. 47), Law for Information Companies [IW4INJURDIU] (S. 49)

Learning Control / Examinations
The assessment consists of a written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The course intents to build up extensive knowledge in german corporate law, trade law and civil law especially in contract law. It is designed for students who have already passed the courses *Civil Law for Beginners* [24012], *Advanced Civil Law* [24504], and *Commercial and Corporate Law* [24011/24509]. At the end students should be able to think through complex legal and economic questions.

Content
The course will focus on corporate law, trade law and civil law, especially contract law. We will discuss legal problems on the basis of selected examples in a application orientated way.

Basic literature
Klunzinger, Eugen: Übungen im Privatrecht, Verlag Vahlen, ISBN 3-8006-3291-8, in der neuesten Auflage

Course: Algorithms for Ad-hoc and sensor networks — Course key: [24654]

Lecturers: Bastian Katz
Credit points (CP): 4 **Hours per week:** 2
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Algorithms [IW4INAALG] (S. 21)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Course: Software Development for modern, parallel platforms Course key: [24660]

Lecturers: Walter F. Tichy, Pankratius
Credit points (CP): 3 **Hours per week:** 2
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Software Systems [IW4INSW] (S. 29)

Learning Control / Examinations
The assessment consists of an oral exam (20 min) following §4, Abs. 2, 2 of the SPO.

Prerequisites
Basic knowledge in the fields of sotware engineering and programming languages as for example teached in the lecture *Multikern-Rechner und Rechnerbündel* [24112] in the winter term is necessary.

Conditions
None.

Learning Outcomes

Content

Course: Patent Law — Course key: [24661]

Lecturers: Bernhard Geissler
Credit points (CP): 3 **Hours per week:** 2/0
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Law of the Information Economy [IW4INJUINWI] (S. 47), Law of the Information Society [IW4INJURDIG] (S. 48)

Learning Control / Examinations
Assessment will consist of a written exam following §4, Abs. 2, 1 of the SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
It is the aim of this course to provide students with knowledge in the area of patent law and the business of technical intellectual property that builds upon, and goes beyond the knowledge the students have already acquired in the general lecture of *Industrial and intellectual property law*. Students shall understand how the legal rules depend upon, and interact with, the economic background and the legislative policy in the field of technical intellectual property, particularly in the field of information and communication technologies. Students shall learn about the rules of national, European and international patent law as well as know-how protection law and to apply these legal rules in practical cases, in particular in the area of utilizing technical intellectual property through agreements and lawsuits. The conflict between the monopoly of a patent and the antitrust law policies in Europe will be reviewed with the students.

Content
The course deals with the subject matter of the law of technical intellectual property, in particular inventions, patents, utility models, design patents, know-how, the rights and obligations of employees as creators of technical IP, licensing, limitations and exceptions to patenting, term of protection, enforcement of the rights and defence against these in invalidation and revocation actions. The course does not merely focus on German patent law, but likewise puts European, US and international patent law into perspective. Students shall understand how the legal rules depend upon, and interact with, the economic background and the legislative policy in the field of technical intellectual property, particularly in the field of information and communication technologies. Students shall learn about the rules of national, European and international patent law as well as know-how protection law and to apply these legal rules in practical cases, in particular in the area of utilizing technical intellectual property through agreements and lawsuits. The conflict between the monopolyöf a patent and the antitrust law policies in Europe will be reviewed with the students.

Media
transparancies

Basic literature
- Schulte, Rainer Patentgesetz Carl Heymanns Verlag, 7. Aufl. 2005 ISBN 3-452-25114-4
- Kraßer, Rudolf, Patentrecht Verlag C.H. Beck, 5. Aufl. 2004 ISBN 3-406-384552

Complementary literature
tba in the transparencies

Course: European and International Law — Course key: [24666]

Lecturers: Indra Spiecker genannt Döhmann
Credit points (CP): 3 **Hours per week:** 2/0
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Law of the Information Economy [IW4INJUINWI] (S. 47), Law of the Information Society [IW4INJURDIG] (S. 48)

Learning Control / Examinations
The assessment consists of a written exam (following §4(2), 1 SPO).

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Media
Content structure

Basic literature
Further details will be announced in the lecture.

Complementary literature
Further details will be announced in the lecture.

Course: Employment Law II — Course key: [24668]

Lecturers: Alexander Hoff
Credit points (CP): 3 **Hours per week:** 2
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Law of the Information Economy [IW4INJUINWI] (S. 47), Law for Information Companies [IW4INJURDIU] (S. 49)

Learning Control / Examinations
The assessment consists of a written exam following §4, Abs. 2, 1 of the SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content
Students will gain insight into the statutory rights of employees and tariff law. They learn about the importance of employers associations and unions for the economy and gain adequate knowledge of laws concerning industrial action, supply of temporary workers and social security law.

Basic literature
Tba at the beginning of the course.

Course: Simulation of Computer Networks — Course key: [24669]

Lecturers: Hannes Hartenstein
Credit points (CP): 4 **Hours per week:** 2/0
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Infrastructures [IW4INNET] (S. 27)

Learning Control / Examinations
The assessment will consist of a 30 minute written exam according to § 4 Abs. 2 Nr. 1 SPO.

Prerequisites
Basics in computer networks, according to the lectures *Kommunikation und Datenhaltung* are required. Additionally the lecture Wahrscheinlichkeitstheorie und Statistik is required.

Conditions
Dependencies according to the module description.

Learning Outcomes
Goal of this lecture is to introduce on the one hand the theoretical basics of simulation of computer networks, and on the other hand practical insights into running simulation studies. An important issue is the modeling of the different building blocks used insimulations.

Content
The simulation of computer networks is a method to quickly and cost-efficiently study and evaluate protocols and therefore is an important tool for network research. While analytical approaches often have to fight against the complexity of the scenarios and field studies cause high costs concerning hardware, simulations allow to efficiently investigate on the parameter space with respect to network topologies, communication patterns and dependencies among protocols. However, simulations results are only of relevance if a precise modeling, simulation run and evaluation has been done. The lecture impart knowledge on the necessary basics with respect to mathematics and algorithms as well as practical experiences in the usage of simulators and simulation tools.

Media
Slides

Basic literature
- Averill Law, W. David Kelton, Simulation Modeling and Analysis, 4th ed., McGraw-Hill, 2006.

Course: Next Generation Internet — Course key: [24674]

Lecturers: Roland Bless
Credit points (CP): 4 **Hours per week:** 2/0
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Infrastructures [IW4INNET] (S. 27)

Learning Control / Examinations
Assessment will consist of an oral exam (20 min) following § 4 Abs. 2 Nr. 1 SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Objective of the lecture is to present latest developments in Internet-based networks and to explain the related advanced methods and techniques that are used. Furthermore, architectural principles of the current Internet are discussed and it is described which new challenges threaten the Internet architecture.

Content
In the main focus of the lecture are latest developments in the area of Internet-based network technologies. At first architectural principles of the current Internet are described and discussed. Next, nowadays and future challenges are presented. Methods to support quality of service (QoS), signaling of QoS requirements as well as IPv6 and multicast support for group communications are described. Application of the presented technologies in IP-based networks are discussed. Advanced approaches like active and programmable networks are presented in this lecture and recent developments in peer-topeer networks.

Media
Slides

Basic literature
James F. Kurose, and Keith W. Ross *Computer Networking* 4th edition, Addison-Wesley/Pearson, 2007, ISBN 0-321-49770-8, Chapters 1, 2.6 (P2P), 4 (Network Layer), 75 - 76 (Scheduling, IntServ, DiffServ, RSVP)

Complementary literature
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

Course: Aktuelle Probleme des Patentrechts — Course key: [24806]

Lecturers: Klaus-J. Melullis
Credit points (CP): 3 **Hours per week:** 2/0
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Law of the Information Economy [IW4INJUINWI] (S. 47), Law of the Information Society [IW4INJURDIG] (S. 48)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Course: Practical Course Data Warehousing and Mining Course key: [24874]

Lecturers: Klemens Böhm
Credit points (CP): 4 **Hours per week:** 2
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Large-Scale Information and Knowledge Management [IW4INLIKM] (S. 24), Advanced Concepts of Information and Knowledge Management [IW4INLIKM1] (S. 26)

Learning Control / Examinations
The assessment will be an "Erfolgskontrolle anderer Art" and consists of several parts (projects, experiments, presentations and reports, according to §4, Abs 2 of the Prüfungsordnung). The course will be assessed with "passed" or "failed" (according to §9, Abs. 3 of the Prüfungsordnung Informationswirtschaft / §7, Abs. 3 of the Prüfungsordnung Informatik). In order to get the passed assessment for the practical course, every part of the assessment must be passed successfully.

Prerequisites
Lecture "Data Warehousing and Mining".

Conditions
None.

Learning Outcomes
In this practical course, the students should transfer the theoretical knowledge from the lecture "Data Warehousing and Mining" into practice. In this process, the students will also learn how to work with common tools and how to deploy them. In the data warehousing block, the students should learn how to set up data warehouses and should become familiar with the data-cube model. In the data mining block, the students should become familiar with the common data-mining techniques. They will be confronted with the typical problems in data mining and will learn how to develop solutions. Furthermore, the students should learn to work in teams in order to work on various projects successfully.

Content
The practical course data warehousing and mining will deepen the theoretical knowledge from the lecture "Data Warehousing and Mining", with a focus on practical aspects and common tools. The course is divided into two blocks, data warehousing and data mining. The data warehousing block focuses on data preprocessing and building data warehouses. The data-mining block roughly follows the KDD process with practical knowledge-discovery examples in businesses. With such examples, the different data-mining concepts are investigated. The focus is on techniques for clustering, classification and discovering frequent itemsets and association rules. Working in teams is another important aspect in the whole course.

Media
- Slides.
- Practical course notes.

Complementary literature
- J. Han und M. Kamber: "Data Mining: Concepts and Techniques", Morgan Kaufmann, 2006.
- I. H. Witten und E. Frank: "Data Mining - Practical Machine Learning Tools and Techniques", Morgan Kaufmann, 2005.
- D. Hand, H. Mannila und P. Smyth: "Principles of Data Mining", MIT Press, 2001.
- L. I. Kuncheva: "Combining Pattern Classifiers", Wiley-Interscience, 2004.
- A. Bauer, H. Günzel: "Data Warehouse Systeme – Architektur, Entwicklung, Anwendung", dpunkt.verlag, 2004.

Course: Principles of Insurance Management — Course key: [25055]

Lecturers: Ute Werner
Credit points (CP): 4 **Hours per week:** 3/0
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Operational Risik Management [IW4WWORM] (S. 45)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Remarks
This lecture will be held additionally in the summer term 2009.

Course: Advanced Lab Applied Informatics — Course key: [25070p]

Lecturers: Andreas Oberweis, Hartmut Schmeck, Detlef Seese, Wolffried Stucky, Rudi Studer, Stefan Tai
Credit points (CP): 5 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: e-Collaboration [IW4INECOLL] (S. 22)

Learning Control / Examinations
The assessment of this course are practical work, presentations and a written seminar thesis according to §4(2), 3 of the examination regulation of the Bachelor of Science programme in Information Engineering and Management. Practical work, presentations and a written thesis are weighted according to the course.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Students are able to

- implement a prototype at the computer based on the given topic.
- write the thesis with a minimal learning curve by using format requirements such as those recommended by well-known publishers.
- give presentations in a scientific context in front of an auditorium. These techniques are presented and learn during the course.
- present results of the research in written form generally found in scientific publications.

Content
The lab intensifies and extends specific topis which are discussed within corresponding lectures. Knowledge of these lecture topics is an advantage but not a precondition.

Media
Slides, access to internet resources

Basic literature
Literature will be given individually.

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 http://www.aifb.uni-karlsruhe.de/Lehre

Course: Seminar in Applied Informatics — Course key: [25070s]

Lecturers: Andreas Oberweis, Hartmut Schmeck, Detlef Seese, Wolffried Stucky, Rudi Studer, Stefan Tai
Credit points (CP): 4 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: e-Collaboration [IW4INECOLL] (S. 22)

Learning Control / Examinations
The assessment is done according to §4(2), 3 of the examination regulation of the Master of Science programme in Information Engineering and Management in form of an evaluation of the seminar presentation and a written seminar report. The weighting of the individual marks (presentation and report) is announced at the beginning of the seminar.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Students are able to

- do literature search based on a given topic: identify relevant literature, find, assess and evaluate this literature.
- write the seminar thesis (and later the Bachelor-/Masterthesis) with a minimal learning curve by using format requirements such as those recommended by well-known publishers.
- give presentations in a scientific context in front of an auditorium. These techniques are presented and learn during the seminar.
- present results of the research in written form generally found in scientific publications.

Content
The seminar intensifies and extends specific topis which are discussed within corresponding lectures. The actual topics are changing each semester. Knowledge of these lecture topics is an advantage but not a precondition.

Media
Slides, Access to internet resources

Basic literature
Literature will be given individually.

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 http://www.aifb.uni-karlsruhe.de/Lehre

Course: Modern Market Research — Course key: [25154]

Lecturers: Wolfgang Gaul
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Marketing [IW4WWMAR] (S. 37), Marketing Research [IW4WWMAR1] (S. 38), Quantitative Marketing and OR [IW4WWMAR2] (S. 39), Behavioral Approaches in Marketing and Data Analysis [IW4WWMAR3] (S. 40), Strategy, Innovation and Data Analysis [IW4WWMAR4] (S. 41)

Learning Control / Examinations

Prerequisites
Basic knowledge of statistics.

Conditions
None.

Learning Outcomes

Content

Course: Marketing and Operations Research — Course key: [25156]

Lecturers: Wolfgang Gaul
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Marketing [IW4WWMAR] (S. 37), Marketing Research [IW4WWMAR1] (S. 38), Quantitative Marketing and OR [IW4WWMAR2] (S. 39)

Learning Control / Examinations

Prerequisites
Basics of Operations Research are required.

Conditions
None.

Learning Outcomes

Content

Course: Corporate Planning and Operations Research — Course key: [25158]

Lecturers: Wolfgang Gaul
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Marketing [IW4WWMAR] (S. 37), Marketing Research [IW4WWMAR1] (S. 38), Quantitative Marketing and OR [IW4WWMAR2] (S. 39)

Learning Control / Examinations

Prerequisites
Basics of operations research are assumed.

Conditions
None.

Learning Outcomes

Content

Course: e-Business & electronic Marketing — Course key: [25160]

Lecturers: Wolfgang Gaul
Credit points (CP): 2,5 **Hours per week:** 1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Marketing [IW4WWMAR] (S. 37), Marketing Research [IW4WWMAR1] (S. 38)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Course: Information Technology and Business Information — Course key: [25162]

Lecturers: Bruno Neibecker
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Marketing [IW4WWMAR] (S. 37), Behavioral Approaches in Marketing and Data Analysis [IW4WWMAR3] (S. 40), Strategy, Innovation and Data Analysis [IW4WWMAR4] (S. 41)

Learning Control / Examinations
Examination performance will consist of a written exam accorcing to the description of the module (written exam following §4(2), 1 of the Prüfungsordnung Informationswirtschaft).

Prerequisites
None.

Conditions
None.

Learning Outcomes
(see description of the course)

Content
The goal of the course is to create a text that is comprehensive, practical, applied, and managerial and that presents a balanced coverage of both, quantitative and qualitative approaches. It takes the perspective of users of marketing research and set out to reflect the current trends in the use of computers (e.g. statistical packages and online research). The course covers as main topics an introduction to interactive mulimedia systems, techniques of internet marketing research, methods of primary data collection including questionnaires and scaling of psychological attributes, methods of observation, program analyzer, psychobiological methods, content analysis and cognitive response approach, experimental designs and panels, secondary data collection, management support systems, a case study in marketing decision support and an overview of philosophy of science.

Basic literature
(Literature is in English and German, see German description)

Course: International Marketing — Course key: [25164]

Lecturers: Wolfgang Gaul
Credit points (CP): 2,5 **Hours per week:** 1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Marketing [IW4WWMAR] (S. 37), Marketing Research [IW4WWMAR1] (S. 38)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Course: Marketing and Innovation — Course key: [25165]

Lecturers: Wolfgang Gaul
Credit points (CP): 2,5 **Hours per week:** 1/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Marketing [IW4WWMAR] (S. 37), Marketing Research [IW4WWMAR1] (S. 38)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Course: Strategic and Innovative Decision Making in Marketing Course key: [25166]

Lecturers: Bruno Neibecker
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Marketing [IW4WWMAR] (S. 37), Strategy, Innovation and Data Analysis [IW4WWMAR4] (S. 41)

Learning Control / Examinations
Examination performance will consist of a written exam accorcing to the description of the module (written exam following §4(2), 1 of the Prüfungsordnung Informationswirtschaft).

Prerequisites
See corresponding module information.

Conditions
None.

Learning Outcomes
(see description of the course)

Content
The course places emphasis on the role of marketing in strategic planning. The planning and implementation stages are discussed using a case study in business portfolio analysis, talking about experience effects, approaches in defining strategic business units. A critical view on established paradigms versus weak signals from management practice is given. Further topics are innovation and diffusion models, behavioral approaches to innovative decision processes and a discussion on Porter's single diamond theory and globalization.

Basic literature
(Literature is in English and German, see German description)

Course: Behavioral Approaches in Marketing — Course key: [25167]

Lecturers: Bruno Neibecker
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Marketing [IW4WWMAR] (S. 37), Behavioral Approaches in Marketing and Data Analysis [IW4WWMAR3] (S. 40)

Learning Control / Examinations
Examination performance will consist of a written exam accorcing to the description of the module (written exam following §4(2), 1 of the Prüfungsordnung Informationswirtschaft).

Prerequisites
None.

Conditions
(see description of the module)

Learning Outcomes

Content
This course gives an introduction to consumer behavior and the influence of cognitive and emotional information processing on consumer decision making. The contribution of advertising response models is considered and faced with social and environmental aspects (e.g. cross-cultural influences) on consumer behavior, mass communication and internet advertising. In addition, a scientific case study on the effectiveness of TV-commercials is discussed. Central issues of the course:
Case Studies in brand management and advertising response.
Psychological factors (research design and test marketing / arousal / effectiveness of TV-commercials as case studies).
Emotions in marketing.
Information processing and retention in memory (schema theory / visual information processing).
Complex advertising response models (attitude towads the ad / attitude towards the brand / persuasion / context effects in learning / decision making / Means-end-theory and strategic advertising).
Social processes (culture / subculture / cross cultural influence / product design).

Basic literature
(Literature is in English and German, see German description)

Course: Entrepreneurship and Marketing — Course key: [25170]

Lecturers: Wolfgang Gaul
Credit points (CP): 2,5 **Hours per week:** 1/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Marketing [IW4WWMAR] (S. 37), Marketing Research [IW4WWMAR1] (S. 38)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes
The Student should ...

Content

Course: Data Analysis and Operations Research — Course key: [25171]

Lecturers: Wolfgang Gaul
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Marketing [IW4WWMAR] (S. 37), Marketing Research [IW4WWMAR1] (S. 38), Quantitative Marketing and OR [IW4WWMAR2] (S. 39)

Learning Control / Examinations

Prerequisites
Basics of data analysis and operations research are assumed.

Conditions
None.

Learning Outcomes

Content

Course: Master Seminar in Marketing

Course key: [25192]

Lecturers: Wolfgang Gaul
Credit points (CP): 4 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Marketing [IW4WWMAR] (S. 37)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Course: Master Seminar zu Marktforschung — Course key: [25193]

Lecturers: Wolfgang Gaul
Credit points (CP): 4 **Hours per week:** 2
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Marketing Research [IW4WWMAR1] (S. 38)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Course: Master Seminar in Quantitative Marketing and OR Course key: [25194]

Lecturers: Wolfgang Gaul
Credit points (CP): 4 **Hours per week:** 2
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Quantitative Marketing and OR [IW4WWMAR2] (S. 39)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Course: Stochastic Calculus and Finance — Course key: [25331]

Lecturers: Svetlozar Rachev
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Englisch
Part of the modules: Finance, Econometrics, and Risk Management [IW4WWFERM] (S. 31)

Learning Control / Examinations
The assessment of this course consists of a written examination (following §4(2), 1 SPO) and of possible additional assignments during the course (following §4(2), 3 SPO).

Prerequisites
None.

Conditions
None

Learning Outcomes
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
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

Media
transparencies, exercises.

Basic literature
To be announced in lecture.

Complementary literature
Hull, J., Options, Futures, & Other Derivatives, Prentice Hall, Sixth Edition, (2005).

Course: Statistical Methods in Financial Risk Management Course key: [25353]

Lecturers: Svetlozar Rachev
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Englisch
Part of the modules: Finance, Econometrics, and Risk Management [IW4WWFERM] (S. 31)

Learning Control / Examinations
The assessment of this course consists of a written examination (following §4(2), 1 SPO) and of possible additional assignments during the course (following §4(2), 3 SPO).

Prerequisites
None.

Conditions
None.

Learning Outcomes
Introduction of statistical methods, topics commonly covered by courses on advanced statistics and econometrics supplemented by the latest scientific results in this area

Content
Financial risk management in financial instruments (risk indicators: Single Fixed Flow,Fixed Rate Bond, FRA, Interest Rate Futures, Interest Rate Swaps, FX Spot, FX Forward, “Plain Vanilla” Optionen) and portfolios (risk indicators: Pricing Environment, Interest Rate Factors, FX factors), credit risk, value-at-risk (VAR) and
asset liability management, evaluation of calibration models and measures of success in risk models, determination of operativ risk in the finacial industry.

Media
transparencies, exercises.

Basic literature
To be announced in lecture.

Course: Portfolio and Asset Liability Management — Course key: [25357]

Lecturers: Svetlozar Rachev
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Englisch
Part of the modules: Finance, Econometrics, and Risk Management [IW4WWFERM] (S. 31)

Learning Control / Examinations
The assessment of this course consists of a written examination (following §4(2), 1 SPO) and of possible additional assignments during the course (following §4(2), 3 SPO).

Prerequisites
None.

Conditions
None.

Learning Outcomes
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

Media
transparencies, exercises.

Basic literature
To be announced in lecture.

Complementary literature
To be announced in lecture.

Course: Financial Time Series and Econometrics — Course key: [25359]

Lecturers: Svetlozar Rachev
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Englisch
Part of the modules: Finance, Econometrics, and Risk Management [IW4WWFERM] (S. 31)

Learning Control / Examinations
The assessment of this course consists of a written examination (following §4(2), 1 SPO) and of possible additional assignments during the course (following §4(2), 3 SPO).

Prerequisites
None.

Conditions
None.

Learning Outcomes
After successful completion of the course students will have the knowledge and qualification to comprehend the essential models -incl. state of the arts science- in financial econometrics, as well as risk measurement and management.

Content
Linear financial time series models: ARMA, ARIMA and forecasting, integrated time series models and so called long memory processes.
Non linear financial time series models: test for odyssey properties, stochastic variance and ARCH-process, regime switching models, test for non linearity, root of unit test and cointegration

Media
transparencies lecture, exercises

Basic literature
Mills: The Econometric Modelling Of Financial Markets. Cambridge University Press.

Course: Game Theory II — Course key: [25369]

Lecturers: Siegfried Berninghaus
Credit points (CP): 6 **Hours per week:** 2/2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Stochastic Modeling and Optimization [IW4WWSSMI] (S. 46)

Learning Control / Examinations
Written exam (80 minutes).

Prerequisites
Basic knowledge of mathematics and statistics is assumed.

Conditions
None.

Learning Outcomes
This course teaches advanced knowledge in strategic decision theory. Latest developments in game theory are discussed. The student learns to judge complex strategic problems and to offer adequate solutions.

Content
This lecture aims at apmplifying the students' knowledge in game theory. Main topics are further concepts of non-cooperative game theory, cooperative game theory, evolutionary game theory and bargaining theory.

Media
Folien, Übungsblätter.

Basic literature
Berninghaus/Ehrhart/Güth, Strategische Spiele, 2. Auflage, Springer Verlag, 2006
van Damme, Stability and Perfection of Nash Equilibria, 2. Auflage, Springer Verlag, 1991

Complementary literature

- Aumann/Hart (edts.), Handbook of Game Theory I-III, Elsevier Publishers, North Holland, 1992/1994/2002

Course: Advanced Econometrics of Financial Markets Course key: [25381]

Lecturers: Svetlozar Rachev
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Englisch
Part of the modules: Finance, Econometrics, and Risk Management [IW4WWFERM] (S. 31)

Learning Control / Examinations
The assessment of this course consists of a written examination (following §4(2), 1 SPO) and of possible additional assignments during the course (following §4(2), 3 SPO).

Prerequisites
None.

Conditions
None.

Learning Outcomes
After successful completion of the course students will have attained both knowledge and competency to comprehend the theories behind portfolio management of major financial institutions. Hence students can adapt this understanding to the more specialised needs of the intermediary.

Content
Advanced Econometrics of Financial Markets covers: Forecasting stock return, market microstructure(non-synchronised trading, spread and modelling transactions), “event studies analysis”, capital asset pricing model, multi-factor price models, intertemporal equilibrium models.

Media
transparencies, exercises.

Basic literature
Campbell, Lo, McKinlay: The Econometrics of Financial Markets. Princeton University Press.

Course: Operations Management — Course key: [25598]

Lecturers: Cornelia Schön
Credit points (CP): 5 **Hours per week:** 3
Term: Wintersemester **Level:** 3
Teaching language: Englisch
Part of the modules: Service Management [IW4WWSER1] (S. 36)

Learning Control / Examinations
The assessment of this course consists of a written examination (60 min) (following §4(2), 1 SPO).

Prerequisites
Successful completion of the module *Introduction to Operations Research* [IW1WWOR].

Conditions
None.

Learning Outcomes
Provide a general introduction to the language, concepts, techniques, tools, and actual developments of operations management.

Content
This course will provide a general introduction to the concepts and techniques of operations management, i.e. the design, planning, control, and improvement of manufacturing and service operations. The course begins with a strategic view of the operations function within a firm at the interface to other business functions such as finance, marketing, and human resources. We stress the role of operations for gaining competitive advantage, and discuss how to coordinate three tiers of operations, namely product development, process management, and supply chain management. As we proceed, we will investigate various problems of operations management at the tactical level in detail.
Particular attention is paid to services which are the largest and fastest growing segment of our economy and which play also an increasing role for manufacturing firms to remain competitive. Services pose particular challenges to managers due to their intangible and experiential nature, perishability and high levels of customer involvement. For services, “process is the product” and the customer often participates in the service delivery process as an external input factor. Accordingly, managing services requires tight integration between operations, strategy, marketing, technology, and organizational issues from an integrated viewpoint with a focus on the customer. Therefore, approaches from manufacturing operations management may not be applied directly to the service context without modifications.
We will cover selected topics in the areas of

- The Process View of the Organization
- Operations Strategy and Management
- Forecasting and Modelling Demand
- Process Analysis and Design
- Product and Service Design
- Logistics and Supply Chain Management
- Inventory Management and Replenishment (EOQ, Newsvendor, Order-up-to Inventory Model, Lot Sizing)
- Capacity Management, Queueing Analysis
- Revenue Management with Capacity Controls
- Project Management and Operations Scheduling
- Layout and Flows
- Push and Pull Production: MRP and JIT
- APS and ERP Systems
- Process Improvement and Quality

The course strives to provide a balance between qualitative (more strategic) concepts and a more quantitative approach at the tactical level drawing on models and methods from Operations Research. In addition to the fundamentals of operations management, we will discuss recent research results from scientific publications and actual case study applications.

Media
Lecture slides.

Course: Markovian Decision Processes — Course key: [25653]

Lecturers: Karl-Heinz Waldmann
Credit points (CP): 5 **Hours per week:** 2/1/2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Stochastic Modeling and Optimization [IW4WWSSMI] (S. 46)

Learning Control / Examinations
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by 0.3.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The lecture provides students with knowledge on Markov decision processes for analysis to control and optimize stochastic dynamic systems. They are able to apply the theory aquired and to adjust the models to actual problems. They develop the optimality criterion and can solve the resulting optimal value function efficiently to gain optimal policies and the optimal value.

Content
See module.

Media
Blackboard, Slides, Flash Animations.

Basic literature
Lecture Notes.

Remarks
The lecture is offered irregularly. The curriculum of the next two years is available online.

Course: Quality Management I — Course key: [25656]

Lecturers: Karl-Heinz Waldmann
Credit points (CP): 5 **Hours per week:** 2/1/2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Stochastic Methods in Economics and Engineering [IW4WWOQM1] (S. 42)

Learning Control / Examinations
The assessment consists of an 2h written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft combined with quality management II. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by 0.3.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The lecture provides students with knowledge of modern techniques in quality management. Students learn to use the techniques, such as control charts, experimental design, efficiently and targeted.

Content
See module.

Media
Blackboard, Slides, Flash Animations.

Basic literature
Lecture Notes

Complementary literature
- Montgomory, D.C. (2005): Introduction to Statistical Quality Control (5e); Wiley.

Remarks
The lecture is offered irregularly. The curriculum of the next two years is available online.

Course: Quality Management II — Course key: [25659]

Lecturers: Karl-Heinz Waldmann
Credit points (CP): 5 **Hours per week:** 2/1/2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Stochastic Methods in Economics and Engineering [IW4WWOQM1] (S. 42)

Learning Control / Examinations
The assessment consists of an 2h written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft combined with quality management I. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by 0.3.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The lecture provides students with knowledge of modern techniques in reliability engineering.

Content
See module.

Media
Blackboard, Slides, Flash Animations.

Basic literature
Lecture Notes

Complementary literature
- BARLOW, R.E., PROSCHAN, F.: Statistische Theorie der Zuverlässigkeit. Harri Deutsch, Thun-Frankfurt, 1978.
- KOHLAS, J.: Zuverlässigkeit und Verfügbarkeit. B.G. Teubner, Stuttgart, 1987.
- BIROLINI, A: Qualität und Zuverlässigkeit technischer Systeme, Springer, Berlin, 1991.

Remarks
The lecture is offered irregularly. The curriculum of the next two years is available online.

Course: Simulation I — Course key: [25662]

Lecturers: Karl-Heinz Waldmann
Credit points (CP): 5 **Hours per week:** 2/1/2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Stochastic Modeling and Optimization [IW4WWSSMI] (S. 46)

Learning Control / Examinations
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by 0.3.

Prerequisites
Foundations in the following fields are required:

- Operations Research, as lectured in *Introduction to Operations Research I* [25040] and *Introduction to Operations Research II* [25043].
- Statistics, as lectured in *Statistics I* [25008/25009] and *Statistics II* [25020/25021].

Conditions
None.

Learning Outcomes
The lecture provides insights into the typical process in planning and conducting simulation studies.

Content
As the world is getting more complex it is oftern not possible to analytically provide key figures of interest without overly simplifying the problem. Thus efficient simulation techniques become more and more important. In the lecture important basic concepts are presented in terms of selected case studies.
Topics overview: Discrete event simulation, generation of random numbers, generating discrete and continous random variables, statistical analysis of simulated data, variance reduction techniques, case studies.

Media
Blackboard, Slides, Flash Animations, Simulation Software

Basic literature

- Lecture Notes
- K.-H. Waldmann / U. M. Stocker: Stochastische Modelle - Eine anwendungsorientierte Einführung; Springer (2004).

Complementary literature

- A. M. Law / W. D. Kelton: Simulation Modeling and Analysis (3rd ed); McGraw Hill (2000)

Remarks
The lecture is offered irregularly. The curriculum of the next two years is available online.

Course: Simulation II — Course key: [25665]

Lecturers: Karl-Heinz Waldmann
Credit points (CP): 5 **Hours per week:** 2/1/2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Stochastic Modeling and Optimization [IW4WWSSMI] (S. 46)

Learning Control / Examinations
The assessment consists of an 1h written exam following §4(2), 1 SPO. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by 0.3 (§4(2), 3 SPO).

Prerequisites
Foundations in the following fields are required:

- Operations Research, as lectured in *Introduction to Operations Research I* [25040] and *Introduction to Operations Research II* [25043].
- Statistics, as lectured in *Statistics I* [25008/25009] and *Statistics II* [25020/25021].
- *Simulation I*[25662]

Conditions
not any

Learning Outcomes
The lecture provides insights into the typical process in planning and conducting simulation studies.

Content
As the world is getting more complex it is oftern not possible to analytically provide key figures of interest without overly simplifying the problem. Thus efficient simulation techniques become more and more important. In the lecture important basic concepts are presented in terms of selected case studies.
Topics overview: Variance reduction techniques, simulation of stochastic processes, case studies.

Media
Blackboard, Slides, Flash Animations, Simulation Software

Basic literature

- Skript
- K.-H. Waldmann / U. M. Stocker: Stochastische Modelle - Eine anwendungsorientierte Einführung; Springer (2004).

Complementary literature

- A. M. Law / W. D. Kelton: Simulation Modeling and Analysis (3rd ed); McGraw Hill (2000)

Remarks
The lecture is offered irregularly. The curriculum of the next two years is available online.

Course: Optimization in a Random Environment — Course key: [25687]

Lecturers: Karl-Heinz Waldmann
Credit points (CP): 5 **Hours per week:** 2/1/2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Stochastic Methods in Economics and Engineering [IW4WWOQM1] (S. 42)

Learning Control / Examinations
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by 0.3.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Students are enabled to apply their knowledge about techniques and methodology on current problems such as the measurement and evaluation of operational risk as required by the Basel II accord.

Content
See module.

Media
Blackboard, Slides, Flash Animations, Simulation Software

Basic literature
Lecture Notes.

Remarks
The lecture is offered irregularly. The curriculum of the next two years is available online.

Course: Stochastic Processes — Course key: [25690]

Lecturers: Karl-Heinz Waldmann
Credit points (CP): 5 **Hours per week:** 2/1/2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Stochastic Modeling and Optimization [IW4WWSSMI] (S. 46)

Learning Control / Examinations
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft. Credit from the voluntary computer lab is accounted for in the overall grade raising the exam grade by 0.3.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Students learn modern techniques to model and analyze discrete and continuous time random dynamic systems. They are enabled to use this powerful analysis instrument, e.g. to develop key figures in queueing systems or stochastic networks.

Content
See module.

Media
Blackboard, Slides, Flash Animations.

Basic literature
Lecture Notes.

Remarks
The lecture is offered irregularly. The curriculum of the next two years is available online.

Course: Algorithms for Internet Applications — Course key: [25702]

Lecturers: Hartmut Schmeck
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Englisch
Part of the modules: e-Collaboration [IW4INECOLL] (S. 22), Complex Internet Applications [IW4INIAPP] (S. 23)

Learning Control / Examinations
The assessment of this course is a written examination (60 min) according to §4(2), 1 of the examination regulation of the Bachelor of Science programme in Information Engineering and Management and an additional written examination (called “bonus exam”, 60 min) according to §4(2), 3 of the examination regulation (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).

Prerequisites
credits for all the Informatics modules of years 1 and 2 (except for at most one module)

Conditions
None.

Learning Outcomes
The students will learn to master methods and concepts of essential algorithms within Internet applications and to develop capabilities for innovative improvements. The course aims at teaching advanced concepts for the design and application of algorithms with respect to the requirements in networked systems. Based on a fundamental understanding of taught concepts and methods the students should be able to select appropriate concepts and methods for problem settings in their future professional life, and - if necessary - customize and apply them in an adequate way. The students will be capable to find appropriate arguments for their chosen approach to a problem setting.
In particular, the student will - know the structure and elementary protocols of the Internet (TCP/IP) and standard routing algorithms (distance vector and link state routing), - know methods of information retrieval in the WWW, algorithms for searching information and be able to assess the performance of search engines, - know how to design and use cryptographic methods and protocols to guarantee and check confidentiality, data integrity and authenticity, - know algorithmic basics of electronic payment systems and of electronic money, - the architectures and methodologies of firewalls.

Content
Internet and World Wide Web are changing our world, this core course provides the necessary background and methods for the design of central applications of the Internet. After an introduction into Internet technology the following topics are addressed: information retrieval in the www, structure and functioning of search engines, foundations of secure communication, electronic payment systems and digital money, and - if time permits - security architectures (firewalls), data compression, distributed computing on the Internet.

Media
Powerpoint slides with annotations on graphics screen, access to Internet resources, recorded lectures

Basic literature
- Tanenbaum: Computer Networks, 4th edition, Prentice-Hall 2003.
- Baeza-Yates, Ribeiro-Neto: Modern Information Retrieval. Addison-Wesley, 1999.
- Wobst: Abenteuer Kryptologie : Methoden, Risiken und Nutzen der Datenverschlüsselung, 3rd edition. Addison-Wesley, 2001.
- Schneier: Applied Cryptography, John Wiley, 1996.
- Furche, Wrightson: Computer money : Zahlungssysteme im Internet [Übers.: Monika Hartmann]. - 1. Aufl. - Heidelberg : dpunkt, Verl. für Digitale Technologie, 1997.

Complementary literature
- Further references will be given in the course.

Course: Organic Computing — Course key: [25704]

Lecturers: Hartmut Schmeck, Sanaz Mostaghim
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Englisch
Part of the modules: Complex Internet Applications [IW4INIAPP] (S. 23)

Learning Control / Examinations
The assessment of this course consists of a written examination (60 min) (following §4(2), 1 SPO) and of submitting written papers or of writing an additional examination (called "bonus exam", 60 min) (following §4(2), 3 SPO). The exam will be offered every second semester (summer term) and may be repeated at every ordinary exam date.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The student acquires the ability to master methods and concepts of Organic Computing and to demonstrate innovation skills regarding the used methods.
Therefore the course aims at the teaching of fundamentals and methods of Organic Computing within the context of its applicability in practice. On the basis of a fundamental understanding of the taught concepts and methods the students should be able to choose the adequate methods and concepts, if necessary further develop them according to the situation and use them properly when facing related problems in their later job. The students should be capable of finding arguments for the chosen solutions and express them to others.

Content
The mission of Organic Computing is to tame complexity in technical systems by providing appropriate degrees of freedom for self-organized behaviour adapting to changing requirements of the execution environment, in particular with respect to human needs. According to this vision an organic computer system should be aware of its own capabilities, the requirements of the environment, and it should be equipped with a number of "self-x" properties allowing for the anticipated adaptiveness and for a reduction in the complexity of system management. These self-x properties are self-organisation, self-configuration, self-optimization, self-healing, self-protection and self-explanation. In spite of these self-x properties, an organic system should be open to external control actions which might be necessary to prevent undesired behaviour.

Media
powerpoint slides with annotations using a tablet pc access to applets and Internet ressources lecture recording (camtasia).

Basic literature

- Autonomic Computing: Concepts, Infrastructure and Applications. M. Parashar and S. Hariri (Ed.), CRC Press. December 2006.
- Self-Organization in Biological Systems. S. Camazine, J. Deneubourg, N. R. Franks, J. Sneyd, G. Theraulaz and E. Bonabeau. Princeton University Press, 2003.
- Complex Adaptive Systems: An Introduction. H. G. Schuster, Scator Verlag, 2001.
- Introduction to Evolutionary Computing. A. E. Eiben and J. E. Smith. Natural Computing Series, Springer Verlag, 2003. Swarm Intelligence: From Natural to Artificial Systems.Eric Bonabeau, Marco Dorigo and Guy Theraulaz. Oxford University Press, 1999.
- Control of Complex Systems. K. Astrom, P. Albertos, M. Blanke, A. Isidori and W. Schaufelberger. Springer Verlag, 2001.

Complementary literature

- **Adaptive and Self-organising Systems,** Christian Müller-Schloer, Moez Mnif, Emre Cakar, Hartmut Schmeck, Urban Richter,
  June 2007. Preprint.Submitted to ACM Transactions on Autonomous and Adaptive Systems (TAAS)
- **Organic Computing - Addressing Complexity by Controlled Self-organization,** Jürgen Branke, Moez Mnif, Christian Müller-Schloer, Holger Prothmann, Urban Richter, Fabian Rochner, Hartmut Schmeck, In Tiziana Margaria, Anna Philippou, and Bernhard Steffen, *Proceedings of ISoLA 2006*, pp. 200-206. Paphos, Cyprus, November 2006.
- Evolutionary Optimization in Dynamic Environments. J. Branke. Kluwer Academic Publishers, 2002.
- Self-star Properties in Complex Information Systems: Conceptual and Practical Foundations (Lecture Notes in Computer Science. O. Babaoglu, M. Jelasity, A. Montresor, C. Fetzer, S. Leonardi, A. van Moorsel and M. van Steen. Springer Verlag, 2005.
- Design and Control of Self-organizing Systems. C. Gershenson. PhD thesis, Vrije Universiteit Brussel, Brussels, Belgium, 2007.
- VDE / ITG / GI - Positionspapier: Organic Computing - Computer- und Systemarchitektur im Jahr 2010. Juli 2003. it - Information Technology, Themenheft Organic Computing, Oldenbourg Verlag. Volume: 47, Issue: 4/2005.

further references will be announced in class

Course: Nature-inspired Optimisation

Course key: [25706]

Lecturers: Sanaz Mostaghim
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Algorithms [IW4INAALG] (S. 21)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Course: Distributed Algorithms

Course key: [25708]

Lecturers: Hartmut Schmeck
Credit points (CP): 5 **Hours per week:** 3
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Algorithms [IW4INAALG] (S. 21)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Remarks
Currently, this course will not be presented

Course: Distributed Database Systems: Basic Technology for e-Business Course key: [25722]

Lecturers: Andreas Oberweis
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: e-Collaboration [IW4INECOLL] (S. 22)

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

Prerequisites
Knowledge of course *Database Systems and XML* [25724] is expected.

Conditions
None.

Learning Outcomes
Students are familiar with the requirements and limitations of distributed database systems. Based on sound theoretical basis and practical exercises, they are able to design and build a distributed database system. They know methods to ensure error-free operation and the consistency of distributed databases and they are able to identify and to assess current and future application areas of distributed database systems. Furthermore, they know how to use them taking into account aspects of economy.

Content
This lecture deals with tasks in spatially distributed data management under special consideration of aspects of economy. Based on existing general knowledge in the field of database systems, the following topics will be addressed among other things: networked systems, design of distributed databases, distributed transaction concepts, request handling in distributed databases, distributed multi-user control, distributed error handling, and distributed data management on the internet.

Media
Slides, access to internet resources.

Basic literature
- P. Dadam: Verteilte Datenbanken und Client/Server-Systeme. Springer 1996
- M. T. Özsu, P. Valduriez: Principles of Distributed Database Systems. Prentice-Hall 1991

Complementary literature
Further literature is given in each lecture.

Course: Database Systems and XML — Course key: [25724]

Lecturers: Andreas Oberweis
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: e-Collaboration [IW4INECOLL] (S. 22)

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

Prerequisites
None.

Conditions
None.

Learning Outcomes
Students know the basics of XML, as well as appropriate data models and are capable of generating XML documents. They are able to use XML database systems and to formulate queries to XML documents. Furthermore, they 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 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.

Media
Slides, access to internet resources.

Basic 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. 2002
- G. Vossen: Datenbankmodelle, Datenbanksprachen und Datenbankmanagementsysteme. Oldenbourg 2000

Course: Document Management and Groupware Systems Course key: [25735]

Lecturers: Stefan Klink
Credit points (CP): 4 **Hours per week:** 2
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: e-Collaboration [IW4INECOLL] (S. 22)

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

Prerequisites
None.

Conditions
None.

Learning Outcomes
Students master the basics of integration and structure of document management systems (DMS) and know the complete DMS process - from document capture of the archiving until retrieval. Students know how to realize operative workflows. They know which activities are needed to carry out the conceptual design and installation of DMS and they are able to apply a DMS as an archive system, workflow system and retrieval system. Furthermore, they know groupware systems exemplarily and can use them for collaborative tasks.

Content
The lecture gives basics of document management and groupware systems. It covers different system categories, their interaction and their use areas and illustrates this with concrete examples. These include document management in the strict sense, scanning, Document Imaging (acquisition and visualization of scanned documents), indexing, electronic archiving, retrieval of relevant documents, workflow, groupware, and office communications.

Media
Slides, access to internet resources.

Basic literature
- Klaus Götzer, Udo Schneiderath, Berthold Maier, Torsten Komke: Dokumenten-Management. Dpunkt Verlag, 2004, 358 Seiten, ISBN 3-8986425-8-5
- Jürgen Gulbins, Markus Seyfried, Hans Strack-Zimmermann: Dokumenten-Management. Springer, Berlin, 2002, 700 Seiten, ISBN 3-5404357-7-8
- Uwe M. Borghoff, Peter Rödig, Jan Scheffcyk, Lothar Schmitz: Langzeitarchivierung – Methoden zur Erhaltung digitaler Dokumente. Dpunkt Verlag, 2003, 299 Seiten, ISBN 3-89864-258-5

Complementary literature
Further literature is given in each lecture individually.

Course: Knowledge Management — Course key: [25740]

Lecturers: Rudi Studer
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Concepts of Information and Knowledge Management [IW4INLIKM1] (S. 26)

Learning Control / Examinations
The assessment is a written examination of 1 hour according to §4, Abs. 2, 1 of the examination regulations .

Prerequisites
Basics in logic, e.g. from lecture Foundations of Informatics 1.

Conditions
None.

Learning Outcomes
Making students sensitive to the problems of corporate knowledge management, knowledge about the central dimensions of influence as well as of relevant technologies for supporting knowledge management.

Content
In modern corporations, knowledge is an increasingly important aspect for fullfilling central tasls (amelioration of business processes, increasing innovation, increasing customer satisfaction, strategic planning and the like). Therfore, knowledge management has become a determining factor of siccess.
The lecture covers the different types of knowledge that play a role in knowledge management, the corresponding knowledge processes (generation, capture, access and usage of knowledge) as well as methodologies for the introduction of knowledge management solutions.
The lecture will further emphasize the following computer science techniques for knowledge management:

- Communities of Practice, Collaboration Tools, Skill Management
- ontology-based knowledge management
- Business Process oriented Knowledge Management
- Personal Knowledge Management
- Case Based Reasoning (CBR)

Media
Slides.

Basic literature

- I. Nonaka, H. Takeuchi: The Knowledge Creating Company. Oxford University Press 1995.
- G. Probst, S. Raub, K. Romhardt: Wissen managen: Wie Unternehmen ihre wertvollste Ressource optimal nutzen. Gabler, Wiesbaden, 5. überarb. Auflage, 2006.
- S. Staab, R. Studer (eds.): Handbook on Ontologies, ISBN 3-540-40834-7, Springer Verlag, 2004.
- A. Back, N. Gronau, K. Tochtermann: Web 2.0 in der Unternehmenspraxis - Grundlagen, Fallstudien und Trends zum Einsatz von Social Software. Oldenbourg Verlag München 2008.
- C. Beierle, G. Kern-Isberner: Methoden wissensbasierter Systeme, Vieweg, Braunschweig/Wiesbaden, 2. überarb. Auflage, 2005

Complementary literature

1. P. Hitzler, M Krötzsch, S. Rudolph, Y. Sure: Semantic Web: Grundlagen, ISBN 3-540-33993-0, Springer Verlag, 2008
2. Abecker, A., Hinkelmann, K., Maus, H., Müller, H.J., (Ed.): Geschäftsprozessorientiertes Wissensmanagement, Mai 2002.VII, 472 S. 70 Abb. Geb. ISBN 3-540-42970-0, Springer Verlag
3. Dieter Fensel. Spinning the Semantic Web. 2003 (ISBN 0262062321).
4. Handschuh, Staab. Annotation for the Semantic Web. 2003 (ISBN 158603345X).
5. J. Sowa. Knowledge Representation. Brooks/Cole 1999
6. Tim Berners-Lee. Weaving the Web. Harper 1999 geb. 2000 Taschenbuch.

Course: Knowledge Discovery — Course key: [25742]

Lecturers: Rudi Studer
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Large-Scale Information and Knowledge Management [IW4INLIKM] (S. 24), Advanced Concepts of Information and Knowledge Management [IW4INLIKM1] (S. 26)

Learning Control / Examinations
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Familiarity with fundamental knowledge discovery techniques, especially with standard supervised and unsupervised machine learning algorithms.

Content
The lecture gives an overview about techniques for knowledge discovery from structured and unstructured datasets and texts. The lecture will probably cover: CRISP process model and data warehouses, OLAP-techniques and visualization of large amounts of data, supervised learning techniques (in particular decision trees, neural networks, support vector machines and instance based learning), unsupervised learning techniques (in particular association rules and clustering) as well as text mining.

Media
Slides.

Basic literature
- Mitchell T: Machine Learning, 1997, McGraw-Hill.
- Berthold M, Hand D (eds): Intelligent Data Analysis, An Introduction, 2003, Springer.
- Witten IH, Frank E: Data Mining: Practical Machine Learning Tools and Techniques, 2005.

Complementary literature
None.

Course: Semantic Web Technologies I — Course key: [25748]

Lecturers: Rudi Studer, Pascal Hitzler, Sebastian Rudolph, Rudolph
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Complex Internet Applications [IW4INIAPP] (S. 23)

Learning Control / Examinations
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft or of an oral exam (20 min) following §4, Abs. 2, 2 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
Lectures on Informatics of the Bachelor on Information Management (Semester 1-4) or equivalent.

Conditions
None.

Learning Outcomes
- Basic knowledge about the main ideas and the realisation of Semantic Web Technologies

Content
”Semantic Web” denotes an extension of the World Wide Web by meta data and applications in order to make the meaning (semantics) of data on the web usable by intelligent systems, e.g. in e-commerce and internet portals. Central to this is the representation and processing of knowledge in form of ontologies. This lecture provides the foundations for knowledge representation and processing for the corresponding technologies and presents example applications. It covers the following topics:
- Extensible Markup Language (XML)
- Resource Description Framework (RDF) and RDF Schema
- Web Ontology Language (OWL)
- Rule Languages
- Applications

Media
Slides.

Basic literature
- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web - Grundlagen, Springer, 2008 (ISBN 978-3-540-33993-9)
- S. Staab, R. Studer (Editors). Handbook on Ontologies. International Handbooks in Information Systems. Springer 2003.

Complementary literature
1. Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, Foundations of Semantic Web Technologies. Textbooks in Computing, Chapman and Hall/CRC Press, 2009.
2. G. Antoniou, Grigoris Antoniou, Frank Van Harmelen, A Semantic Web Primer, MIT Press, 2004
3. Uwe Schöning. Logik für Informatiker. Spektrum Akademischer Verlag, 5. Auflage 2000
4. Steffen Hölldobler. Logik und Logikprogrammierung. Synchron Verlag, 3. Auflage 2003
5. Dieter Fensel. Spinning the Semantic Web. 2003 (ISBN 0262062321).
6. Handschuh, Staab. Annotation for the Semantic Web. 2003 (ISBN 158603345X).
7. J. Sowa. Knowledge Representation. Brooks/Cole 1999
8. Tim Berners-Lee. Weaving the Web. Harper 1999 geb. 2000 Taschenbuch.

Course: Semantic Web Technologies II — Course key: [25750]

Lecturers: Pascal Hitzler, Sudhir Agarwal
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: e-Collaboration [IW4INECOLL] (S. 22), Complex Internet Applications [IW4INIAPP] (S. 23)

Learning Control / Examinations
Written Examination (60 min) according to §4, Abs. 2, 1 of the examination regulations or oral examination of 20 minutes according to §4, Abs. 2, 2 of the examination regulations.

Prerequisites
Lectures on Informatics of the Bachelor on Information Management (Semester 1-4) or equivalent. Semantic Web Technologies [25748] is recommended.

Conditions
none.

Learning Outcomes
- Detailed knowledge about the management and the usage of ontologies for Semantic Web Technologies
- Advanced skills in modelling knowledge for Semantic Web Technologies

Content
Building upon the content of the lecture “Semantic Web Technologies I”, the lecture covers methods for the realisation of intelligent systems on the world wide web and in other application domains. The lecture covers central aspects in the life cycle of ontologies and meta data, and in particular the following topics:
- Tools for managing metadaten and ontologies
- Knowledge representation using ontologies
-
- Semantic wikis
- Semantic Web Services
- Information integration
- Semantic Search
- Applications

Media
Slides.

Basic literature
- Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, York Sure: Semantic Web - Grundlagen, Springer, 2008 (ISBN 978-3-540-33993-9)
- S. Staab, R. Studer (Editors). Handbook on Ontologies. International Handbooks in Information Systems. Springer 2003.

Complementary literature
1. Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, Foundations of Semantic Web Technologies. Textbooks in Computing, Chapman and Hall/CRC Press, 2009.
2. G. Antoniou, Grigoris Antoniou, Frank Van Harmelen, A Semantic Web Primer, MIT Press, 2004
3. Uwe Schöning. Logik für Informatiker. Spektrum Akademischer Verlag, 5. Auflage 2000
4. Steffen Hölldobler. Logik und Logikprogrammierung. Synchron Verlag, 3. Edition 2003
5. Dieter Fensel. Spinning the Semantic Web. 2003 (ISBN 0262062321).
6. Handschuh, Staab. Annotation for the Semantic Web. 2003 (ISBN 158603345X).
7. J. Sowa. Knowledge Representation. Brooks/Cole 1999
8. Tim Berners-Lee. Weaving the Web. Harper 1999 geb. 2000 Taschenbuch.

Course: Complexity Management — Course key: [25760]

Lecturers: Detlef Seese
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Englisch
Part of the modules: e-Collaboration [IW4INECOLL] (S. 22)

Learning Control / Examinations
The assessment of this course consists of a written examination (60 min) (following §4(2), 1 SPO). The exam will be offered every semester and may be repeated at every ordinary exam date.
Questions are in English, answers are possible in German or in English.
In case that only a small number of candidates apply for the examination there will be offered an orall examination.

Prerequisites
A basic knowledge in informatics is suitable.

Conditions
None.

Learning Outcomes
Students will be enabled to acquire abilities, methods and instruments in the area of complexity management and learn to use them in an innovative way. The students should be enabled to find arguments for the solution of problems in this area. The basic goal of the lecture is to enable to understand the difficulties to manage complex systems and processes.

Content
Complexity is one of the biggest challenges of our time. Central questions are: - Why humans often fail in complex situations? - What is complexity? -What are reasons for complexity? - Which parameters are essential to control complexity? - How systems have to be designed to reduce their complexity and to enable management of complexity?
The lecture gives a survey on fundamental results and handles the following topics: - Understanding of the difficulties produced by complex systems and complex processes - Foundations: modelling complex systems, complexity theory, descriptive, structural and parametric complexity, dynamic systems, topology, dimension, non-linearity, chaos, randomness and emerging structures, human shortcomings, simulation - Complexity of products and production - Complexity of markets - How to improve complexity management? - Decision support by intelligent use of IT

Media
The slides of the lectures will be provided on the website of the lecture.

Basic literature

- Franz Reither: Komplexitätsmanagement. Gerling Akademie Verlag, München 1997
- G. Schuh, U. Schwenk: Produktkomplexität managen. Carl Hanser Verlag, München 2001
- Ch. Perrow: Normal Accidents. Living with High-Risk technologies, Basic Books, New York, 1984.
- J.D. Sterman: Business Dynamics, Systems Thinking and Modeling for a Complex World, McGraw-Hill Higher Education, 2000.
- R. G. Downey, M.R. Fellows: Parameterized Complexity. Springer 1999
- Heinz-Otto Peitgen, Hartmut Jürgens, Dietmar Saupe: Chaos and Fractals, Springer-Verlag New York, 1992, 2004 (second edition).
- S. Wolfram: A new kind of Science. Wolfram Media Inc. 2002

Complementary literature

- M.R. Garey, D. S. Johnson: Computers and intractability A guide to the theory of NP-completeness, W. H. Freeman and Company, New York, 1979
- N. Immerman: Descriptive Complexity; Springer-Verlag, New York 1999
- R. Diestel: Graphentheorie, Springer 1996
- J. A. Bondy, U.S.R. Murty: Graph Theory, Springer 2008
- H.D. Ebbinghaus, J. Flum, W. Thomas: Mathematical Logic, Springer-Verlag, New York 1984
- Christos H. Papadimitriou: Computational Complexity, Addison-Wesley, Reading, Massachusetts, 1994
- R. Niedermeier: Invitation to Fixed-Parameter Algorithms, Oxford University Press 2006
- W. Metzler: Nichtlineare Dynamik und Chaos, Teubner Studienbücher Mathematik, Stuttgart 1998
- G. Frizelle, H. Richards (eds.): Tackling industrial complexity: the ideas that make a difference. University of Cambridge, Institute of Manufacturing 2002
- W. Bick, S. Drexl-Wittbecker: Komplexität reduzieren, Konzept. Methoden. Praxis, LOG_X Verlag GmbH, Stuttgart, 2008
- U. Lindemann, M. Maurer, T. Braun: Structural Complexity Management, An Approach for the field of Product Design, Springer-Verlag, Berlin, Heidelberg, 2009

- M. J. North, Ch. M. Macal: Managing Busieness Complexity, Discovering Strategic Solutions with Agent-Based Modeling and Simulation, Oxford University Press 2006
- S. Bornholdt, H. G. Schuster (Eds.): Handbook of Graphs and Networks, From the Genome to the Internet, Wiley-VCH, 2003
- Further references will be given in each lecture.

Remarks
The content of the lecture will permanently be adapted to actual developments. This can be the cause to changes of the described contend and schedule.

Course: Intelligent Systems in Finance — Course key: [25762]

Lecturers: Detlef Seese
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Concepts of Information and Knowledge Management [IW4INLIKM1] (S. 26)

Learning Control / Examinations
The assessment is a written examination.
See the German part for special requirements to be admitted for the examination.

Prerequisites
None.

Conditions
None.

Learning Outcomes

- The students acquire abilities and knowledge of methods and systems from the area of machine learning and learn how to use them in the area of finance, which is the core area of application of this lecture.
- It is taught the ability to choose and change these methods and systems adequate to the situation and to use them for problem solving in the area of finance.
- The students get the ability to find strategic and creative answers in their search for solutions for precisely defined, concrete and abstract problems.
- At the same time the lecture aims to give foundational knowledge and methods in the context of their application in practise. On the basis of the basic understanding of concepts and methods of informatics the students should be able to comprehend quickly the new developments in the area and to use them correctly.

Content
A new generation of computing methods, commonly known as “intelligent systems”, has recently been successfully applied to a variety of business and financial modelling tasks. In many application fields these novel methods outperform traditional statistical techniques. The lecture provides a comprehensive coverage of the area, including foundations and applications. In particular it deals with intelligent software agents, genetic algorithms, neural networks, support vector machines, fuzzy-logic, expert systems and intelligent hybrid systems. The presented applications focus on the finance area and are related to risk management (credit risk, operational risk), financial trading, portfolio management and economic modelling. The lecture is given in cooperation with the company msgGILLARDON. The lecture starts with an introduction of the central problems of application in this area, e.g. decision support for investors, Portfolioselection under constraints, information retrieval from business reports, automatic development of trading rules for the capital market, modelling of time series at the capital market, explanation of phenomena at capital markets by simulation, decision support in risk management (credit risk, operational risk). After this the basics of intelligent systems are discussed. Basic ideas and essential results for different stochastic heuristics for local search are discussed next, especially Hill Climbing, Simulated Annealing, Threshold Accepting and Tabu Search. After this different population-based approaches of evolutionary methods are presented, e.g. Genetic Algorithms, Evolutionary Strategies and Programming, Genetic Programming, Memetic Algorithms and Ant-Algorithms. It follows an introduction into Neural Networks, Support Vector Machines and Fuzzylogic. Softwareagents and agentbased stock market models are the next topic. The lecture ends with an overview on the complexity of algorithmic problems in the area of finance, giving in this way one of the key reasons for the necessity to use heuristics and intelligent systems. Essential examples and basic applications are choosen from the area of finance.

Media
Slides.

Basic literature
There is no text book covering completely the content of the lecture.

- Z. Michalewicz, D. B. Fogel. How to Solve It: Modern Heuristics. Springer 2000.
- J. Hromkovic. Algorithms for Hard Problems. Springer-Verlag, Berlin 2001.
- P. Winker. Optimization Heuristics in Econometrics. John Wiley & Sons, Chichester 2001.
- A. Brabazon, M. O´Neill. Biologically Inspired Algorithms for Financial Modelling. Springer, 2006.
- A. Zell. Simulation Neuronaler Netze. Addison-Wesley 1994.
- R. Rojas. Theorie Neuronaler Netze. Springer 1993.
- N. Cristianini, J. Shawe-Taylor. An Introduction to Support Vector Machines and other kernal-based learning methods. Cambridge University Press 2003.
- G. Klir, B. Yuan. Fuzzy Sets and Fuzzy Logic: Theory and Applications. Prentice-Hall, 1995.
- F. Schlottmann, D. Seese. Modern Heuristics for Fiance Problems: A Survey of Selected Methods and Applications. In S. T. Rachev (Ed.) Handbook of Computational and Numerical Mrthods in Finance, Birkhäuser, Boston 2004, pp. 331 - 359.

Further references will be given in each lecture.

Complementary literature

- S. Goonatilake, Ph. Treleaven (Eds.). Intelligent Systems for Finance and Business. John Wiley & Sons, Chichester 1995.
- F. Schlottmann, D. Seese. Financial applications of multi-objective evolutionary algorithms, recent developments and future directions. Chapter 26 of C. A. Coello Coello, G. B.Lamont (Eds.) Applications of Multi-Objective Evolutionary Algorithms, World Scientific, New Jersey 2004, pp. 627 - 652.
- D. Seese, F. Schlottmann. Large grids and local information flow as reasons for high complexity. In: G. Frizelle, H. Richards (eds.), Tackling industrial complexity: the ideas that make a difference, Proceedings of the 2002 conference of the Manufacturing Complexity Network, University of Cambridge, Institute of Manufacturing, 2002, pp. 193-207. (ISBN 1-902546-24-5).
- R. Almeida Ribeiro, H.-J. Zimmermann, R. R. Yager, J. Kacprzyk (Eds.). Soft Computing in Financial Engineering. Physica-Verlag, 1999.
- S. Russel, P. Norvig. Künstliche Intelligenz Ein moderner Ansatz. 2. Auflage, Pearson Studium, München 2004.
- M. A. Arbib (Ed.). The Handbook of Brain Theory and neural Networks (second edition). The MIT Press 2004.
- J.E. Gentle, W. Härdle, Y. Mori (Eds.). Handbook of Computational Statistics. Springer 2004.
- F. Schweitzer. Brownian Agents and Active Particles. Collective Dynamics in the Natural and Social Sciences, Springer 2003.
- D. Seese, C. Weinhardt, F. Schlottmann (Eds.) Handbook on Information Technology in Finance, Springer 2008.
- Further references will be given in the lecture.

Remarks

The content of the lecture will permanently be adapted to actual developments. This can be the cause to changes of the described contend and schedule.

Course: IT Complexity in Practice

Course key: [25764]

Lecturers: Kreidler
Credit points (CP): 3 **Hours per week:** 1/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: e-Collaboration [IW4INECOLL] (S. 22)

Learning Control / **Examinations**

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Course: Service-oriented Computing 1 Course key: [25770]

Lecturers: Stefan Tai
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: e-Collaboration [IW4INECOLL] (S. 22), Service Technologies [IW4INSER] (S. 30)

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

Prerequisites
Lecture *AI2* [25033] is recommended.

Conditions
None.

Learning Outcomes
The course introduces concepts, methods, and techniques of "service-oriented computing", including languages for (Web) service description, methods and tools for the development of services, and platforms (middleware, runtimes) for the Web-based deployment, delivery, and execution of services. In addition, software-as-a-service models and emerging trends (incl. Cloud Computing) will be presented and discussed. The course provides a solid technical foundation that enables the student to address the increasingly relevant challenges of developing "service-oriented architectures (SOA)" in the industry.

Content
Web services represent the next-generation of Web technology, and are an evolution of conventional distributed middleware. They enable new and improved ways for enterprise computing, including application interoperability and integration, and business process management. Modern software systems are being designed as service-oriented architectures (SOA), introduding increased agility and flexibilty at both the software systems and the business level. Web services and SOA thus have a profound impact on software development and the businesses that they support. The course "Service-oriented Computing" introduces the concepts, methods and technology that provide a solid foundation in this area. Topics include:

- Service description
- Service engineering, including development and implementation
- Service composition (aggregation), including process-based service orchestration
- Interoperability formats and protocols
- Service platforms and runtimes (middleware)
- Software-as-a-Service models
- Service intermediaries (markets)
- Mashups and situational applications
- Cloud computing

Media
Slides, access to internet resources.

Basic literature
Will be given in the course.

Course: Service-oriented Computing 2 Course key: [25772]

Lecturers: Stefan Tai, Rudi Studer
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Service Technologies [IW4INSER] (S. 30)

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

Prerequisites
It is recommended to attend the course *Service-oriented Computing* [25770] beforehand.

Conditions
None.

Learning Outcomes
Students will extend their knowledge and proficiency in the area of modern service-oriented technologies. Thereby, they acquire the capability to understand, apply and assess concepts and methods that are of innovative and scientific nature.

Content
Building upon basic Web service technologies the lecture introduces select topics of advanced service computing and service engineering. In particular, focus will be placed on new Web-based architectures and applications leveraging Web 2.0, Cloud Computing, Semantic Web and other emerging technologies.

Basic literature
Literature will be announced in the lecture.

Course: Web Service Engineering — Course key: [25774]

Lecturers: Christian Zirpins
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Service Technologies [IW4INSER] (S. 30)

Learning Control / Examinations
The assessment consists of an oral exam (20 min) (following §4(2), 2 SPO).

Prerequisites
None.

Conditions
The course might be combined with the lectures “Applied Informatics II - IT Systems for e-Commerce” and “Service-Oriented Computing 1”.

Learning Outcomes
Students will acquire a deep and systematic understanding of service-oriented software systems and their embedding in organizations. Equipped with practical and research-based knowledge, they will be enabled to engineer state-of-art service-oriented applications with Web technologies and gain a broad understanding of tools and methodologies for their own work.

Content
The lecture “Web Service Engineering” covers technical and organizational aspects with respect to the development of modern service-oriented software as socio-technical systems in enterprises and Web environments. It introduces background, state-of-technology and emerging trends of methods, tools and processes for application development with Web services. The topics of the lecture include e.g.:
- Web service foundations and base technologies
- Service-oriented software and enterprise architectures (SOA)
- SOA life cycle and development processes
- Analysis and requirements engineering for SOA
- Service-oriented design and modeling
- Construction and testing of Web service applications
- Web service development tools
- Trends: e.g. development with service mashups / cloud services

Media
Slides in PDF-format will be provided via the course webpages.

Basic literature
Compulsory literature will be announced in the course.

Remarks
This course will be offered from summer term 2009 on.

Course: Management of IT-Projects — Course key: [25784]

Lecturers: Roland Schätzle
Credit points (CP): 4 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: e-Collaboration [IW4INECOLL] (S. 22)

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

Prerequisites
None.

Conditions
None.

Learning Outcomes
Students know the terminology of IT project management and typical used methods for planning, handling and controlling. They are able to use methods appropiate to current project phases and project contexts and they know how to 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.

Media
Slides, access to internet resources.

Basic 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.

Course: Strategic Management of Information Technology Course key: [25788]

Lecturers: Thomas Wolf
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: e-Collaboration [IW4INECOLL] (S. 22)

Learning Control / Examinations
The assessment of this course is a written or (if necessary) oral examination according to §4(2) of the examination regulation.

Prerequisites
None.

Conditions
None.

Learning Outcomes
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.

Media
Slides, internet resources

Basic 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

Course: Practical Seminar Knowledge Discovery — Course key: [25810]

Lecturers: Rudi Studer
Credit points (CP): 4 **Hours per week:** 2
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Large-Scale Information and Knowledge Management [IW4INLIKM] (S. 24), Advanced Concepts of Information and Knowledge Management [IW4INLIKM1] (S. 26)

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.

Prerequisites
None.

Conditions
Lecture “Knowledge Discovery” recommended.

Learning Outcomes
Independent preparation and presentation of a seminar topic from the fields of knowledge discovery or text mining adhering to scientific standards. In case of a practical course, additionally, example implementation and/or experiments.

Content
The seminar/practical course will cover topics in the field of Knowledge Discovery. Each term, the seminar will cover a different specialization field, e.g.:

- Text Mining,
- Ontology Learning and Information Extraction,
- Inductive Logic Programming,
- Learning with Background Knowledge.

The topics are usually arranged as a seminar talk + practical work to be acknowledged as seminar/practical course. In individual cases, this course can also be acknowledged just as seminar (without practical work).
Details will be announced every semester.

Media
Slides.

Basic literature

- Christopher Manning and Hinrich Schütze. Foundations of Statistical NLP, MIT Press, 1999.
- Tom Mitchell, Machine Learning, McGraw Hill, 1997.
- Ricardo Baeza-Yates and Berthier Ribeiro-Neto, Modern Information Retrieval, Addison-Wesley, 1999.
- James Allen. Natural Language Understanding, 2nd edition.

Complementary literature
None.

Course: Lab Class Web Services — Course key: [25820]

Lecturers: Stefan Tai, Rudi Studer, Gerhard Satzger, Christian Zirpins
Credit points (CP): 4 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Service Technologies [IW4INSER] (S. 30)

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.

Prerequisites
The lecture “Service-oriented Computing 1” is recommeded.

Conditions
None.

Learning Outcomes
Students will acquire the technical expertise to apply service-oriented platforms and tools. Thereby, they will be enabled to develop practical solutions for concrete problems of constructing service-oriented IT infrastructure for provision of electronic services over the Internet.

Content
The “Praktikum (lab class) Web Services” provides a practical introduction to fundamental Web service technologies and their application to support service value networks on the Internet. Based on concrete application scenarios for Web-based business service networks, the class focuses on the development of software solutions for specific aspects of service-oriented IT-infrastructure. This includes the complete development lifecycle of a large-scale software project and its implementation in small project teams.

Basic literature
For introduction, the following books are recommended:
• M. P. Papazoglou. Web Services: Principles and Technology. Pearson, 2007.
• G. Alonso, F. Casati, H. Kuno, and V. Machira ju. Web Services - Concepts, Architec-tures and Applications. Springer, 2004.
Specific literature will be announced in the course.

Course: Management and Strategy — Course key: [25900]

Lecturers: Hagen Lindstädt
Credit points (CP): 4 **Hours per week:** 2/0
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Strategy and Organization [IW4WWORG1] (S. 44)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes
The participants learn about central concepts of strategic management along the ideal-typical strategy process: internal and external strategic analysis, concept and sources of competitive advantages, their importance when establishing competitive and corporate strategies as well as strategy assessment and implementation. This aims in particular to provide a summary of the basic concepts and models of strategic management, i.e. to provide in particular an action-oriented integration.

Content

- Corporate management principles
- Strategic management principles
- Strategic analysis
- Competitive strategy: modelling and selection on a divisional level
- Strategies for oligopolies and networks: anticipation of dependencies
- Corporate strategy: modelling and evaluation on a corporate level
- Strategy implementation

Media
Slides.

Basic literature

- Grant, R.M.: *Contemporary Strategy Analysis.* Blackwell, 5. Aufl. Massachusetts 2005.
- Lindstädt, H.; Hauser, R.: *Strategische Wirkungsbereiche von Unternehmen.* Gabler, Wiesbaden 2004.

The relevant excerpts and additional sources are made known during the course.

Course: Managing Organizations Course key: [25902]

Lecturers: Hagen Lindstädt
Credit points (CP): 4 **Hours per week:** 2/0
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Business Organization: Theory and Management Perspective [IW4WWORG] (S. 43), Strategy and Organization [IW4WWORG1] (S. 44)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes
The course should enable the participants to assess the strengths and weaknesses of existing organisational structures and rules using systematic criteria. Here concepts and models for designing organisation structures, regulating organisational processes and managing organisational changes are presented and discussed using case studies. The course is structured to relate to actions and aims to give students a realistic view of the opportunities and limits of rational design approaches.

Content

- Principles of organisational management
- Managing organisational structures and processes: the selection of design parameters
- Ideal-typical organisational structures: choice and effect of parameter combinations
- Managing organisational changes

Media
Slides.

Basic literature

- Kieser, A.; Walgenbach, P.: *Organisation*. Schäffer-Poeschel, 4. Aufl. Stuttgart 2003.
- Robey, D.; Sales, C.A.: *Designing Organizations*, McGraw-Hill. 4. Aufl. Boston 1994.
- Scholz, C.: *Strategische Organisation*. 2. Aufl. Landsberg/Lech 2000.
- Staehle, W.H.: *Management*. Vahlen, 8. Aufl. München 1999.

The relevant excerpts and additional sources are made known during the course.

Course: Organization Theory — Course key: [25904]

Lecturers: Hagen Lindstädt
Credit points (CP): 6 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Business Organization: Theory and Management Perspective [IW4WWORG] (S. 43)

Learning Control / Examinations
The assessment consists of a written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The participants are made familiar with mostly classical principles of economic organisational theory and institutional economics. This includes transaction cost theory and agency-theory approaches, models for the function and design of organisational information and decision-making systems, transfer price models to coordinate the exchange of goals and services within companies, models on incentive systems and relative performance tournaments as well as selected OR optimisation approaches to designing organisational structures. The course therefore lays the basis for a deeper understanding of the advanced literature on this key economic area.

Content
- Basic considerations and institution-economic principles of organisational theory
- Transfer prices and internal market-price relationships
- Design and coordination without conflicting objectives
- Organisation under asymmetric information and conflicting objectives: agency theory principles

Media
Folien.

Basic literature
- Laux, H.; Liermann, F.: Grundlagen der Organisation. Springer, 5. Aufl. Berlin 2003.
- Milgrom, P.; Roberts, J.: Economics, Organization and Management. Prentice Hall, Englewoods Cliffs 1992.

The relevant excerpts and additional sources are made known during the course.

Course: Special Topics in Management: Management and IT Course key: [25907]

Lecturers: Hagen Lindstädt
Credit points (CP): 2 **Hours per week:** 1/0
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Business Organization: Theory and Management Perspective [IW4WWORG] (S. 43), Strategy and Organization [IW4WWORG1] (S. 44)

Learning Control / Examinations
Written exam 100%.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The course discusses management questions and concepts that are clearly motivating from a current and practical perspective. Here the integration of IT and process issues into corporate management from the management's perspective is one of the subjects of particular interest. The event takes place in close cooperation with leading, practical managers.

Content
(Excerpt):

- A summary of current management concepts and questions.

Media
Slides.

Basic literature
The relevant excerpts and additional sources are made known during the course.

Course: Value-Based Instruments of Corporate Strategy Course key: [25912]

Lecturers: Ulrich Pidun, Michael Wolff
Credit points (CP): 4 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Business Organization: Theory and Management Perspective [IW4WWORG] (S. 43)

Learning Control / Examinations
The assessment consists of a written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
None.

Conditions
none.

Learning Outcomes
The course follows two learning objectives. Firstly, the course participants are presented with the key concepts and models on which the current approaches of value-based management are based in theory and practice. Secondly the course participants should be enabled to transfer the concepts presented to real situations. In order to achieve these learning objectives the connection to classical strategy development instruments is discussed first. Then the various value levers and the concepts of value-based corporate management are presented. This includes both external aspects (such as valuing acquisitions) as well as internal ones ("integrated value management") by value-based corporate management.

Content
- Strategy development in corporate groups
- Growth as a strategic value lever
- Strategic valuation of acquisitions
- Introduction to value management
- Integrated value-based corporate management
- Downsides of multi-business corporations

Media
Slides.

Basic literature
- Brealy, R.A./Myers, S.C. (2000): Principles of Corporate Finance

The relevant excerpts and additional sources are made known during the course.

Course: Seminar: Management and Organization — Course key: [25915]

Lecturers: Hagen Lindstädt
Credit points (CP): 4 **Hours per week:** 2
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Business Organization: Theory and Management Perspective [IW4WWORG] (S. 43)

Learning Control / Examinations
Term paper (50%) and presentation (50%).
Completion of all 1st an 2nd year modules of the Bachelor Program or Admission to the Master Program.

Prerequisites
See corresponding module information.

Conditions
None.

Learning Outcomes
The aim of the seminar is to describe corporate and organisational management approaches, to assess them critically and clarify them using practical examples. The focus is on assessing the models with a view to their applicability and theoretical limits.

Content
The subjects are redefined each semester on the basis of current issues.

Media
Slides.

Basic literature
The relevant sources are made known during the course.

Course: Seminar: Management and Organization — Course key: [25916]

Lecturers: Hagen Lindstädt
Credit points (CP): 4 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Business Organization: Theory and Management Perspective [IW4WWORG] (S. 43)

Learning Control / Examinations
Term paper (50%) and presentation (50%).

Prerequisites
Completion of all 1st an 2nd year modules of the Bachelor Program or Admission to the Master Program.

Conditions
None.

Learning Outcomes
The aim of the seminar is to describe corporate and organisational management approaches, to assess them critically and clarify them using practical examples. The focus is on assessing the models with a view to their applicability and theoretical limits.

Content
The subjects are redefined each semester on the basis of current issues.

Media
Slides.

Basic literature
The relevant sources are made known during the course.

Course: Managing New Technologies — Course key: [26291]

Lecturers: Thomas Reiß
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Business Organization: Theory and Management Perspective [IW4WWORG] (S. 43)

Learning Control / Examinations
Written exam 100% following §4, Abs. 2.

Prerequisites
None.

Conditions
None.

Learning Outcomes
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.

Media
Slides.

Basic literature
- Hausschildt/Salomo: Innovationsmanagement; Borchert et al.: Innovations- und Technologiemanagement;
- Specht/Möhrle; Gabler Lexikon Technologiemanagement

Course: Enterprise Risk Management — Course key: [26326]

Lecturers: Ute Werner
Credit points (CP): 4,5 **Hours per week:** 3/0
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Operational Risik Management [IW4WWORM] (S. 45)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes
Learning to identify, to analyse and to assess business risks; this serves as a basis for strategy and policy design regarding risks and opportunities of an enterprise. Introduction to optimization approaches that allow to consider area-specific objectives, risk-bearing capacity and risk acceptance.

Content

1. Concepts and practice of risk management, based on decision theory
2. Goals, strategies and measures for the identification, analysis, assessment and management of risks
3. Insurance as an instrument for loss-financing
4. Selected aspects of risk management: e.g. environmental protection, organizational failure and D&O-coverage, development of a risk management culture
5. Organisation of risk management
6. Approaches for determining optimal combinations of risk management measures considering their investment costs and outcomes.

Basic literature
K. Hoffmann. Risk Management - Neue Wege der betrieblichen Risikopolitik. 1985. R. Hölscher, R. Elfgen. Herausforderung Risikomanagement. Identifikation, Bewertung und Steuerung industrieller Risiken. Wiesbaden 2002. W. Gleissner, F. Romeike. Risikomanagement - Umsetzung, Werkzeuge, Risikobewertung. Freiburg im Breisgau 2005. H. Schierenbeck (Hrsg.). Risk Controlling in der Praxis. Zürich 2006.

Remarks
This course is offered irregularly. For further information, see: http://insurance.fbv.uni-karlsruhe.de

Course: Multidisciplinary Risk Research — Course key: [26328]

Lecturers: Ute Werner
Credit points (CP): 4,5 **Hours per week:** 3/0
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Operational Risik Management [IW4WWORM] (S. 45)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes
Getting an overview of the various theoretical, empirical and methodological approaches used in risk research. Learning to assess disciplinary perspectives and approaches. Detailed examination of at least one theoretical and one methodological approach by the analysis of case studies.

Content
The course consists of two chapters:
In the theoretical part risk concepts of various disciplines will be discussed as well as categorisations of risk (e.g. technical or natural origin) and of risk carriers. Based on empirical research, processes of risk perception, risk assessment, and risk taking – at the individual, institutional, and global level - are described and explained.
The methodological part of the course deals with the hazard research, approaches for identification and mapping of risks and their accumulations, as well as with safety culture research. Using empirical studies, survey methods regarding risk perception and risk assessment will be discussed. Specific problems in the context of intercultural research will be considered too.

Basic literature

- U. Werner, C. Lechtenbörger. Risikoanalyse & Risikomanagement: Ein aktueller Sachstand der Risikoforschung. Arbeitspapier 2004
- Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen (WBGU). Welt im Wandel: Strategien zur Bewältigung globaler Umweltrisiken. Jahresgutachten 1998, http://www.wbgu_jg1998.html.
- R. Löfstedt, L. Frewer. Risk and Modern Society, London.
- http://www.bevoelkerungsschutz.ch
- M. Nippa. Risikoverhalten von Managern bei strategischen Unternehmensentscheidungen – eine erste Annäherung. 1999.

Course: International Risk Transfer — Course key: [26353]

Lecturers: Wolfgang Schwehr
Credit points (CP): 2,5 **Hours per week:** 2/0
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Operational Risik Management [IW4WWORM] (S. 45)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes
Becoming acquainted with the various possibilities of international risk transfer.

Content
How are the costs of potential major damages financed and covered on a global scale? Traditionally, direct insurers and, especially, reinsurers are conducting a global business, Lloyd´s of London is a turntable for international risks, and global industrial enterprises are establishing captives for self insurance. In addition to this, capital markets and insurance markets are developing innovative approaches to cover risks, which were hard to insure in the past (e.g. weather risk). The lecture will elucidate the functioning and the background of these different possibilities of international risk transfer.

Basic literature

- K. Geratewohl. Rückversicherung: Grundlagen und Praxis Band 1-2.
- Brühwiler/ Stahlmann/ Gottschling. Innovative Risikofinanzierung - Neue Wege im Risk Management.
- Becker/ Bracht. Katastrophen- und Wetterderivate.

Course: Risk Management of Microfinance and Private Households Course key: [26354]

Lecturers: Ute Werner
Credit points (CP): 4,5 **Hours per week:** 3/0
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Operational Risik Management [IW4WWORM] (S. 45)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes
Becoming acquainted with starting points for analysing the special risk situation of private households and micro enterprises; learning to synchonize various risk coping instruments, identifying risks of microfinance products and learning to design innovative microfinance products.

Content
The course consists of two interlocking parts:
In the first part the socio-economic framework as well as the goals and strategies of private-sector risk management are discussed, with an emphasis on insurance decisions. In the second part the issue of small enterpreneural entities and their specific risk related problems in covering their financial requirements is addressed. Typically their size and other specific characteristics lead to high risks for financial services institutions. After an introduction to the economic principles of microfinance, the institutions working in this sector are presented as well as innovative credit-, savings-, and insurance products (which are often combined), and we´ll discuss approaches for performance measurement from the perspectives of customers, suppliers, and investors.

Basic literature

- H.-U. Vollenweider. *Risikobewältigung in Familie und Haushalt - eine sicherheitsökonomische Studie.* 1986.
- P. Zweifel, R. Eisen. Versicherungsökonomie. 2003
- J. Ledgerwood, I. Johnson, J.M. Severino. *Microfinance Handbook: An Institutional and Financial Perspective.* 2001.
- B.M. de Aghion, J. Morduch. *The* Economics of Microfinance.2005.

Complementary literature
This course is offered irregularly. For further information, see: http://insurance.fbv.uni-karlsruhe.de

Course: Public Sector Risk Management — Course key: [26355]

Lecturers: Reinhard Mechler
Credit points (CP): 2,5 **Hours per week:** 2/0
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Operational Risik Management [IW4WWORM] (S. 45)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes
In additin to theoretical and methodological principles of risk research, operative risk management by various institutions and the corresponding characteristics of risk transfer are discussed in this course. As public households often act as “risk carriers of last resort”, i.e. carry risks that other institutions don´t prepare for, their risk management becomes increasingly important on an economic, social und political level.

Content
1. Risk concepts, risk management and the role of the public sector
2. Quantitative and qualitative methods of risk management
3. Problem areas of public sector risk management
· Natural catastrophes
· Climate change
· Aging and social insurance
· Large-scale projects
· Terrorism

Basic literature
P. Bernstein. Against the Gods. Wiley, New York.
M. Fone / P. Young. Public Sector Risk Management, Butterworth Heinemann, Oxford
B. Flyvbjerg / N. Bruzelius / W. Rothengatter. Megaprojects and Risk: An Anatomy of Ambition. Cambridge University Press, Cambridge 2003.
A. Schick / H. Polackova Brixi. Government at Risk. World Bank and Oxford University Press, Washington DC 2004

Course: Management of Business Networks — Course key: [26452]

Lecturers: Christof Weinhardt, Jan Kraemer
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Englisch
Part of the modules: Information, Market, and Service Engineering [IW4WWIMSE] (S. 32), Service Management [IW4WWSER1] (S. 36)

Learning Control / Examinations
The assessment of this course is a written examination (60 min) (following §4(2), 1 SPO) and by submitting written papers as part of the exercise (following §4, Abs. 2, 3 SPO). The total grade for this lecture will consist to 50% of the grade achieved in the written mid term examination, to 10% of the assignments during the exercises, and to 40% of a project work, which includes a term paper and a presentation.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The student will become acquainted with the theoretical fundamentals of economic networks and how to manage them. Support of economic networks by information systems will be accomplished by several case studies, which will be worked on by groups autonomously. Basic knowledge of organisation theory, network analysis, strategic & operative management and logic systems will be communicated to the student. Furthermore, he will have a focused view on the mechanisms and supporting tools for interaction between companies, especially in negotiations and negotiation-supporting systems. In small groups, the student is trained in team-oriented and autonomous working techniques. Within this domain, the student will be trained to seek and read relevant technical literature in English, the language of science, and to adopt it to a specific problem.

Content
The significant and lasting impact of web-based business-to-business (B2B) networks has just recently become apparent. The exploratory phase during the first Internet hype bred a variety of approaches which were often bold in business nature, yet simple and unfounded in system architecture. Only very few survived and proved sustainable. Nowadays web-based B2B networks are increasingly reappearing and even promoted by major traditional companies and governments. However, this new wave of networks is more mature and more powerful in functionality than their predecessors. As such they provide not only auction systems but also facilities for electronic negotiation. This implies a shift from price-focused to relationship-oriented trading. But what motivates this shift? Why do firms enter business networks? How can these networks be best supported by IT? The course intends to resolve these questions. Firstly, an introduction in organization theory will be given. Secondly, the problems of networks will be addressed. Thirdly, an analysis of how IT can alleviate those problems will be undertaken.

Media
Powerpoint presentations, recorded lecture available on the internet, (if circumstances allow videoconferencing).

Basic literature

- Milgrom, P., Roberts, J., Economics, Organisation and Management. Prentice-Hall, 1992.
- Shy, O., The Economics of Network Industries. Cambridge, Cambridge University Press, 2001.
- Bichler, M. The Future of e-Markets - Multi-Dimensional Market Mechanisms. Cambridge, Cambridge University Press, 2001.

Course: eFinance: Information Engineering and Management for Securities TradingCourse key: [26454]

Lecturers: Christof Weinhardt, Ryan Riordan
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Information, Market, and Service Engineering [IW4WWIMSE] (S. 32), Information and Market Engineering [IW4WWIMSE1] (S. 34)

Learning Control / Examinations
70% of the mark is based on the written examination and 30% is based on assignments during the exercises.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The goal of the lecture is to make the students familiar with the theoretical as well as the practical aspects of electronic trading and exchanges and the IT systems used in the financial industry. While markets for products and services are discussed, the focus is on the trading of financial securities. Existing centralized equity exchanges face competition from new alternative trading systems make possible by today´s information technology. This course will also examine the impact and implications of this dynamic. The focus is on the economic and technical design of markets as information processing systems.

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.

Media
Powerpoint presentations, recorded lecture available on the internet

Basic 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

Complementary 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

Course: Business Models in the Internet: Planning and Implementation Course key: [26456]

Lecturers: Christof Weinhardt, Carsten Holtmann
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Information, Market, and Service Engineering [IW4WWIMSE] (S. 32), Service Engineering [IW4WWIMSE2] (S. 35)

Learning Control / Examinations
50% of the mark is based on the written mid term examination, 10% is based on assignments during the exercises, and 40% of the mark is based on a project work, which includes a term paper and a presentation.

Prerequisites
None.

Conditions
None

Learning Outcomes
This lecture aims at providing the students with knowledge about the lifecycles of web applications starting from economic concepts to the commercialization within the WWW. Students will learn, on the one hand, to analyze, design and to implement web applications and, on the other hand, to develop sustaining business models. This involves the analysis of the online users´ requirements and expectations, the assessment of the potential innovative web applications have, the study of web technologies allowing students to gauge their applicability.

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.

Media
Powerpoint presentations, recorded lecture available on the internet, (if circumstances allow videoconferencing)

Basic literature
Will be announced within the course.

Course: Market Engineering: Information in Institutions Course key: [26460]

Lecturers: Christof Weinhardt, Jan Kraemer
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Englisch
Part of the modules: Information, Market, and Service Engineering [IW4WWIMSE] (S. 32), Information and Market Engineering [IW4WWIMSE1] (S. 34), Service Engineering [IW4WWIMSE2] (S. 35)

Learning Control / Examinations
The assessment of this course is a written examination (following §4(2), 1 SPO) and by submitting written papers as part of the exercise (following §4(2), 3 SPO). The total grade for this lecture will consist to 70% of the grade achieved in the written examination and to 30% of the assignments during the exercises.

Prerequisites
None.

Conditions
None.

Learning Outcomes
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.

Media

- Powerpoint,
- eLearning Platform Ilias

Basic literature

1. Roth, A., The Economist as Engineer: Game Theory, Experimental Economics and Computation as Tools for Design Economics. Econometrica 70(4): 1341-1378, 2002.
2. Weinhardt, C. ,Holtmann, C., Neumann, D., Market Engineering. Wirtschaftsinformatik, 2003.
3. Wolfstetter, E., Topics in Microeconomics - Industrial Organization, Auctions, and Incentives. Cambridge, Cambridge University Press, 1999.
4. Smith, V. „Theory, Experiments and Economics“, The Journal of Economic Perspectives,Vol. 3, No. 1, 151-69 1989

Course: eServices Course key: [26466]

Lecturers: Christof Weinhardt, Gerhard Satzger
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 3
Teaching language: Englisch
Part of the modules: Service Management [IW4WWSER1] (S. 36)

Learning Control / Examinations
The assessment of this course is a written examination (following §4(2), 1 SPO) and by submitting written papers as part of the exercise (following §4(2), 3 SPO). The total grade for this lecture will consist to 70% of the grade achieved in the written examination and to 30% of the assignments during the exercises.

Prerequisites
None.

Conditions
None.

Learning Outcomes
This lecture presents concepts, methods and application examples for the engineering and management of eServices. The students will get to know the basic principles and elements of eServices and their specific properties compared to physical goods. Creating eServices needs an overall view of information technology with regards to flexibility, safety, data security, measurability and cost allocation.
In addition, problems and solutions in designing and providing eServices are discussed; the elementary relationship to information management will also be treated. Application examples from industry stress the concepts´ application in the economy.

Content
So far, management studies usually focused on physical goods. However, due to the increasing development of information and communication technology, distribution of electronic services is becoming more important. Electronic services are characterized by an increasing degree of intangibility, interactivity and individuality. Traditional, goods-oriented models, methods and tools for are often found to be inadequate for service engineering and management.
Building on a systematic categorization of (e)Services, we cover concepts and foundations for engineering and managing IT-based services, allowing further specialization in subsequent courses. Topics include service innovation, service economics, service computing, transformation and coordination of service value networks as well as collaboration for knowledge intensive services.
In addition, application examples, guest lectures (e.g. business model changes driven by the advent of eServices) and a number of hands-on exercises will illustrate the applicability of the concepts.

Media
PowerPoint slides;

Course: Service Innovation — Course key: [26468]

Lecturers: Gerhard Satzger, Andreas Neus
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Englisch
Part of the modules: Service Management [IW4WWSER1] (S. 36)

Learning Control / Examinations
The assessment consists of an 1h written exam following §4(2), 3 SPO and of assignments during the course as an "Erfolgskontrolle anderer Art" following §4(2), 3 SPO.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Understand the difference between innovation and invention, and that disruptive effects can be fast and wide-reaching.
Know examples for innovation via processes, organization, business models; see how service and product innovation differ
Understand the link between risk and innovation; be aware of obstacles to innovation and know how to address them

Content
While innovation in manufacturing or agriculture can leverage a considerable body of research, experience and best practice, innovation in services has not reached the same level of maturity. In practice, while many organizations have a well-understood process for innovating in the product business, innovating in services is often still a fuzzy and complex undertaking. In this lecture we will discuss the state of research, compare product and service innovation, understand how innovation diffusion works, examine case studies of service innovation, open vs. closed innovation, how to leverage user communities to drive innovation and understand obstacles, and enablersand how to manage, incentivize and foster service innovation.

Basic 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

Complementary 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
- 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.

Course: Seminar Service Science, Management & Engineering Course key: [26470]

Lecturers: Stefan Tai
Credit points (CP): 4 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Service Technologies [IW4INSER] (S. 30), Service Engineering [IW4WWIMSE2] (S. 35), Service Management [IW4WWSER1] (S. 36)

Learning Control / Examinations
The assessment of this course is according to §4(2), 3 SPO in form of an examination of the written seminar thesis (15-20 pages), a presentation and active participation in class.
The final mark is based on the examination of the written seminar thesis but can be upgraded or downgraded according to the quality of the presentation.

Prerequisites
See corresponding module information.

Conditions
Lecture *eServices* [26462] is recommended.

Learning Outcomes
Autonomously deal with a special topic in the Service Science, Management and Engineering field adhering to scientific standards.

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.

Course: Practical seminar Information Engineering and Management Course key: [26478]

Lecturers: Christof Weinhardt
Credit points (CP): 1 **Hours per week:** 0*
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Information, Market, and Service Engineering [IW4WWIMSE] (S. 32), Information and Market Engineering [IW4WWIMSE1] (S. 34), Service Engineering [IW4WWIMSE2] (S. 35), Service Management [IW4WWSER1] (S. 36)

Learning Control / Examinations
The student is evaluated based on the written work, a presentation of the results in front of an audience and his contribution to the discussion

Prerequisites
None.

Conditions
The practical seminar is a supplement to the course seminar Information Engineering and Management [26474] and it can only be chosen in conjunction with the course [26474].

Learning Outcomes
The student should be able to do a literature review based on a predefined topic in the context of information engineering and management. The approach comprises the identification of relevant literature according to the topic and an analysis as well as an evaluation of the methods presented in the literature. The student learns to present his results in a paper and in front of an audience on a academic level. This process gives him the knowledge and practice for further research work like a master thesis or a doctoral thesis

Content
As a supplement to the seminar Information Management and Engineering [26474] the student has to analyse the selected topic from course [26474] by applying practical methods, e.g. implementation of algorithms or creating a market survey

Media
- PowerPoint slides
- eLearning Platform Ilias
- Software Development Tools

Basic literature
The student will receive the necessary literature for his research topic.

Remarks
- Students from Bachelor and Master Course can visit the practical seminar. The research topic as well as the evaluation of the work and the presentation will have a different focus between Bachelor and Master Course.
- All the practical seminars offered at the chair of Prof. Dr. Weinhardt can be chosen. The current topics of the practical seminars are available at the following homepage: http://www.im.uni-karlsruhe.de/lehre.
- *) The practical seminar is a supplement to the seminar Seminar Information Engineering and Management [26474] and does not require additional semester periods per week.

Course: Business and IT Service Management — Course key: [26484]

Lecturers: Gerhard Satzger
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Englisch
Part of the modules: Service Management [IW4WWSER1] (S. 36)

Learning Control / Examinations
The assessment of this course is a written examination (60 min.) (following §4(2), 1 SPO) and by submitting written papers as part of the exercise (following §4(2), 3 SPO).

Prerequisites
None.

Conditions
None.

Learning Outcomes
Students understand the importance of “servitization” for organizations, the challenges for the management of service-oriented enterprises and the interdependence of business and IT services.
Students learn standard concepts and methods of service-oriented management and are able to apply them in practical case studies.
Student get familiar with current research and tools and are able to critically evaluate them.
Students practice to communicate in English and to work on solutions in teams.

Content
The rapid development of information and communication technology transforms many enterprises towards service-oriented structures: with new digital services, new business models and 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. Particular focus will be on the interdependence of business, IT and legal aspects.
The course will be taught in English. It should provide ample opportunity for active participation of students. The course will integrate presentations of experts from business practice as well as a comprehensive case study (”en bloc” for 1.5 days) in which students will actively work on the strategic service-oriented shift of an enterprise.

Basic 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

Course: Electronic Markets (Principles) Course key: [26502]

Lecturers: Andreas Geyer-Schulz
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Information, Market, and Service Engineering [IW4WWIMSE] (S. 32), Information and Market Engineering [IW4WWIMSE1] (S. 34)

Learning Control / Examinations
Assessment consists of a written exam of 1 hour length following §4, Abs. 2, 1 of the Prüfungsordnungen für Informationswirtschaft and by submitting written papers as part of the exercise following §4, Abs. 2, 3 Prüfungsordnungen für Informationswirtschaft. The total grade for this lecture will consist to about 90% of the grade achieved in the written exam (maximum 100 points) and to about 10% of the written papers for the exercise (maximum 12 points). The written exam is considered successfully taken if at least 50 points are acquired.
The grades of this lecture are assigned following the table below. At least 50 points have to be acquired to pass the written exam. All additional points from excersise work will be added to the exam points once 50 points have been achieved:

Grade	Minimum points
1.0	104
1.3	98
1.7	92
2.0	86
2.3	80
2.7	74
3.0	68
3.3	62
3.7	56
4.0	50
4.7	40
5.0	0

Prerequisites
None.

Conditions
None.

Learning Outcomes
The student

- has an overview about the different organizational form and their efficiency,
- names coodination methods and motivation methods and evaluates them regarding their efficiency,
- knows, in the context of markets as a coordination form, the conditions under which markets are not efficient (market failure),
- knows phenomena like adverse selections and moral hazard,
- names reasons for these phenomena and develops methods to encounter them.

Content
What are the conditions that make electronic markets develop? The first part of the lecture treats the selection of the type of organization as an optimization of transaction costs. The second part includes the efficiency of electronic markets (price, information and allocation efficiency) as well as reasons for market failure.
Besides a centralistic approach, markets can be used for decentral coordination of plans and activities. Hereby, optimality can be garuanteed, if the coordination problem has no design or innovation characteristics. Viewed from a bottom-up perspective, given the coordination problem, it is possible to answer questions regarding the centralization or decentralization, the design of coordination mechanisms, and the coherence of business strategies. The last part of the lecture consists of motivation problems, like bounded rationality and information assymetries (private information and moral hazard) and the development of incentive systems.

Basic literature
Kapitel “Management Control Systems, Dezentralisierung, interne Märkte und Transferpreise” (S. 745-773) in Charles T. Horngren, Srikant M. Datar, and George Foster. Cost Accounting: A Managerial Emphasis. Prentice Hall, Upper Saddle River, 11 edition, 2003.
Paul Milgrom and John Roberts. Economics, Organisation and Management. Prentice Hall, 1 edition, 1992.

Complementary literature

Michael Dell and Catherine Fredman. Direct from DELL: Strategies that Revollutionized an Industry. Harper Collins Publisher, London, 1999.
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.
Friedrich A. Hayek. The use of knowledge in society. The American Economic Review, 35(4):519 – 530, Sep 1945.
Norbert Hochheimer. Das kleine QM-Lexikon. Wiley-UCH, Weinheim, 2002.
Adam Smith. An Inquiry into the Nature and Causes of the Wealth of Nations, volume II. 1976.

Course: Electronic Markets: Institutions and Market Mechanisms Course key: [26504]

Lecturers: Andreas Geyer-Schulz
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Information, Market, and Service Engineering [IW4WWIMSE] (S. 32), Information and Market Engineering [IW4WWIMSE1] (S. 34)

Learning Control / Examinations
Assessment consists of a written exam of 1 hour length following §4, Abs. 2, 1 of the Prüfungsordnungen für Informationswirtschaft and by submitting written papers as part of the exercise following §4, Abs. 2, 3 Prüfungsordnungen für Informationswirtschaft. The total grade for this lecture will consist to about 90% of the grade achieved in the written exam (maximum 100 points) and to about 10% of the written papers for the exercise (maximum 12 points). The written exam is considered successfully taken if at least 50 points are acquired.
The grades of this lecture are assigned following the table below. At least 50 points have to be acquired to pass the written exam. All additional points from excersise work will be added to the exam points once 50 points have been achieved:

Grade	Minimum points
1.0	104
1.3	98
1.7	92
2.0	86
2.3	80
2.7	74
3.0	68
3.3	62
3.7	56
4.0	50
4.7	40
5.0	0

Prerequisites
None.

Conditions
None.

Learning Outcomes
See german version.

Content
The lecture treats the design of electronic markets. Therefore, interdependencies of market organization, market mechanisms, institutions and products are described and theoretical foundations are lectured.
The topics include:

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

Basic literature
Thomas Copeland and Fred Weston. Financial Theory and Corporate Policy. Addison-Wesley, Reading, 3 edition, 1988.
Philip Kotler. Marketing Management – analysis, planning, and control, Fourth Edition. Prentice Hall, 1980.
Paul Milgrom and John Roberts. Economics, Organisation and Management. Prentice Hall, 1 edition, 1992.
Michael E. Porter. Competitive Strategy : Techniques for Analyzing Industries and Competitors. Free Press, New York, 1998.

Complementary literature
Deutsche Börse AG. Xetra – market model stock trading rel. 7.0. Technical Report 11, Deutsche Börse AG, Deutsche Börse AG Neue Börsenstr. 1 60284 Frankfurt am Main, 09 2002.
Wiener Börse AG. DAS XETRA MARKTMODELL. Technical report, Wiener Börse AG, 2002.
Yakov Amihud and Haim Mendelson. Trading mechanisms and stock returns: An empirical investigation. The Journal of Finance, 42(3):533–553, 1987.

Martin Bichler. An experimental analysis of multi-attribute auctions. Decision Support Systems, 29, 2000.
Martin Bichler. Simulation multivariater Auktionen – Eine Analyse des OTC-handels mit Finanzderivaten. Wirtschaftsinformatik, 42(3):244–252, 2000.
Martin Bichler. The Future of e-Markets: Multidimensional Market Mechanisms. Cambridge University Press, Cambridge, 2001.
Carrie Beam and Arie Segev. Automated negotiations: A survey of the state of the art. Technical Report 97, Fisher Center for Information Technology and Marketplace Transformation, Haas School Business, University of California, Berkeley, 1997.
Steven J. Brams and Alan D. Taylor. Fair Division : From Cake-Cutting to Dispute Resolution. Cambridge University Press, Cambridge, 1996.
Steven J. Brams and Alan D. Taylor. The Win-Win Solution: Guaranteeing Fair Shares to Everybody. W.W. Norton, New York, 1999.
Edward R. Capen, Robert Clapp, and William Campbell. Competitive bidding in high- risk situations. Journal of Petroleum Technology, 23:641–653, 1971.
Thomas E. Copeland and Dan Galai. Information effects on the bid-ask spread. The Journal of Finance, 38(5):1457–1469, 1983.
Adrian Dragulescu. Applications of Physics to Economics and Finance: Money, Income, Wealth, and the Stock Market. PhD thesis, University of Maryland, College Park, 2002.
Sven De Vries and Rakesh Vohra. Combinatorial auctions: A survey. INFORMS Journal on Computing, 15(3):284–309, 2003.
Eugene F. Fama. Efficient capital markets: A review of theory and empirical work. The Journal of Finance, 25(2):383–417, May 1970.
Eugene F. Fama. Efficient capital markets: Reply. The Journal of Finance, 31(1):143–145, Mar 1976.
Eugene F. Fama. Efficient capital markets: Ii. The Journal of Finance, 46(5):1575–1617, Dec 1991.
Yuzo Fujishima, Kevin Leyton-Brown, and Yoav Shoham. Taming the computational complexity of combinatorial auctions: Optimal and approximate approaches. In Thomas Dean, editor, Proceedings of the Sixteenth International Joint Conference on Artificial Intelligence, pages 548–553, San Francisco, CA, USA, 1999. Morgan Kaufmann Publishers Inc.
Robert Forsythe, Thomas R. Palfrey, and Charles R. Plott. Asset valuation in an experimental market. Econometrica, 50(3):537–568, May 1982.
Sanford J. Grossman and Merton H. Miller. Liquidity and market structure. The Journal of Finance, 43(3):617–633, Jul 1988.
Nils H. Hakansson, Avraham Beja, and Jivendra Kale. On the Feasibility of Automated Market Making by a Programmed Specialist. The Journal of Finance, 40(1):1–20, Mar 1985.
Charles Holt. Industrial organization: A survey of laboratory research. In The Handbook of Experimental Economics, chapter 5, pages 349–443. Princeton University Press, 1998.
Thomas Ho and Hans R. Stoll. Optimal dealer pricing under transactions and return uncertainty. Journal of Financial Economics, 9:47–73, 1981.
Paul Klemperer. Auction theory: A guide to the literature. Journal of Economics Surveys, 13(3):227–286, Jul 1999.
John Kagel and Alvin Roth. The Handbook of Experimental Economics. Princeton University Press, Princeton, 1998.
Frank Kelly and Richard Steinberg. A combinatorial auction with multiple winners for universal service. Management science, 46(4):586–596, 2000.
Roger B. Myerson. Incentive Compatibility and the Bargaining Problem. Econometrica, 47(1):61–74, Jan 1979.
Roger B. Myerson. Optimal auction design. Mathematics of Operations Research, 6(1):58–73, Feb 1981.
Noam Nisan. Bidding and allocation in combinatorial auctions. In Proceedings of the 2nd ACM conference on Electronic commerce, pages 1–12. ACM, 2000.
Maureen O´Hara and George S. Oldfield. The microeconomics of market making. The Journal of Financial and Quantitative Analysis, 21(4):361–376, Dec 1986.
Axel Ockenfels and Alvin E. Roth. Late and Multiple Bidding in Second Price Internet Auctions: Theory and Evidence Concerning Different Rules for Ending an Auction. Technical report, Faculty of Economics and Management, University of Magdeburg, P.O. Box 4120, D-39016 Magdeburg and Harvard University, Department of Economics and Graduate School of Business Administration, Soldiers Field Road, Baker Library 183, Boston, MA 02163, USA, 2001.
Alvin E. Roth and Axel Ockenfels. Last-minute Bidding and the Rules for Ending Second-price Auctions: Evidence from eBay and Amazon Auctions on the Internet. American Economic Review, 2003.
Michael H. Rothkopf, Aleksandar Pekec, and Ronald M. Harstad. Computationally Manageable Combinational Auctions. Management Science, 44(8):1131 – 1147, 1998.
Thomas Sandholm. An algorithm for optimal winner determination in combinatorial auctions. In Thomas Dean, editor, Proceedings of the Sixteenth International Joint Conference on Artificial Intelligence, pages 542–547, San Francisco, CA, USA, 1999. Morgan Kaufmann Publishers Inc.
Julia Schindler. Auctions with interdependent valuations : theoretical and empirical analysis, in particular of internet auctions. PhD thesis, WU-Wien, Augasse 2–6, A-1090 Wien, 2003.
Martin Shubik. Market Structure and Behavior. Harvard University Press, Cambridge, 1980.
Christoph Schlueter and Michael J. Shaw. A strategic framework for developing electronic commerce. IEEE Internet Computing, 1(6):20–28, 11/ 1997.
Robert Wilson. Nonlinear Pricing. Oxford University Press, Oxford, 1997.
Robert B. Wilson. Short course on nonlinear pricing. Technical report, Stanford Business School, Stanford, CA 94305–5015, 10 1999.
Andrew B. Whinston, Dale O. Stahl, and Soon-Yong Choi. The Economics of Electronic Commerce. MacMillan Publishing Company, Indianapolis, 1997.

Fredrik Ygge. Improving the computational efficiency of combinatorial auction algorithms. Technical report, Enersearch AB, Gothenburg, Schweden, 1999.

Course: Personalization and Recommender Systems Course key: [26506]

Lecturers: Andreas Geyer-Schulz
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Information, Market, and Service Engineering [IW4WWIMSE] (S. 32), Service Engineering [IW4WWIMSE2] (S. 35)

Learning Control / Examinations
Assessment consists of a written exam of 1 hour length following §4, Abs. 2, 1 of the Prüfungsordnungen für Informationswirtschaft and by submitting written papers as part of the exercise following §4, Abs. 2, 3 Prüfungsordnungen für Informationswirtschaft. The total grade for this lecture will consist to about 90% of the grade achieved in the written exam (maximum 100 points) and to about 10% of the written papers for the exercise (maximum 12 points). The written exam is considered successfully taken if at least 50 points are acquired.
The grades of this lecture are assigned following the table below. At least 50 points have to be acquired to pass the written exam. All additional points from excersise work will be added to the exam points once 50 points have been achieved:

Grade	Minimum points
1.0	104
1.3	98
1.7	92
2.0	86
2.3	80
2.7	74
3.0	68
3.3	62
3.7	56
4.0	50
4.7	40
5.0	0

Prerequisites
None.

Conditions
Keine

Learning Outcomes
Ziel der Vorlesung ist es, den Studenten einen vertieften Einblick in die Möglichkeiten der Personalisierung insbesondere von Internet-basierten Anwendungen zu geben. Ein Schwerpunkt liegt auf Empfehlungsdiensten. Es werden konkrete Verfahrung aus den Bereichen der Statistik, des Data Mining und der Spieltheorie vorgestellt, die zur Berechnung von Empfehlungen basierend auf verschiedenen Datengrundlagen dienen. Hierbei geht es sowohl um den Umgang mit expliziten Empfehlungen von Nutzern einer Internet-basierten Anwendung als auch um die Erfassung und Auswertung impliziter Daten wie Kaufhistorien. Weiterhin behandelt werden die Evaluation von Recommender Systemen und der Vergleich mit anderen Systemen in diesem sehr forschungsnahen Gebiet.

Content
Vorlesung: Die Vorlesung gibt zunächst einen Überblick über allgemeine Aspekte und Konzepte der Personalisierung und deren Bedeutung und Möglichkeiten für Dienstleister wie für Kunden. Danach werden verschiedene Kategorien von Empfehlungssystemen vorgestellt, sowohl aus dem Bereich expliziter Empfehlungsdienste wie Rezensionen als auch im Bereich impliziter Dienste, die Empfehlungen basierend auf gesammelten Daten über Produkte und/oder Kunden berechnen. Die Vorlesung gewährt ebenfalls einen detaillierten Einblick in die aktuell in der Abteilung laufende Forschung im Bereich der Recommendersysteme.

Media
Folien, Aufzeichnung der Vorlesung im Internet.

Basic 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.

Complementary 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.

Course: Customer Relationship Management — Course key: [26508]

Lecturers: Andreas Geyer-Schulz
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Englisch
Part of the modules: Information, Market, and Service Engineering [IW4WWIMSE] (S. 32), Service Engineering [IW4WWIMSE2] (S. 35)

Learning Control / Examinations
The assessment of this course is a written examination (60 min) (following §4(2), 1 SPO) and by submitting written papers as part of the exercise (following §4(2), 3 SPO). The total grade for this lecture will consist to about 90% of the grade achieved in the written exam (maximum 100 points) and to about 10% of the written papers for the exercise (maximum 12 points). The written exam is considered successfully taken if at least 50 points are acquired.
The grades of this lecture are assigned following the table below. At least 50 points have to be acquired to pass the written exam. All additional points from excersise work will be added to the exam points once 50 points have been achieved:

Grade	Minimum points
1.0	104
1.3	98
1.7	92
2.0	86
2.3	80
2.7	74
3.0	68
3.3	62
3.7	56
4.0	50
4.7	40
5.0	0

Prerequisites
None.

Conditions
None.

Learning Outcomes
The objective of this course is to make students aware of the goals and different aspects of Service Management. Furthermore it is intended to embed Service Management and its different apects in the concepts of business administration. The students should acquire the theoretical and practical knowledge as well as tools to implement projects in this area sucessfully. The link between Service Managemetn and CRM is also to be tought within this course.

Content
Course: The course begins with an introduction into Service Management as the strategic concepts which also covers all CRM applications. The course is divided in the basics of Service Management as well as different topics within this concept like external and internal marketing, quality management and organizational requirements.

Media
Slides

Basic literature
Christian Grönroos. Service Management and Marketing : A Customer Relationship Management Approach. Wiley, Chichester, 2nd edition, 2000.

Complementary literature
Jill Dyché. The CRM Handbook: A Business Guide to Customer Relationship Management. Addison-Wesley, Boston, 2nd edition, 2002.
Ronald S. Swift. Accelerating Customer Relationships: Using CRM and RelationshipTechnologies. Prentice Hall, Upper Saddle River, 2001.
Stanley A. Brown. Customer Relationship Management: A Strategic Imperative in theWorld of E-Business. John Wiley, Toronto, 2000.

Course: Master Seminar in Information Engineering and Management Course key: [26510]

Lecturers: Andreas Geyer-Schulz
Credit points (CP): 3 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Information, Market, and Service Engineering [IW4WWIMSE] (S. 32), Information and Market Engineering [IW4WWIMSE1] (S. 34), Service Engineering [IW4WWIMSE2] (S. 35)

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 and a presentation.The final mark is based on the examination of the written seminar thesis but can be upgraded or downgraded according to the quality of the presentation.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The student is able to

- to perform a literature search for a given topic, to identify, find, value and evaluate the relevant literature.
- 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.

Course: Practical Course in Information Engineering and Management (Master) Course key: [26510p]

Lecturers: Andreas Geyer-Schulz
Credit points (CP): 2 **Hours per week:** 0*
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Information, Market, and Service Engineering [IW4WWIMSE] (S. 32), Information and Market Engineering [IW4WWIMSE1] (S. 34), Service Engineering [IW4WWIMSE2] (S. 35)

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 a course work and its presentation.

Prerequisites
None.

Conditions
The Practical Course is an extension to the lecture *Master Seminar in Information Engineering and Management*. The dates of these lectures coincide.

Learning Outcomes
The student is able

- to work on a given question in a practical manner, e.g. conduct a market study, implement an algorithm.
- to communicate the work written as well as verbaly in a scientific adequate manner.
- to identify problems that occur during the work, to discuss them and to develop solution approaches for them.

Content
The Practical Course is an extension of the *Master Seminar in Information Engineering and Management*. The topic treated in the seminar is extended by a practical work. The practical work may be the conduction of a small market study of the implementation of a algorithm.
A report has to be written apart and has to be presented in the seminar.

Remarks
The Practical Course is an extension of the Master-Seminar and does not require extra lecture lessons.

Course: Social Network Analysis in CRM — Course key: [26518]

Lecturers: Bettina Hoser
Credit points (CP): 5 **Hours per week:** 2/1
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Information, Market, and Service Engineering [IW4WWIMSE] (S. 32), Service Engineering [IW4WWIMSE2] (S. 35)

Learning Control / Examinations
The assessment consists of an 1h written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft and of assignments during the course as an "Erfolgskontrolle anderer Art" following § 4, Abs. 2, 3 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
None

Conditions
keine

Learning Outcomes
The objectives of this course are to give students an introduction to and overview of social network analysis as a methodological approach for analysis in different areas of business administration, especially customer relationship management. Theory as well as application of social network analysis will be discussed. Students will learn how to perform and interpret analysis results.

Content
The trend to view economic and social structures as networks allows to anlysze these networks by well established and new methods from mathematics, business administration, sociology and phyiscs. The goal of these analyses are to understand different aspects of these networks: In organizations (internal Marketing): Here networks analysis kann help to detect whether hierarchies and official structures are 'alive' or if so called 'hidden organizations' have evolved. In addition such results can reveal ineffient procedures or structures within an organization. In CRM: Within analytical CRM the concept of customer value can be enriched by enclosing the network value that customer offers to the company (Customer Network Value). In Marketing: To successfully implement a virale marketing strategy the knowledge of the structure of customer networks is essential. The dynamics on these networks are relevant if one wants to use these networks for marketing purposes. Internetstructure: For information services, such as e.g. search engines, ithe identification of relevant nodes and clusters is a the major service profided and thus relevant for business success.
The analysis should identify the relevant (central) nodes in a network, find cliques, describe their connections and, if relevant, describe alos the direction of information flow within the network. To achieve this different methods will be discussed during the course.

Media
Folien

Basic literature
Mark Chignell Behnak Yaltaghian. Re-ranking search results using network analysis: A case study with google. In IBM Centre for Advanced Studies Conference, editor, Proceedings of the 2002 conference of the Centre for Advanced Studies on Collaborative research, page 14, 2002.
J.R. Hanson D. Krackhardt. Informal networks: The company behind the chart. Harvard Business Review, 71(4):104–110, Jul 1993.
Pedro Domingos and Matt Richardson. Mining the network value of customers. In ACM Press, editor, Proceedings of the seventh ACM SIGKDD international conference on Knowledge discovery and data mining, pages 57–66, 2001.
M.G. Everett and S.P. Borgatti. The centrality of groups and classes. Journal of Mathematical Sociology, 23(3):181–201, 1999.
Christian Grönroos. Service Management and Marketing : A Customer Relationship Management Approach. Wiley, Chicester, 2 edition, 2000.
Sabrina Helm. Viral marketing: Establishing customer relationships by word-of-mouse. Electronic Markets, 10(3):158–161, Jul 2000.
Dieter Jungnickel. Graphs, Networks and Algorithms. Number 5 in Algorithms and Computation in Mathematics. Springer Verlag, Berlin, 1999.
Leo Katz. A new status index derived from sociometric analysis. Psychometrika, 18(1):39–43, Mar 1953.
Jon M. Kleinberg. Authoritative sources in a hyperlinked environment. JACM, 46(5):604–632, sep 1999.
Barry Wellman Laura Garton. Social impacts of electronic mail in organizations: A review of research literature. Communication Yearbook, 18:434–453, 1995.
Carl D. Meyer. Matrix Analysis and Applied Linear Algebra. Society for Industrial and Applied Mathematics, Philadelphia, 2000.
Andrew Richards, William ; Seary. Eigen analysis of networks. Journal of Social Structure, 1(2), Feb 2000.
Pacey C. Foster Stepehen P. Borgatti. The network paradigm in organizational research: A review and typology. Journal of Management, 29(6):991–1013, 2003.

Mani R. Subramani and Balaji Rajagopalan. Knowledge-sharing and influence in online social networks via viral marketing. Communications of the ACM, 46(12):300–307, Dec 2003.
Stanley Wasserman and Katherine Faust. Social Network Analysis: Methods and Applications, volume 8 of Structural Analysis in the Social Sciences. Cambridge University Press, Cambridge, 1 edition, 1999.
Barry Wellman. Computer networks as social networks. Science, 293:2031–2034, Sep 2001.

Complementary literature

Bruce Bower. Scientists hope to download some insight into online interactions. ScienceNews Online, 161(18):http://www.sciencenews.org/20020 30.04.2003, May 2002.
N. Dunford and J.T. Schwartz. Linear Operators, Spectral Theory, Self Adjoint Operators in Hilbert Space (Wiley Classics Library). Wiley, 1988.
Kurt Endl. Analytische Geometrie und Lineare Algebra. VDI Verlag, 1985.
Daniel Gross. It´s who you know. really. The New York Times, 22nd Aug. 2004, Aug 2004.
R Guimera, L Danon, A Diaz-Guilera, F Giralt, and A Arenas. Self-similar community structure in organisations. oai:arXiv.org:cond-mat/0211498 (2003–04–29), Nov 2002.
Robert A. Hanneman. Free introductory textbook on social network analysis. online.
Daniel Hoppe. Customer lifetime value. Master´s thesis, Universität Karlsruhe (TH), Informationsdienste und Elektronische Märkte, Universität Karlsruhe (TH), D-76128 Karlsruhe, Feb 2003.
Simone Kimpeler, Castulus Kolo, and Anke Matuschewski. Erfolgsfaktoren wissensbasierter Unternehmensnetzwerke. Wissensmanagement, (2):52 – 55, 2001.
Ned Kock. Benefits for virtual organizations from distributed groups. Communications of the ACM, 43(11):107–112, Nov 2000.
Kathleen M. Carley Manju K. Ahuja, Dennis F. Galletta. Individual centrality and performance in virtual r&d groups: An empirical study. Management Science, 49(1):21–38, Jan 2003.
Andrew Parker Rob Cross. The Hidden Power of Social Networks: Understanding How Work Really Gets Done in Organizations. Harvard Business School Press, Jun 2004.
R. Smith. Instant Messaging as a Scale-free Network. e-publication: www.arXiv.org, cond-mat(0206378), 19 2002.

Course: Derivatives — Course key: [26550]

Lecturers: Marliese Uhrig-Homburg
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Finance, Econometrics, and Risk Management [IW4WWFERM] (S. 31)

Learning Control / Examinations
The assessment consists of a written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft and of possible assignments during the course as an "Erfolgskontrolle anderer Art" following § 4, Abs. 2, 3 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
None.

Conditions
None.

Learning Outcomes
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.

Media
Slides, Exercises/Exercise sheets

Basic literature
- Hull (2005): Options, Futures, & Other Derivatives, Prentice Hall, 6th Edition

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

Course: Fixed Income Securities — Course key: [26560]

Lecturers: Marliese Uhrig-Homburg
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Finance, Econometrics, and Risk Management [IW4WWFERM] (S. 31)

Learning Control / Examinations
The assessment consists of a written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft and of possible assignments during the course as an “Erfolgskontrolle anderer Art” following § 4, Abs. 2, 3 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The Student should ...

Content

Basic literature

- Bühler, W., Uhrig-Homburg, M., Rendite und Renditestruktur am Rentenmarkt, in Obst/Hintner, Geld-, Bank- und Börsenwesen - Handbuch des Finanzsystems, (2000), S.298-337.
- Sundaresan, S., Fixed Income Markets and Their Derivatives, South-Western College Publising, (1997).

Complementary literature

- Hull, J., Options, Futures, & Other Derivatives, Prentice Hall, Sixth Edition, (2005).

Course: Credit Risk — Course key: [26565]

Lecturers: Marliese Uhrig-Homburg
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Finance, Econometrics, and Risk Management [IW4WWFERM] (S. 31)

Learning Control / Examinations
The assessment consists of a written exam following §4, Abs. 2, 1 of the Prüfungsordnung für Informationswirtschaft and of possible assignments during the course as an "Erfolgskontrolle anderer Art" following § 4, Abs. 2, 3 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
None.

Conditions
None.

Learning Outcomes
The Student should ...

Content

Basic 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).

Complementary literature

- Bluhm, C., Overbeck, L., Wagner, C. , Introduction to Credit Risk Modelling, Chapman & Hall, CRC Financial Mathematics Series, (2002).
- Duffie, D., Singleton, K.J., Credit Risk: Pricing, Measurement and Management, Princeton Series of Finance, Prentice Hall, (2003).

Course: Seminar in Financial Engineering Course key: [26580]

Lecturers: Marliese Uhrig-Homburg
Credit points (CP): 3 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Finance, Econometrics, and Risk Management [IW4WWFERM] (S. 31)

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, its presentation, class participation, and possible further tasks.

Prerequisites
None.

Conditions
None.

Learning Outcomes
Learn to work independently with scientific articles and to become familiar with scientific writing. Furthermore, presentation and discussion skills are developed during the seminar class sessions.

Content
Changing current topics complementing the lectures´ contents.

Media
Aktuelle wissenschaftliche Artikel.

Basic literature
wird jeweils zu den einzelnen Seminarthemen angegeben

Complementary literature
Über die beim Seminar angegebene Einstiegsliteratur hinaus ist eigenständige Literaturrecherche erforderlich.

Course: Cloud Computing

Course key: [CC]

Lecturers: Stefan Tai, Wilfried Juling, Kunze
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Service Technologies [IW4INSER] (S. 30)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Remarks
This course will be offered from winter term 2009/2010 on.

Course: Software Engineering II

Course key: [SWT2]

Lecturers: Ralf Reussner, Walter F. Tichy
Credit points (CP): 6 **Hours per week:** 3/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Software Systems [IW4INSW] (S. 29)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Course: Seminar Information Engineering and Management Course key: [SemIW]

Lecturers: Christof Weinhardt
Credit points (CP): 4 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 3
Teaching language: Deutsch
Part of the modules: Information, Market, and Service Engineering [IW4WWIMSE] (S. 32), Information and Market Engineering [IW4WWIMSE1] (S. 34), Service Engineering [IW4WWIMSE2] (S. 35), Service Management [IW4WWSER1] (S. 36)

Learning Control / Examinations
The student is evaluated based on the written work, a presentation of the results in front of an audience and his contribution to the discussion

Prerequisites
See corresponding module information.

Conditions
Business Engineering/Economics Engineering: Preferably at least one module offered by the institute should have been chosen before attending this seminar.

Learning Outcomes
The student should be able to do a literature review based on a predefined topic in the context of information engineering and management. The approach comprises the identification of relevant literature according to the topic and an analysis as well as an evaluation of the methods presented in the literature. The student learns to present his results in a paper and in front of an audience on a academic level. This process gives him the knowledge and practice for further research work like a master thesis or a doctoral thesis

Content
In the seminar the student should learn to apply the research methods to a predefined topic area. The topics are based on research questions in Information Engineering and Management across different industry sectors. This problem analysis requires a interdisciplinary examination.

Media
- Powerpoint,
- eLearning Platform Ilias
- Software Tools, if necessary

Basic literature
The student will receive the necessary literature for his research topic.

Remarks
- Students from Bachelor and Master Course can visit the seminar. The research topic as well as the evaluation of the work and the presentation will have a different focus between Bachelor and Master Course.
- All the seminars offered at the chair of Prof. Dr. Weinhardt can be chosen. The current topics of the seminars are available at the following homepage: http://www.im.uni-karlsruhe.de/lehre.

Course: Transaction Management — Course key: [TV]

Lecturers: Klemens Böhm
Credit points (CP): 5 **Hours per week:** 2/1
Term: ??? **Level:** 4
Teaching language: Deutsch
Part of the modules: Large-Scale Information and Knowledge Management [IW4INLIKM] (S. 24), Advanced Concepts of Information and Knowledge Management [IW4INLIKM1] (S. 26)

Learning Control / Examinations

Prerequisites
None.

Conditions
None.

Learning Outcomes

Content

Course: Database Implementation and Tuning — Course key: [db_impl]

Lecturers: Klemens Böhm
Credit points (CP): 5 **Hours per week:** 2/1
Term: Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Large-Scale Information and Knowledge Management [IW4INLIKM] (S. 24), Advanced Concepts of Information and Knowledge Management [IW4INLIKM1] (S. 26)

Learning Control / Examinations
It will be announced in advance if the assessment consists of an 1h written exam following §4, Abs. 2, 1 of the Prüfungsordnung or of a 20 minute oral examination following §4, Abs. 2, 2 of the Prüfungsordnung.

Prerequisites
Knowledge about database systems, e.g. from the lecture “Communications and Database Systems”.

Conditions
None.

Learning Outcomes
The lecture follows several goals. From the point of view of methodical engineering of large scale systems, the role of architecture and non functional properties should be understood. From the algorithmically point of view, it should be comprehensible at which point in the architecture which functional and non functional properties define the building blocks of the implementation. Furthermore, it will be important to understand how the architectural properties influence the algorithms and which range of possibilities is feasible. As well, the participants of the lecture should become familiar with the classical algorithms of database technology and get a feeling for its fields of application. From the point of view of a database administrator, the participants should understand which performance related parameters are vital if a certain query profile is given and how such parameters are connected with the underlying algorithms.

Content
Database systems form the backbone of all kinds of information processing. Without such systems, business management, commerce, research and development – as well as everything in the areas of mobile communication, genetics and the web – is not possible. Therefore, nowadays it belongs to the general knowledge of computer science, to understand how such systems are composed. In addition to that, many techniques which are today common sense in in computer science, have there roots in database technology. Finally, many specialists are needed, so called database administrators, who are able to configure the functionality and performance of database systems. Without the knowledge of what happens inside such systems, it is hardly possible to configure and tune them.
Such knowledge will be thought in this lecture. As an orientation framework serves a reference architecture which primarily comes from performance optimisation. Its essential components are the memory and query engine as well as transaction management. These components are discussed following a layered architecture from file management at the bottom to the user interface at the top level. This layered architecture allows for determining methodically the necessary and possible means of performance improvement as well as identifying their place within the architecture. Therefore, the lecture also contributes in the area of software engineering of large scale systems.

Media
Slides.

Complementary literature
- T.Härder, E.Rahm: Datenbanksysteme – Konzepte und Techniken der Implementierung. Springer, 1999
- G.Saake, A.Heuer, K.-U.Sattler: Datenbanken: Implementierungstechniken. 2. Aufl. mitp-Verlag, 2005
- A.Kemper, A.Eickler: Datenbanksysteme – Eine Einführung. 6. Aufl. Oldenbourg, 2006
- H.Garcia-Molina, J.D.Ullman, J.Widom: Database Systems – The Complete Book. Prentice-Hall, 2002
- P.C.Lockemann, K.R.Dittrich: Architektur von Datenbanksystemen. dpunkt.verlag 2004

Course: Deployment of Database Systems — Course key: [dbe]

Lecturers: Klemens Böhm
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Large-Scale Information and Knowledge Management [IW4INLIKM] (S. 24)

Learning Control / Examinations
It will be announced in advance if the assessment consists of an 1h written exam following §4, Abs. 2, 1 of the Prüfungsordnung or of a 20 minute oral examination following §4, Abs. 2, 2 of the Prüfungsordnung.

Prerequisites
Knowledge about database systems, e.g., from the lecture “Communications and Database Systems”.

Conditions
None.

Learning Outcomes
At the end of the course, the participants should be able to explain and compare database concepts (especially data models and query languages) – in more breadth, compared to database courses at the undergraduate level. They should know and be able to assess the different possibilities to store complex user data using database technology.

Content
This course introduces students to the deployment of modern database technology, in both breadth and depth. ´Breadth´ is reached by the detailed study and comparison of different data models (especially the relational and the semi-structured/XML data models) and appropriate query languages (SQL, XQuery). ´Depth´ is reached by the study of several non-trivial applications, such as management of XML or e-commerce data, implementation of retrieval-models using relational database technology, or the usage of SQL for accessing sensor networks. Since all these applications are generic problems themselves, the study of such applications is interesting in itself already.

Media
Slides.

Basic literature
- Andreas Heuer, Gunther Saake: Datenbanken - Konzepte und Sprachen. 2. Aufl., mitp-Verlag, Bonn, Januar 2000.
- Alfons Kemper, Andre Eickler: Datenbanksysteme. 6. Aufl., Oldenbourg Verlag, 2006.

Complementary literature
- Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom: Database Systems: The Complete Book. Prentice Hall, 2002
- Ramez Elmasri, Shamkant B. Navathe: Fundamentals of Database Systems.

Remarks
This lecture is not offered in the winter term 2008/2009.

Course: Practical Course Database Systems — Course key: [dbprakt]

Lecturers: Klemens Böhm
Credit points (CP): 4 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Large-Scale Information and Knowledge Management [IW4INLIKM] (S. 24)

Learning Control / Examinations
The assessment will be an “Erfolgskontrolle anderer Art” and consists of several parts (projects, experiments, presentations and reports, according to §4, Abs 2 of the Prüfungsordnung). The course will be assessed with “passed” or “failed” (according to §9, Abs. 3 of the Prüfungsordnung Informationswirtschaft / §7, Abs. 3 of the Prüfungsordnung Informatik). In order to get the passed assessment for the practical course, every part of the assessment must be passed successfully.

Prerequisites
Knowledge about database systems, e.g. from the lecture “Communications and Database Systems”.

Conditions
The lecture “Deployment of Database Systems” must have been passed or must be followed at the same time.

Learning Outcomes
In the practical course, the knowledge from the lecture “Deployment of Database Systems” is reinforced on a practical level. The focus is on database-application programming, the usage of interactive query languages and database design. Furthermore, the students should learn to work in teams in order to work on various projects successfully.

Content
The practical course database systems lets students learn how to deploy database systems in practice, as a supplement to the different lectures on database technology. The participants will work in selected projects with commercial (object-)relational and XML database technology. Furthermore, database design will be practised with real-world examples. The following projects are planned for the course:

- Accessing databases, in particular from user programs,
- data management with non-conventional database technology,
- database design.

Working in teams is another important aspect of all projects.

Media

- Slides.
- Practical course notes.

Basic literature
Please refer to the literature from the lecture “Deployment of Database Systems”.

Complementary literature
Please refer to the literature from the lecture “Deployment of Database Systems”.

Remarks
This practical course is not offered in the winter term 2008/2009.

Course: Practical Course Distributed Data Management (former Practical Course Database Systems) Course key: [praktvd]

Lecturers: Klemens Böhm
Credit points (CP): 4 **Hours per week:** 2
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Large-Scale Information and Knowledge Management [IW4INLIKM] (S. 24)

Learning Control / Examinations
The assessment will be an “Erfolgskontrolle anderer Art” and consists of several parts (projects, experiments, presentations and reports, according to §4, Abs 2 of the Prüfungsordnung). The course will be assessed with “passed” or “failed” (according to §9, Abs. 3 of the Prüfungsordnung Informationswirtschaft / §7, Abs. 3 of the Prüfungsordnung Informatik). In order to get the passed assessment for the practical course, every part of the assessment must be passed successfully.

Prerequisites
Knowledge about database systems, e.g. from the lecture “Communications and Database Systems”, as well as basic knowledge of JAVA programming.

Conditions
The lecture “Distributed Data Management” must have been passed or must be followed at the same time.

Learning Outcomes
During this practical course, the students should

1. deepen selected topics from the lecture “Distributed Data Management” in the context of sensor networks,
2. gain experiences in programming sensor nodes,
3. develop self-containedly a solution for a given problem from the research-area of query processing in sensor networks and
4. get experience in developing and programming in teams as well as getting familiar with the according tools.

Content
Characteristics of modern information systems like massively distributed data creation, query processing over the internet and an increased demand regarding the robustness of such systems require distributed storage and query processing. Traditional database systems initially did not meet these new requirements, but met them by offering additional software extensions. These extensions suffer from the fact that the original system was not designed with a distributed system in mind and therefore the extension either only offer limited functionality or their applicability is tailored to a specific scenario. This course offers a broad introduction into distributed database technology, that does not have the drawbacks of afore mentioned extensions. Furthermore the participants get an in-depth look on selected research topics through theoretical course work and hands-on experience with different distributed database systems: The first block of the course will introduce database schemas for distributed storage and based on this, the participants will use SQL to execute queries over distributedly stored data. The second block of the course will focus on query processing in sensor networks, which is an application of distributed databases, where extensions of standard database technology are not sufficient for several reasons. After an introductional phase into sensor databases, the students will develop a solution to a complex research problem over several weeks. For the development and testing of this solution, we will provide Sun SPOT sensor nodes (www.sunspotworld.com).

Media

- Slides.
- Practical course notes.

Basic literature
Please refer to the literature from the lecture “Distributed Data Management”.

Complementary literature
Please refer to the literature from the lecture “Distributed Data Management”.

Course: Seminar Information Systems — Course key: [semis]

Lecturers: Klemens Böhm
Credit points (CP): 4 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Large-Scale Information and Knowledge Management [IW4INLIKM] (S. 24), Advanced Concepts of Information and Knowledge Management [IW4INLIKM1] (S. 26)

Learning Control / Examinations
The assessment involves writing a seminar paper and an oral presentation as a graded “Erfolgskontrolle anderer Art” according to §4, Abs. 2 of the Prüfungsordnung. The final grade for the seminar will be the grade for the written paper which can be increased or decreased by up to two grade points (”Notenstufen”) according to the performance of the oral presentation.

Prerequisites
Lectures held at the Information Systems Group related to the current topic of the seminar are strongly recommended.

Conditions
None.

Learning Outcomes
Independent preparation and presentation of a seminar topic from the field of information systems adhering to scientific standards.

Content
The Information Systems Group offers at least one seminar covering selected topics from the wide area of information systems every semester (every seminar at the “Lehrstuhl für Systeme der Informationsverwaltung”, which is not an undergraduate seminar, counts as “Seminar Information Systems”). Usually, the topics will be close to current research of the group, e.g., peer-to-peer networks, database systems, data mining, sensor networks and workflow-management systems.
Details will be announced each semester (announcements at the notice boards of the institute and at the homepage of the Information Systems Group).

Media
Slides.

Basic literature
Will be announced for every seminar.

Complementary literature
Literature from lectures concerning the seminar topic.

Course: Distributed Data Management — Course key: [vert_dh]

Lecturers: Klemens Böhm
Credit points (CP): 5 **Hours per week:** 2/1
Term: Wintersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Large-Scale Information and Knowledge Management [IW4INLIKM] (S. 24), Advanced Concepts of Information and Knowledge Management [IW4INLIKM1] (S. 26)

Learning Control / Examinations
It will be announced in advance if the assessment consists of an 1h written exam following §4, Abs. 2, 1 of the Prüfungsordnung or of a 20 minute oral examination following §4, Abs. 2, 2 of the Prüfungsordnung.

Prerequisites
Knowledge about database systems, e.g. from the lecture “Communications and Database Systems”.

Conditions
None.

Learning Outcomes
At the end of the course, the participants should be able to explain the pros and cons of distributed data management. They should have understood that subtle differences in the problem formulation can lead to very different solutions. In particular, the participants should be able to explain and differentiate the fundamental approaches to guarantee consistency in a distributed environment and to explain and classify approaches for data management in highly distributed environments (e.g., Peer-to-Peer systems or sensor networks) and for query processing.

Content
In modern information systems, distribution is a fundamental issue. Centralised, monolithic database architectures will probably not play an important role any more in many scenarios. However, there are various unsolved principal problems in in the field of distributed data management, or issues where existing solutions are not satisfactory. Truly, there are many products available, promising to facilitate distributed data management. However, these solutions art not always appropriate, application programmers has to develop large parts of the functionality on their own, or elegant, theoretically solid solutions lead to unsatisfactory runtime behaviour. (Therefore, you should not just choose this course if you are interested in the fundamental problems of distributed data management. If you have a special interest in practical aspects and applications, these topics are important as well.) The course introduces you to the theory of distributed data management and makes you familiar with the corresponding algorithms and methods. Topics of this course include correct and fault-tolerant concurrent executions of transactions in distributed environments (classical solutions as well as very recent developments) and data management in highly distributed environments.

Media
Slides.

Basic literature
- Philip A. Bernstein, Vassos Hadzilacos, Nathan Goodman. Concurrency Control and Recovery In Database Systems. http://research.microsoft.com/pubs/ccontrol/
- Weikum, G., Vossen, G. Transactional Information Systems: Theory, Algorithms, and the Practice of Concurrency Control and Recovery, Morgan Kaufmann, 2001.

Course: Algorithm Engineering — Course key: [xAlgoEng]

Lecturers: Peter Sanders, Dorothea Wagner
Credit points (CP): 4 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Algorithms [IW4INAALG] (S. 21)

Learning Control / Examinations
Assessment will consist of an oral exam (20 min) following §4, Abs. 2, 2 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
Lecture *Algorithmentechnik*

Conditions
None.

Learning Outcomes
The students come to know the methodology of algorithm engineering. Moreover, examples of well done algorithm engineering are presented.

Content

- What is algorithm engineering, why is it interesting, ...?
- Realistic models of machines and applications
- Practice-oriented design of algorithms
- Implementation techniques
- Experimental methods
- Analysis of measured data

The above skills are taught using concrete examples. In the past the following topics from the area of fundamental algorithms and data structures have been used for example:

- linked lists without special cases
- Sorting: parallel, external, superscalar,...
- Priority queues (chache efficiency,...)
- Search trees for integer keys
- Full-text indexing
- Graph algorithms: minimum spanning trees (external,...), route planning

The best practical and theoretical techniques known are considered. In most cases, these techniques are very different from the methods taught in a beginner's course.

Media
Slides, Scriptum, papers, source codes

Complementary literature

- K. Mehlhorn, P. Sanders, Algorithms and Data Structures - The Basic Toolbox, Springer 2008

Remarks
The lecture will be offered again in the winter term 09/10.

Course: Graph Algorithms

Course key: [xGraphAlgo]

Lecturers: Dorothea Wagner
Credit points (CP): 4 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Algorithms [IW4INAALG] (S. 21)

Learning Control / Examinations
Assessment will consist of an oral exam (20 min) following §4, Abs. 2, 2 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
Lecture *Algorithmentechnik* [24079] is recommended.

Conditions
None.

Learning Outcomes
Students will acquire basic knowledge about fundamental methods and techniques in the field of network analysis.

Content
Networks are ubiquitous in our modern world. Beside physically present networks used for example in electrotechnology or for transportation, the number and the relevance of abstract or virtual networks drastically increases. Examples are the connectivity structure of the WWW or the analysis of political relations. Due to the large number of applications and their inherent problem settings, a variety of methods and approaches have emerged mixing techniques from graph theory, linear algebra and probabilistic methods.
The course systematically deals with fundamental techniques. Most of the objectives are motivated by applications, yet the focus is put on algorithmic aspects.

Course: Parallel Algorithms — Course key: [xParallAlgo]

Lecturers: Peter Sanders
Credit points (CP): 4 **Hours per week:** 2
Term: Winter-/Sommersemester **Level:** 4
Teaching language: Deutsch
Part of the modules: Advanced Algorithms [IW4INAALG] (S. 21)

Learning Control / Examinations
Assessment will consist of an oral exam (20 min.) following §4, Abs. 2, 2 of the Prüfungsordnung für Informationswirtschaft.

Prerequisites
Knowlegde from lecture *Algorithmentechnik* is required.

Conditions
None.

Learning Outcomes
The Students are to learn basic techniques for the design of parallel algorithms as well as a selection of important parallel algorithms.

Content
Models and their relationship to real machines:

- Shared memory - PRAM
- Message passing, BSP
- Circuits

Analysis: speedup, efficiency, scalability
Basic techniques:

- SPMD
- Parallel divide and conquer
- Collective communication
- Load balancing

Examples of real algorithms:

- Collective Communication (also for large data sets): broadcast, reduce, prefix sums, all-to-all exchange
- Matrix arithmetic
- Sorting
- List ranking
- Minimum spanning trees
- Load balancing: master worker with adaptive problem size, random polling, random distribution

Media
Slides (pdf), scientific articles

Complementary literature

- Sanders, Worsch. Parallele Programmierung mit MPI – ein Praktikum
- Kumar, Grama, Gupta und Karypis. Introduction to Parallel Computing.
- JáJá. An Introduction to Parallel Algorithms

Remarks
The lecture will be offered again in the winter term 09/10.

76

Prüfungs- und Studienordnung der Universität Karlsruhe (TH) für den Master-Studiengang Informationswirtschaft

vom 30. April 2006

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.

Aufgrund von §34 Abs. 1, Satz 1 des Landeshochschulgesetzes (LHG) vom 1. Januar 2005 hat der Senat der Universität Karlsruhe (TH) am 25. April 2006 die folgende Studien- und Prüfungsordnung für den Master-Studiengang Informationswirtschaft beschlossen.

Der Rektor hat seine Zustimmung am 30. April 2006 erteilt.

Inhaltsverzeichnis

I. Allgemeine Bestimmungen **77**
§ 1 Geltungsbereich; Zweck der Prüfung . . . 77
§ 2 Akademischer Grad . . . 77
§ 3 Regelstudienzeit, Studienaufbau, Umfang des Lehrangebots . . . 77
§ 4 Aufbau der Prüfungen . . . 77
§ 5 Prüfungsausschuss . . . 78
§ 6 Prüfer und Beisitzer . . . 79
§ 7 Anmeldung und Zulassung zu den Prüfungen . . . 79
§ 8 Durchführung von Prüfungen und Erfolgskontrollen . . . 79
§ 9 Bewertung von Prüfungen und Erfolgskontrollen . . . 80
§ 10 Erlöschen des Prüfungsanspruchs, Wiederholung von Prüfungen und Erfolgskontrollen . . . 83
§ 11 Versäumnis, Rücktritt, Täuschung, Ordnungsverstoß . . . 84
§ 12 Mutterschutz . . . 84
§ 13 Anerkennung von Studienzeiten, Studienleistungen und Prüfungsleistungen . . . 85
§ 14 Interdisziplinäres Seminar . . . 86
§ 15 Master-Arbeit . . . 86
§ 16 Zusatzmodule und Zusatzleistungen . . . 87

II. Master-Prüfung **87**
§ 17 Umfang und Art der Master-Prüfung . . . 87
§ 18 Bestehen der Master-Prüfung, Bildung der Gesamtnote . . . 88
§ 19 Master-Zeugnis und Urkunde . . . 88

III. Schlussbestimmungen **89**
§ 20 Bescheid über Nicht-Bestehen, Bescheinigung von Prüfungsleistungen 89
§ 21 Ungültigkeit der Master-Prüfung, Entziehung des Master-Grades . . . 89
§ 22 Einsicht in die Prüfungsakten . . . 89
§ 23 In-Kraft-Treten . . . 90

I. Allgemeine Bestimmungen

§ 1 Geltungsbereich; Zweck der Prüfung

(1) Diese Master-Prüfungsordnung regelt Studienablauf, Prüfungen und den Abschluss des Studiums im Master-Studiengang Informationswirtschaft an der Universität Karlsruhe (TH).

(2) Die Master-Prüfung (§17 – 19) 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 Master-Prüfung soll festgestellt werden, ob der Kandidat 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

§ 2. Aufgrund der bestandenen Master-Prüfung wird der akademische Grad „Master of Science“ (abgekürzt: „M.Sc.“) für den Master-Studiengang Informationswirtschaft (englischsprachig: for the Master Programme Information Engineering and Management) verliehen.

§ 3 Regelstudienzeit, Studienaufbau, Umfang des Lehrangebots

(1) Die Regelstudienzeit beträgt vier Semester. Sie umfasst Prüfungen und die Master-Arbeit.

(2) Die im Studium zu absolvierenden Lehrinhalte sind in Module gegliedert, die jeweils aus einer Lehrveranstaltung oder mehreren, thematisch und zeitlich aufeinander bezogenen Lehrveranstaltungen bestehen. Art, Umfang und Zuordnung der Module zu einem Fach, sowie die Möglichkeiten, Module untereinander zu kombinieren, beschreibt der Studienplan. Die Fächer und ihr Umfang werden in §17 definiert.

(3) Der für das Absolvieren von Lehrveranstaltungen und Modulen vorgesehene Arbeitsaufwand wird in Leistungspunkten (Credits) ausgewiesen. Die Maßstäbe für die Zuordnung von Leistungspunkten entsprechen dem ECTS (European Credit Transfer System). Ein Leistungspunkt entspricht einem Arbeitsaufwand von etwa 30h.

(4) Der Umfang der für den erfolgreichen Abschluss des Studiums erforderlichen Studienleistungen wird in Leistungspunkten gemessen und beträgt insgesamt 120 Leistungspunkte.

(5) Die Verteilung der Leistungspunkte im Studienplan auf die Semester hat in der Regel gleichmäßig zu erfolgen.

(6) Lehrveranstaltungen können auch in englischer Sprache angeboten werden.

§ 4 Aufbau der Prüfungen

(1) Die Master-Prüfung besteht aus einer Master-Arbeit und Fachprüfungen, jede der Fachprüfungen aus einer oder mehreren Modulprüfungen, jede Modulprüfung aus einer oder mehreren Lehrveranstaltungsprüfungen. Eine Lehrveranstaltungsprüfung 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).

§ 5 Prüfungsausschuss
(1) Für den Master-Studiengang 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 wissenschaftlichen 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 Master-Studiengang Informationswirtschaft erhöht sich die Anzahl der Vetreter der Studierenden auf zwei Mitglieder mit beratender Stimme, wobei je ein Vertreter aus dem Bachelor- und aus dem Master-Studiengang 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 wissenschaftlichen 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 Prüfungsordnung in die Prüfungspraxis der Fakultäten. Er achtet darauf, dass die Bestimmungen der Prüfungsordnung eingehalten werden. 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 Prüfungsordnung.
(4) 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.
(5) 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.

§ 6 Prüfer und Beisitzer

(1) Der Prüfungsausschuss bestellt die Prüfer und die Beisitzenden. Er kann die Bestellung dem Vorsitzenden übertragen.

(2) Zur Abnahme von Erfolgskontrollen (§4 Abs. 2) sind vorrangig Professoren, Juniorprofessoren, Hochschul- und Privatdozenten zu bestellen.

(3) Soweit Lehrveranstaltungen von anderen als den unter §6 Abs. 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.

§ 7 Anmeldung und Zulassung zu den Prüfungen

(1) Um zu schriftlichen und/oder mündlichen Prüfungen (§4 Abs. 2, Nr. 1 und 2) in einem bestimmten Modul zugelassen zu werden, muss der Student 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. Darüber hinaus muss sich der Student für jede einzelne Lehrveranstaltungsprüfung, die in Form einer schriftlichen oder mündlichen Prüfung (§4 Abs. 2, Nr. 1 und 2) durchgeführt wird, beim Studienbüro anmelden. Dies gilt auch für die Zulassung zur Master-Arbeit.

(2) Die Zulassung darf nur abgelehnt werden, wenn der Kandidat in einem mit der Informationswirtschaft vergleichbaren oder einem verwandten Studiengang bereits eine Diplomvorprüfung, Diplomprüfung, Bachelor- oder Masterprüfung nicht bestanden hat, sich in einem Prüfungsverfahren befindet oder den Prüfungsanspruch in einem solchen Studiengang verloren hat. In Zweifelsfällen entscheidet der Prüfungsausschuss.

§ 8 Durchführung von Prüfungen und Erfolgskontrollen

(1) Erfolgskontrollen werden 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 von dem 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 der Prüfer müssen mindestens 6 Wochen vor Semesterbeginn bekanntgegeben werden.

Im Einvernehmen zwischen Prüfer und Kandidat kann die Art der Erfolgskontrolle auch nachträglich geändert werden. Dabei ist jedoch §4 Abs. 3 zu berücksichtigen.

(3) Eine schriftlich durchzuführende Prüfung kann auch mündlich, eine mündlich durchzuführende Prüfung kann auch schriftlich abgenommen werden. Diese Änderung muss mindestens sechs Wochen vor der Prüfung bekannt gegeben werden.

(4) Weist ein Kandidat 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, Erfolgskontrol-

len in einer anderen Form zu erbringen.
(5) Bei Lehrveranstaltungen in englischer Sprache können mit Zustimmung des Kandidaten die entsprechenden Erfolgskontrollen in englischer Sprache abgenommen werden.
(6) Schriftliche Prüfungen (§4 Abs. 2, Nr. 1) sind in der Regel von zwei Prüfern nach §6 Abs. 2 oder §6 Abs. 3 zu bewerten. Die Note ergibt sich aus dem arithmetischen Mittel der Einzelbewertungen. Entspricht das arithmetische Mittel keiner der in §9 Abs. 2, Satz 2 definierten Notenstufen, so ist auf die nächst bessere 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 Kandidat.
(8) Die wesentlichen Gegenstände und Ergebnisse der mündlichen Prüfung in den einzelnen Fächern sind in einem Protokoll festzuhalten. Das Ergebnis der Prüfung ist dem Kandidaten jeweils am Tag der mündlichen 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 Kandidaten 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 Kandidaten 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.

§ 9 Bewertung von Prüfungen und Erfolgskontrollen
(1) Das Ergebnis einer Erfolgskontrolle wird von den jeweiligen Prüfern in Form einer Note festgesetzt.
(2) Im Master-Zeugnis dürfen nur folgende Noten verwendet werden:

1 = „sehr gut“ (very good) für eine hervorragende Leistung;
2 = „gut“ (good) für eine Leistung, die erheblich über den durchschnittlichen Anforderungen liegt;
3 = „befriedigend“ (satisfactory) für eine Leistung, die durchschnittlichen Anforderungen entspricht;
4 = „ausreichend“ (sufficient) für eine Leistung, die trotz ihrer Mängel noch den Anforderungen genügt;
5 = „nicht ausreichend“ (failed) für eine Leistung, die wegen erheblicher Mängel den Anforderungen nicht mehr genügt.

Für die Master-Arbeit und die Lehrveranstaltungsprüfungen 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) und
- 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 Leistungsnachweise 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. Module, Lehrveranstaltungen oder Erfolgskontrollen, die bereits in einem Bachelor-Studiengang angerechnet wurden, dürfen in diesem Studiengang nicht noch einmal geprüft und angerechnet werden.
(6) Erfolgskontrollen können in Form von Leistungsnachweisen dokumentiert werden. Leistungsnachweise dürfen in Lehrveranstaltungsprüfungen oder Modulprüfungen nur eingerechnet werden, wenn die Benotung nicht nach §9 Abs. 3 erfolgt ist. Die durch Leistungsnachweise zu dokumentierenden Erfolgskontrollen und die daran geknüpften Bedingungen werden im Studienplan festgelegt.
(7) Eine Lehrveranstaltungsprüfung 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 wird im Studienplan geregelt. Die differenzierten Lehrveranstaltungsnoten (§9 Abs. 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 Lehrveranstaltungsprüfung endgültig nicht bestanden wurde.

82

(9) Die Ergebnisse der Modulprüfungen und der Lehrveranstaltungsprüfungen, der Leistungsnachweise und der Master-Arbeit sowie die erworbenen Leistungspunkte werden beim Studienbüro der Universität erfasst.
(10) Die Noten der Module eines Faches gehen in die Fachnote mit einem Gewicht proportional zu den ausgewiesenen Leistungspunkten der Module ein. Eine Fachprüfung ist bestanden, wenn die für das Fach erforderliche Anzahl von Leistungspunkten nachgewiesen wird.
(11) Innerhalb der Regelstudienzeit, einschließlich der Urlaubssemester für das Studium an einer ausländischen Hochschule (Regelprüfungszeit), können in einem Fach auch mehr Leistungspunkte erworben werden, als für das Bestehen der Fachprüfung erforderlich sind. In diesem Fall werden bei der Festlegung der Fachnote nur die Modulnoten berücksichtigt, die unter Abdeckung der erforderlichen Leistungspunkte die beste Fachnote ergeben.
(12) Die Gesamtnote der Master-Prüfung, die Fachnoten und die Modulnoten lauten:
bei einem Durchschnitt bis 1.5 „sehr gut“ (very good)
bei einem Durchschnitt über 1.5 bis 2.5 „gut“ (good)
bei einem Durchschnitt über 2.5 bis 3.5 „befriedigend“ (satisfactory)
bei einem Durchschnitt über 3.5 bis 4.0 „ausreichend“ (sufficient).
(13) Zusätzlich zu den Noten nach §9 Abs. 2 werden ECTS-Noten für Fachprüfungen, Modulprüfungen und für die Master-Prüfung 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* (Fail) - es sind Verbesserungen erforderlich, bevor die Leistungen anerkannt werden
F		*nicht bestanden* (FAIL) - es sind erhebliche Verbesserungen erforderlich.

Die Quote ist als der Prozentsatz der erfolgreichen Studenten definiert, die diese Note in der Regel erhalten. Dabei ist von einer mindestens fünfjährigen Datenbasis über mindestens 30 Studenten auszugehen. Für die Ermittlung der Notenverteilungen, die für die ECTS-Noten erforderlich sind, ist das Studienbüro der Universität zuständig.
(14) Bis zum Aufbau einer entsprechenden Datenbasis wird als Übergangsregel folgende Abbildung von Noten auf ECTS-Noten zur Bildung dieser Skala für alle Module des Masterstudiengangs herangezogen:

Note	ECTS-Note
1.0	A
1.3	A
1.7	B
2.0	B
2.3	B
2.7	C
3.0	C
3.3	C
3.7	D
4.0	E
4.7	FX
5.0	F

Diese Verteilung wird jährlich gleitend über mindestens fünf Jahre mit mindestens 30 Studenten 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.

§ 10 Erlöschen des Prüfungsanspruchs, Wiederholung von Prüfungen und Erfolgskontrollen

(1) Kandidaten 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) Kandidaten können eine nicht bestandene mündliche Prüfung (§4 Abs. 2, Nr. 2) einmal wiederholen.

(3) Wiederholungsprüfungen nach §10 Abs. 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. Ist auch die Wiederholung einer schriftlichen oder mündlichen Prüfung mit nicht ausreichend bewertet worden, so kann der Kandidat einen Antrag an den Rektor auf eine letzte mündliche Prüfung stellen, darüber entscheidet der Rektor. §8 Abs. 3 findet keine Anwendung auf die letzte mündliche Prüfung.

(6) Hat ein Kandidat eine Erfolgskontrolle nicht bestanden, so sind ihm Umfang und Fristen der Wiederholung der Erfolgskontrolle in geeigneter Weise bekannt zu machen.

(7) Die Wiederholung einer bestandenen Erfolgskontrolle ist nicht zulässig.

(8) Eine Fachprüfung ist endgültig nicht bestanden, wenn mindestens ein Modul des Faches endgültig nicht bestanden ist.

84

(9) Die Master-Arbeit kann bei einer Bewertung mit „nicht ausreichend“ einmal wiederholt werden. Eine zweite Wiederholung der Master-Arbeit ist ausgeschlossen.
(10) Ist gemäß §34 Abs. 2, Satz 3 LHG die Master-Prüfung bis zum Beginn der Vorlesungszeit des achten Fachsemesters dieses Studiengangs einschließlich etwaiger Wiederholungen nicht vollständig abgelegt, so erlischt der Prüfungsanspruch im Studiengang, es sei denn, dass der Student die Fristüberschreitung nicht zu vertreten hat. Die Entscheidung darüber trifft der Prüfungsausschuss.

§ 11 Versäumnis, Rücktritt, Täuschung, Ordnungsverstoß
(1) Die Abmeldung von einer Prüfung muss in schriftlicher Form erfolgen. Die Abmeldung von einer schriftlichen Prüfung ohne Angabe von Gründen ist bis zur Ausgabe der Prüfungsaufgaben möglich. Bei mündlichen Prüfungen muss der Rücktritt spätestens drei Werktage vor dem betreffenden Prüfungstermin erklärt werden. Erscheint der Kandidat zum Termin einer schriftlichen oder mündlichen Prüfung (§4 Abs. 2, Nr. 1 und 2) ohne triftige Gründe nicht oder tritt er nach Beginn der Prüfung ohne triftige Gründe von der Prüfung zurück, so gilt die Prüfung als mit „nicht ausreichend“ (5.0) bewertet. Die Sätze 1–4 gelten für Erfolgskontrollen anderer Art (§4 Abs. 2, Nr. 3) entsprechend.
(2) Die für den Rücktritt oder das Versäumnis geltend gemachten Gründe müssen dem Prüfer unverzüglich schriftlich angezeigt und glaubhaft gemacht werden. Bei Krankheit des Kandidaten bzw. eines von ihm zu versorgenden Kindes oder pflegebedürftigen Angehörigen kann die Vorlage eines ärztlichen Attestes verlangt werden. Werden die Gründe anerkannt, so soll der Kandidat die Prüfung zum nächstmöglichen Termin ablegen. Ergebnisse bereits bestandener Erfolgskontrollen sind in diesem Falle anzurechnen.
(3) Versucht der Kandidat, das Ergebnis einer mündlichen oder schriftliche 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. Ein Kandidat, der den ordnungsgemäßen Ablauf der Prüfung stört, kann von dem jeweiligen Prüfer oder Aufsichtsführenden 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 Kandidaten von der Erbringung weiterer Prüfungen ausschließen. Die Sätze 1–3 gelten für Erfolgskontrollen anderer Art (§4 Abs. 2, Nr. 3) entsprechend.
(4) Der Kandidat kann innerhalb von 14 Tagen verlangen, dass die Entscheidung nach §11 Abs. 3, Satz 1 und 2 vom Prüfungsausschuss überprüft wird. Belastende Entscheidungen des Prüfungsausschusses sind dem Kandidaten unverzüglich schriftlich mitzuteilen, zu begründen und mit einer Rechtsbehelfsbelehrung zu versehen.

§ 12 Mutterschutz
(1) Werdende Mütter müssen in den letzten sechs Wochen vor der Entbindung und bis zum Ablauf von acht Wochen nach der Entbindung nicht an Erfolgskontrollen teilnehmen. §6 Abs. 1 Satz 2 des Mutterschutzgesetzes (Regelung für Früh- und Mehrlingsgeburten) gilt entsprechend. Anträge auf Inanspruchnahme des Mutterschutzes sind an den Prüfungsausschuss zu richten. Wird der Mutterschutz in Anspruch genommenen, so verlängern sich alle Fristen dieser Prüfungsordnung entsprechend.

85

§ 13 Anerkennung von Studienzeiten, Studienleistungen und Prüfungsleistungen

(1) Studienzeiten, Studienleistungen und Prüfungsleistungen im Master-Studiengang Informationswirtschaft an einer Universität oder einer gleichgestellten Hochschule in Deutschland werden angerechnet, sofern Gleichwertigkeit nachgewiesen wird. Studienzeiten, Studienleistungen und Prüfungsleistungen in anderen Studiengängen werden anerkannt, soweit die Gleichwertigkeit festgestellt ist. Die Anerkennung von Teilen der Master-Prüfung wird in der Regel versagt, wenn die Anerkennung von mehr als der Hälfte der Leistungspunkte oder mehr als der Hälfte der Modulprüfungen oder die Anerkennung der Master-Arbeit beantragt worden ist.
(2) Für Studienzeiten, Studienleistungen und Prüfungsleistungen in staatlich anerkannten Fernstudien gilt §13 Abs. 1 entsprechend. Das gleiche gilt außerdem auch für Studienzeiten, Studienleistungen und Prüfungsleistungen an anderen Bildungseinrichtungen, insbesondere an staatlichen oder staatlich anerkannten Berufsakademien sowie an Fach- und Ingenieurschulen.
(3) Über die Gleichwertigkeit von Studien- bzw. Prüfungsleistungen entscheidet der Prüfungsausschuss im Einvernehmen mit dem zuständigen Prüfer. Gleichwertigkeit ist festzustellen, wenn die Studienzeiten, Studienleistungen und Prüfungsleistungen in Inhalt, Umfang und in den Anforderungen denjenigen des entsprechenden Studiums an der Universität Karlsruhe (TH) im Wesentlichen entsprechen. Dabei ist kein schematischer Vergleich, sondern eine Gesamtbetrachtung und Gesamtbewertung vorzunehmen. Bei der Anerkennung von Studienzeiten, Studienleistungen und Prüfungsleistungen, die außerhalb Deutschlands erbracht wurden, sind die von Kultusministerkonferenz und Hochschulrektorenkonferenz gebilligten Äquivalenzvereinbarungen sowie Absprachen im Rahmen von Hochschulpartnerschaften zu beachten. Soweit solche nicht vorliegen, kann die Zentralstelle für ausländisches Bildungswesen gehört werden. §13 Abs. 1, Satz 1 gilt entsprechend.
(4) Der Prüfungsausschuss entscheidet in Abhängigkeit von Art und Umfang der anzurechnenden Studien- und Prüfungsleistungen über die Einstufung in ein höheres Fachsemester.
(5) Werden Studien- und Prüfungsleistungen anerkannt, so werden die Noten im Falle der Vergleichbarkeit der Notensysteme übernommen und entsprechend §9 in die Berechnung der Gesamtnote einbezogen. Bei unvergleichbaren Notensystemen wird der Vermerk „anerkannt“ aufgenommen. Bei der Berechnung der Gesamtnote wird die entsprechende Leistung ausgeschlossen.
(6) Bei Vorliegen der Voraussetzungen nach §13 Abs. 1– 4 besteht ein Rechtsanspruch auf Anrechnung. Die Anrechnung von Studienzeiten, Studienleistungen und Prüfungsleistungen, die in Deutschland erbracht wurden, erfolgt von Amts wegen. Die Studierenden haben die für die Anrechnung erforderlichen Unterlagen vorzulegen.
(7) Erbringt ein Student 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 Student nach §16 der Prüfungs- und Studienordnung der Universität Karlsruhe (TH) vom 12.8.2005 für den Bachelor-Studiengang Informationswirtschaft erbracht hat und die im Studienplan dieses Studiengangs vorgesehen sind, werden auf Antrag des Studierenden an den Prüfungsausschuss anerkannt.

86

§ 14 Interdisziplinäres Seminar

(1) Im Master-Studiengang Informationswirtschaft müssen Studierende ein interdisziplinäres Modul, das in Form eines Seminars organisiert ist, im Umfang von 6 Leistungspunkten absolvieren, das von je einem Prüfer nach §6 Abs. 2 aus der Informatik, dem Recht und den Wirtschaftswissenschaften betreut wird.

§ 15 Master-Arbeit

(1) Die Master-Arbeit soll zeigen, dass der Kandidat 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 Master-Arbeit werden 30 Leistungspunkte zugeordnet. Die Bearbeitungsdauer beträgt 6 Monate. Die Master-Arbeit kann auch in englischer Sprache geschrieben werden.

(2) Die Master-Arbeit kann von jedem Prüfer nach §6 Abs. 2 vergeben werden. Soll die Master-Arbeit außerhalb der beiden nach §1 Abs. 2, Satz 1 beteiligten Fakultäten angefertigt werden, so bedarf dies der Genehmigung des Prüfungsausschusses. Dem Kandidaten ist Gelegenheit zu geben, für das Thema Vorschläge zu machen. Die Master-Arbeit kann auch in Form einer Gruppenarbeit zugelassen werden, wenn der als Prüfungsleistung zu bewertende Beitrag des einzelnen Kandidaten aufgrund objektiver Kriterien, die eine eindeutige Abgrenzung ermöglichen, deutlich unterscheidbar ist und die Anforderung nach §15 Abs. 1 erfüllt.

(3) Auf Antrag des Kandidaten sorgt ausnahmsweise der Vorsitzende des Prüfungsausschusses dafür, dass der Kandidat innerhalb von vier Wochen nach Antragstellung von einem Betreuer ein Thema für die Master-Arbeit erhält. Die Ausgabe des Themas erfolgt in diesem Fall über den Vorsitzenden des Prüfungsausschusses.

(4) Thema, Aufgabenstellung und Umfang der Master-Arbeit sind vom Betreuer so zu begrenzen, dass die Master-Arbeit mit dem in §15 Abs. 1 festgelegten Arbeitsaufwand bearbeitet werden kann.

(5) Die Master-Arbeit hat 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.“ Wenn diese Erklärung nicht enthalten ist, wird die Arbeit nicht angenommen.

(6) Der Zeitpunkt der Ausgabe des Themas der Master-Arbeit und der Zeitpunkt der Abgabe der Master-Arbeit sind beim Prüfungsausschuss aktenkundig zu machen. Der Kandidat kann das Thema der Master-Arbeit nur einmal und nur innerhalb der ersten zwei Monate der Bearbeitungszeit zurückgeben. Auf begründeten Antrag des Kandidaten kann der Prüfungsausschuss die in §15 Abs. 1 festgelegte Bearbeitungszeit um höchstens drei Monate verlängern. Wird die Master-Arbeit nicht fristgerecht abgeliefert, gilt sie als mit „nicht ausreichend“ bewertet, es sei denn, dass der Kandidat dieses Versäumnis nicht zu vertreten hat. §12 Abs. 1 (Mutterschutz) gilt entsprechend.

(7) Die Master-Arbeit 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 Master-Arbeit fest. Der Bewertungszeitraum soll 8 Wochen nicht überschreiten.

§ 16 Zusatzmodule und Zusatzleistungen
(1) Der Kandidat kann sich weiteren Prüfungen in Modulen unterziehen. §3 und §4 der Prüfungsordnung bleiben davon unberührt.
(2) Das Ergebnis maximal zweier Module, die jeweils mindestens 9 Leistungspunkte umfassen müssen, wird auf Antrag des Kandidaten in das Master-Zeugnis als Zusatzmodule aufgenommen und als solche gekennzeichnet. Zusatzmodule werden bei der Festsetzung der Gesamtnote nicht mit einbezogen. Alle Zusatzleistungen werden im Transcript of Records automatisch aufgenommen und als Zusatzleistungen gekennzeichnet. Zusatzleistungen werden mit den nach §9 vorgesehenen Noten gelistet. Diese Zusatzleistungen gehen nicht in die Festsetzung der Gesamt-, Fach- und Modulnoten ein.
(3) Der Kandidat hat bereits bei der Anmeldung zu einer Prüfung in einem Modul diese als Zusatzleistung zu deklarieren.

II. Master-Prüfung

§ 17 Umfang und Art der Master-Prüfung
(1) Die Master-Prüfung besteht aus den Fachprüfungen nach §17 Abs. 2, dem interdisziplinären Seminarmodul nach §14 sowie der Master-Arbeit nach §15.
(2) In den ersten beiden Studienjahren sind Fachprüfungen aus folgenden Fächern durch den Nachweis von Leistungspunkten in einem oder mehreren Modulen abzulegen:

- aus dem Fach Betriebswirtschaftslehre: im Umfang von 9 Leistungspunkten,
- aus dem Fach Operations Research: im Umfang von 4 Leistungspunkten,
- aus dem Fach Recht: im Umfang von 6 Leistungspunkten.

Des weiteren sind Fachprüfungen

- aus einem wirtschaftswissenschaftlichen Fach durch 1 Modul im Umfang von 20 Leistungspunkten oder durch 2 Module im Umfang von je 10 Leistungspunkten,
- aus dem Fach Informatik durch ein Modul im Umfang von 16 Leistungspunkten und ein Modul im Umfang von 17 Leistungspunkten,
- aus dem Fach Recht im Umfang von 12 Leistungspunkten

abzulegen. In jedem Fach kann ein wissenschaftliches Seminar mit mindestens 2 und höchstens 4 Leistungspunkten enthalten sein. Wirtschaftswissenschaftliche Fächer sind Betriebswirtschaftslehre, Operations Research, Statistik und Volkswirtschaftslehre. Ein Modul in BWL, OR oder Statistik im Umfang von 20 Leistungspunkten muß zumindest eine Vorlesung aus dem Fach Volkswirtschaftslehre im Umfang von 4 Leistungspunkten enthalten, ein Modul VWL im Umfang von 20 Leistungspunkten eine Vorlesung aus einem der Fächer Betriebswirtschaftslehre, Operations Research oder Statistik im Umfang von 4 Leistungspunkten. Werden zwei wirtschaftswissenschaftliche Module mit 10 Leistungspunkten gewählt, gilt dies entsprechend.

Die Module, die ihnen zugeordneten Leistungspunkte und die Zuordnung der Module zu den Fächern sind im Studienplan festgelegt.

88

Zur entsprechenden Modulprüfung kann nur zugelassen werden, wer die Anforderungen nach §7 erfüllt.

(3) Als eine weitere Prüfungsleistung ist eine Master-Arbeit gemäß §15 anzufertigen.

§ 18 Bestehen der Master-Prüfung, Bildung der Gesamtnote

(1) Die Master-Prüfung ist bestanden, wenn alle in §17 genannten Prüfungsleistungen mindestens mit „ausreichend“ bewertet wurden.

(2) Die Gesamtnote der Master-Prüfung errechnet sich als ein mit Leistungspunkten gewichteter Notendurchschnitt. Dabei werden alle Prüfungsleistungen nach §17 mit ihren Leistungspunkten gewichtet.

(3) Hat der Kandidat die Master-Arbeit mit der Note 1.0 und die Master-Prüfung mit einem Durchschnitt von 1.0 abgeschlossen, so wird das Prädikat „mit Auszeichnung“ (with distinction) verliehen. Mit einer Masterarbeit mit der Note 1.0 und bis zu einem Durchschnitt von 1.3 kann auf Antrag an den Prüfungsausschuß das Prädikat „mit Auszeichnung“ (with distinction) verliehen werden.

§ 19 Master-Zeugnis und Urkunde

(1) Über die Master-Prüfung wird nach Bewertung der letzten Prüfungsleistung eine Master-Urkunde und ein Zeugnis erstellt. Die Ausfertigung von Master-Urkunde und Zeugnis soll nicht später als sechs Wochen nach der Bewertung der letzten Prüfungsleistung erfolgen. Master-Urkunde und Master-Zeugnis werden in deutscher und englischer Sprache ausgestellt. Master-Urkunde und Zeugnis tragen das Datum der erfolgreichen Erbringung der letzten Prüfungsleistung. Sie werden dem Kandidaten gleichzeitig ausgehändigt. In der Master-Urkunde wird die Verleihung des akademischen Master-Grades beurkundet. Die Master-Urkunde 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 Master-Arbeit 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 Kandidat 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 Kandidaten (Transcript of Records).

(4) Die Abschrift der Studiendaten (Transcript of Records) enthält in strukturierter Form alle vom Kandidaten erbrachten Prüfungsleistungen. Dies beinhaltet alle Fächer, Fachnoten und ihre entsprechende ECTS-Note samt den zugeordneten Leistungspunkten, die dem jeweiligen Fach zugeordneten Module mit den Modulnoten, entsprechender ECTS-Note und zugeordneten Leistungspunkten, sowie die den Modulen zugeordneten Lehrveranstaltungen samt Noten und zugeordneten Leistungspunkten. Aus der Abschrift der Studiendaten soll die Zugehörigkeit von Lehrveranstaltungen zu den einzelnen Modulen und die Zugehörigkeit der Module zu den einzelnen Fächern deutlich erkennbar sein.

(5) Die Master-Urkunde, das Master-Zeugnis und das Diploma-Supplement ein-

schließlich des Transcript of Records werden vom Studienbüro der Universität ausgestellt.

III. Schlussbestimmungen

§ 20 Bescheid über Nicht-Bestehen, Bescheinigung von Prüfungsleistungen

(1) Der Bescheid über die endgültig nicht bestandene Master-Prüfung wird dem Kandidaten durch den Prüfungsausschuss in schriftlicher Form erteilt. Der Bescheid ist mit einer Rechtsbehelfsbelehrung zu versehen.

(2) Hat der Kandidat die Master-Prüfung endgültig nicht bestanden, wird ihm auf Antrag und gegen Vorlage der Exmatrikulationsbescheinigung eine schriftliche Bescheinigung ausgestellt, die die erbrachten Prüfungsleistungen und deren Noten sowie die zur Prüfung noch fehlenden Prüfungsleistungen enthält und erkennen lässt, dass die Prüfung insgesamt nicht bestanden ist. Dasselbe gilt, wenn der Prüfungsanspruch erloschen ist.

§ 21 Ungültigkeit der Master-Prüfung, Entziehung des Master-Grades

(1) Hat der Kandidat 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 Kandidat 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 Kandidat hierüber täuschen wollte, so wird dieser Mangel durch das Bestehen der Prüfung geheilt. Hat der Kandidat die Zulassung vorsätzlich zu Unrecht erwirkt, so entscheidet der Prüfungsausschuss nach Maßgabe des Landesverwaltungsverfahrensgesetzes in der jeweils gültigen Fassung.

(3) Dem Kandidaten ist vor einer Entscheidung nach §21 Abs. 1 und §21 Abs. 2, Satz 2 Gelegenheit zur Äußerung zu geben.

(4) Das unrichtige Prüfungszeugnis ist einzuziehen und gegebenenfalls ein neues zu erteilen. Dies bezieht sich auch auf alle davon betroffenen Anlagen (Transcript of Records und Diploma Supplement). Mit dem unrichtigen Prüfungszeugnis sind auch die Master-Urkunde, das Master-Zeugnis und alle Anlagen (Transcript of Records und Diploma Supplement) einzuziehen, wenn die Prüfung aufgrund einer Täuschung für „nicht bestanden“ erklärt wurde.

(5) Die Entziehung des akademischen Master-Grades richtet sich nach den gesetzlichen Bestimmungen.

(6) Eine Entscheidung nach §21 Abs. 1 oder §21 Abs. 2, Satz 2 ist nach einer Frist von fünf Jahren ab dem Datum des Prüfungszeugnisses ausgeschlossen.

§ 22 Einsicht in die Prüfungsakten

(1) Innerhalb eines Jahres nach dem Ablegen einer Erfolgskontrolle §4 Abs. 2 ist einem Kandidaten auf Antrag in angemessener Frist Einsicht in die ihn betreffenden Unterlagen dieser Erfolgskontrolle zu gewähren. Der Vorsitzende des Prüfungsausschusses bestimmt Ort und Zeit der Einsichtnahme. Kann der Kandidat einen festgesetzten Termin zur Einsichtnahme nicht wahrnehmen, muss er dies gegenüber dem Prüfungsausschuss anzeigen und begründen. Der Prüfungsausschuss entscheidet über

eine weitere Gelegenheit zur Einsichtnahme.
(2) §22 Abs. 1 gilt entsprechend für die Einsicht in die Prüfungsakte.
(3) Prüfungsunterlagen sind mindestens 5 Jahre aufzubewahren.

§ 23 In-Kraft-Treten
(1) Diese Studien- und Prüfungsordnung tritt am 1. Oktober 2006 in Kraft.
(2) Auf Antrag können Studierende, die auf Grundlage der Prüfungsordnung für den Diplomstudiengang Informationswirtschaft vom 19. August 1999 ihr Studium an der Universität Karlsruhe (TH) aufgenommen haben, ihr Studium auf Grundlage der Prüfungsordnung für den Master-Studiengang Informationswirtschaft vom 30. April 2006 fortsetzen, wenn sie im Diplomstudiengang mindestens ins 7. Fachsemester eingestuft werden und wenn eine Bachelor-äquivalente Studien- und Prüfungsleistung vorliegt. Dies ist durch den Prüfungsausschuss zu prüfen. Leistungen im Diplomstudiengang können auf Antrag eines Studierenden vom Prüfungsausschuß anerkannt werden.
Karlsruhe, den 30. April 2006

Professor Dr. sc. tech. Horst Hippler
(Rektor)

Index

A

Advanced Algorithms (Modul) ... 21
Advanced Concepts of Information and Knowledge Management (Modul) ... 26
Advanced Econometrics of Financial Markets ... 132
Advanced Infrastructures (Modul) ... 27
Advanced Lab Applied Informatics ... 111
Advanced Systems - Seminar ... 87
Advanced Web Applications ... 80
Aktuelle Probleme des Patentrechts ... 108
Algorithm Design ... 63
Algorithm Engineering ... 213
Algorithms for Ad-hoc and sensor networks ... 101
Algorithms for Cellular Automata ... 94
Algorithms for Internet Applications ... 141
Algorithms for Planar Graphs ... 92
Algorithms for Visualization of Graphs ... 93

B

Behavioral Approaches in Marketing ... 121
Behavioral Approaches in Marketing and Data Analysis (Modul) 40
Business Administration in Information Engineering and Management ... 51
Business and IT Service Management ... 186
Business Models in the Internet: Planning and Implementation 180
Business Organization: Theory and Management Perspective (Modul) ... 43

C

Civil Law for Advanced ... 100
Cloud Computing ... 203
Communication and Database Systems ... 88
Complex Internet Applications (Modul) ... 23
Complexity Management ... 153
Component Based Software Engineering ... 96
Computer Contract Law ... 91
Contract Drafting and Internet Law (Modul) ... 18
Copyright ... 71
Corporate Planning and Operations Research ... 115
Credit Risk ... 201
Customer Relationship Management ... 194

D

Data Analysis and Operations Research ... 123
Data Warehousing and Mining ... 70
Database Implementation and Tuning ... 207
Database Systems and XML ... 147
Datenschutz und Privatheit in vernetzten Informationssystemen 90
Deployment of Database Systems ... 208
Derivatives ... 199
Distributed Algorithms ... 145
Distributed Data Management ... 212
Distributed Database Systems: Basic Technology for e-Business ... 146
Document Management and Groupware Systems ... 148

E

e-Business & electronic Marketing ... 116
e-Collaboration (Modul) ... 22
eFinance: Information Engineering and Management for Securities Trading ... 179
Electronic Markets (Principles) ... 187
Electronic Markets: Institutions and Market Mechanisms ... 189
Employment Law I ... 82
Employment Law II ... 105
Enterprise Risk Management ... 173
Entrepreneurship and Marketing ... 122
eServices ... 182
European and International Law ... 104

F

Finance, Econometrics, and Risk Management (Modul) ... 31
Financial Time Series and Econometrics ... 130
Fixed Income Securities ... 200

G

Game Theory II ... 131
Graph Algorithms ... 214

H

High Performance Communication ... 67

I

Information and Market Engineering (Modul) ... 34
Information Engineering and Management 1 (Modul) ... 15
Information Engineering and Management 2 (Modul) ... 16
Information Integration and Web Portals ... 77
Information Technology and Business Information ... 117
Information, Market, and Service Engineering (Modul) ... 32
Intelligent Systems in Finance ... 155
Interdisciplinary Seminar (Modul) ... 19
Interdisciplinary Seminar in Information Engineering and Management ... 57
International Marketing ... 118
International Risk Transfer ... 175
Internet Law ... 55
IT Complexity in Practice ... 157

K

Knowledge Discovery ... 150
Knowledge Management ... 149

L

Lab Class Web Services ... 164
Large-Scale Information and Knowledge Management (Modul) 24
Law for Information Companies (Modul) ... 49
Law of Contracts ... 56
Law of the Information Economy (Modul) ... 47

Law of the Information Society (Modul) 48

M

Management and Strategy 165
Management of Business Networks 178
Management of IT-Projects 161
Managing New Technologies 172
Managing Organizations 166
Market Engineering: Information in Institutions 181
Marketing (Modul) 37
Marketing and Innovation 119
Marketing and Operations Research 114
Marketing Research (Modul) 38
Markovian Decision Processes 134
Master Seminar in Information Engineering and Management 195
Master Seminar in Marketing 124
Master Seminar in Quantitative Marketing and OR 126
Master Seminar zu Marktforschung 125
Master Thesis (Modul) 20
Mobile Communication 98
Model Driven Software Development 95
Modern Market Research 113
Moving Objects Databases 81
Multicore Computers and Computer Clusters 69
Multidisciplinary Risk Research 174
Multimedia Communication 75

N

Nature-inspired Optimisation 144
Network and IT-Security Management 79
Network Security: Architectures and Protocols 89
Next Generation Internet 107

O

Operational Risik Management (Modul) 45
Operations Management 133
Optimization in a Random Environment 139
OR Methods and Models in Information Engineering and Management 54
Organic Computing 142
Organization Theory 167

P

Parallel Algorithms 215
Patent Law 103
Personalization and Recommender Systems 192
Portfolio and Asset Liability Management 129
Power Management 73
Power Management Praktikum 85
Practical Course Data Warehousing and Mining 109
Practical Course Database Systems 209
Practical Course Distributed Data Management (former Practical Course Database Systems) 210
Practical Course in Algorithm Design 64
Practical Course in Information Engineering and Management (Master) 196
Practical Course in Telematics 60
Practical Course: Web Technologies 86
Practical seminar Information Engineering and Management 185
Practical Seminar Knowledge Discovery 163
Principles of Information Engineering and Management 53
Principles of Insurance Management 110
Public Media Law 65
Public Sector Risk Management 177

Q

Quality Management I 135
Quality Management II 136
Quantitative Marketing and OR (Modul) 39

R

Randomized Algorithms 84
Risk Management of Microfinance and Private Households 176

S

Semantic Web Technologies I 151
Semantic Web Technologies II 152
Seminar in Applied Informatics 112
Seminar in Financial Engineering 202
Seminar in Telematics 61
Seminar Information Engineering and Management 205
Seminar Information Systems 211
Seminar Service Science, Management & Engineering 184
Seminar: Management and Organization . . . . . 170 f.
Service Engineering (Modul) 35
Service Innovation 183
Service Management (Modul) 36
Service Technologies (Modul) 30
Service-oriented Computing 1 158
Service-oriented Computing 2 159
Simulation I 137
Simulation II 138
Simulation of Computer Networks 106
Social Network Analysis in CRM 197
Software Architecture 62
Software Development for modern, parallel platforms 102
Software Engineering II 204
Software Systems (Modul) 29
Special Topics in Management: Management and IT 168
Statistical Methods in Financial Risk Management 128
Stochastic Calculus and Finance 127
Stochastic Methods in Economics and Engineering (Modul) . 42
Stochastic Modeling and Optimization (Modul) 46
Stochastic Models in Information Engineering and Management (Modul) 17
Stochastic Processes 140
Strategic and Innovative Decision Making in Marketing 120
Strategic Management of Information Technology 162
Strategy and Organization (Modul) 44
Strategy, Innovation and Data Analysis (Modul) 41
System Architecture 58
System Software (Modul) 28

T

Tax Law I 83
Tax Law II 99
Telecommunications Law 97
Telematics 74
Telematics for Information Management and Engineering . . . 59
Trademark and Unfair Competition Law 76

Transaction Management 206

U

Ubiquitous Computing 78

V

Value-Based Instruments of Corporate Strategy 169

W

Web Engineering 72
Web Service Engineering 160
Wireless Sensor-Actuator-Networks 66
Workflow Management Systems 68