Contents

Contact & Imprint

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

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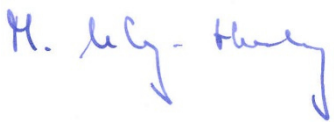
1 Foreword

Master the Financial Challenges: The Engineering Perspective makes the Difference

Assessing and controlling different types of risks are key responsibilities in the financial sector. The quality of risk management processes is a crucial factor in the success or failure of a business. Increasingly complex financial products, various regulations and the enormous importance of information technology have created a great challenge both to financial and non-financial companies. Mastering these challenges requires a thorough understanding of complex financial strategies, financial modeling ability, computational proficiency, and eventually, managerial vision.

In response to this demand, HECTOR School's Master Program in Financial Engineering offers a unique combination of familiarity to finance theory, engineering methods, management tools, mathematical and computational techniques. With its long tradition of interdisciplinary programs, the Karlsruhe Institute of Technology (KIT) provides an ideal interdisciplinary environment. Building on the long-established reputation for excellence in business engineering, the two-part program combines an in-depth knowledge and understanding of fundamental concepts in business, finance, and management on the one hand, with the latest developments in financial engineering on the other hand. With the pace of financial innovation, the need for highly qualified people trained in financial engineering also increases. A demanding career in a financial company such as an investment or commercial bank, an exchange or a rating agency would be an ideal place to work, with the abilities attained in the program. The techniques are also to the utmost benefit for candidates who pursue a career in a non-financial corporate, since the material covered is well applicable to corporate finance, and corporate risk management.

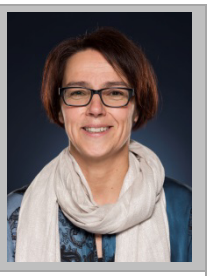
Meet us, to explore the Financial Engineering track at the Karlsruhe Institute of Technology (KIT). Join us, to acquire the tools that will guide your career path in this exciting area.

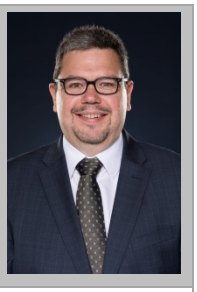


Prof. Dr. Marliese Uhrig-Homburg

Program Director of Financial Engineering

2 Program Directors

Title/ Name	Prof. Dr. Marliese Uhrig-Homburg	
Phone	+49 (0)721-608 48183	
E-Mail	***Marliese.Uhrig-Homburg@kit.edu***	
Affiliation	Institute for Finance, Banking and Insurance, KIT Endowed Chair (DZ Bank) of Financial Engineering and Derivates Postfach 6980, 76049 Karlsruhe	
Current Position	Director for Finance, Banking and Insurance, KIT	
Vita	1995 Ph.D. (Dr. rer. Pol.) Finance, Universität Mannheim 2001 Habilitation (venia legendi in Business Administration), Universität Mannheim Offers of professorships to the universities Greifswald, Ulm, Cologne and the European Business School 2002 Appointed full professor Karlsruhe Institute of Technology (KIT) 2005 – today Director for Finance, Banking and Insurance, KIT	
Fields of Interest	▪ Finance and Financial Engineering ▪ Derivative Securities ▪ Fixed income markets and term structure theory ▪ Empirical Finance ▪ Corporate Finance	
Memberships & Awards	▪ Advisory board of the German Finance Association ▪ European Finance Association (EFA) ▪ American Finance Association (AFA) ▪ European Financial Management Association (EFMA)	

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 • Member of DFG Graduiertenkolleg "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 & 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 Financial Engineering
			2. Information and Market Engineering
			3. Service Management
			4. Innovation of Services
2	EM2	Global Financial Markets	1. Global Financial Markets
3	MM1	International Project Management	1. Project Management
			2. Multi-Project Management in an International Setting
			3. Development Management
			4. Intercultural Management

# of Module	Type of Module	Name of Module	Course
4	MM2	Finance for Executives	1. Introduction to Finance and Accounting
			2. Financial Accounting
			3. Fundamentals of Finance
5	EM3	Introduction to Financial Engineering	1. Corporate Financial Engineering
			2. Tools for Financial Engineering
6	MM3	Management Accounting, Marketing and Strategy	1. Business Strategy
			2. Management Accounting
			3. Marketing
7	EM4	Advanced Financial Engineering	1. Derivatives
			2. Fixed Income
8	EM5	Advanced Risk and Asset Management	1. Advanced Risk and Asset Management
9	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 FE

3.2 Academic Calendar Intake 2015

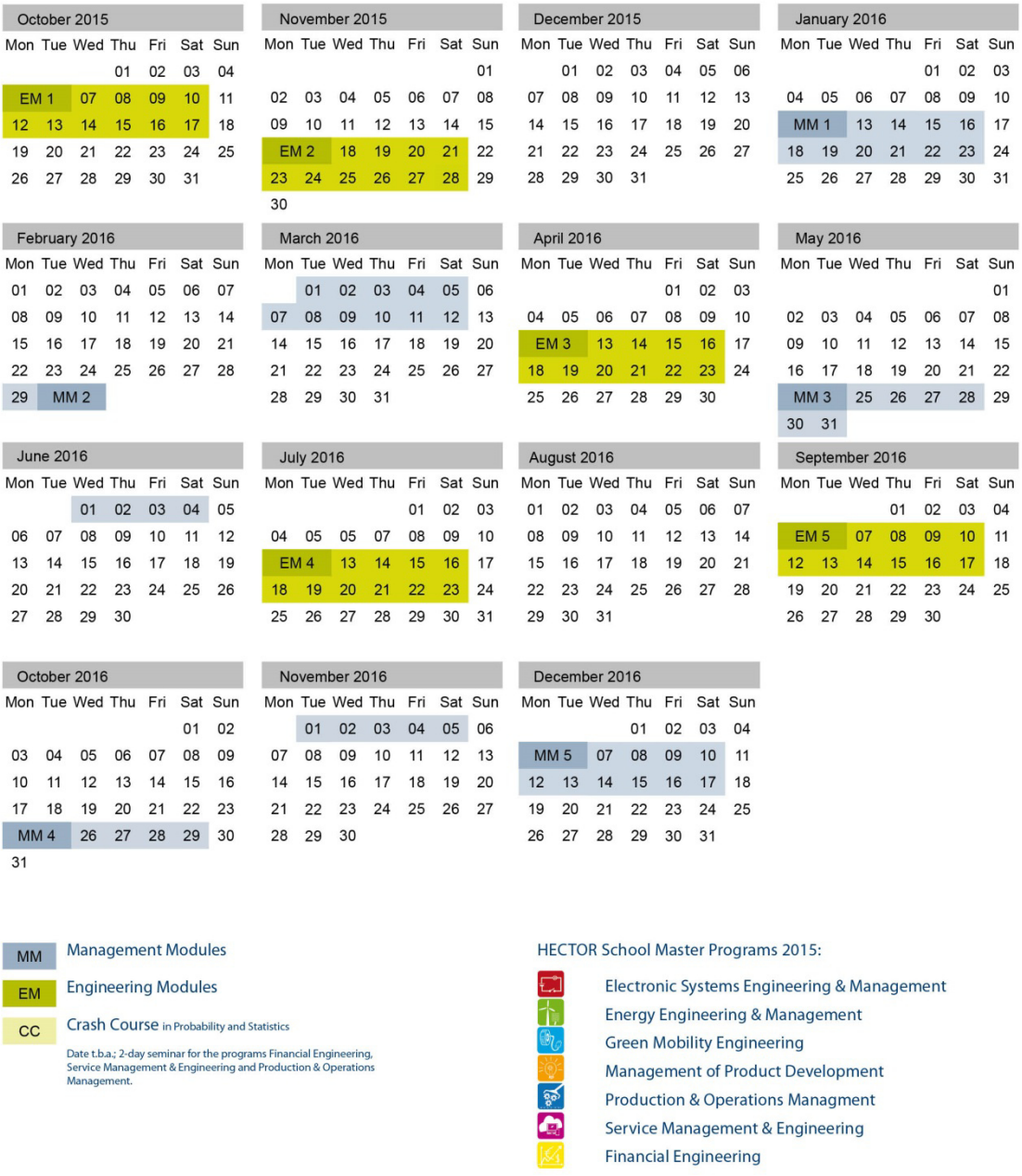


Figure 1: Academic Calendar Intake 2015

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 know-how. Therefore all programs are based on 5 Management Modules where the participants are provided with general knowledge in Finance, Accounting, Marketing, Multiproject 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
Prof. Dr. Christine Barz	Booth School of Business, University of Chicago
Dr. Michael A. Buchmann	IMTEAM Intercultural Management Team
Dr. Kerstin Fehre	Institute of Applied Business Studies and Management, KIT
Sven Jacobs	Norton Rose Fulbright LLC
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, Heilbronn
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. Marliese Uhrig-Homburg	Institute for Finance, Banking and Insurance, KIT
Module Supervisors	
Prof. Dr. Andreas Geyer-Schulz	Institute of Information Systems and Management, KIT
Prof. Dr. Martin E. Ruckes	Institute for Finance, Banking and Insurance, KIT

Name	Institute
Prof. Dr. Marliese Uhrig-Homburg	Institute for Finance, Banking and Insurance, KIT
Prof. Dr. Maxim Ulrich	Chair of Financial Economics and Risk Management, KIT
Lecturers in Alphabetical Order	
Prof. Dr. Nicole Branger	The Münster School of Business and Economics, University of Münster
Prof. Dr. Gerhard Satzger	KSRI – Karlsruhe Service Research Institute, 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 Financial Engineering

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

1. The graduates are able to thoroughly understand and analyze financial interconnections regarding their content, and optimize them. They are also able to develop innovative solutions based on fundamental economic laws, using instruments of mathematics and statistics.
2. They understand the design and further development of information markets and services. In addition, they are familiar with innovation processes and their implementation.
3. They can apply recognized financial theories, financial engineering methods, management tools, and mathematical and computational techniques and, at the same time, recognize the limits of models of economics and finance.
4. Their deep understanding of complex financial products and knowledge of capital markets enable them to meet the challenges of a globally active financial sector.
5. The graduates have an overview of the process of risk management and, using this background, are able to independently determine risks, assess them and derive recommendations for action.
6. They are further able to analyze and evaluate technological problems in the context of service management of financial products under economics aspects.
7. The graduates are able to thoroughly understand the approach in the internal and external financial reporting and to apply it in the corporate context.
8. Furthermore, they are familiar with approaches to preparing and optimizing a company's strategic decisions.
9. They have acquired in-depth knowledge of stochastics and applied game theory and can apply these under the aspect of uncertainty.
10. 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.
11. They are able to understand marketing, human resource management, and legal issues approaches in the corporate context, to recognize and evaluate interconnections and thus based on this to evaluate the effectiveness of strategies. On the basis of this analysis, recommendations for action can be derived.

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, Prof. Dr. Stefan Nickel, Dipl.-Inform. Abilio Avila
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 the course “project management and scheduling” 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: ***Robert@Landw3hr.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 in printed form</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 three written exams and a case study 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 this 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 the assignment during the course. For the course *Marketing* the performance appraisal will be based on case study presentations and a simulation game.

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 slides and 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 ▪ Essentials in Marketing Strategy ▪ Product Management ▪ Pricing ▪ Sales Management
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 in the context of product management, pricing, and sales management are discussed and participants are introduced to key tools to approach these issues. Selling "solutions" is the key context in which most of these methods are introduced.
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, cas 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	▪ Christian Homburg, Sabine Kuester, and Harley Krohmer (2009), Marketing Management: A Contemporary Perspective, New York (McGraw-Hill) ▪ Christian Homburg, 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 is build on a solid analysis of strategic decision situations. For example problems of strategic negotiating 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 participant 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 will be 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 organization, 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 are 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	
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***

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

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 provide a basic introduction of expected utility theory and its applications in insurance and asset markets. The participant 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 participant should understand the basic concepts and formal results of expected utility theory in a mathematically rigorous way. The participant should be 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	Participation during course: Written - Oral 8% Case Study: Written - Oral 8% Project Work: Written - Oral 8% Exam: Written - Oral 76%
Course Material	PowerPoint 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.
Pre-Requisites	Basic familiarity with elementary probability theory and statistics.
Teaching Method	The course structure consists of lectures, exercises and project work using all types of electronic

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<tr><td></td><td>and other multimedia devices.</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>100%</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>Course Material</td><td>Lecture notes, exercises, homework.</td></tr>
<tr><td>Literature</td><td>

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>Prof. Dr. Christiane Barz, E-Mail: Christiane.Barz@tu-berlin.de</td></tr>
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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 participant in problems and concepts of the macroeconomic and microeconomic theory. The participant cuts through the concepts and quantitative methods of the macroeconomic and microeconomic theory and is 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 participant is 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 participant gains deepened knowledge of complex under company law constructions. In the process the participant gets to know various corporate structures and understands the implications of forms of company for the risk management and for the guidelines in financial reporting. Moreover, the participant is 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 participant 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 is 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 printed 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 learns 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 sometimes depend 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 module "Information and Service Management" 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 makes participants systematically identify the difference 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 to 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 Financial 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 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, and innovative operations in service economy.

Performance appraisal

Within the first Master-specific Financial Engineering module the performance appraisal is 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 Financial Engineering

Lecturer	Prof. Dr. Marliese Uhrig-Homburg, Prof. Dr. Martin Ruckes, Prof. Dr. Maxim Ulrich
Content	Financial Engineering: Overview • Pricing of financial assets • Risk and return and their dependence on systematic and idiosyncratic risk • Corporate financial engineering to solve corporate problems
Course Objectives	The objective of the course is to introduce students to state-of-the-art challenges in financial engineering. This introduction provides a general overview, highlighting that financial engineering skills are essential for risk management, asset pricing and corporate finance.
Learning Targets/ Skills	The Participant ▪ is able to define financial engineering. ▪ understands concepts of how to value financial claims. ▪ knows how to translate financial problems into academic thinking. ▪ has insights into current practical problems in risk management, asset pricing and corporate financial engineering.
Pre-Requisites	None
Teaching Method	Lecture, discussion
Performance Appraisal	

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

Course Material	Lecture notes
Literature	None
Contact Lecturer	Prof. Dr. Marliese Uhrig-Homburg, E-Mail: ***Uhrig@kit.edu*** Prof. Dr. Martin E. Ruckes, E-Mail: ***Martin.Ruckes@kit.edu*** Prof. Dr. Maxim Ulrich; E-Mail: ***Maxim.Ulrich@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 and bidding languages. ▪ Auction theory I – single and multi-unit auctions. ▪ Auction theory II – combinatorial auctions. ▪ Reputation mechanisms. ▪ 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 four tutorials where the exercises will be used to review the presented material and enhance understanding. Additionally five 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”.
Course Objectives	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.
Learning Targets/ Skills	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.
Pre-Requisites	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.
Teaching Method	The lecture is based on slides that are distributed among participants before the lectures. Additional material is provided using the website of the lecture.

Performance Appraisal		Written	Oral
	Participation during course	-	-
	Case Study	-	-
	Project Work	-	-
	Exam	-	100%
Course Material	The lecture is based on current research material. A text book covering all of the material does not yet exist. Presentation, slides and handouts		
Literature	▪ Roth, A., The Economist as Engineer: Game Theory, Experimental Economics and Computation as Tools for Design Economics. Econometrica 70(4): 1341-1378, 2002. ▪ Weinhardt, C., Holtmann, C., Neumann, D., Market Engineering. Wirtschaftsinformatik, 2003.		
Contact Lecturer	Prof. Dr. Christof Weinhardt, E-Mail: ***Weinhardt@kit.edu***		

6.1.3 Service Management

Lecturer	Prof. Dr. Andreas Geyer-Schulz
Content	This course covers at least eight 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 the 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 participant 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	Written: Participation during course -; Case Study -; Project Work -; Exam - Oral: Participation during course -; Case Study -; Project Work -; Exam 100%
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 talking about the 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 two 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 participant has to work on case studies of service innovation, open vs. closed innovation, and learns how to leverage user communities to drive innovation, understands 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. ▪ 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.
Pre-Requisites	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.
Teaching Method	The lecture is based on slides that are distributed to the participant before the lectures. Additional material is provided using the web site of the lecture.
Performance Appraisal	

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

Course Material	The lecture is based on actual research material. A text book covering all of the material does not yet exist. Presentation, slides and handouts.
Literature	▪ 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
Contact Lecturer	Prof. Dr. Gerhard Satzger, E-Mail: ***Gerhard.Satzger@kit.edu***

6.2 Global Financial Markets

The goal of this module is to develop an understanding of global capital markets. Open up any quality newspaper and you see that global financial markets matter a great deal. Nearly all employers are directly or indirectly affected by changing market prices. On the other hand, employees and households in general hold financial assets to save for retirement. It is therefore a natural question to understand how prices are formed on stock and bond markets and how to build optimal portfolios. It is the goal of this module to shed light on both questions.

This module introduces theoretical and empirical insights to understand global financial markets. The main focus is on building valuable intuition that will turn out to be very useful for advanced courses and for the professional career. Participants will understand the main risk/ return characteristics of equity and fixed-income markets from a conceptual and empirical point of view. There are scientific reasons for why in the long-run equity beats bond investments, and why it is even more advantageous to combine both asset classes into a single portfolio. Participants will understand the main risk/ return characteristics of equity and fixed-income markets from a conceptual and empirical point of view.

Module Name: Global Financial Markets

Module Supervisor: Prof. Dr. Maxim Ulrich

Type of Module: Engineering Module 2 (EM2)

Lectures in Module	**Workload Distribution [hrs]**	
	Presence	**Self studies**
Global Financial Markets	75	165

Major Learning Results (LR):

LR-1: Knowledge of how to build optimal investment portfolios.

LR-2: Knowledge of why risks should be part of a portfolio, while others should be eliminated.

LR-3: Gaining a solid understanding of what moves equity and fixed income markets.

Performance appraisal for this Module:

Within the second Master-specific Module in Financial Engineering the performance appraisal consists of a written exam with varying components of class room participation and project work.

Credit Points: 8

6.2.1 Global Financial Markets

Lecturer	Prof. Dr. Maxim Ulrich
Content	The course covers the following topics: risk and return, equity premium, portfolio management (Markowitz), predicting equity returns, CAPM, Fama and French 3-factor model, Efficient Market Hypothesis, diversification, no arbitrage, performance measurement, bond pricing, term structure of interest rates, interest rate risk, duration, relative value trades in fixed-income markets, inflation-indexed bonds, Taylor rule, Federal Reserve.
Course Objectives	The main objective of this course is to develop an understanding of global capital markets. Participants will understand the main risk/ return characteristics of equity and fixed-income markets from a conceptual and empirical point of view. There are scientific reasons for why in the long-run equity beats bond investments, and why it is even more advantageous to combine both asset classes into a single portfolio. It is the objective of this course to shed light on these scientific reasons.
Learning Targets/ Skills	After successful completion of this course, the participant will ▪ know how to build optimal investment portfolios. ▪ know why some risks should be part of a portfolio, while others should be eliminated. ▪ has a solid understanding of what moves equity and fixed-income markets.
Pre-Requisites	None
Teaching Method	This course offers a case-based introduction to global financial markets. The case method creates an interactive environment and invites students to actively participate during class.
Performance Appraisal	Participation during course: Written -, Oral 10% Case Study: Written 30%, Oral - Project Work: Written 20%, Oral 20% Exam: Written 40%, Oral - The exam will be partially oral and written. The overall grade can include other assignments such as submitted exercises and class participation. The exact performance appraisal will be announced before the beginning of the course.
Course Material	Course reader, handouts, case studies, slides
Literature	Will be provided as a course reader
Contact Lecturer	Prof. Dr. Maxim Ulrich, E-Mail: ***Maxim.Ulrich@kit.edu***

6.3 Introduction to Financial Engineering

This module introduces and applies essential financial engineering tools to applications from corporate finance and quantitative asset/ risk management. For the corporate finance applications, this module teaches how managers may optimize the financing structure and the dividend policy of firms. For the asset/ risk management application, the module conveys essential quantitative and computational tools to build superior forecasting models for expected returns and risks of equity and fixed-income investments.

Module Name: Introduction to Financial Engineering

Module Supervisor: Prof. Dr. Martin E. Ruckes

Type of Module: Engineering Module 3 (EM3)

Lectures in Module	**Workload Distribution [hrs]**	
	Presence	**Self studies**
Corporate Financial Engineering	37,5	82,5
Tools for Financial Engineering	37,5	82,5

Major Learning Results (LR):

LR-1: Qualification to evaluate complex real economic and financial investment problems.

LR-2: Qualification to manage financial product portfolios.

LR-3: Qualification to identify and evaluate cost-effective financing alternatives.

LR-4: Qualification to map out business financing structures.

LR-5: Qualification to apply quantitative tools to model risk and return characteristics.

LR-6: Qualifications to set-up computational models to predict returns.

LR-7: Qualifications to solve quant finance problems with modern software.

Performance appraisal for this Module:

Within the third Master-specific Financial Engineering module the performance appraisal comprises of one combined oral exam as well as problem sets and project work.

Credit Points: 8

6.3.1 Corporate Financial Engineering

Lecturer	Prof. Dr. Martin Ruckes
Content	Successful investment is critical to any firm. This course discusses how complex investment projects can be analyzed and evaluated. This includes the purchase of shares of another firm or the acquisition of an entire firm. Further, the course provides the methodological tools to analyze and optimize the financing structure and dividend policies of firms. All concepts are applied to real world situations.
Course Objectives	▪ Thorough knowledge of valuation models. ▪ Application of valuation models to corporate investments and mergers and acquisitions. ▪ Thorough knowledge of financial structure and payout policy models. ▪ Application of financial structure and payout policy models to complex investments and firms as a whole.
Learning Targets/ Skills	The Participant gains competencies for the analysis and evaluation of complex projects as well as the analysis and optimization of the pattern of finance of major projects and means of finance of businesses.
Pre-Requisites	Completion of the MM 2 course “Fundamentals of Finance”.
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	-	50%
Case Study	-	-
Project Work	-	-
Exam	-	50%

Course Material	Lecture notes and case studies.
Literature	▪ Titman, S. and J.D. Martin: Valuation, 3rd ed., Prentice Hall, 2010 ▪ Berk, J. and P. DeMarzo, 3rd ed., Prentice Hall, 2010
Contact Lecturer	Prof. Dr. Martin E. Ruckes, E-Mail: ***Martin.Ruckes@kit.edu***

6.3.2 Tools for Financial Engineering

Lecturer	Prof. Dr. Maxim Ulrich
Content	The key to success in quantitative risk and asset management is the combination of sound financial economics intuition and quantitative/ computational tools. This course focuses on the latter. It teaches quantitative/ computational tools that are essential for practical risk and asset management applications. In addition to quantitative tools, students will also learn essential empirical and numerical skills. A brief and hands-on introduction to Matlab will be part of the course.
Course Objectives	The course objective is three-fold. First, participants are expected to learn how to solve linear ordinary and stochastic differential equations. Second, participants are trained on how to empirically set-up and implement forecasting models for expected asset returns and risks. Third,

<table>
<tr><td></td><td>participants are introduced to numerical tools and gain exposure to Matlab.</td></tr>
<tr><td>Learning Targets/ Skills</td><td>After successful completion of this course, participants will know how to:
analytically solve differential equations
set-up and estimate regression-type forecasting models
estimate yield curve and multi-factor equity models
use Matlab for implementing numerical and empirical algorithms.</td></tr>
<tr><td>Pre-Requisites</td><td>Successful completion of the course “Introduction to Global Financial Markets” (EM2).</td></tr>
<tr><td>Teaching Method</td><td>The course aims for a dynamic and interactive class environment. Discussions, exercises, cases, lectures, and computer work build the basis for this course.</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>10%</td></tr><tr><td>Case Study</td><td>20%</td><td>-</td></tr><tr><td>Project Work</td><td>30%</td><td>-</td></tr><tr><td>Exam</td><td>40%</td><td>-</td></tr></table></td></tr>
<tr><td>Course Material</td><td>Course material will be provided in a separate course reader.</td></tr>
<tr><td>Literature</td><td>Provided in a separate course reader.</td></tr>
<tr><td>Contact Lecturer</td><td>Prof. Dr. Maxim Ulrich, E-Mail: Maxim.Ulrich@kit.edu</td></tr>
</table>

5.4 Advanced Financial Engineering

The module “Advanced Financial Engineering” provides a unifying approach to the pricing of derivative securities. Moreover, the most important concepts pertaining to term structure modeling are discussed and participants are introduced to the efficient use and implementation of pricing and risk management methods on derivative and fixed income securities markets. The participants develop an understanding of the underlying evaluation theory, realize its limitations, and apply economic and mathematical approaches to analyze and understand financial products. Tools of risk management enable the participants to carry out major risk assessments and sensitivity analyses. They learn how to use computer-assisted methods for implementation of evaluation and risk management methods. During the course on “Derivatives”, they thoroughly cope with financial and derivative markets, study static and dynamic trading strategies and conceive option price theory as a central approach to assessing derivative instruments. During the course on Fixed Income, the participants get acquainted with the central concept of yield curve, apply option price theory to assess interest derivatives and acquire the ability of managing interest change risks.

Module Name: Advanced Financial Engineering

Module Supervisor: Prof. Dr. Marliese Uhrig-Homburg

Type of Module: Engineering Module 4 (EM4)

Lectures in Module	**Workload Distribution [hrs]**	
	Presence	**Self studies**
Derivatives	37,5	82,5
Fixed Income	37,5	82,5

Major Learning Results (LR):

LR-1: Skills of evaluating derivative securities.

LR-2: Skills of evaluating risks and carrying out sensitivity analyses.

LR-3: Skills of implementing evaluation and risk management methods.

LR-4: Skills of assessing static and dynamic trading strategies by means of option price theory.

Performance appraisal for this Module:

Within the second Master-specific Module in Financial Engineering the performance appraisal consists of oral and written exams with varying components of class room participation and project work. The exam for the lectures *Derivatives* and *Fixed Income* will be combined.

Credit Points: 8

6.4.1 Derivatives

Lecturer	Prof. Dr. Marliese Uhrig-Homburg
Content	Introduction to derivatives: Forwards, futures, options, exotic derivatives, no-arbitrage pricing, equilibrium pricing. Forwards and futures: Valuation of forward contracts, forward and futures prices, marking to market, delivery options. Options: Fundamental properties of option prices, binomial model, Black-Scholes model and extensions. Financial engineering with derivatives: Greeks, delta hedging, risk management with derivatives.
Course Objectives	The knowledge of how derivatives can be analyzed and priced is essential for any practitioner working in modern quantitative finance. Since markets are still evolving and more and more complex and exotic derivatives are traded, the course also concentrates on tools for handling these instruments. Furthermore, the management of risks present in financial markets can be crucial for both financial and non-financial institutions.
Learning Targets/ Skills	The Participant ▪ gains a comprehension of pricing in derivate markets. ▪ has competencies in the application of the derivate know-how for risk management purposes.
Pre-Requisites	▪ Successful participation in MM1 and in MM2 ▪ Knowledge of modules EM 1-2 is strongly recommended
Teaching Method	The course structure consists of lectures as well as accompanying exercises, cases and homework.
Performance Appraisal	Participation during course: Written - / Oral 30% Case Study: Written - / Oral - Project Work: Written - / Oral 20% Exam: Written 50% / Oral -
Course Material	Textbooks, presentation slides and handouts.
Literature	▪ Hull, John C. (2012): Options, Futures and Other Derivatives; 6th Edition, Prentice-Hall ▪ Björk, T. (2004): Arbitrage Theory in Continuous Time, Seond Edition, Oxford Finane. ▪ Clewlow, L, Strikland, Ch. (2001): Implementing Derivatives Models, London.
Contact Lecturer	Prof. Dr. Marliese Uhrig-Homburg, E-Mail: ***Uhrig@kit.edu***

6.4.2 Fixed Income

Lecturer	Prof. Dr. Nicole Branger
Content	Fixed income securities: Bond markets, fixed income derivatives (bond futures, forward rate agreements, swaps, interest rate options).

<table>
<tr><td></td><td>Term structure of interest rates: Equivalent descriptions of the term structure of interest rates, volatility structure, dynamics of the term structure of interest rates.

Interest rate risk management: Duration, Convexity, Delta-hedging.

Specific pricing models: Black model, factor models, spot-rate models, forward-rate models (HJM), market models (LIBOR, Swap).</td></tr>
<tr><td>Course Objectives</td><td>Interest rate risk is an important risk factor in the market. To work in the fixed income market, students should have a sound knowledge both of the instruments traded in this market, and of the models used to price and hedge these instruments.</td></tr>
<tr><td>Learning Targets/ Skills</td><td>The Participant acquires

▪ competencies for measuring, evaluating and controlling of risks by changes in interest rates using dynamic interest modules.

▪ competencies for evaluating numeric procedures.</td></tr>
<tr><td>Pre-Requisites</td><td>▪ Successful participation in MM1 and MM2

▪ Knowledge of Module EM 1 is strongly recommended

▪ Knowledge of basic concepts presented in the Derivatives course is required</td></tr>
<tr><td>Teaching Method</td><td>The course structure consists of lectures as well as accompanying exercises, cases and homework.</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>20%</td></tr>
<tr><td>Exam</td><td>60%</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>Course Material</td><td>Textbooks, presentation slides and handouts.</td></tr>
<tr><td>Literature</td><td>▪ Sundaresan, Suresh (2009): Fixed Income Markets and Their Derivatives; 2nd edition, South-Western

▪ James, Jessica; Webber, Nick (2000): Interest Rate Modeling; John Wiley & Sons Ltd</td></tr>
<tr><td>Contact Lecturer</td><td>Prof. Dr. Nicole Branger, E-Mail: Nicole.Branger@wiwi.uni-muenster.de</td></tr>
</table>

6.5 Advanced Risk and Asset Management

The objective of this module is to bring participants to the frontier of modern risk and asset management. A significant part of the module will be on implementing advanced risk and asset management concepts with modern software. Students will therefore combine recently found empirical patterns with new advances in investment theory to build superior risk-return strategies.

Module Name: Advanced Risk and Asset Management

Module Supervisor: Prof. Dr. Maxim Ulrich

Type of Module: Engineering Module 5 (EM5)

Lectures in Module	**Workload Distribution [hrs]**	
	Presence	**Self studies**
Advanced Risk and Asset Management	75	165

Major Learning Results (LR):

LR-1: Understanding of current methods for superior risk and return analysis.

LR-2: Hands-on experience in implementing advanced risk and asset management applications with modern software.

LR-3: Combination of theoretical and empirical insights to develop one's own investment strategies and to back test their performance.

Performance appraisal for this Module:

Within the fifth Master-specific Module in Financial Engineering the performance appraisal is based on oral exams containing varying components of class room participation.

Credit Points: 8

6.5.1 Advanced Risk and Asset Management

Lecturer	Prof. Dr. Maxim Ulrich
Content	This course surveys recent trends in risk and asset management. It builds on the contents from EM2 and on the empirical tools from EM3 and puts them at work for state-of-the-art academic and industry problems. Return characteristics of different asset classes will be re-visited with the modern stochastic discount factor approach. We will study return anomalies and search for variables that help us predict asset returns. Moreover, we will discuss new developments in theory and practice of portfolio and risk management.
Course Objectives	The objective of this course is to bring students to the frontier of quantitative risk and asset management. While that frontier contains many exciting topics, we will mainly focus on how to build investment portfolios with superior risk/ return characteristics and greater chance of outperformance.
Learning Targets/ Skills	The Participant ▪ knows current trends and developments in theory and practice of risk and asset management. ▪ is able to combine theoretical and empirical know-how to improve the practice of risk and asset management. ▪ implements independent investment research.
Pre-Requisites	Successful completion of the course “Introduction to Global Financial Markets” (EM2) and “Tools for Financial Engineering” (EM3).
Teaching Method	The course aims for a dynamic and interactive class environment. Lectures, practice sessions, group discussions and computer work are the main media through which knowledge is revealed.
Performance Appraisal	<table><tr><th></th><th>Written</th><th>Oral</th></tr><tr><td>Participation during course</td><td>-</td><td>10%</td></tr><tr><td>Case Study</td><td>30%</td><td>-</td></tr><tr><td>Project Work</td><td>40%</td><td>-</td></tr><tr><td>Exam</td><td>20%</td><td>-</td></tr></table>The exam will be either oral or written. The overall grade can include other assignments such as submitted exercises and class participation. The exact performance appraisal may differ from the above description and will be announced before the beginning of the course.
Course Material	Course material will be provided in a separate course reader.
Literature	Provided in a separate course reader.
Contact Lecturer	Prof. Dr. Maxim Ulrich, E-Mail: ***Maxim.Ulrich@kit.edu***

7 Master Thesis Financial 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 a 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 Financial 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
06.09.2011	EH	All	All	Relaunch Course Guide Book in Layout and Structure
07.09.2011	EH	3	3.	Update vita Prof. Uhrig-Homburg according to *http://derivate.fbv.kit.edu/Mitarbeiter_Uhrig-Homburg.php*
15.09.2011	MW	10	5.1.2	Update literature
15.09.2011	MW	11 + 12	5.2.1	Update literature
15.09.2011	MW	14	5.2.2	Update literature
15.09.2011	MW	14	5.2.3	Update literature
15.09.2011	MW	25	5.5.1	Update literature
15.09.2011	MW	37	6.3.2	Update literature
15.09.2011	MW	42	6.4.1	Update literature
15.09.2011	MW	44	6.5.1	Update literature
25.01.2012	JE	Div	Div	Neue Modulbeschreibungen, Präzisierung der Modulkompetenzen für EM 1-5 im Rahmen der generellen Auflagenbearbeitung eingefügt.
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”.
		46	6.2.	Adjustment of introductory text.
		56	7.	Adjustment of master thesis process

Date	Author	Page	Chapter	Change/Corrections
		57	8.	Adjustment of figures.
		63	9.3., 9.4., 9.5.	Adjustment of links.