Contents

Contact & Imprint

HECTOR School of Engineering and Management, Karlsruhe Institute of Technology (KIT)

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1 Foreword

Service Management and Engineering for Sustained Business Success

The importance of information for companies in our modern internet economy is twofold: First, efficient and effective information supply is required for business planning and operations. Efficiency, reliability, and safety are key issues for information supply chains in modern companies. Second, information is an important product for the TIME industry, which includes not only companies in the field of information brokerage but also in the telecommunication, multimedia, and entertainment sector. Flexibility and short response times to changing market requirements are nowadays main success factors.

Service Management and Engineering aims at satisfying these requirements on the one hand; it provides approved methods and tools to support the complete information supply chain in all kinds of organizations. On the other hand, Service Management and Engineering provides techniques that cover the whole life cycle of information products, leading from the early planning stage via the design and production steps to the final market introduction. It includes aspects such as pricing, design of contracts and technical implementation of electronic markets. Service Management and Engineering is based on an interdisciplinary approach which comprises innovative concepts from different disciplines such as informatics, business administration, economics and law.

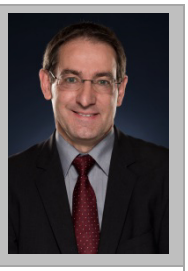
The present HECTOR School Master Program in Service Management Engineering provides the chance to specialize in the theory, in the methods, and in the applications of Service Management and Engineering.

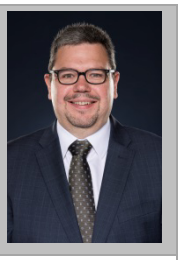
The future need for highly qualified people trained in Service Management and Engineering will further increase due to the predicted growth of industry. The program prepares students for challenging positions such as product manager in the telecommunication sector, chief information officer in a bank or consultant in the field of information brokerage and e-business.

Prof. Dr. Andreas Oberweis

Program Director of Service Management and Engineering

2 Program Directors

Title/ Name	Prof. Dr. rer. nat. Andreas Oberweis	
Phone	+49 (0) 721-608 44516	
E-Mail	***oberweis@kit.edu***	
Affiliation	Institute of Applied Informatics and Formal Description Methods, KIT	
Current Position	Chair: Business Information Systems, KIT	
Vita	1990 PH.D. (Dr. rer.nat.) Universität Mannheim 1995 Doctorate of Science (Habilitation) Universität Karlsruhe (TH) 1995 Appointed Full Professor Goethe Universität Frankfurt 2003 Appointed Full Professor Universität Karlsruhe (TH) Board Member EUCIP	
Fields of Interest	▪ Distributed Systems ▪ Information Systems Modeling ▪ E-Collaboration ▪ E-Learning ▪ Document Management	
Memberships & Awards	▪ Gesellschaft für Informatik ▪ GMDS ▪ ACM ▪ IEEE Computer Society	

Title/ Name	Prof. Dr. Martin E. Ruckes	
Phone	+49 (0) 721-608 43427	
E-Mail	***Martin.Ruckes@kit.edu***	
Affiliation	Co-head of Institute of Finance, Banking, and Insurance, KIT	
Current Position	Co-head of Institute of Finance, Banking, and Insurance, KIT	
Vita	▪ Assistant Professor of Finance, Dept. of Finance, School of Business, University of Wisconsin Madison, 2000-2007 ▪ Research Associate, Dept. of Economics, University of Mannheim, 1998-1999 ▪ Research Fellow, Dept. of Economics, University of Mannheim, 1997-1998 ▪ Lecturer, Dept. of Finance, School of Business, University of Wisconsin-Madison, 1997 ▪ Visiting Scholar, Dept. of Economics, Boston University, 1996 ▪ Visiting Researcher, Dept. of Economics, Université Libre de Bruxelles, 1996 ▪ Memeber of DFGGraduiertenkolleg “Allokation auf Finanz- und Gütermärkten”, University	

	of Mannheim
Fields of Interest	▪ Primary fields: Corporate Investment, Corporate Finance, Economics of Organizations, Banking ▪ Secondary fields: Contract Theory, Industrial Organization
Memberships & Awards	▪ Research grant ("On the Structure of the Modern Financial System"), BBBank, 2009 ▪ Research grant ("Managerial Entrenchment and Corporate Investment"), Graduate School of the University of Wisconsin-Madison, 2006 ▪ Research grant ("Coordination Risk in Lending and the Capital Structure of Arbitrageurs"), Graduate School of the University of Wisconsin-Madison, 2005 ▪ Research grant ("Arbitraging Arbitrageurs"), Graduate School of the University of Wisconsin-Madison, 2003 ▪ Research grant (for research visit at Boston University), German Academic Exchange Service, 1996-1997 ▪ Scholarship (for participating in the Ph.D. program at the University of Mannheim), German Science Foundation, 1994-1996 ▪ Research grant (for research visit at the Université Libre de Bruxelles), Erasmus Exchange Program, 1996

3 Organization

3.1 Program Structure and Curriculum

Excellence in Technology Management: Seven Executive Master Programs are offered by the HECTOR School of Engineering and Management. The school – named after Dr. h.c. Hans-Werner Hector, the co-founder of the software company SAP – is run in cooperation with four University Departments of the KIT. The programs are offered in:

- Electronic Systems Engineering and Management (ESEM)
- Energy Engineering and Management (EEM)
- Financial Engineering (FE)
- Green Mobility Engineering (GME)
- Management of Product Development (MPD)
- Production and Operations Management (POM)
- Service Management and Engineering (SME)

The concurrently taught Executive Master Programs are designed for working professionals. Block lectures scheduled at intervals allow participants to continue with demanding careers while acquiring new skills. The course program officially begins in October of each year and lasts 15 months. After this the Master Programs will be completed with a Master Thesis. Courses are divided into 10 intensive modules of 10 days each, following a timetable of monthly intervals. Each participant will take the same sequence of courses throughout the program. The two-week block lectures allow a complete immersion into the academic environment without long interruption of existing work-related responsibilities.

The following table (Tab. 3-1) shows the sequence of the modules in and the curriculum of the program.

# of Module	Type of Module	Name of Module	Course
1	EM1	Information and Service Management	1. Introduction to Service Management and Engineering
			2. Information and Market Engineering
			3. Service Management
			4. Innovation of Services
2	EM2	Service Technologies	1. Advanced Computer Networks
			2. Advanced Web Applications
			3. IT Safety and Security
			4. Cloud Computing
3	MM1	International Project	1. Project Management

# of Module	Type of Module	Name of Module	Course
		Management	2. Multi-Project Management in an International Setting
			3. Development Management
			4. Intercultural Management
4	MM2	Finance for Executives	1. Introduction to Finance and Accounting
			2. Financial Accounting
			3. Fundamentals of Finance
5	EM3	Digital Services	1. Information and Knowledge Management
			2. IT Aspects of Mobile Businesses
			3. Big Data
			4. Information Pricing
			5. Service Pricing
5	MM3	Management Accounting, Marketing and Strategy	1. Business Strategy
			2. Management Accounting
			3. Marketing
7	EM4	Business Processes and Software Engineering	1. Business Process Engineering
			2. Software Systems Engineering
8	EM5	Regulations and Economics of Networks	1. Communication Law
			2. Industrial and Network Economics
			3. Economics of Contracts
7	MM4	Stochastic and Games	1. Applied Game Theory
			2. Decisions under Risk and Uncertainty
			3. Optimization under Uncertainty
			4. Simulation and Case Studies
10	MM5	Law and Contracts	1. Decisions, Contracts, Markets and Trade
			2. International Law – The Law of Business Organizations
			3. International Intellectual Property Law

Tab. 3-1 Sequence of the modules and curriculum of the program in SME

3.2 Academic Calendar Intake 2015

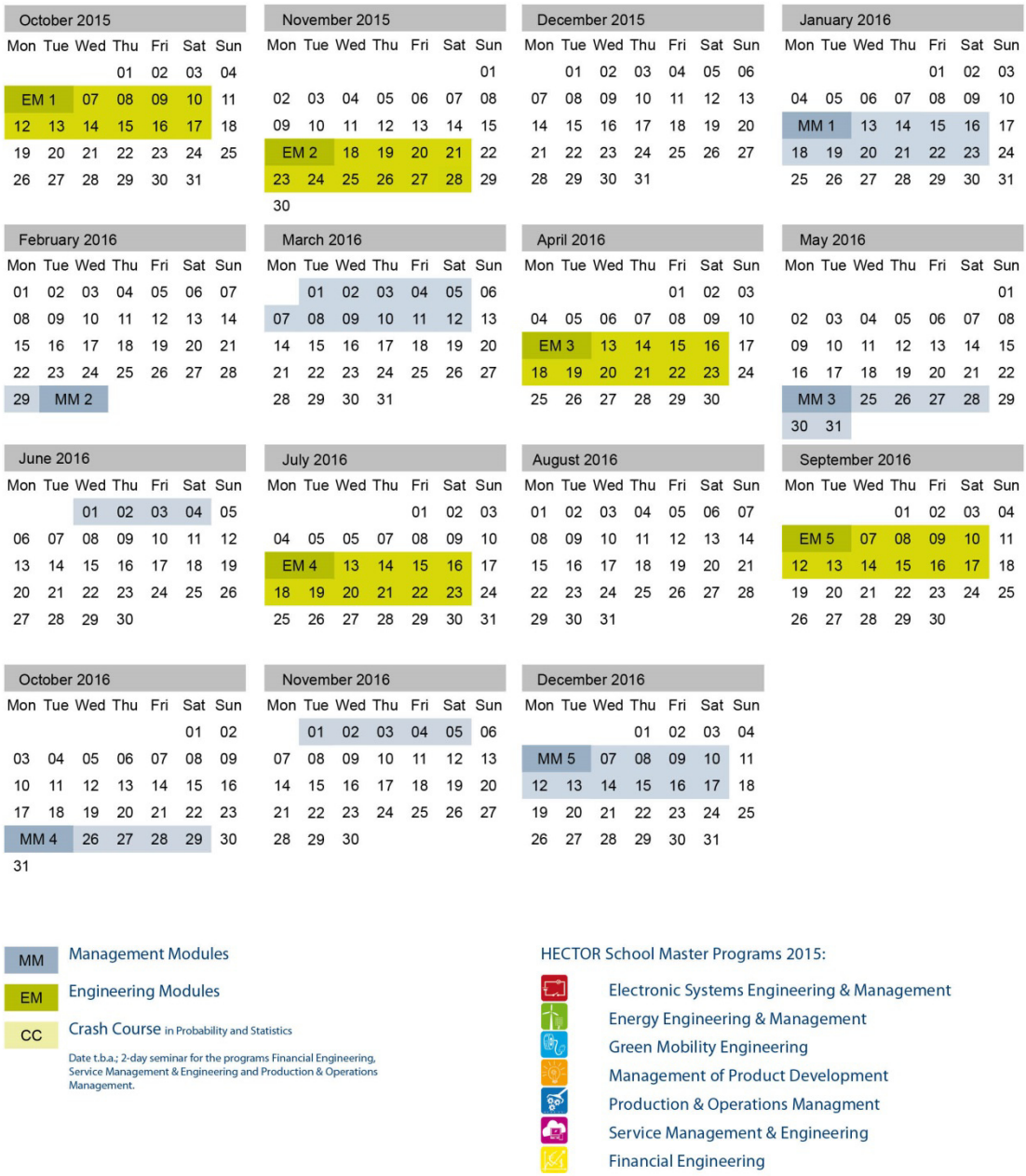


Figure 1: Academic Calendar Intake 2015

3.3 Teaching Structure

Our programs are more than typical MBA programs. The primary goal is to enable young professionals to take a holistic approach when managing highly interdependent processes. Leadership for engineers in today's fast changing and complex environment does imply technological and organizational responsibilities and requires economical accountability and human resource management know-how. Therefore all programs are based on 5 Management Modules where the participants are provided with general knowledge in finance, accounting, marketing, multi-project management and international law so they can consider commercial consequences of business decisions.

The engineering emphasis of each Master Program is laid on 5 additional Modules adapted to each specialization. The lectures in the Masters-specific field provide insight into the newest research topics. They convey current and state of the art methodology necessary to master the scope of innovative technologies. These engineering lectures also comprise the theoretical background necessary to model and analyze key decision problems in manufacturing sites.

Workshops and case studies allow ample opportunity to explore the direct applications of the modules simulating the real business environment. The programs conclude with a Master Thesis which allows the participants to work on a research project reflecting their own company's needs and its specific business environment. The final title bestowed after having successfully completed the programs is the M.Sc. of the Karlsruhe Institute of Technology (KIT).

3.4 Credit Points

The awarded credit points during the part-time Master of Science Program are distributed as follows (for further information on the ECTS System please see chapter 9.1.):

Module	Hours in class	Credit Points	
		POM, MPD, ESEM, GME, EEM	FE, SME
MM1	75	6	6
MM2	75	6	6
MM3	75	6	6
MM4	75	6	6
MM5	75	6	6
EM1	75	6	8
EM2	75	6	8
EM3	75	6	8
EM4	75	6	8
EM5	75	6	8
Master Thesis	900/600	30	20
Total		90	90

3.5 Lecturers

3.5.1 Management Modules

Name	Institute
Program Director	
Prof. Dr. Martin E. Ruckes	Institute for Finance, Banking and Insurance, KIT
Module Supervisors	
Prof. Dr. Stefan Nickel	Institute for Operations Research, KIT
Prof. Dr. Martin E. Ruckes	Institute for Finance, Banking and Insurance, KIT
Prof. Dr. Martin Klarmann	Institute of Economic Information and Marketing, KIT
Prof. Dr. Clemens Puppe	Institute of Economic Theory and Statistics, KIT
Lecturers in Alphabetical Order	
Prof. Dr.-Ing. Dr. h.c. Albert Albers	Institute of Product Development, KIT
Dipl. Inform. Abilio Avila	Institute for Entrepreneurship, Technology Management and Innovation, KIT
Prof. Dr. Christine Barz	Technische Universität Berlin
Dr. Michael A. Buchmann	IMTEAM Intercultural Management Team
Dr. Kerstin Fehre	Institute of Applied Business Studies and Management, KIT
Sven Jacobs	Norton Rose Fulbright LLP
Prof. Dr. Anja Kern	Cooperative State University, DHBW Mosbach
Dr.-Ing. Robert Landwehr	Daimler AG
Prof. Dr. Hagen Lindstädt	Institute of Applied Business Studies and Management, KIT
Dr. Torsten Lüdecke	Institute for Finance, Banking and Insurance, KIT
Prof. Dr. Martin Schulz	German Graduate School of Management and Law
Prof. Dr. Orestis Terzidis	Institute for Entrepreneurship, Technology Management and Innovation
Prof. Dr. Berthold Wigger	Institute for Economic Policy Research, KIT

3.5.2 Engineering Modules

Name	Institute
Program Director	
Prof. Dr. Andreas Oberweis	Institute of Applied Informatics and Formal Description Methods, KIT
Module Supervisors	
Prof. Dr. Andreas Geyer-Schulz	Institute of Information Systems and Management, KIT
Prof. Dr. Sebastian Abeck	Institute of Telematics, KIT
Prof. Dr. Rudi Studer	Institute of Applied Informatics and Formal Description Methods, KIT
Prof. Dr. Andreas Oberweis	Institute of Applied Informatics and Formal Description Methods, KIT
Prof. Dr. Indra Spiecker gen. Döhmann	Department of Law, Goethe Universität Frankfurt am Main
Lecturers in Alphabetical Order	
PD Dr.-Ing. Roland Bless	Institute of Telematics, KIT
Dr. Michael Gebhart	Institute of Telematics, KIT
Dr. Andreas Harth	Institute of Applied Informatics and Formal Description Methods, KIT
Dr. Stefan Hellfeld	FZI – Research Center for Information Technology, KIT
Prof. Dr. Kay Mitusch	Institute for Economic Policy Research, KIT
Prof. Dr. Jörn Müller-Quade	Institute for Cryptography and Security, KIT
Prof. Dr. Clemens Puppe	Institute of Economic Theory and Statistics, KIT
Prof. Dr. Ralf H. Reussner	Institute for Program Structures and Data Organization, KIT
Prof. Dr. Gerhard Satzger	Karlsruhe Service Research Institute, KIT
Prof. Dr. York Sure-Vetter	Institute of Applied Informatics and Formal Description Methods, KIT
Prof. Dr. Christof Weinhardt	Institute of Information Systems and Management, KIT

4 Qualification Objectives

4.1 Qualification Objectives at Program Level

All seven executive master programs of the HECTOR School of KIT have the following qualification objectives in common:

1. Enabling the graduates to operate in an analytical and scientifically sound way
2. Enabling the graduates to independently apply and further develop methods and technologies in the areas of research and development
3. Enabling the graduates to perform successful, self-dependent, and innovative work which is related to their occupational fields in their respective areas of the specialization
4. Enabling the graduates to work on complex topics in the pursued specialization
5. Enabling the graduates to apply methods both in economic and in management-related issues
6. Enabling the graduates to assume leadership positions in the field of their chosen specialization, also in international contexts

4.2 Qualification Objectives for Service Management and Engineering

The specific qualification objectives for the executive master program SME are the following:

1. The graduates are able to understand and evaluate the influences of developments in the field of modern information and communication technologies on future services.
2. They are able to efficiently and effectively use these technologies to develop competitive and innovative service offerings and to successfully lead the service-oriented change of business and business processes. To achieve this aim, graduates are taught an interdisciplinary and holistic perspective on problems and their solutions.
3. They can also apply design principles of innovative services technologies and independently create solutions approaches for problem areas.
4. They are capable of recognizing safety and reliability problems and have mastered the most important methods for dealing with them.
5. Graduates will be able to solve the economic issues of the pricing of services using the appropriate models, and understand the different life cycles of business processes and supporting software systems.
6. The graduates can assess regulatory framework conditions and legal issues of contractual arrangements and duly consider them in design decisions.
7. They are also able to analyze and evaluate technological problems in the context of service management under economics aspects.
8. They are able to thoroughly understand the approach in the internal and external financial reporting and to apply it in the corporate context.
9. Furthermore, they are familiar with approaches to preparing and optimizing a company's strategic decisions.
10. They have acquired in-depth knowledge of stochastics and applied game theory and can apply these under the aspect of uncertainty.
11. They have mastered the essential skills of project management in an international context and through their interdisciplinary training can actively integrate those from various fields, hierarchical levels and cultural backgrounds and thus prepare and implement decisions concerning corporate strategy.
12. They are able to understand marketing, human resource management, and legal issue approaches in the corporate context, to recognize and evaluate interconnections and thus, based on this, to evaluate the effectiveness of strategies. Recommendations for action can be derived on the basis of this analysis.

5 Description of the Management Modules

5.1 International Project Management

International project management is one of the crucial key qualifications for employees in an internationally acting company. In order to acquire this important competency, the participants receive an introduction to project management that aims at being able to identify and apply goals and quantitative methods of project planning. The participants realize how they can analyze and steer projects. Special emphasis of the module is laid on the pervasion and creation of project-network and Gantt-diagrams, heuristic solution processes and “change management” in the project. Furthermore the calculation approaches in time- and resource-limited projects as well as risk and cost management approaches are in focus. For this purpose methodological competence is conveyed in the areas modeling, planning and disposition of projects. The final focus is on the international diversity of management cultures, their impact on different understandings and practices in project management and on ways to successfully manage international projects.

Module Name: International Project Management

Module Supervisor: Prof. Dr. Stefan Nickel

Type of Module: Management Module 1 (MM1)

Lectures in Module	**Workload Distribution [hrs]**	
	Presence	**Self studies**
Project Management	30	42
Multi-Project Management in an International Setting	15	21
Development Management	15	21
Intercultural Management	15	21

Major Learning Results (LR):

LR-1: Knowledge of the principles and various instruments of project management and project planning and the acquisition of abilities to plan projects and create controlling systems.

LR-2: Analysis of various methods and procedures of multi-project management and project controlling in a global context.

LR-3: Knowledge of the product development process as well as important parameters of product development and development methods in the context of project management.

LR-4: Understanding of cultural issues in project management and application of ways to mitigate cross-cultural risks and leverage cultural differences.

Performance appraisal for this Module:

Within the first Management Module the performance appraisal consists of three written exams and a graded project work. For the course *Intercultural Management* the performance appraisal will be based on a case study and class room participation.

Credit Points: 6

5.1.1 Project Management

Lecturer	Prof. Dr. Orestis Terzidis, Dipl.-Inform. Abilio Avila, Prof. Dr. Stefan Nickel
Content	▪ Introduction to project management and to a project case ▪ Project planning cycle and project characteristics ▪ Project innovation through design Thinking ▪ Bridging discipline and innovation ▪ Organizational structures ▪ Project objectives, initiation and planning ▪ Activity-on-Node networks ▪ Structural and time analysis ▪ Stochastic time analysis ▪ Project execution ▪ Project monitoring and controlling ▪ Project closing ▪ Teamwork ▪ Stakeholder management ▪ Project communication ▪ Risk management ▪ Cost & budget ▪ Quality management ▪ Traditional project management vs. agile project management ▪ Bridging discipline and agility
Course Objectives	Understand the general approach in project management and know-how to plan, initiate and execute projects.
Learning Targets/ Skills	The Participant ▪ gains competencies of the principles and instruments of project management ▪ gains skills to plan, initiate and execute projects. ▪ learns how to manage competing objectives and stakeholders.
Pre-Requisites	none

Teaching Method	The course consists of introductory lectures, accompanying exercises, cases and discussions. The overall teaching approach is based on action learning / experiential learning.
Performance Appraisal	

	Written	Oral
Participation during course	-	-
Case Study	-	25%
Project Work	-	25%
Exam	50%	-

Course Material	Slides, templates, checklists
Literature	• A Guide to the Project Management Body of Knowledge (PMBOK® Guide)—Fifth Edition, Project Management Institute • The Fast Forward MBA in Project Management, Eric Verzuh • Agile Product Management with Scrum: Creating Products That Customers Love, Addison-Wesley, Roman Pichle • Scrum Guide 2013, Ken Schwaber, Jeff Sutherland • Designing for Growth: A Design Thinking Tool Kit for Managers (Columbia Business School Publishing), Jeanne Liedtka, Tim Ogilvie • Operations Research, Stefan Nickel, Oliver Stein, Karl-Heinz Waldmann, 2014, Springer-Lehrbuch
Contact Lecturer	Prof. Dr. Orestis Terzidis, E-Mail: ***Orestis.Terzidis@kit.edu*** Prof. Dr. Stefan Nickel, E-Mail: ***Stefan.Nickel@kit.edu*** Dipl. Inform. Abilio Avila, E-Mail: ***Abilio.Avila@kit.edu***

5.1.2 Multi-Project Management in an International Setting

Lecturer	Dr.-Ing. Robert Landwehr
Content	▪ Identification of the main characteristics and problems of international single and multi-project management ▪ Introduction of methods and tools for multi-project management ▪ Discussion of the organization and financing as well as the cultural aspects of international single and multi- project management ▪ Analysis of real world business cases
Course Objectives	Because of the growing importance of project work and the increasing internationalization of projects, this course focuses on complex multi-project management approaches in global environment. The content of the course “Project Management” are extended by introducing methods and tools for managing single and multiple projects. Another point of focus is the organization and the financing of international projects. In addition the cultural aspects of international collaboration are also discussed. The content of the course is complemented by industrial examples to provide a practical reference. The concerted aim is to impart the basic knowledge of project, development and innovation management.
Learning Targets/ Skills	The Participant

	▪ gains knowledge of various methods and procedures of project management and project controlling in a global context. ▪ is able to analyze problem areas of project management in international and intercultural coherences and to specifically contribute to the improvement of project management in an intercultural environment. ▪ is able to structure a project portfolio in critical and confusing situations and to make proposals to the top-management about the evaluation and selection or prioritization of projects. ▪ is capable to systematically establish and apply a multi-project management system including related tools and processes (including project portfolio analysis, program management, risk evaluation, interdependency analysis etc.) with the aid of the mediated knowledge in a business (respectively at a location).
Pre-Requisites	Professional basic knowledge in project management, such as project planning, risk assessment for projects and project controlling.
Teaching Method	The course consists of lectures, and industrial presentations as well as accompanying exercises and collective discussions.
Performance Appraisal	

	Written	Oral
Participation during course	-	-
Case Study	-	-
Project Work	-	-
Exam	100 %	-

Course Material	Lecture notes and presentations in printed form.
Literature	▪ B.P. Lientz, K.P. Rea: International Project Management, 2002 ▪ Owen J. Murphy: International Project Management; South-Western Pub 2005; ISBN: 0324203020
Contact Lecturer	Dr.-Ing. Robert Landwehr, E-Mail: ***Mail@Robert-Landwehr.de***

5.1.3 Development Management

Lecturer	Prof. Dr.-Ing. Dr. h.c. Albert Albers
Content	Development management is an essential function in many industries and strongly related to project management. Well-founded knowledge within this field is extremely advantageous. By taking part in this course, participants learn to define and characterize development of projects. The significance of the processes, that make a product and a company successful are also taught. Thus participants gain insight into the influences on targets, methods to control development processes, cost and time management, human resource management, quality management and information management. In addition, fundamental methods, such as the adaptation of phase models, the strategic planning of human resources and the integration of a development department into a company, will be taught. Real examples are presented in order to convey company structures, project management and the influence of company-specific factors, three key issues within development management.

Course Objectives	Great ideas do not suffice to turn R&D investments into profitable products. This course offers a groundbreaking innovative approach towards developing products that consumers will buy and therefore help to support a company's long-term success based on an effective project management.
Learning Targets/ Skills	The Participant ▪ gains competencies of the product development process and the existing dependencies on markets and businesses as well as important parameters of product development and development methods. ▪ is capable of analyzing the development process in terms of project management on the basis of a systematic development approach (including profile definition, idea generation, conceptual and integrated development). ▪ learns, based on practically oriented case studies, how to apply creativity techniques, like development rules and principles for quality management, to be able to find ideal solution processes in the project planning of a development process.
Pre-Requisites	No specific prerequisites are required.
Teaching Method	The course structure consists of lectures, and industrial presentations as well as accompanying exercises and group discussions.
Performance Appraisal	**Written** / **Oral** **Participation during course**: - / - **Case Study**: - / - **Project Work**: - / - **Exam**: 100 % / -
Course Material	Lecture notes and presentations in printed form.
Literature	A comprehensive reader will be supplied.
Contact Lecturer	Prof. Dr.-Ing. Dr. h.c. Albert Albers, E-Mail: ***Albert.Albers@kit.edu***

5.1.4 Intercultural Management

Lecturer	Dr. Michael Buchmann
Content	Why and what is 'Intercultural Management'? ▪ 'Culture' in the sense of 'business culture', 'corporate' or 'leadership culture' and 'national management culture'; it's strong impact on business and management performance ▪ Triangle and interaction of 'culture', 'context' and 'individual' ▪ Cultural competence as a key factor for international success Systems and indicators to measure and describe different management cultures ▪ Survey of individual values of participants, comparisons with cultural values ▪ Dimensions of culture (Hofstede, Hall) ▪ Hofstede's 5 dimensions of culture; references to Hall, Trompenaars, Globe ▪ 'Culture standards', factors of variations, changes over time ▪ Illustrations and examples from and reference to countries of participants

<table>
<tr><td></td><td>Applications
Specific implications for international project management
Communication, risk and conflict management
Hierarchy and stake holder management, leadership
Team composition, development and cooperation
Planning, structuring and time management
with further attention to virtual teams
Leveraging intercultural polarities –process and tools for international project management
Leveraging intercultural polarities –process and tools for international project management
Case study</td></tr>
<tr><td>Course Objectives</td><td>Cultural differences are mainly based on historical reasons and depend on the social perspective and judgment. The objective of this course is to understand this approach and accept the consequences for the individual behavior. Culture appropriate behavior greatly increases success in international management and cooperation’s. Participants acquire a clear and manageable system to tell and successfully inter-act with cultural differences in project management.</td></tr>
<tr><td>Learning Targets/ Skills</td><td>The Participant
is able to systematically analyze cultural differences.
acquires a comprehension of intercultural differences and the effects on global project management teams in order to adjust the own behavior.</td></tr>
<tr><td>Pre-Requisites</td><td>Open mindedness.</td></tr>
<tr><td>Teaching Method</td><td>Power point presentations and lectures with frequent examples, discussions with and contributions by participants, individual survey, exercises and short cases</td></tr>
<tr><td>Performance Appraisal</td><td><table><tr><th></th><th>Written</th><th>Oral</th></tr><tr><td>Participation during course</td><td>-</td><td>60%</td></tr><tr><td>Case Study</td><td>-</td><td>40%</td></tr><tr><td>Project Work</td><td>-</td><td>-</td></tr><tr><td>Exam</td><td>-</td><td>-</td></tr></table></td></tr>
<tr><td>Course Material</td><td>Lecture notes and presentations</td></tr>
<tr><td>Literature</td><td>Geert Hofstede: Cultural Dimensions for Project Management, in J. O. Riis, J. Lauridsen, M. Fangel, S. Hildenbrandt and F. Runge (eds): Project Management – Tools and Visions, Proceedings of the 7th Internet Worl Congress 1982, Volume G-K, Copenhagen, The Danish Technical Press, 1982, 683-700, Also in International Journal of Project Management, Vol. 1, no. 1, 1983, 4-48
Nancy J. Adler with Allison Gundersen: International Dimensions of Organizational Behavior, Thomson Higher Education, Mason OH USA, 5th ed. (international student edition) 2007.
Geert Hofstede, Gert Jan Hofstede, Michael Minkov: Cultures and Organizations: Software of the Mind – Intercultural Cooperation and its Importance for Survival, revised and expanded 3. ed., Mc Graw Hill 2010.</td></tr>
<tr><td>Contact Lecturer</td><td>Dr. Michael Buchmann, E-Mail: buchmann@executivesynergy.net</td></tr>
</table>

5.2 Finance for Executives

The module "Finance for Executives" focuses on analyzing, interpreting and reporting business activities in companies. The module's focus is on financial accounting and on corporate finance. In the financial accounting segment, participants gain an understanding of how financial accounting is used by prospective consumers of corporate financial information, such as managers, stockholders, financial analysts, and creditors. The course enables students to understand how economic events are recorded in the three main financial statements: income statement, balance sheet, and statement of cash flows. Participants will develop the skills needed to analyze corporate financial statements.

In the corporate finance segment, participants gain a profound economic and methodical knowledge of modern financial management. Participants develop an understanding of how capital is allocated within companies and are able to assess the profitability of investment projects and acquisitions. In addition, participants gain a thorough understanding how financial markets work and how companies are able to obtain capital from financial markets to support their business strategy.

Module Name: Finance for Executives

Module Supervisor: Prof. Dr. Martin E. Ruckes

Type of Module: Management Module 2 (MM2)

Lectures in Module	**Workload Distribution [hrs]**	
	Presence	**Self studies**
Introduction to Finance and Accounting	7,5	10,5
Financial Accounting	33,75	47,25
Fundamentals of Finance	33,75	47,25

Major Learning Results (LR):

LR-1: Evaluation of investment projects from a financial point of view and the development of an understanding of the main principles of business finance and the efficient acquisition of capital resources.

LR-2: Development of an understanding of how financial statements are generated and how users of financial information analyze financial statements.

LR-3: Application of concepts to real world problems by combination of concepts of financial accounting, financial management and business strategy.

Performance Appraisal for this Module:

Within the second Management Module the performance appraisal consists of two written exams and a case study work with a presentation.

Credit Points: 6

5.2.1 Introduction to Finance and Accounting

Lecturer	Prof. Dr. Martin E. Ruckes, Dr. Torsten Lüdecke
Content	The introductory lecture reviews some of the most challenging issues and questions raised by modern corporate finance and focuses on how this discipline views and uses financial statements. The balance sheet and the income statement are presented as the two most important financial statements. Both statements are analyzed with respect to the question how management decisions shape financial statements.
Course Objectives	The course shows how finance and accounting work together and build upon each other. To that end, key principles and concepts along with many important terms from both domains are introduced and defined.
Learning Targets/ Skills	The Participant gets a broad understanding of ▪ what executives want to accomplish in corporate finance ▪ guiding principles of finance and accounting, ▪ the content, structure, and use of major financial statements.
Pre-Requisites	None
Teaching Method	Lecture as well as accompanying exercises, homework, discussion sections and cases.
Performance Appraisal	

	Written	Oral
Participation during course	-	100%
Reflection document	-	-
Project Work	-	-
Exam	-	-

Course Material	Lecture notes, homework, exercises and case studies.
Literature	Hawawini, G. and Viallet, C. (2011): Finance for Executives, 4th ed., South-Western Publishing. Penman, S.H. (2013): Financial Statement Analysis and Security Valuation, 5th ed., McGraw Hill.
Contact Lecturer	Prof. Dr. Martin Ruckes, E-Mail: ***Martin.Ruckes@kit.edu*** Dr. Torsten Lüdecke, E-Mail: ***Torsten.Luedecke@kit.edu***

5.2.2 Financial Accounting

Lecturer	Dr. Torsten Lüdecke
Content	This course provides participants with an understanding of the key financial statements and its underlying accounting principles. It is shown how investment and financing decisions affect the

	balance sheet and the income statement. Financial statement analysis is applied to measure a firm's liquidity, operational efficiency, and profitability.
Course Objectives	The course objective is to understand and critically assess financial statements. Participants know about the main principles and concepts of financial accounting used to prepare the balance sheet and income statement. Financial statements are analyzed to reveal profitability, identify cash flows and track the operating cycle.
Learning Targets/ Skills	The Participant is able to ▪ understand the balance sheet, income statement and statement of cash flow ▪ track corporate decision-making into financial statements, ▪ apply financial statement analysis.
Pre-Requisites	None
Teaching Method	The course structure consists of lectures as well as accompanying exercises, cases, homework and discussion sections.
Performance Appraisal	

	Written	Oral
Participation during course	-	-
Case Study	-	20%
Project Work	-	-
Exam	80%	-

Course Material	Lecture notes, homework, case studies and exercises. Printed material.
Literature	Penman, S.H. (2013): Financial Statement Analysis and Security Valuation, 5th ed., McGraw Hill. Hawawini, G. and Viallet, C. (2011): Finance for Executives, 4th ed., South-Western Publishing.
Contact Lecturer	Dr. Torsten Lüdecke, Email: ***Torsten.Luedecke@kit.edu***

5.2.3 Fundamentals of Finance

Lecturer	Prof. Dr. Martin E. Ruckes
Content	This course begins with an overview of the environment in which financial decisions occur and of the financial information available. Investment rules, such as the net present value rule are applied to value securities and to capital budgeting. It follows the valuation of risky cash flow streams resulting from corporate projects or entire firms. After discussing the instruments of long-term financing, the problems of optimal capital structure and the dividend decision are addressed.
Course Objectives	The course objective is to understand the main principles of finance and thereby be able to analyze corporate investment and financing decisions, such as ▪ valuation of risky cash flows and its application to corporate investments, ▪ financing choices, ▪ firm valuation.
Learning Targets/ Skills	The Participant ▪ is placed in a position to judge corporate investment projects from a financial point of view, ▪ gains a thorough comprehension of the main principles of business finance, ▪ is able to assess the value of business enterprises
Pre-Requisites	None

Teaching Method	The course structure consists of lectures as well as accompanying exercises, cases, homework, discussion sections and cases.		
Performance Appraisal		Written	Oral
	Participation during course	-	-
	Case Study	-	20%
	Project Work	-	-
	Exam	80%	-
Course Material	Lecture notes, homework, exercises and case studies.		
Literature	Hawawini, G. and Viallet, C. (2015): Finance for Executives, 5th ed., South-Western Publishing		
Contact Lecturer	Prof. Dr. Martin E. Ruckes, E-Mail: ***Martin.Ruckes@kit.edu***		

5.3 Management Accounting, Marketing and Strategy

This module addresses three key core functions of any business: Management Accounting, Marketing and Strategy. Participants will be introduced to fundamental concepts in each of these three domains. After the module they will be able to apply methods and tools to face challenges in this context.

In the Management Accounting part of these module, participants will understand the key principles behind cost accounting, planning, and control. In the Marketing element, participants will be introduced to the marketing concept and the marketing mix. The implementation of the marketing concept will then be illustrated along the challenge of selling hybrid offerings made up of products and services ("solution selling"). Doing so, the module also introduces a number of important sales concepts. Finally, the Strategy element of the course will introduce participants to a strategic perspective on business portfolios, by using analysis and evaluation tools to, at the end, formulate strategies at a company level.

Module Name: Management Accounting, Marketing and Strategy

Module Supervisor: Prof. Dr. Martin Klarmann

Type of Module: Management Module 3 (MM3)

Lectures in Module	**Workload Distribution [hrs]**	
	Presence	**Self studies**
Business Strategy	15	21
Management Accounting	37,5	52,5
Marketing	22,5	31,5

Major Learning Results (LR):

LR-1: Description of central concepts of strategic management alongside the ideal-typical strategy process and the implementation of internal and external analyses.

LR-2: Evaluation of accounting systems, instruments of cost management and identification of interfaces with financial accounting, financial management and business strategy.

LR-3: Understanding of the marketing concepts. Ability to apply key methods to the analysis and handling of marketing and sales problems, especially in the context of selling solutions.

Performance appraisal for this Module:

Within the third Management Module the performance appraisal for *Management Accounting* and *Business Strategy* consists of a written exam and assignment during course. For the course *Marketing* the performance appraisal will be based on a case study and subsequent class room discussion.

Credit Points: 6

5.3.1 Business Strategy

Lecturer	Prof. Dr. Hagen Lindstädt Dr. Kerstin Fehre
Content	The course introduces the overall process of strategic management containing strategic analysis, strategy formulation, strategy evaluation based on competitive advantage, and portfolio strategy. The overall process is used as the structuring element, each step will be analyzed and explained in detail. In addition, students learn and experience the most important concepts of strategy formulation in oligopolies. A special emphasis is put on the integration, discussion and application of the frameworks. Several case studies will confirm the attained knowledge.
Course Objectives	Major course objectives are to explain the process of strategic management and to analyze business situations from the internal and external perspective. The formulation of strategies on the business unit and on the corporate level and the evaluation of strategic options based on competitive advantages are introduced and discussed. Furthermore, a major objective is to access existing business portfolios from a strategic perspective.
Learning Targets/ Skills	The Participant ▪ is able to describe central concepts of strategic management alongside the ideal-typical strategy process. ▪ is able to undertake internal and external strategic analyses (e.g. SWOT Analysis) with the goal of strategy formulation. ▪ understands the classical concepts and sources of competitive advantages as well as their meaning for the formulation of competitive and business strategies. ▪ is able to formulate strategies at a company level and at a business unit level. ▪ understands the central principles of strategy evaluation and strategy implementation as well as the classical concepts of change management.
Pre-Requisites	No specific prerequisites are required; however prior knowledge of accounting and financial management as well as principles of business administration is advantageous.
Teaching Method	The course structure consists of lectures and accompanying exercises, cases, and discussion sections. PowerPoint slides will be presented. Selected media will be used as necessary.
Performance Appraisal	

	Written	Oral
Participation during course	-	-
Case Study	-	-
Project Work	-	-

	Exam	100 %	-
Course Material	A comprehensive reader will be provided.		
Literature	▪ Robert M. Grant: Contemporary Strategy Analysis, Blackwell, 7th ed. 2010		
Contact Lecturer	Prof. Dr. Hagen Lindstädt, E-Mail: ***Hagen.Lindstaedt@kit.edu*** Dr. Kerstin Fehre, E-Mail: ***Kerstin.Fehre@kit.edu***		

5.3.2 Management Accounting

Lecturer	Prof. Dr. Anja Kern		
Content	Participants will learn about: ▪ Product costing concepts ▪ Cost allocation: between departments and from activities to products ▪ Job costing ▪ Process costing ▪ Short-term decision making, cost-volume-profit analysis ▪ Strategic investment decisions ▪ Budgeting and variance analysis ▪ Responsibility accounting ▪ Performance management		
Course Objectives	Participants get an overview of accounting and controlling topics. They understand specific accounting and controlling topics, they are able to apply these to assignments and they are able to position these in the context of their own work.		
Learning Targets/ Skills	The Participant gains an understanding of key concepts and techniques of management accounting, is able to use relevant costs for decision making, and is in the position to purposeful apply instruments for planning and control.		
Pre-Requisites	We build on some understanding from Management Module 1, in particular: ▪ Principles of financial accounting ▪ Discounting of future cash flows		
Teaching Method	The meetings will be partly lecture style and there will also be ample time for students to work on assignments and for plenary discussion of those assignments and related topics. These discussions should additionally stimulate students to exchange professional ideas and experience.		
Performance Appraisal		Written	Oral
	Participation during course	30%	10%
	Case Study	-	-
	Project Work	-	-
	Exam	60%	-
Course Material	Lecture notes on slides, textbook (see below)		
Literature	Cost Management" by M. Wouters, F. Selto, R. Hilton, and M. Maher, 2012, McGraw-Hill Higher Education, ISBN-13 9780077132392		
Contact Lecturer	Prof. Dr. Anja Kern, E-Mail: ***dranjakern@gmail.com***		

5.3.3 Marketing

Lecturer	Prof. Dr. Martin Klarmann
Content	▪ Introduction to Marketing ▪ Product Management ▪ Pricing ▪ Branding ▪ Sales Management ▪ Key Marketing Metrics
Course Objectives	It is the overarching objective of this class to introduce participants to the marketing concept (i.e., seeing the firm from the customer's perspective). To do so, essential marketing decisions are discussed and participants are introduced to key tools to approach these issues. Brand development and sales management are also discussed as well as quantitative approaches in customer retention.
Learning Targets/ Skills	The Participant ▪ understands the idea of market segmentation and is capable of choosing appropriate segmentation criteria for his or her own firm. ▪ understands marketing's product concept and is able to apply conjoint analysis to distinguish important from less important parts of the offering. ▪ knows what a "solution" is and can avoid key mistakes in the implementation of solution selling. ▪ can estimate a price demand function and apply the three key approaches to determining prices for an offering. ▪ can make educated choices with regard to the channel structure of his or her firm. ▪ can design and implement different approaches to measuring customer feedback. ▪ knows the basic personal selling process and the challenges that go with it.
Pre-Requisites	none
Teaching Method	Lecture, case study, and a simulation game.
Performance Appraisal	

	Written	Oral
Participation during course	-	
Case Study	-	80%
Simulation Game	-	20%
Exam	-	-

Course Material	All slides presented in class will be provided to students. Case study reading material will be distributed upfront the module.
Literature	▪ Homburg, Christian, Sabine Kuester, and Harley Krohmer (2009), Marketing Management: A Contemporary Perspective, New York (McGraw-Hill) ▪ Homburg, Christian, Heiko Schäfer, and Janna Schneider (2012), Sales Excellence: Systematic Sales Management (Management for Professionals), Berlin (Springer)
Contact Lecturer	Prof. Dr. Martin Klarmann, E-Mail: ***Martin.Klarmann@kit.edu***

5.4 Stochastic and Games

The module offers a wide spectrum of application possibilities of the approaches of game theory for management applications as well as a comprehensive introduction into stochastic systems and phenomena related to business. The module builds on a solid analysis of strategic decision situations. For example problems of strategic negotiation in auctions and similar allocation mechanisms are in focus. For a better understanding of the theoretical concepts empirical aspects of strategic decision making are also discussed. Furthermore, the module presents advanced techniques in modeling and analysis of stochastic systems. The module enables the participants to gain an understanding of stochastic phenomena in order to apply this knowledge particularly in decision-making under uncertainty.

Module Name: Stochastic and Games

Module Supervisor: Prof. Dr. Clemens Puppe

Type of Module: Management Module 4 (MM4)

Lectures in Module	**Workload Distribution [hrs]**	
	Presence	**Self studies**
Applied Game Theory	25	35
Decisions under Risk and Uncertainty	15	21
Optimization under Uncertainty	10	14
Simulation and Case Studies	25	35

Major Learning Results (LR):

LR-1: Advanced solution concepts for strategic decision situations and the application on concrete economic-political problems.

LR-2: Knowledge of modeling, analysis and optimization of stochastic systems in economy and technology.

LR-3: Methodical understanding, validation and analysis of simulations.

Performance appraisal for this Module:

Within the fourth Management Module the performance appraisal is based on three written exams. The exams in *Applied Game Theory* and *Decisions under Risk and Uncertainty* will be combined.

Credit Points: 6

5.4.1 Applied Game Theory

Lecturer	Prof. Dr. Clemens Puppe
Content	This course gives an overview of basic game theoretical concepts including a discussion of selected applications of these concepts to problems in industrial organizations, auctions and common cost distribution problems. Particular emphasis is placed on the experimental aspects of game theoretical tools and applications to real world examples.
Course Objectives	▪ Integration of experimental and theoretical aspects of modern strategic thinking. ▪ Provision of powerful tools to solve complex strategic decision problems. ▪ Discussing case studies in some selected applications of Game Theory.
Learning Targets/ Skills	The Participant ▪ knows and analyzes simple and complex strategic decision situations. ▪ knows the basic solution methods for these problems and apply them. ▪ knows advanced solution concepts for strategic decision situations and is able to apply them to specific (economic) problems. ▪ knows the experimental method from the draft of the economic experiment through to the data evaluation and apply it.
Pre-Requisites	Some knowledge in statistics (probability theory) and mathematics (analysis) is required.
Teaching Method	The course structure consists of lectures, exercises and courses at the PC Lab. Students can check their understanding of the material by solving exercises on our IT server.
Performance Appraisal	

	Written	Oral
Participation during course	-	-
Case Study	-	-
Project Work	-	-
Exam	100%	-

Course Material	Lecture notes, homework, exercises.
Literature	▪ Gardner (1995): Games for Business Economics, Wiley & Sons ▪ Gibbons (1992): A Primer in Game Theory, Harvester-Wheatsheaf. ▪ Cabral, Luís M. B. (2000), Introduction to Industrial Organization. Cambridge, MA: MIT Press.
Contact Lecturer	Prof. Dr. Clemens Puppe, E-Mail: ***Clemens.Puppe@kit.edu***

5.4.2 Decisions under Risk and Uncertainty

Lecturer	Prof. Dr. Clemens Puppe
Content	Definition of risk and uncertainty, risk measures, expected utility theory, preferences towards risk: risk neutrality, risk aversion and risk proneness, Arrow-Pratt measure of risk aversion, diversification, insurance, the value of information, demand for risky assets, uncertainty aversion, Ellsberg Paradox, behavioral analysis of risk taking.

Course Objectives	The objective of the course is to provide a basic introduction of expected utility theory and its applications in insurance and asset markets. The participants should also be made aware of the limitations of expected utility theory via a careful study of the paradoxes of Allais and Ellsberg as well as behavioral phenomena such as framing, anchoring and reference points.
Learning Targets/ Skills	The participants understands the basic concepts and formal results of expected utility theory in a mathematically rigorous way. The participants are able to infer the behavioral implications of expected utility theory in real life applications.
Pre-Requisites	Basic calculus and probability theory.
Teaching Method	Lecture, exercises and cases.
Performance Appraisal	

	Written	Oral
Participation during course	-	20%
Case Study	-	-
Project Work	-	10%
Exam	-	70%

Course Material	Slides and exercises
Literature	▪ Pindyck / Rubinfeld: Microeconomics, Ch. 5 ▪ D.M. Kreps: Notes on the Theory of Choice
Contact Lecturer	Prof. Dr. Clemens Puppe, E-Mail: ***Clemens.Puppe@kit.edu***

5.4.3 Optimization under Uncertainty

Lecturer	Prof. Dr. Stefan Nickel
Content	This course introduces the basics of stochastic models for a selection of optimization problems. The course covers the following topics: ▪ **Inventory management** systems in practice mostly have to deal with fluctuations in customer demand patterns over time. The course provides a number of scientific models from the area of mathematics and operations research which facilitate a structured way to balance the different trade-offs between several cost types in order to maintain optimal inventory holding strategies under uncertain demand. ▪ The task of **queuing theory** lies in a mathematical description of waiting systems and aims towards an efficient usage of the system through finding an appropriate balance between the costs of service and the amount of waiting. In this course, students get familiar with basic principles of queueing, with the stochastics behind them, as well as with a number of special types of queueing systems encountered in applications. ▪ **Stochastic programming** is a general mathematical method of optimization that can be applied when several parameters, such as production rates, production costs, production capacity, demand levels, selling prices, required by a model may be unknown. When some or all the parameters can be modeled using some probability distribution we fall into the area of stochastic programming. The course covers a basic introduction into stochastic programming and illustrates its benefits with examples from practice.
Course Objectives	Understanding of relevant decision problems arising when data or information is not certain.

Learning Targets/ Skills	Knowledge of the decision/ optimization problems under uncertain and basic solution approaches. Example for logistics problems under uncertainty are given.
Pre-Requisites	Basics in stochastics
Teaching Method	The course structure consists of lectures as well as accompanying exercises and discussion sections.
Performance Appraisal	

	Written	Oral
Participation during course	-	8%
Case Study	-	8%
Project Work	-	8%
Exam	-	76%

Course Material	Power Point slides
Literature	▪ Hillier & Liebermann: Introduction to Operations Research ▪ Nahmias: Production and Operations Analysis
Contact Lecturer	Prof. Dr. Stefan Nickel, E-Mail: ***Stefan.Nickel@kit.edu***

5.4.4 Simulation and Case Studies

Lecturer	Prof. Dr. Christiane Barz
Content	The nature of simulation, discrete-event simulation, random-number generators, generating random variants, modeling complex systems, simulation software, selecting input probability distributions, output data analysis, building valid, creditable and appropriately detailed simulation models, variance-reduction techniques, simulation of Markov Models and queuing systems, simulation case study I (Service Management & Engineering), simulation case study II (Financial Engineering).
Course Objectives	The course provides an up-to-date treatment of all important aspects of a simulation study, including modeling, simulation languages, validation and output analysis. There are some connections with almost all other courses.
Learning Targets/ Skills	The Participant ▪ learns to methodically understand and validate simulations and to analyze the results. ▪ gains knowledge of various random number generators, simulation types (Monte Carlo Simulation, discrete event simulation, etc.), simulation software, statistic evaluation and analysis methods, validation methods and techniques for minimizing variance. ▪ understands the dealing with pseudo-random numbers, the structure of Monte Carlo and Discrete Event Simulations, the interpretation of simulation results, the selection of a suitable method for minimizing variance. ▪ is able to analyze the structure of a simulation, especially the valid modeling of random elements and the utilization of techniques for minimizing variance. ▪ learns to apply Discrete Event Simulation (especially by taking the example of Markov chains and Markov processes) in various contexts.

<table>
<tr><td>Pre-Requisites</td><td colspan="3">Basic familiarity with elementary probability theory and statistics.</td></tr>
<tr><td>Teaching Method</td><td colspan="3">The course structure consists of lectures, exercises and project work using all types of electronic and other multimedia devices.</td></tr>
<tr><td>Performance Appraisal</td><td></td><td>Written</td><td>Oral</td></tr>
<tr><td></td><td>Participation during course</td><td>-</td><td>-</td></tr>
<tr><td></td><td>Case Study</td><td>-</td><td>-</td></tr>
<tr><td></td><td>Project Work</td><td>-</td><td>-</td></tr>
<tr><td></td><td>Exam</td><td>100%</td><td>-</td></tr>
<tr><td>Course Material</td><td colspan="3">Lecture notes, exercises, homework.</td></tr>
<tr><td>Literature</td><td colspan="3">▪ Brémaud, P.: Markov Chains, Gibbs Fields, Monte Carlo Simulation, and Queues; Springer, 1999
▪ Law, M. / Kelton, W. D. : Simulation Modeling and Analysis (3rd ed); McGraw Hill (2000)</td></tr>
<tr><td>Contact Lecturer</td><td colspan="3">Prof. Dr. Christiane Barz, E-Mail: Christiane.Barz@tu-berlin.de</td></tr>
</table>

5.5 Law and Contracts

This module consists of an economic and a juristic part. In the economic part the subject areas decision theory, expected use, risk and ambiguity, negotiation- and basis-incentive-theory create the starting basis. The main goal of this part of the module is to deepen the knowledge of the participants in problems and concepts of the macroeconomic and microeconomic theory. The participants cut through the concepts and quantitative methods of the macroeconomic and microeconomic theory and are enabled to independently give an opinion on macro- and microeconomic problems. Furthermore, current problems of the world economy are discussed, for example stagnation and economic growth, unemployment and international labor division and harmonization of the international currency system. In this way the participants are enabled to recognize relevant economic coherences and to create connections to their practical experiences.

The juristic module part is divided in lectures about business law and lectures about international patent, trademark and copyright law. The participants gain deepened knowledge of complex under company law constructions. In the process the participants get to know various corporate structures and understand the implications of forms of company for the risk management and for the guidelines in financial reporting. Moreover, the participants are conveyed the knowledge on which juristic basis the terminology of “intellectual property” is based and which consequences this has on business decisions.

Module Name: Law and Contracts

Module Supervisor: Prof. Dr. Clemens Puppe

Type of Module: Management Module 5 (MM5)

Lectures in Module	**Workload Distribution [hrs]**	
	Presence	**Self studies**
Decisions, Contracts, Markets and Trade	37,5	52,5
International Law - The Law of Business Organizations	22,5	31,5
International Intellectual Property Law	15	21

Major Learning Results (LR):

LR-1: Dealing with advanced concepts of the microeconomic theory and basic concepts of the macroeconomic theory.

LR-2: Fundamental knowledge of the German and international business law.

LR-3: Detailed knowledge of the judicature of “intellectual property“.

Performance appraisal for this Module:

Within the fifth Management Module the performance appraisal will be based on written exams with varying components of class room participation.

Credit Points: 6

5.5.1 Decisions, Contracts, Markets and Trade

Lecturer	Prof. Dr. Clemens Puppe Prof. Dr. Berthold Wigger
Content	The course treats the fundamental principles of economics both from a microeconomic and a macroeconomic perspective. In the microeconomic part, the focus is on the impact of individual decisions on market equilibrium and the optimal design of contracts. The basic modeling tools including expected utility theory, the derivation of individual demand with quasi-linear preferences, and the fundamental concepts of game theory and bargaining theory are introduced. The macroeconomic part covers the topics of trade cycles and economic growth, money and inflation, aggregate income and unemployment. Current issues such as the open economy and problems of European integration will also be discussed.
Course Objectives	The participants will be trained in basic economic thinking both from a micro- and a macroeconomic perspective and in basic econometrics. The purpose of the course is to provide the necessary background for all other courses related to economics.
Learning Targets/ Skills	The Participant ▪ knows how to deal with advanced concepts of the microeconomic theory – for example the general theory of equilibrium or the pricing theory – and are able to apply these to real problems, e. g. the allocation of factor and goods markets. ▪ knows the basic concepts of the macroeconomic theory, especially the dynamic theory of equilibrium, and is able to apply these to the latest political issues, for example questions of optimal taxation, arrangement of pension insurance systems as well as politico-economic and monetary policy arrangements to stabilize business cycles and economic growth. ▪ understands and can apply the substantial techniques to analyze inter temporal macroeconomic models with uncertainty. ▪ understands the dynamic theories of equilibrium that are necessary for the description of prices and allocations of goods and financial markets as well as their temporal development.
Pre-Requisites	Basic knowledge of linear algebra and analysis.
Teaching Method	The material presented in the course will be supplemented by problem sets and exercises. Part of the course will consist of case studies. Homework and discussion sections complete the lectures.
Performance Appraisal	

	Written	Oral
Participation during course	-	20%
Case Study	-	10%
Project Work	-	-

	Exam	70%	-
Course Material	The course material will be presented using all types of electronic and other multi-media devices. Lecture notes will be available in digital form.		
Literature	▪ Varian (2010): Intermediate Microeconomics: A Modern Approach, 8th Edition, Norton. ▪ Mankiw (1999): Macroeconomics, Worth Publishers ▪ Burda/Wyplosz (2001): Macroeconomics – A European Text, Oxford University Press		
Contact Lecturer	Prof. Dr. Clemens Puppe, E-Mail: ***Clemens.Puppe@kit.edu*** Prof. Dr. Berthold U. Wigger, E-Mail: ***Berthold.Wigger@kit.edu***		

5.5.2 International Law – The Law of Business Organizations

Lecturer	Prof. Dr. Martin Schulz		
Content	This course provides insight into important business law issues relevant to managerial practice including corporate governance and compliance issues. After outlining the German corporate legal framework, we will discuss some crucial issues of international and European business law, such as the law applicable to corporations engaged in cross-border activities. Special emphasis will be placed on recent developments in the EU including the new multinational corporate form of the European Company (SE). We will analyze some prominent forms of business organizations with a special focus on limited liability companies and stock corporations. Key practical issues such as the incorporation of business forms, important questions relating to composing corporate contracts, corporate governance and compliance issues as well as the liability of shareholders and managers will also be discussed and analyzed.		
Course Objectives	The Participant ▪ understands how business law functions (also in cross border cases). ▪ gains insight into important forms of business organizations. ▪ learns central issues of business law including their international dimension. ▪ recognizes the interdependence of business law within a globalized economy.		
Learning Targets/ Skills	The participant becomes familiar with important forms of business organizations and learn how to deal with business law issues including international aspects and cross border elements. The participant learns how to structure and communicate legal issues in international business law cases.		
Pre-Requisites	A basic knowledge of German as well as basic knowledge of legal concepts (such as contracts) is helpful.		
Teaching Method	The course structure consists of lectures including case studies and home reading.		
Performance Appraisal		Written	Oral
	Participation during course	-	-
	Case Study	-	-
	Project Work	-	50 %
	Exam	50 %	-

Course Material	PowerPoint Presentations, case studies based on actual law cases and a reader (to be prepared and distributed in advance).
Literature	▪ Kraakman, Reinier / Davies, Paul / Hansmann, Henry / Hertig, Gerard / Hopt, Klaus / Kanda, Hideki / Rock, Edward, The Anatomy of Corporate Law, A Comparative and Functional Approach, 2nd edition Oxford 2009. ▪ Schulz, Martin/ Wasmeier, Oliver. The Law of Business Organizations – A Concise Overview of German Corporate Law, Heidelberg 2012. ▪ Du Plessis, Jean J. / Großfeld, Bernhard / Luttermann, Claus / Saenger, Ingo / Sandrock, Otto, German Corporate Governance in International and European Context, Berlin 2007.
Contact Lecturer	Dr. Martin Schulz, E-Mail: ***Martin.Schulz@ggs.de***

5.5.3 International Intellectual Property Law

Lecturer	Sven Jacobs
Content	In international business relations, intellectual property plays an ever increasing role. In innovative industries and in the information society, patents, trademarks and copyrights often constitute the most valuable asset of a firm. Knowledge of how the international IP system works, how IP can be protected beyond national boundaries, is therefore an important part of managing problems of law and contracts. The course gives an overview of the fundamental principles of international Intellectual Property (IP) law as part of the global system of international trade law. The mechanisms of international protection by registration rights (patents, trademarks) and non-registration rights (copyright) are explained. The course focuses both on the legal rules and mechanisms in place and on the underlying philosophies of unification and harmonization of conflicting IP policy options and aims. The course also highlights institutional aspects of the WTO/TRIPS-system and of European harmonization in the area of IP.
Course Objectives	The course aims at a general understanding of the mechanisms of international IP law, in particular, how the international system is built on the basis of the notion of territoriality and national law. The course interrelates with the other legal lecture (International Law –The Law of Business Organizations, taught by Schulz), and the specialized course on “Communication Law” taught as a specialized course in the Master Program Service Management and Engineering by Prof. Spieker.
Learning Targets/ Skills	The Participant ▪ holds detailed knowledge of the main rights of intellectual property. ▪ analyses and evaluates more complex issues and adds them to a legal solution. ▪ transforms the legal fundamentals in contracts about the usage of intellectual property and solves more complex violation cases. ▪ knows and understands the basics of legal application procedures and has a wide overview of the legal matters caused by the internet.
Pre-Requisites	The participant should have some basic knowledge and working experience in intellectual property (IP) law. Specialized knowledge in at least one of the major IP rights (patents; trademark; copyright) is advisable, but not a prerequisite.
Teaching Method	The course consists of lectures, as well as accompanying exercises and discussion sections.

Performance Appraisal		Written	Oral
	Participation during course	-	20%
	Case Study	-	-
	Project Work	-	-
	Exam	80 %	-
Course Material	▪ Course book (see literature); handouts ▪ Legal Sources (Online) ▪ PowerPoint Presentations ▪ Optional: discussion forum		
Literature	▪ Goldstein, International Intellectual Property Law, Foundation Press, New York, 2001 (or later edition, if available at the time of the course) ▪ WIPO Intellectual Property Handbook – Policy, Law and Use, 2nd edition, Geneva, 2004. Wipo Publication No. 489(E).		
Contact Lecturer	Sven Jacobs, E-Mail: ***Sven.Jacobs@nortonrosefulbright.com***		

6 Description of the Engineering Modules

6.1 Information and Service Management

Nowadays, financial as well as other service markets are characterized by a strong interrelation with Information Service Management due to the original set-up of the financial markets. New financial products depend sometimes on the information technological feasibility. The overall objective of the module is therefore to provide an introduction into market engineering with an emphasis on the design and the further development of information markets ("Information and Market Engineering") and services ("Service Management" and "Service Innovation"). The "Information and Service Management" module enables participants to understand and analyze business innovation and adaptation processes and thus get an idea of, among other things, innovation diffusion. Innovation driver analyses make participants systematically identify the differences between invention and innovation. Since the structure of information markets is discussed participants are able to develop an understanding for the action of market actors. In addition, consideration of service competition as a business strategy helps participants structure the impacts of service competition on the design of businesses, markets, products, processes, and services.

Module Name: Information and Service Management

Module Supervisor: Prof. Dr. Andreas Geyer-Schulz

Type of Module: Engineering Module 1 (EM1)

Lectures in Module	**Workload Distribution [hrs]**	
	Presence	**Self studies**
Introduction to Service Management and Engineering	7,5	16,5
Information and Market Engineering	22,5	49,5
Service Management	30	66
Innovation of Services	15	33

Major Learning Results (LR):

LR-1: Skill to understand and to analyze the information, service and finance products and to oversee the associated projects from the innovation through to the product launch.

LR-2: Ability of secure application and further development of methods and technologies in research and development.

LR-3: Ability of leadership visions and professional field related successful, independent, innovative operations in service economy.

Performance appraisal for this Module:

Within the first Master-specific Service Management and Engineering module the performance appraisal will be based on a written exam in *Service Innovation* and oral exams in *Information and Market Engineering* and *Service Management.*

Credit Points: 8

6.1.1 Introduction to Service Management and Engineering

Lecturer	Prof. Dr. Andreas Oberweis
Content	*Currently under revision*
Course Objectives	*Currently under revision*
Learning Targets/ Skills	*Currently under revision*
Pre-Requisites	*Currently under revision*
Teaching Method	*Currently under revision*
Performance Appraisal	

	Written	Oral
Participation during course	-	100%
Case Study	-	-
Project Work	-	-
Exam	-	-

Course Material	*Currently under revision*
Literature	*Currently under revision*
Contact Lecturer	Prof. Dr. Andreas Oberweis, E-Mail: ***Andreas.Oberweis@kit.edu***

6.1.2 Information and Market Engineering

Lecturer	Prof. Dr. Christof Weinhardt
Content	The course contains the following topics: ▪ Introduction “What is market engineering?”, “What is the institution market and how does it work?”. Information rules for markets. ▪ Institutional framework for electronic markets. ▪ System performance & information efficiency. ▪ Mechanism design & bidding languages. ▪ Auction Theory I – Single and multi-unit auctions. ▪ Auction Theory II – Combinatorial auctions. ▪ Reputation mechanisms.

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- Continuous double auctions and the clearing house.
- Process descriptions and IT architecture.
- Strategic aspects of electronic markets.
- Business-to-business markets and EAI.
- Laboratory experiments as a tool for market engineering.
- Case Study: Political stock markets and information efficiency.

The lectures will be accompanied by 4 tutorials where the exercises will be used to review the presented material and enhance understanding.

Additionally 5 sessions will be spent in the lab, where the technique of economic experiments will be studied. At the end of the course, a case study will be conducted, where participants can apply the presented material in information and market engineering.
</td></tr>
<tr><td>Course Objectives</td><td>The course objective is to comprehend, to enhance, and to evaluate the design potentials of electronic market platforms in their entirety. In parallel, it’s in the focus of the course how to organize the integration of those platforms into traditional business processes as well as into innovative dynamic (supply) networks and to develop and implement solutions to interdisciplinary questions.</td></tr>
<tr><td>Learning Targets/ Skills</td><td>The Participant

- gains competencies for the analysis of business processes in relation to electronic markets.
- is able to develop and convert new products and services considering the technological progresses of information and communication technology as well as the growing economic networking.
- is able to reconstruct business processes under these circumstances.
</td></tr>
<tr><td>Pre-Requisites</td><td>Background knowledge in microeconomic theory is helpful but not a prerequisite for this course. Some of the basic mathematical skills will be reviewed in the classes.</td></tr>
<tr><td>Teaching Method</td><td>The lecture is based on slides that are distributed to the participants before the lectures. Additional material is provided using the website of the lecture.</td></tr>
<tr><td>Performance Appraisal</td><td>
<table>
<tr><th></th><th>Written</th><th>Oral</th></tr>
<tr><td>Participation during course</td><td>-</td><td>-</td></tr>
<tr><td>Case Study</td><td>-</td><td>-</td></tr>
<tr><td>Project Work</td><td>-</td><td>-</td></tr>
<tr><td>Exam</td><td>-</td><td>100%</td></tr>
</table>
</td></tr>
<tr><td>Course Material</td><td>The lecture is based on current research material. Presentation, slides and handouts.</td></tr>
<tr><td>Literature</td><td>

- Roth, A., The Economist as Engineer: Game Theory, Experimental Economics and Computation as Tools for Design Economics. Econometrica 70(4): 1341-1378, 2002.
- Weinhardt, C., Holtmann, C., Neumann, D., Market Engineering. Wirtschaftsinformatik, 2003.
</td></tr>
<tr><td>Contact Lecturer</td><td>Prof. Dr. Christof Weinhardt, E-Mail: Weinhardt@kit.edu</td></tr>
</table>

6.1.3 Service Management

Lecturer	Prof. Dr. Andreas Geyer-Schulz
Content	This course covers at least 8 of the following topics: ▪ The growth of the service sector and globalization motivate service competition as sustainable competitive strategies of companies. Service strategies are implemented by service management and customer relationship management (CRM) with a long-term perspective. ▪ Transaction and relation oriented marketing strategies are compared. Strategic and tactical elements of a CRM strategy are identified. ▪ The definition of services and its consequences in service management. ▪ (Perceived) service and relationship quality is modeled conceptually. Service quality measurement models are discussed. ▪ Quality management is introduced as an important component of service management. The gap model, holistic service quality management programs, and service recovery are discussed. ▪ The long term return on investment from services and relationships is analyzed. ▪ The augmented service offering is described as a model to design and develop service packages for customers. ▪ Principles of service management. ▪ Productivity in services. ▪ Marketing and market-oriented management. ▪ Integrated marketing communication. ▪ Brand relationships and image. ▪ Market-oriented organization: Structure, resources, and service processes. ▪ Internal marketing. ▪ Service culture. ▪ Rules for service competition and barriers for successful service management. The course contains three case studies, which will be conducted as a project.
Course Objectives	The course objective is to understand service management as a sustainable competitive strategy and to understand the consequences of such a strategy for management, organization, marketing, IT and all other parts of the company.
Learning Targets/ Skills	The Participant ▪ acquires knowledge of the structure of information markets. ▪ develops an understanding for the actions of the market participants. ▪ understands service competition as a business strategy and realizes its effects of service competition on the design of markets, products, processes and services.
Pre-Requisites	Marketing, organization, strategic management, cost accounting at a basic level. Systems analysis and design (including business process design) at a bachelor level.

Teaching Method	The lecture is based on slides that are distributed to the participants before the lectures. Additional material is provided using the website of the lecture. Three cases/ projects will be worked out in the course.
Performance Appraisal	<table><tr><th></th><th>Written</th><th>Oral</th></tr><tr><td>Participation during course</td><td>-</td><td>-</td></tr><tr><td>Case Study</td><td>-</td><td>-</td></tr><tr><td>Project Work</td><td>-</td><td>-</td></tr><tr><td>Exam</td><td>-</td><td>100%</td></tr></table>
Course Material	The lecture is based on the textbook Service Management and Marketing (2007) by Christopher Grönroos. It is complemented with current research material and a reader on CRM source material. Presentations with slides and handouts. CD-ROM with reader.
Literature	▪ Grönroos, C. (2007). Service Management and Marketing: Customer Management in Service Competition, Wiley & Sons, The Atrium, Southern Gate, Chichester, West Sussex PO198SQ, Engl, 3. Ed.
Contact Lecturer	Prof. Dr. Andreas Geyer-Schulz, E-Mail: ***Andreas.Geyer-Schulz@kit.edu***

6.1.4 Innovation of Services

Lecturer	Prof. Dr. Gerhard Satzger
Content	The course contains the following topics: ▪ Basics of innovation and Services. ▪ Diffusion as a model for adoption of innovations. ▪ Differences between innovation in services and goods. ▪ Technology as an enabler for innovation and its diffusion. ▪ Challenges of measuring and managing innovation processes. ▪ Opportunities for innovation by better understanding customers‘ value-in-use. ▪ Balancing exploitation and exploration in services. ▪ Concepts of open and peer-to-peer innovation. ▪ Different kinds of resistance: threats to power, habit and mental models. The lectures will be accompanied by 2 tutorials where the exercises will be used to review the presented material and enhance understanding.
Course Objectives	The objective is to discuss the state of research, compare product and service innovation and understand how innovation diffusion works. Furthermore, the participants have to work on case studies of service innovation, open vs. closed innovation, and learn how to leverage user communities to drive innovation, understand obstacles and enablers and how to manage, incentivize and foster service innovation.
Learning Targets/ Skills	The Participant ▪ is able to understand and analyze innovation processes in businesses.

<table>
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- acquires comprehension of diffusion process of innovations.
- is able to systematically analyze the difference between invention and innovation and to perform an innovation driver analysis.

</td></tr>
<tr><td>Pre-Requisites</td><td>Background knowledge in Service Science, Management and Engineering (SSME) is helpful but not a prerequisite for this course. Some of the basic economical skills will be reviewed in the classes.</td></tr>
<tr><td>Teaching Method</td><td>The lecture is based on slides that are distributed to the participants before the lectures. Additional material is provided using the website of the lecture.</td></tr>
<tr><td>Performance Appraisal</td><td>

	Written	Oral
Participation during course	-	-
Case Study	-	-
Project Work	-	-
Exam	100%	-

</td></tr>
<tr><td>Course Material</td><td>The lecture is based on current research material. A text book covering all of the material does not yet exist. Presentation, slides and handouts.</td></tr>
<tr><td>Literature</td><td>

- 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

</td></tr>
<tr><td>Contact Lecturer</td><td>Prof. Dr. Gerhard Satzger, E-Mail: Gerhard.Satzger@kit.edu</td></tr>
</table>

6.2 Service Technologies

The module “Service Technologies” focuses on two important parts: First on the design and engineering principles behind current networking technologies and second on security problems and solutions identified so far regarding those technologies.

The knowledge imparted on “Advanced Computer Networks” enables participants to understand the interactions of network components and apply the relevant facts to design principles for current service technologies and networks. Current modeling and markup languages (e.g. UML, HTML) and protocols (e.g. HTTP, SOAP) are explained to understand the architecture of web applications. On the security part, fundamentals of cryptography and their applications in complex safety systems are introduced. Cloud computing concepts and technologies taught within the module enable the participants to assess the opportunities and challenges of web-scale service applications having in mind the current state-of-the-art in IT Safety and Security.

Module Name: Service Technologies

Module Supervisor: Prof. Dr. Sebastian Abeck

Type of Module: Engineering Module 2 (EM2)

Lectures in Module	**Workload Distribution [hrs]**	
	Presence	**Self studies**
Advanced Computer Networks	22,5	49,5
Advanced Web Applications	22,5	49,5
IT Safety and Security	15	33
Cloud Computing	15	33

Major Learning Results (LR):

LR-1: Understanding of the technical fundamentals of network technologies for setting up electronic markets and implementing digital services.

LR-2: Ability to apply advanced web standards to design service-oriented and web-based systems.

LR-3: Skills in handling tools and methods for implementing safety and data protection requirements in networked applications.

LR-4: Achievement of thorough methodological skills to provide IT resources and services in cloud environments.

Performance appraisal for this Module:

Within the second master-specific module in Service Management and Engineering the performance appraisal consists of oral exams containing varying components of class room participation. The exams for the lecture *Advanced Computer Networks* and *Advanced Web Applications* will be combined.

Credit Points: 8

6.2.1 Advanced Computer Networks

Lecturer	PD Dr.-Ing. Roland Bless
Content	This course starts with a short repetition of networking basics and discusses the internet architecture including its design principles. An overview of the next internet protocol generation "IP Version 6" is given. Current trends in multimedia communications are presented as well as mechanisms and architectures to support quality of service and resource management in networks. Current techniques and protocols for Voice over IP or peer-to-peer networks are discussed as well. Basics of multicast are described which constitute a basis for providing efficient support for group communications.
Course Objectives	▪ Know-how on the latest networking technologies and directions ▪ Understanding design and engineering principles of networks
Learning Targets/ Skills	The Participant ▪ gains knowledge of the various networking technologies and understands the interactions between network components. ▪ is able to apply design and presentation principles of networks.
Pre-Requisites	The participant should be able to understand computer science as well as engineering principles and concepts.
Teaching Method	The course structure consists of lectures as well as accompanying live demonstrations and exercises.
Performance Appraisal	

	Written	Oral
Participation during course	-	-
Case Study	-	-
Project Work	-	-
Exam	-	100%

Course Material	Slides, books.
Literature	▪ James F. Kurose, Keith W. Ross: Computer Networking, 5th Edition, Addison Wesley, 2009 ▪ Larry L. Peterson, Bruce S. Davie: Computer Networks: A Systems Approach, 4th Edition, Morgan Kaufmann, 2007 ▪ Alan B. Johnston: SIP – understanding the Session Initiation Protocol, 2nd ed., Artech House, 2004
Contact Lecturer	PD Dr.-Ing. Roland Bless E-Mail: ***Bless@kit.edu***

6.2.2 Advanced Web Applications

Lecturer	Prof. Dr. Sebastian Abeck Dr. Michael Gebhart
Content	The architecture of a web-based system comprises the architecture of the web application and the architectures of the underlying networked system. Multi-layered application architectures and Service-Oriented Architectures (SOA) based on web service standards are introduced and languages to model and specify these architectures are presented. An insightful overview of process-oriented integration of existing IT-Systems is discussed. Service-Oriented Architectures (SOA) are used as an integration platform. To implement this next generation integration architecture, an in-depth look into the key web service technologies and their fundaments will be undertaken. In addition methods and technologies are discussed to compose basic web services to complex web services and to build advanced web applications oriented on business processes.
Course Objectives	The course objectives are to: ▪ understand the architecture of multi-layered and service-oriented web applications. ▪ know the modeling language UML to describe an architecture and to give examples that show how this language is applied in a given scenario. ▪ understand basic web technologies including HTTP, SOAP, WSDL. ▪ know concepts and technologies to compose basic web services to complex web services oriented on business processes. ▪ understand the reasons for service-oriented architectures as paradigm to support business processes. ▪ be aware of a methodology to specify business processes and to derive appropriate service designs.
Learning Targets/ Skills	The Participant ▪ is familiar with modern development tools as well as current modeling and programming languages (including HTTP, SOAP, WSDL). ▪ gains knowledge of the architecture of multilayered and service-oriented web applications.
Pre-Requisites	Fundamental knowledge of communication architectures and protocols (esp. architecture of the internet and web) and programming experience (e.g. Java) are pre-requisites.
Teaching Method	Course documents on each of the three parts of the lecture containing: ▪ learning goals to be obtained. ▪ slides presented by the teacher. ▪ explanatory text to each slide. ▪ exercises to be carried out by the participants. ▪ tables (e.g. glossary, references).
Performance Appraisal	

	Written	Oral
Participation during course	-	-
Case Study	-	-
Project Work	-	-
Exam	-	100%

Course Material	Course documents and lecture video (both available via Internet).
Literature	▪ Thomas Erl, Anish Karmarkar et al.: Web Service Contract Design and Versioning of SOA, Prentice Hall, 2009. ▪ Michael P. Papazoglou: Web Services: Principles and Technology, Pearson Education, 2008.
Contact Lecturer	Prof. Dr. Sebastian Abeck, E-Mail: ***Sebastian.Abeck@kit.edu*** Dr. Michael Gebhart; E-Mail: ***Michael.Gebhart@qa82.de***

6.2.3 IT Safety and Security

Lecturer	Prof. Dr. Jörn Müller-Quade
Content	The course starts with foundations of cryptographic techniques including symmetric ciphers, hash functions, public key encryption and digital signatures. Building on these foundations, more complex security protocols are studied. Especially secure voting is discussed as a complex security application for which even the definition of security is non-trivial. Basic models and methods from computer security are taught, including the Bell LaPadula model for access control. All theoretical topics are enriched with case studies which show the limits of theoretical modeling and help building the mindset needed for successful work in the area of IT security.
Course Objectives	▪ Knowledge of the cryptographic foundations of IT security. ▪ Understanding of security leaks through case studies. ▪ Development of the ability to mistrust given solutions.
Learning Targets/ Skills	The Participant ▪ knows the theoretical basics as well as basic mechanisms of computer security and cryptography. ▪ understands the mechanisms of computer security and is able to explain them. ▪ reads and understands current scientific articles. ▪ evaluates the security of given procedures and recognizes dangers. ▪ applies mechanisms of computer security in new IT and business environments.
Pre-Requisites	Participants should have basic knowledge of higher math and linear algebra.
Teaching Method	The course structure consists of lectures and accompanying exercises.
Performance Appraisal	

	Written	Oral
Participation during course	-	20%
Case Study	-	-
Project Work	-	-
Exam	-	80%

Course Material	Slides, books
Literature	▪ Ross Anderson: Security Engineering Second Edition, Wiley, 2008 ▪ Jonathan Katz, Yehuda Lindell: Introduction to Modern Cryptography: Principles and Protocols, Chapman & Hall, 2007
Contact Lecturer	Prof. Dr. Jörn Müller-Quade: E-Mail: ***Joern.Mueller-Quade@kit.edu***

6.2.4 Cloud Computing

Lecturer	Prof. Dr. Ralf H. Reussner
Content	Building on computer and storage virtualization Cloud Computing provides scalable, network-centric, abstracted IT infrastructure, platforms, and software applications as on-demand services that are billed by consumption. Innovative business models, cost efficiency, and faster time-to-market are the expected benefits associated with Cloud Computing. The lecture introduces concepts and technologies of Cloud Computing covering topics such as: ▪ Fundamentals: Virtualization, Service-orientation. ▪ Commercial and Open-Source Cloud offerings. ▪ Cloud service engineering. ▪ Web-scale Cloud service architecture. ▪ Cloud service management. ▪ Cloud economics. ▪ Obstacles and opportunities.
Course Objectives	The participant becomes familiar with concepts and technologies of Cloud Computing and understands opportunities and challenges in the engineering and management of Web-scale services.
Learning Targets/ Skills	The Participant ▪ learns and applies concepts, methods and technologies of Cloud Computing for the supply and usage of IT-resources, development and operating time environments and applications of various kind as services in the web.
Pre-Requisites	Basic programming experience (e.g. Java) and fundamentals of Web and Web services computing are desired.
Teaching Method	Lecture and interactive group exercises and discussions.
Performance Appraisal	Written: Participation during course: -; Case Study: -; Project Work: -; Exam: - Oral: Participation during course: 20%; Case Study: -; Project Work: -; Exam: 80%
Course Material	Course documents provided at the beginning of the lecture.
Literature	-
Contact Lecturer	Prof. Dr. Ralf H. Reussner: E-Mail: ***Reussner@kit.edu***

6.3 Digital Services

The module “Digital Services” focuses on advanced concepts and methods that are essential in digital service systems and e-applications. Understanding the need for information and knowledge management in businesses, participants of the module are able to implement concepts for modeling, representation, and manipulation of knowledge and services. Based on the acquired eCommerce-supporting methods and systems, the participants are qualified to select, evaluate, design, and apply these methods and systems according to the specific use case at hand.

Participants get acquainted with the characteristics of Big Data and the opportunities they are providing for improving businesses. They also learn methods and systems to acquire, manage, and analyze Big Data in real-life settings.

Due to the fact that digital services are used more and more on mobile devices, participants will gain an understanding of the use of mobile information technology in combination with digital services in business. In one part of the module methods and procedures of the efficient and effective use of mobile digital services and mobile applications as well as the basics in development are conveyed to improve specific business segments.

After having learned the meanings of “information” and “pricing”, participants can develop a differentiated view on the pricing of goods and information of goods. Based on a case study of the price elasticity of demand, they develop application and implementation strategies which, in turn, require suitable team and communication skills. Participants learn how to individualize prices based on ICT and to tie pricing to service outcomes.

Module Name: Digital Services

Module Supervisor: Prof. Dr. Rudi Studer

Type of Module: Engineering Module 3 (EM3)

Lectures in Module	**Workload Distribution [hrs]**	
	Presence	**Self studies**
Information and Knowledge Management	22,5	49,5
IT Aspects of Mobile Businesses	19,5	42,9
Big Data	18	39,6
Information Pricing	7,5	16,5
Service Pricing	7,5	16,5

Major Learning Results (LR):

LR-1: Skills in handling tools and methods for knowledge management and service design.

LR-2: Understanding how to improve specific parts in business by the use of mobile information technology (e.g. to mobilize business processes or to implement omni-channel solutions).

LR-3: Understanding of the processes and systems of eCommerce and knowing how to cope with different service pricing methods.

LR-4: Know-how to price information and services accordingly to the business environment and the market.

Performance appraisal for this Module:

Within the third Master-specific Module in Service Management and Engineering the performance appraisal is based on oral exams containing varying components of class room participation. The exams for the lecture *Information Pricing* and *Service Pricing* are combined.

Credit Points: 8

6.3.1 Information and Knowledge Management

Lecturer	Prof. Dr. York Sure-Vetter
Content	The course primarily deals with recent technical advancements in Information and Knowledge Management with a focus on semantic web technologies and semantic web services. The course provides an overview of fundamental aspects and a general introduction to the topics. Practical tools and applications are jointly explored and give a hands-on experience to state-of-the-art semantic web- and web 2.0-technologies and how they can be used in corporate environments. In addition, semantic web services as a new paradigm for modeling, orchestrating and executing services are presented. Practical applications based on semantic web services are used to illustrate the potentials of the new technology.
Course Objectives	To provide a framework of interdisciplinary knowledge, methods and skills to support understanding of Information and Knowledge Management with a focus on semantic web and web 2.0-technologies as well as semantic web services.
Learning Targets/ Skills	The Participant ▪ gets to know and to apply methods and instruments in the area of "Information and Knowledge Management" and to demonstrate the capability to be innovative regarding the applied methods. ▪ learns the practical application of the use of semantic web-based systems. ▪ is capable of choosing and correctly applying the appropriate methods for the arising problems as part of the daily tasks. ▪ is put in the position to find and represent arguments for problem solving.
Pre-Requisites	No specific prerequisites are required. Some understanding of basic ideas in (object-oriented) modeling could be useful.

Teaching Method	The course consists of lectures as well as accompanying discussion and hands-on sessions.
Performance Appraisal	

	Written	Oral
Participation during course	-	20%
Case Study	-	-
Project Work	-	-
Exam	-	80%

Course Material	Lecture slides will be provided digital. Additional material is available online (links will be provided in the slides).
Literature	▪ „Foundations of Semantic Technologies“; P. Hitzler, M. Krötzsch, S. Rudolph; CRC Press; 2009. ▪ Handbook of Ontologies“ by Staab/Studer (eds.) Springer Verlag 2009
Contact Lecturer	Prof. Dr. York Sure-Vetter: E-Mail: ***York.Sure-Vetter@kit.edu***

6.3.2 IT Aspects of Mobile Businesses

Lecturer	Dr. Stefan Hellfeld
Content	This course will focus on mobile business, programming mobile apps, mobile services and the special features of mobile information technology if it is used in business. After a brief introduction to mobile business the following topics will be covered: ▪ Mobile devices and their classification. ▪ Mobile operating systems. ▪ Electronic vs. mobile business. ▪ Business models in mobile business. ▪ Mobile services and security aspects. ▪ Development of mobile services and apps.
Course Objectives	The objective of this course is to provide an overview of and some insight into mobile information technology, tools, and services that are essential enablers of mobile business and mobile applications.
Learning Targets/ Skills	The Participant: ▪ learns systems and methods of informatics to support the use of mobile information technology in business. ▪ is able to situation-relatedly choose, rate, design and apply these methods and systems.
Pre-Requisites	The course requires some basic knowledge in Informatics and an active interest in current web technologies. Therefore it is necessary to have completed Management Module 1, and it is advantageous to have taken modules EM1 and EM2.
Teaching Method	PowerPoint slides, supplementary web-based content sources, discussion of case studies; interactive exercises, programming lessons, teaching material will be available on associated web site.
Performance Appraisal	

	Written	Oral
Participation during course	-	20%
Case Study	-	-

	Project Work	-	-
	Exam	-	80%
Course Material	The course is based on various information sources: books, slides, online documentation of Mobile ICT standards. The course material will be available via the course website.		
Literature	▪ S. Hellfeld: Hybride Simulation mobiler Geschäftsprozesse, KIT Scientific Publishing, Karlsruhe, 2013 ▪ Web sites, which will be mentioned in the course		
Contact Lecturer	Dr. Stefan Hellfeld: E-Mail: ***Hellfeld@fzi.de***		

6.3.3 Big Data

Lecturer	Prof. Dr. Rudi Studer Dr. Andreas Harth		
Content	The course presents an overview of methods and technologies related to Big Data including: ▪ Distributed Systems and Cloud Computing. ▪ Foundational Big Data Technologies. ▪ Theory and Practice of NoSQL Systems. ▪ Big Linked Data. ▪ Exploiting Similarity Measures for Data Integration. The course concludes with an outlook on further topics, including data mining and machine learning.		
Course Objectives	The course teaches the fundamentals of Big Data, including real-world cases, as well as current technical challenges and opportunities of Big Data. Participants will learn the foundational algorithms of large-scale distributed systems. Further, participants will learn how to make use of available technologies to manage Big Data on cloud infrastructures and to perform data analytics tasks. The hands-on sessions will include setting up a cloud environment, and querying and visualizing a large dataset.		
Learning Targets/ Skills	After completing the course, the participants are able to: ▪ explain the V's of Big Data. ▪ outline the distributed architectures and core components used in Big Data systems. ▪ explain Brewer's CAP theorem. ▪ select NoSQL systems appropriate for given requirements. ▪ outline the use of similarity metrics for data mapping. ▪ explain steps involved in large-scale data integration and data analytics.		
Pre-Requisites	No specific prerequisites are required. Some basic knowledge in databases and web technologies could be useful.		
Teaching Method	The course consists of lectures, direct instruction and hands-on exercises.		
Performance Appraisal		Written	Oral
	Participation during course	-	-
	Case Study	-	-
	Project Work	-	-
	Exam	-	100%

Course Material	Lecture slides will be provided in digital form.
Literature	Jure Leskovec, Anand Rajaraman, Jeff Ullman, Mining of Massive Datasets, http://mmds.org/. AnHai Doan, Alon Halevy, Zachary Ives, Principles of Data Integration, Morgan Kaufmann, 2012.
Contact Lecturer	Prof. Dr. Rudi Studer, E-Mail: ***Studer@kit.edu*** Dr. Andreas Harth, E-Mail: ***Harth@kit.edu***

6.3.4 Information Pricing

Lecturer	Prof. Dr. Christof Weinhardt
Content	The course will focus on the economics and pricing of information as used in business. Introduction: “What is information?”, “What is pricing?”. Part I – Information economy, information lifecycle and foundations, models of price and quality insecurity. Part II – Network effects, competition, network economy, standardization. Part III – Marketing and pricing of information goods, static pricing. Part IV – Flexible (price differentiation, bundling) and dynamic pricing (auctions, negotiations). The lectures will be accompanied by exercise sessions where the presented material will be reviewed and applied to practical problems to enhance participants understanding.
Course Objectives	The course aims to provide a framework of interdisciplinary knowledge, methods and skills to understand the characteristics and complexities of information goods. In today's society, as well as in business, information plays a central role. The resulting changing structures and processes are not directly explained by the traditional approaches of economic theory. As information has been implicitly regarded as a production factor, its competitive aspects have not been fully addressed. To anchor the central role of information in the lecture, the concept of the "information lifecycle" as a structuring instrument is introduced and systematically explained. Based on the lifecycle of information goods, the individual phases: Extraction, Storage, Transformation, Review, Marketing, and use of information are analyzed from an economic and micro-economic perspective based on classical and new theories. The course concludes with different pricing models and their properties.
Learning Targets/ Skills	The Participant ▪ gains competencies in the application of the option-price theory. ▪ understands the central role and competitive advantages of information as an economic and production factor. ▪ is able to analyze information with appropriate methods and concepts. ▪ evaluates information flows and the value of information in an interdisciplinary context. ▪ learns to develop solutions in teams.
Pre-Requisites	No specific prerequisites are required. Some understanding of basic ideas in mathematics could be useful.
Teaching Method	The course consists of lectures as well as accompanying discussion sections, exercises and

	homework.
Performance Appraisal	

	Written	Oral
Participation during course	-	-
Case Study	-	-
Project Work	-	-
Exam	-	100%

Course Material	The lecture is based on current research material. A textbook covering all of the material does not yet exist. Presentations, slides and handouts.
Literature	▪ Wilson, R. (1992). Nonlinear Pricing. Oxford, Oxford University Press. ▪ Shapiro, C. and H. R. Varian (1999). Information Rules. Boston, MA, Harvard Business School Press. ▪ Wirth, H., Electronic Business. Gabler Verlag 2001.
Contact Lecturer	Prof. Dr. Christof Weinhardt: E-Mail: ***Weinhardt@kit.edu***

6.3.5 Service Pricing

Lecturer	Prof. Dr. Gerhard Satzger
Content	The course presents an overview on fundamental aspects of service pricing focusing on: ▪ specifics of service pricing - characteristics of service pricing in comparison to product pricing - potential of information and communication technology (ICT) for service pricing - pricing impact to drive servitization ▪ service pricing to co-create value - prices as scalars: price differentiation and revenue management - prices as functions: risk-gain sharing - prices within overall Ts&Cs/ case study on individualized pricing.
Course Objectives	The objective of this course is to familiarize participants with the specifics of service pricing and enable them to exploit potentials enabled by ICT. Particular focus is put on service pricing as a means to co-create value between provider and customer(s) and the options to tie pricing to service outcomes.
Learning Targets/ Skills	The Participant ▪ understands the nature of service pricing and its managerial implications. ▪ is able to apply concepts of price differentiation and revenue management of services. ▪ gets familiar with the concept of sharing risks in service relationships. ▪ is able to exploit the potential of pricing to drive servitization.
Pre-Requisites	A basic understanding of accounting and finance concepts is strongly recommended.
Teaching Method	The course consists of lectures, exercises, discussions and a detailed case study on pricing in IT

<table>
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<tr><td>Performance Appraisal</td><td>
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<tr><th></th><th>Written</th><th>Oral</th></tr>
<tr><td>Participation during course</td><td>-</td><td>-</td></tr>
<tr><td>Case Study</td><td>-</td><td>-</td></tr>
<tr><td>Project Work</td><td>-</td><td>-</td></tr>
<tr><td>Exam</td><td>-</td><td>100%</td></tr>
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<tr><td>Course Material</td><td>Lecture slides will be distributed in electronic form before the beginning of the class.</td></tr>
<tr><td>Literature</td><td>

Nagle / Hogan (2010), The Strategy and Tactics of Pricing, 5th edition.
Ng (2007), The Pricing and Revenue Management of Services.
Lovelock / Wirtz (2010), Services Marketing.
Satzger/ Kieninger (2011), Risk-Reward Sharing in IT Service Contracts – A Service System View, Proceedings HICSS, p. 1-8

</td></tr>
<tr><td>Contact Lecturer</td><td>Prof. Dr. Gerhard Satzger: E-Mail: Gerhard.Satzger@kit.edu</td></tr>
</table>

6.4 Business Processes and Software Engineering

In business organizations business processes and software engineering are known to be closely linked to one another. The participants in the module "Business Process and Software Engineering" have the ability to effectively and efficiently adapt the particular demands of business processes by means of a technical approach that applies both the tools and methods of business process engineering and of software systems. They obtain a detailed overview of the stages of development of software systems and they are qualified to apply the tools and methods of the development process.

Module Name: Business Processes and Software Engineering

Module Supervisor: Prof. Dr. Andreas Oberweis

Type of Module: Engineering Module 4 (EM4)

Lectures in Module	**Workload Distribution [hrs]**	
	Presence	**Self studies**
Business Process Engineering	37,5	82,5
Software Systems Engineering	37,5	82,5

Major Learning Results (LR):

LR-1: Knowledge how to use languages, methods, and tools for designing, implementing, and optimizing business processes.

LR-2: Knowledge how to use methods, procedure models, and tools for efficient development of complex software systems with high demands on quality.

LR-3: Knowledge how to cope with the different life cycles of business processes and software systems and skills in using methods for their optimal coordination**.**

Performance appraisal for this Module:

Within the fourth Master-specific Module in Service Management and Engineering the performance appraisal is based on oral exams containing varying components of class room participation.

Credit Points: 8

6.4.1 Business Process Engineering

<table>
<tr><td>Lecturer</td><td>Prof. Dr. Andreas Oberweis</td></tr>
<tr><td>Content</td><td>This course introduces methods and tools to support the whole life cycle of business processes. This includes the phases business process modeling, business process simulation and analysis, as well as business process execution and monitoring. Different languages for business process modeling are presented, such as Event Driven Process Chains, Petri Nets and BPMN. Workflow management systems and service oriented architectures are introduced as two different concepts to support flexible executions of business processes.</td></tr>
<tr><td>Course Objectives</td><td>The objective of this course is to provide participants with a profound survey of languages, methods and tools for Business Process Engineering. The courses in the modules EM2 (Service Technologies) and EM3 (Digital Services) cover material that is closely related to the topic of this course.</td></tr>
<tr><td>Learning Targets/ Skills</td><td>The Participant
knows goals of business process modeling and knows various modeling languages.
is able to choose an appropriate modeling language in a given context and to apply it with the respective tools support.
knows analysis methods in order to rate process models and is able to evaluate them regarding certain quality features.</td></tr>
<tr><td>Pre-Requisites</td><td>The course requires some basic knowledge in informatics and management, especially in modeling approaches. Therefore it is necessary to have completed MM2.</td></tr>
<tr><td>Teaching Method</td><td>The content of the lectures will be supplemented by application of business process engineering tools in the laboratory and case study based project work.</td></tr>
<tr><td>Performance Appraisal</td><td><table><tr><th></th><th>Written</th><th>Oral</th></tr><tr><td>Participation during course</td><td>-</td><td>20%</td></tr><tr><td>Case Study</td><td>-</td><td>-</td></tr><tr><td>Project Work</td><td>-</td><td>-</td></tr><tr><td>Exam</td><td>-</td><td>80%</td></tr></table></td></tr>
<tr><td>Course Material</td><td>Digital copies of the slides will be provided to the participants. Additional material can be downloaded from the course website.</td></tr>
<tr><td>Literature</td><td>J. vom Brocke, M. Rosemann (Eds.): Handbook on Business Process Management, Springer, 2010
M. Dumas, W.M.P. van der Aalst, A.H.M. ter Hofstede: Process-Aware Information Systems, Wiley, 2005
Matthias Weske: Business Process Management. Concepts, Languages, Architectures, Springer, 2007</td></tr>
<tr><td>Contact Lecturer</td><td>Prof. Dr. Andreas Oberweis: E-Mail: Oberweis@kit.edu</td></tr>
</table>

6.4.2 Software Systems Engineering

<table>
<tr><td>Lecturer</td><td>Prof. Dr. Andreas Oberweis

Prof. Dr. Ralf H. Reussner</td></tr>
<tr><td>Content</td><td>The course covers all stages of software systems development: systems planning, analysis and design, testing and implementation, as well as maintenance. Special focus is placed on embedding software systems in technical or sociotechnical environments. Different process models for software development are considered. Specific methods for software quality prediction and management, configuration management, software reuse, and cost estimation are presented. Software components and software architectures are treated in detail.</td></tr>
<tr><td>Course Objectives</td><td>The objective of this course is to provide participants with a profound survey of methods and tools for the different stages of software systems development and maintenance. The courses in EM2 (Service Technologies) cover material that is closely related to the topic of this course.</td></tr>
<tr><td>Learning Targets/ Skills</td><td>The Participant

▪ knows methods and tools for software development (for example MDSD) and maintenance.

▪ gets to know component based software developments and is able to recognize the connection to engineering software development and to software architectures.

▪ visualizes the advantages and disadvantages of these component models. In order to be able to critically rate the most important techniques and procedures from experience and research are conveyed, like for example performance-forecast of draft time and code-generation from models.

▪ learns and applies currently used technologies (EJBs, SOA etc.) as well as current research focuses, for example model transformations into the development of software prototypes.

▪ learns the systematic work with architecture descriptions through structured methods for architecture evaluation (for example SAAM)</td></tr>
<tr><td>Pre-Requisites</td><td>The course requires some basic knowledge in informatics, especially in modeling approaches. Therefore it is strongly advantageous to have completed MM1.</td></tr>
<tr><td>Teaching Method</td><td>The course consists of lectures and exercises. The content of the lectures will be supplemented by application of software tools in the laboratory.</td></tr>
<tr><td>Performance Appraisal</td><td>
<table>
<tr><th></th><th>Written</th><th>Oral</th></tr>
<tr><td>Participation during course</td><td>-</td><td>20%</td></tr>
<tr><td>Case Study</td><td>-</td><td>-</td></tr>
<tr><td>Project Work</td><td>-</td><td>-</td></tr>
<tr><td>Exam</td><td>-</td><td>80%</td></tr>
</table>
</td></tr>
<tr><td>Course Material</td><td>Digital copies of the slides will be provided to the participants. Additional material can be downloaded from the course website.</td></tr>
<tr><td>Literature</td><td>▪ B. Bruegge, A.H. Dutoit: Object-Oriented Software Engineering Using UML, Patterns, and Java, 3rd Edition, Prentice Hall, 2009 and additional journal articles.</td></tr>
<tr><td>Contact Lecturer</td><td>Prof. Dr. Andreas Oberweis: E-Mail: Andreas.Oberweis@kit.edu

Prof. Dr. Ralf Reussner: E-Mail: Ralf.Reussner@kit.edu</td></tr>
</table>

6.5 Regulations and Economics of Networks

The fundamental knowledge of communication law supports participants in the adaptation of business strategies to today's media and information industry and is in the focus of this module.

The participants are able to identify and solve relevant problems from the areas of information, data protection, and business law. In the part "Network Economics", participants implement price models and business strategies as economic concepts reacting to changed market conditions in e.g., the transportation or telecommunications sectors. The participants are qualified to identify and take into account the problems (e.g. "moral hazard" and "adverse selection") that are linked to contract design.

Module Name: Regulations and Economics of Networks

Module Supervisor: Prof. Dr. Indra Spiecker gen. Döhmann

Type of Module: Engineering Module 5 (EM5)

Lectures in Module	**Workload Distribution [hrs]**	
	Presence	**Self studies**
Communication Law	22,5	49,5
Industrial and Network Economics	30	66
Economics of Contracts	22,5	49,5

Major Learning Results (LR):

LR-1: Understanding of the economic and legal aspects of service markets.

LR-2: Ability to assess and estimate the situation, objectives, possibilities, and problems of regulation in network industries.

LR-3: Qualification to assess competition processes in the telecommunications and internet sector with a view to their specific requirements.

LR-4: Knowledge about the legal and economic aspects of contract design.

Performance appraisal for this Module:

Within the fifth Master-specific Module in Service Management and Engineering the performance appraisal is based on oral exams containing varying components of project work.

Credit Points: 8

6.5.1 Communication Law

Lecturer	Prof. Dr. Indra Spiecker gen. Döhmann
Content	The lecture deals with the basics of Communication Law: How is the underlying infrastructure regulated (telecommunications law)? What basic rules have to be kept in mind when facing e-commerce? What are relevant data protection regulations? In what respect is international and supranational (EU) law influencing the various national regulatory systems? Managers involved in the development of information products need a basic knowledge of public and administrative law, in particular of regulatory law, to answer these questions. The lecture aims at a general understanding of the mechanisms of international and European Communications law, in particular, how it influences the various national legal systems and the interplay of international, supranational and national law. The telecommunications and the law of data protection are major aspects treated in this module.
Course Objectives	The lecture gives the international, European and national legal background in public and administrative law for various business activities, such as data management systems, electronic market platforms and e-business models, and helps to develop relevant projects with view to later legal problems. It shall raise sensitivity to relevant legal problems. The module is related to the other legal modules, e.g. on property law.
Learning Targets/ Skills	The Participant ▪ knows the basic functioning of public and administrative law, of interpretation and structures of law, including a basic overview over U.S. law. ▪ realizes and understands possible conflicts with international and European communications law. ▪ is able to solve easily practical international and European communication and data protection law cases. ▪ is able to discuss solutions of various conflicts and reflect on different legal cultures.
Pre-Requisites	No specific prerequisites are required. Basic knowledge/ practical experience in European and international Law as well as telecommunication and data protection law would be helpful but is not required.
Teaching Method	The course structure consists of lectures as well as accompanying exercises, cases, homework and discussion sections.
Performance Appraisal	

	Written	Oral
Participation during course	-	-
Case Study	-	-
Project Work	-	20%
Exam	80%	-

Course Material	Lecture notes; homework; legal sources, case studies and exercises, PowerPoint presentations.
Literature	▪ Witt, B. C. (2010): Datenschutzrecht ▪ Vranckx, C. (2013): Öffentliches Recht für Wirtschaftswissenschaftler
Contact Lecturer	Prof. Dr. Indra Spiecker: E-Mail: ***Spiecker@jur.uni-frankfurt.de***

6.5.2 Industrial and Network Economics

Lecturer	Prof. Dr. Kay Mitusch
Content	The course starts on the first day with a recap on willingness to pay, welfare, perfect markets, and basic monopoly and oligopoly, including exercises. Days two and three are devoted to practical topics of industrial economics: price vs. quantity competition, first- and second-mover advantages in price vs. quantity (or capacity) competition, market entry, entry barriers and entry deterring strategies, product differentiation and innovation. The course will give a mixture of theoretical insights, practical issues, exercises, and cases. The final day is devoted to network economics, which combines parts of industrial economics and parts of public economics in dealing with the network sectors of the economy. Based on typical cost characteristics of network or infrastructure industries the problems of "market failure", public policy and regulation will be addressed. Finally, the modern form of two-sided markets, which dominate the internet business, will be discussed.
Course Objectives	The course objective is to gain an understanding of strategic behavior firms and of the particular issues of network industries.
Learning Targets/ Skills	The Participant • gets a feeling how markets work and how they can be analyzed. • learns to distinguish between forms of competition and of anti-competitive behavior. • analyzes the entrant-incumbent interaction and the concept of "natural monopoly" in network economics. • understands the basics of network economies from the point of view of both industrial economics and public economics.
Pre-Requisites	Basic knowledge of linear algebra and analysis, basic knowledge in economics.
Teaching Method	The material presented in the course will be supplemented by exercises. The exercises will be solved in form of guided group work.
Performance Appraisal	

	Written	Oral
Participation during course	-	-
Case Study	-	-
Project Work	-	-
Exam	-	100%

Course Material	PowerPoint presentations will be handed out before each lecture.
Literature	▪ Jensen, E.J., and Waldman, D.E., 2007: Industrial Organization: Theory and Practice. ▪ Shy (2001), The Economics of Network Industries, Cambridge University Press
Contact Lecturer	Prof. Dr. Kay Mitusch: E-Mail**: *Kay.Mitusch@kit.edu***

6.5.3 Economics of Contracts

Lecturer	Prof. Dr. Clemens Puppe
Content	The course treats modern principal-agent theory and the principles governing the functioning of contracts within and across firms. The specific problems that arise in a framework of incomplete information are addressed. The course provides the tools and methods to deal with the incentive problems that arise from informational asymmetries by analyzing the optimal contract design. Other topics are the problem of truthful preference revelation, the Groves-mechanisms, incomplete contracts and tournaments. Applications include incentives at the workplace and internet auctions; special emphasis is on behavioral aspects of economic contracts.
Course Objectives	The participant is trained in an important subject within modern microeconomic theory: principle-agent theory. The purpose of the course is to provide the background to the problems of optimal contract design. A focal point is the incentive problem that arises from asymmetrically informed parties. The connections to the Law and Economics literature will be provided.
Learning Targets/ Skills	The Participant ▪ implements judicial and economic basic considerations regarding contracts. ▪ acquires knowledge of the incentive problems on the basis of asymmetric information distribution. ▪ acquires the ability to analyze Moral Hazard and Adverse Selection problems.
Pre-Requisites	The participant is expected to have the following background: Basic knowledge of linear algebra and analysis, stochastic and games.
Teaching Method	The material presented in the course will be supplemented by problem sets in the exercises. After the evaluation of the submitted exercises there will be a written exam (or oral, if the number of participants is too low). Part of the course will consist of conducting and discussing experiments in behavioral contract theory.
Performance Appraisal	Participation during course: Written - / Oral - Case Study: Written - / Oral - Project Work: Written - / Oral 20% Exam: Written - / Oral 80%
Course Material	The course materials will be presented using all types of electronic and other multi-media devices. The lecture notes will be handed out before each lecture.
Literature	▪ Salanie (1997), The Economics of Contracts: A Primer, MIT Press. ▪ Brousseau/ Glachant (2002), The Economics of Contracts: Theories and Applications, Cambridge University Press. ▪ Macho-Stadler/Perez-Castrillo/ Watt (2002), An Introduction to the Economics of Information: Incentives and Contracts, Oxford University Press.
Contact Lecturer	Prof. Dr. Clemens Puppe: E-Mail: ***Clemens.Puppe@kit.edu***

7 Master Thesis Service Management and Engineering

The Master Thesis can be performed either as a research project in one of the institutes at the KIT or in cooperation with the participant's company. In the latter case it should be performed under the supervision of an advising faculty member from the HECTOR School.

The following table (Tab. 7-1) summarizes the Master Thesis scope and process:

Content	The scope of the Master Thesis should contain the following criteria: ▪ description of the problem ▪ review of the relevant literature (state of the art) ▪ definition, selection and description of suitable approaches ▪ execution of the necessary work schedule (experiments, statistical analyses) ▪ derivation of a conclusion ▪ discussion of validity, scope and verification
Learning Targets/ Skills	Participants demonstrate the skills to independently solve a scientific problem adapting methods and models acquired during participation in the modules 1-10.
Pre-Requisites	Successful completion of 80% of the modules and exams.
Workload	The Master Thesis is to be completed within a period of 6 months. Start of the Master Thesis is the 1st day of the following month after the 8th HECTOR School module.
Master Thesis Operations	1. Orientation Phase: Until module 6 the participants are asked to search for a project within their professional environment. Along with this, they are also asked to search for a first supervisor within the lecturers of the HECTOR School. 2. Registration Phase: The participants are asked to hand in the official Master Thesis application form with an outline of the Master Thesis topic and signed by the chosen first supervisor to the student office of the HECTOR School until the end of module 8. The participant then receives the approval by the study regulations committee. 3. Project Phase: The project phase starts with the 1st of the following month after the 8th HECTOR School module. During the project phase the participants are asked to follow a milestone plan, which is agreed on with their supervisor. The participants regularly report about their progress to the HECTOR School. Before the final submission, the students will hold official colloquia, where they are asked to present the contents of their Master Thesis in a 20 minutes colloquium using modern media. The colloquia dates are usually set around 4 weeks before the official submission date. 4. Submission Phase: The participant is asked to hand in two paper copies and a digital version on CD or data stick to the student office by the announced completion date. Templates and style formats will be communicated by the HECTOR School.

Tab. 7-1 Master Thesis scope and process

Further information on the Master Thesis regulations can be seen in the General Study and Examination Regulations, § 11 (see also Chap.9.4.).

8 Karlsruhe Institute of Technology (KIT)

On October 01, 2009, the Karlsruhe Institute of Technology (KIT) was founded by a merger of Forschungszentrum Karlsruhe and Universität Karlsruhe. The basis was the KIT Merger Act that was adopted unanimously by the Baden-Württemberg state parliament in July 2009. KIT bundles the missions of both precursory institutions: A university of the state of Baden-Wuerttemberg with teaching and research tasks and a large-scale research institution of the Helmholtz Association conducting program-oriented provident research on behalf of the Federal Republic of Germany. Within these missions, KIT is operating along the three strategic fields of action of research, teaching, and innovation.

With roundabout 9450 employees and an annual budget of about EUR 850 million, one of the largest research and teaching institutions nationwide is established in Karlsruhe. It has the potential to assume a top position worldwide in selected fields of research. The objective: KIT will become an institution of top research and excellent scientific education as well as a prominent location of academic life, life-long learning, comprehensive advanced training, unrestricted exchange of know-how, and sustainable innovation culture.

8.1 Department of Mechanical Engineering

Production Technology: Taking an integrated approach

The holistic treatment of products and production in an international environment is central to industrial engineering research projects at Karlsruhe; included in this is not only manufacturing itself, but also operation, maintenance and recycling. The opening of national borders for industries results in the necessity to reduce development times and in turn increase the application of technical models and computational simulations.

Research at Karlsruhe in production focuses on taking an integrated approach to the product and the production within an international context. It is not restricted to the process of production alone, but also includes aspects such as plant operation, maintenance and recycling. Another aspect is the increasing pressure to intensify automation. Research and teaching at the Department's production-technology oriented institutes cover almost every phase of the product life cycle. Research includes issues such as product planning, design, production planning, manufacturing and assembly, quality management, material flow technology and logistics as well as industrial management and ergonomics.

Product Development and Design: The creative element

Product Development and Design have the goal of examining and developing a theoretical basis for methodical development processes including the respective computing systems (CAD/CAM). Taking traditional design methods as a starting point, researchers use an integrated approach to accompany and systematically manage the entire product development and production process. Complex product

development and production tasks are solved in close cooperation with industry. In doing so the focus is on the entire development chain – from environmentally compatible and strategic product planning brainstorming all the way to creating complete three dimensional CAD designs is focused on. Simulations and prototype construction are also part of the process. Other research areas include:

- Energy and environment – developing sustainable technology
- Material Technology – enabling innovative engineering
- Microsystem technology- large impact from small devices
- Mechatronics – a symbiosis of two technological worlds
- Vehicle and powertrain technology – the motors of a mobile society
- Theoretical basics – the foundations of engineering

8.2 Department of Economics and Management

Research and teaching at the Department of Economics and Management in Karlsruhe is distinguished by interdisciplinary networked tasks and a focus on current developments. The faculty is the largest training center for graduate industrial engineers in Germany.

The interdisciplinary course in industrial engineering with business studies has characteristics that are typical for Karlsruhe Institute of Technology (KIT): it is geared towards quantitative problems and is therefore strongly method-orientated; it also includes applied computer science. Working in an interdisciplinary network, perhaps taking both economic and technical aspects into account at the same time, is essential for the design, manufacture and marketing of products.

Interdisciplinary research

Despite the large number of resources devoted to teaching at the institutes, research is still very much a priority. The interdisciplinary Research Training Group “Market Engineering” recently founded bridges the gap between education and research. The program is devoted to designing institutions, services, systems and social models for electronic markets while taking into account all of the economic, technology-based and legal aspects.

The main fields of research include:

- Finance and capital market research
- Marketing and market research
- Mapping work processes using computer science
- Information management
- Production and materials flow management
- Ergonomics

- Sustainable construction
- Traffic prediction and transport network planning
- System dynamics and innovation
- Optimization, resource management and risk management
- Actuarial science and applied risk science
- Welfare economics
- Experimental economic research

8.3 Department of Informatics

Without the use of computers hardly anything in our society would function. Whether in transportation, production, administration, health care or leisure, computers unobtrusively complete increasingly important tasks. As a result, information technology has become an extremely significant sector. The Universität Karlsruhe (TH) was the first German university to offer a full Diploma degree in informatics in 1972. Ever since then, the Department of Informatics is considered a leader in the field and internationally ranked number one in all the major rankings and evaluations.

Research and education in informatics at the Karlsruhe Institute of Technology (KIT) is characterized by its breadth coupled with a strong focus on theoretical and practical aspects. The value that the faculty places on multi-disciplinary education is shown by the offer of business informatics degree program. Other fields of research include:

- The applications of computer science: computer-aided surgery
- Semi-humanoid robot systems
- Computers for everyday use

8.4 Department of Electrical Engineering and Information Technology

Its 15 institutes – including two interdepartmental research centers – and approximately 1500 students put the department in the very heart of engineering at the Karlsruhe Institute of Technology (KIT). By focusing on automation, energy, information and communication technology and electronic components and circuits, the faculty puts students in touch with all of the cutting-edge areas of electrical engineering and information technology.

The demand for components and systems for the fast transfer, storage, visualization and processing of information is steadily increasing. Hybrid and quantum components and molecular electronics result in completely new possibilities for future information processing and storage.

Microelectronic and nanoelectronic components also enable the so-called System on Chip (SoC): the integration of complete microelectronic systems onto a single silicon chip has become feasible through the rapid development of CMOS VLSI technology. This demands cost-effective technology, application specific hardware/software architectures and highly efficient design methods. Other research areas include:

- Mechatronics – new functions through interdisciplinary research
- Energy at the cross roads of ecology and economics
- Fuel cells: a technology for the future
- Wireless communication: effective planning of transmitter networks
- Systems engineering: personal health monitoring
- Aviation and aeronautics
- Microelectronics, nanoelectronics and optoelectronics

8.5 Department of Chemical Engineering

The Department of Chemical Engineering and Process Engineering at the KIT with 12 chairs at 6 institutes and about 1000 students is one of the world's largest in their field of study. Chemical Engineers have been educated successfully in Karlsruhe since 1928. The traditional courses chemical engineering and process engineering were complemented by the bioengineering program in 2001. All three courses have steadily increasing intake and graduate numbers.

Chemical engineering, process engineering and biological engineering are interdisciplinary engineering sciences connecting the fields of engineering, technical physics, mathematics, and chemistry. The focus of research and teaching at the faculty is in the three general themes material process technology, biotechnology and food technology, energy and environmental technology.

8.6 Department of Civil Engineering, Geo and Environmental Sciences

At the beginning of the foundation of the University of Karlsruhe stood the engineer Johann Gottfried Tulla. In 1807 he founded an Engineering School in order to educate employees for the administration of Highway Building and Hydraulic Engineering, which was organized by him. An architect joined this project: Friedrich Weinbrenner, his Building School arose from the Architectural Drawing School, which existed since 1787. The union of Tulla's Engineering School and Weinbrenner's Building School with the Academy of Machine Construction of Freiburg and a School of Forestry gave rise to the foundation of a Polytechnic School in 1807. It achieved academic quality and was called "technical academy. Tulla, the principal of the highway building and hydraulic administration of Baden County had already intensely prepared the project. In Paris short after Napoleon's coup d'état he had got to

know the Polytechnic University of Ecole – the University, which at first gave its students a basic scientific education, before it specialized the prospective engineers in their future profession.

Today both the traditional acquiring of basic scientific knowledge and accomplishing of applied scientific work are regarded as equally important at the University Fridericiana, how the university is called since 1902. And Tulla's special field of activity - the regulation of the Rhein is still researched today. Since 2002 Geo- and Environmental Sciences and the Civil Engineering work together within this department. Thus the dovetail connection and interaction of building structures and their environment and the study of intervention/interference in the city and cultivated landscape are accommodated during the education and research.

9 Appendix

9.1 European Credit Transfer and Accumulation System

9.1.1 What is the ECTS (European Credit Transfer System)?

The European System for calculating, assessing and accumulating student performance is a system specifically designed for students. It is based on the workload that the student must complete in order to achieve the objectives of the program of study. These objectives are primarily defined in the form of learning outcomes and the competencies that are to be acquired in the course of study.

9.1.2 What are the primary aspects of ECTS?

The ECTS is based on the general understanding that the workload for a full-time student during an academic year corresponds to a total of 60 ECTS-credits. That means that the workload for a full-time student studying in Europe comprises 1500-1800 working hours per year in most cases. For our part-time program the workload consists of 90 ECTS for the whole program which is effectuated in approximately 1,5-2 academic years.

- The workload in ECTS consists of the time that a student requires to complete a variety of learning activities, such as attending lectures and seminars (contact hours), self-study, project work, exam preparation, etc.
- Credits are assigned to all components of a program of study (e.g. modules, courses, laboratories, final project, etc.) and indicate the workload of each component in relation to the total workload that would be required in one full year of study in the appropriate program of study.
- The learning results are a set of competencies, which indicate what the students should know, understand, and be able to do at the end of a short or long learning process. Credits in ECTS are awarded to students only after the course has been completed and a corresponding evaluation of the desired learning results has been made.
- The assessment of student performance is documented via the commonly-used grading system for each local/national region. It is good practice, especially in the case of credit transfers, to include an ECTS grade. The ECTS grading scale ranks students based on a statistical distribution. Thus, statistical data on student performance is a necessary prerequisite for applying the ECTS grading scheme. Successful students can obtain the following grades: A for the best 10%, B for the next 25%, C for the next 30%, D for the next 25%, E for the next 10%. Unsuccessful course performance receives a grade F. The transcript of records need not specify the number of failed attempts.

9.2 Quality Management

The faculty of the Hector School of Engineering and Management guarantee for the quality and continual improvement of the curriculum. A number of tools are used in order to ensure the high academic and pedagogic standards defined by their members.

9.2.1 Course evaluation

After each module a written questionnaire is distributed to the participants on which they can evaluate the quality of the lectures. The main topics are:

- lecture content
- practical applicability
- interference/overlap with other lectures
- relationship/link to preceding lectures
- speed of material presentation
- extension of the lecture material
- usefulness/relevance of lecture notes
- audibility of lecturer
- blackboard, transparency structure
- preparation of lecturer
- presentation style and motivation
- willingness to answer questions

After each module the returned questionnaires are analyzed and published on the sharepoint of the HECTOR School and are discussed with lecturers and participants.

9.3 Admissions Regulations

The official " Satzung für den Zugang zu dem weiterbildenden Masterstudiengang Service Management and Engineering am Karlsruher Institut für Technologie" can be found here http://www.sle.kit.edu/amtlicheBekanntmachungen2013.php

A translated version of the "Admission Regulations" can be found on the sharepoint of HECTOR School.

9.4 General Study and Examination Regulations

The official "Studien- und Prüfungsordnung des Karlsruher Instituts für Technologie (KIT) für die weiterbildenden Masterstudiengänge Service Management and Engineering und Financial Engineering" can be found here http://www.sle.kit.edu/amtlicheBekanntmachungen2013.php

A translated version of the "General Study and Examination Regulations" can be found on the sharepoint of HECTOR School.

9.5 Fees Regulations

The official " Satzung des Karlsruher Instituts für Technologie (KIT) über die Studiengebühren für die weiterbildenden Masterstudiengänge Electronic Systems Engineering & Management, Energy Engineering & Management, Financial Engineering, Green Mobility Engineering, Management of Product Development, Production and Operations Management, Service Management & Engineering" can be found here http://www.sle.kit.edu/amtlicheBekanntmachungen2013.php

A translated version of the "Fees Regulations" can be found on the sharepoint of HECTOR School.

9.6 Change Management

Corrections regarding content and structure are listed below:

Date	Author	Page	Chapter	Change/Corrections
14.09.2011	TH	All	All	Relaunch Course Guide Book in Layout and Structure
19.09.2011	MW	10	5.1.2	Update literature
19.09.2011	MW	11 + 12	5.2.1	Update literature
19.09.2011	MW	14	5.2.2	Update literature
19.09.2011	MW	14 + 15	5.2.3	Update literature
19.09.2011	MW	25	5.5.1	Update literature: WIPO Intellectual Property Handbook – Policy, Law and Use, 2nd Ed., Geneva, 2004 Wipo Publication No. 489 (E)
19.09.2011	MW	30 - 31	6.1.2	Update literature
19.09.2011	MW	32	6.1.3	Update literature
19.09.2011	MW	33 + 34	6.2.1	Update literature
19.09.2011	MW	35	6.2.2	Update literature
19.09.2011	MW	46	6.4.2	Update literature
19.09.2011	MW	47 + 48	6.5.2	Update literature
21.02.2012	SF	26	4.3.3.	New lecturer for “Marketing”: Prof. Dr. Martin Klarmann
01.05.2012	SF	13	4.1.1.	New lecture “Introduction to Accounting and Controlling” added. Lecturer: Prof. Dr. Ir. Marc Wouters
16.10.2012	SF	17	4.2.1.	New lecturers for “Project Management and Scheduling” added. Lecturers: Dr. Silke Heine and Prof. Dr. Stefan Nickel
14.01.2013	SF	All	All	Review of entire program structure, learning results, workload and literature
01.09.2015	SF	5	2.	Second program director added.
		9	3.2.	Academic Calendar for Intake 2015 added
		11	3.5.1.	Program director added to table
		13	4.	New chapter added: Qualification Objectives Number of the following chapters changed!
		27	5.3.2.	New lecturer for “Management Accounting”

	44	6.1.4.	Renaming of lecture “Service Innovation” – NEW: “Innovation of Services”.
	51	6.3.1.	New lecturer for “Information and Knowledge Management”
	52	6.3.2.	New lecturer for “IT Aspects of mobile Businesses”
	56	7.	Adjustment of master thesis process
	57	8.	Adjustment of figures.
	63	9.3., 9.4., 9.5.	Adjustment of links.