

Executive Master Program Financial Engineering



Master Program Schedule

The Master Programs are designed for working professionals. Intermittent periods of lectures are scheduled to allow participants to continue with demanding careers while acquiring new skills.

The programs lasts over a period of 18 - 20 months. They are divided into ten intensive modules of 14 days, each alternating with monthly breaks. The programs are completed with a masters thesis.

The primary goal of our programs 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 as well as requires economical accountability and Human Resource Management know-how.

The engineering emphasis is laid on 5 Modules adapted to each specialization. The lectures provide insight into the newest research topics and convey current and state of the art methodology necessary to master the scope of innovative technologies.

The following timetable shows the schedule for the Master Intake 2013. Current programs are also available depending on open places.

March 2013							April 2013							May 2013							June 2013							
Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	
				01	MM 1		01	02	03	04	05	06	07			01	02	03	04	05						01	02	
04	05	06	07	08	09	10	08	09	10	11	12	MM 2		06	07	08	09	10	11	12	03	04	05	06	07	08	09	
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25	26	27	28	29	30	31	29	30						27	28	29	30	31			24	25	26	27	28	29	30	
July 2013							August 2013							September 2013							October 2013							
Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	
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November 2013							December 2013							January 2014							February 2014							
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				01	EM 3								01			01	02	03	MM 4								01	02
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							30	31																				
March 2014							April 2014							May 2014							June - September 2014							
Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Master Thesis (company project): June - September 2014							
					01	02			01	02	03	04	05	06			01	02	03	04								
03	04	05	06	07	08	09	07	08	09	10	11	12	13	05	06	07	08	09	MM 5									
10	11	12	13	14	15	16	14	15	16	17	18	19	20	12	13	14	15	16	17	18								
17	18	19	20	21	22	23	21	22	23	24	25	26	27	19	20	21	22	23	24	25								
24	25	26	27	28	EM 5		28	29	30					26	27	28	29	30	31									
31																												

MM Management Modules EM Engineering Modules



Financial Engineering

Financial Engineering provides innovative solutions for pricing, hedging, trading, and portfolio management problems by employing advanced mathematical methods and computer technology.

In recent years, few disciplines have developed the way Financial Engineering has. The noteworthy progress in the theory of finance, together with the development of innovative financial tools, provided the means to find solutions for well-known problems in finance. The advancements can be found in the areas of design, analysis, and pricing of financial instruments which are essential to investment policies and the risk management process of both financial and non-financial companies.

The aim of the Master Program in Financial Engineering is to prepare graduates to perform executive functions in the area of finance. The courses should enable graduates to develop and implement innovative solutions for problems in Financial Engineering based on both solid knowledge of finance theory and mathematical methods.

The focus lies not only on problem solving of present problems, but in the analysis and solution techniques necessary to solve those that have yet emerged due to rapid changes in the markets. With this in mind, this interdisciplinary program composed of management, finance, operations research, and applied computer science has been established.

The Karlsruhe Institute of Technology (KIT) has a long tradition of finance and capital markets research in the Faculty of Economics and Business Engineering. For over 20 years, its faculty members, have successfully hosted the Finance, Banking and Insurance Symposium which attracts a large international audience.

Recently, the field has been strengthened through a new endowment professorship for 'Financial Engineering and Derivatives'. The Karlsruhe Capital Market Database, managed by the faculty, offers an excellent basis for empirical capital market research. The orientation of methods is a further strength of the faculty which is fundamental in many areas of Financial Engineering: the faculty analyzes stochastic and econometric models of financial markets, and applies stochastic methods of operations research and game theory to financial problems. Further, the faculty is knowledgeable of electronic markets research and platform design, which are important in understanding the many developments in Financial Engineering.



Prof. Dr. Marliese Uhrig-Homburg
Head of Institute of Financial, Banking and Insurance (FBV)
Program Director Financial Engineering (FE)



Content Management Modules

The aim of the 5 Management Modules (MM) is to provide profound knowledge and understanding of the fundamental concepts which are essential for every successful manager.

- MM 1 Accounting & Controlling: Financial Accounting | Management Accounting
- MM 2 International Project Management: Project Management & Scheduling | Information and Process Modelling | Multiproject Management in an International Setting | Development Management | Intercultural Management | Project Risk, Change and Profit Management
- MM 3 Finance & Marketing: Fundamentals of Finance | Marketing | Marketing & Business Strategy | Intercultural Communication
- MM 4 Stochastic & Games: Stochastic Models and Optimization | Applied Game Theory | Simulation and Case Studies
- MM 5 Law & Contracts: International Intellectual Property Law | Decisions, Contracts, Markets and Trade | International Law - The Law of Business Organizations

MM 1: Accounting & Controlling

Accounting focuses on measuring, processing and communicating information. In this course the concepts of both financial and managing accounting are covered, providing a powerful framework which supports participants in making successful business decisions. Particular emphasis is placed upon the implementation of new technologies in the current business environment and the analysis of real world business cases and relevant business practices.

MM 2: International Project Management

International Project Management is a key to the world of business. In order to become fully acquainted with this important discipline the module aims to help the participants to understand the objectives of project management and scheduling, to learn how to analyse planned projects and to control project execution. Particular attention is paid to the construction of project networks and Gantt charts, heuristic solution procedures and rescheduling as well as the completion of temporal and resource-constrained project scheduling computations. Modelling, planning and scheduling, which arise in a great variety of practical situations, are also emphasized.

MM 3: Finance & Marketing

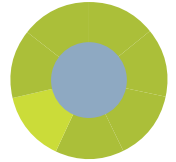
This module is comprised of two of the most important issues in management: Fundamentals of Finance and Marketing. The former addresses two fundamental financial questions, which are central to corporate and private investment: how to raise capital and how to invest it. Marketing focuses on creating optimal interaction between interest groups (e.g. company and customers, authorities and citizens, political parties and voters).

MM 4: Stochastic & Games

The module presents advanced techniques in modeling and analyzing stochastic systems and strategic decision problems as well. The module will enable the students to get a better understanding of stochastic phenomena, and, in particular, to use this knowledge in making decisions under uncertainty, where uncertainty can arise either from "nature" or from playing against conscious opponents ("strategic uncertainty").

MM 5: Law & Contracts

This module comprises both economics and legal sections. In the economics section, a groundwork is laid through introducing decision theory, expected utility, risk and ambiguity, bargaining and basic incentive theory. In addition, fundamental problems regarding world economics are discussed, for example stagnation and economic growth, unemployment and international division of labor, and harmonization of the international monetary system. The legal section is divided into lectures about the law of business organizations and lectures about international patent, trademark and copyright law.



Content Engineering Modules

- EM 1 Information and Service Management: Information and Market Engineering | Service Management | Service Innovation
- EM 2 Financial Management: Modern Theory of Investment | Corporate Financial Engineering
- EM 3 Quantitative Methods in Finance: Financial Econometrics | Stochastic Calculus and Introduction to Mathematical Finance
- EM 4 Fixed Income and Derivative Securities: Derivatives | Fixed Income Securities | Computational Finance
- EM 5 Risk Management: Insurance, Risk Analysis & Asset Liability Management | Credit Risk & Operational Risk

EM 1: Information & Service Management Information & Market Engineering

Participants learn to comprehend, to enhance, and to evaluate the design potentials of electronic market platforms in their entirety. They learn to organize their integration into traditional business processes as well as into innovative dynamic (supply) networks and to develop and implement solutions to interdisciplinary questions.

Service Management

The targets of this course are for participants to understand the structure and nature of information markets and services and to evaluate the conduct of market participants and information providers and consumers.

Service Innovation

Participants will discuss the state of research, compare product and service innovation and understand how innovation diffusion works. Furthermore they will examine case studies of service innovation, open vs. closed innovation, how to leverage user communities to drive innovation, understand obstacles and enablers and how to manage, incentivize and foster service innovation.

EM 2: Financial Management

Modern Theory of Investment

Participants are expected to gain fundamental insights into the valuation of risky investments and the valuation of firms. They will be capable at applying their knowledge to real world problems. The importance of market efficiency and the role of signaling should become clear.

Corporate Financial Engineering

Financial Engineering is the backbone for innovative financial solutions and products. Participants will learn that financial pro-

duction follows from strong theorems in finance. Applications to equities, debt and securitization, and financial processes are common in practice.

EM 3: Quantitative Methods in Finance Financial Econometrics

The course objective is to provide participants with an introduction to econometrics of financial markets including modern issues such as predictability of asset returns, market micro structure, multi-factor pricing models and estimation of the term structure of interest rates. The participants will learn the basis of analysis, estimation and forecasting of financial time series and their application to financial risk assessment.

Stochastic Calculus and Introduction to Mathematical Finance

The lecture aims on developing a theoretical basis for understanding Arbitrage Pricing Theory and its application to valu-

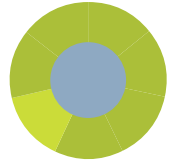
ation and replication of financial instruments. Participants will learn to evaluate and hedge financial contracts using Arbitrage Pricing Theory and apply it to asset and derivative pricing.

EM 4: Fixed Income & Derivative Securities Derivatives

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.

Participants will become familiar with financial and derivatives markets, understand the pricing of derivatives, and learn how to manage risk in these markets.





Fixed Income Securities

Interest rate risk is an important risk factor in the market. To work in the fixed income market, participants should have a sound knowledge both of the instruments traded in this market, and of the models used to price and hedge these instruments.

After this class, participants will know about the different interest rates and about the main interest rate derivatives. They will know how they can use these instruments to hedge interest rate risk. Furthermore, they should be familiar with the most important interest rate models that are used for pricing and hedging of interest rate contingent claims.

Computational Finance

For many problems in pricing and risk management, closed form solutions are not available, but one has to use numerical methods. For a practitioner, it is thus crucial to know how to handle and implement these techniques and derive fast and efficient solutions. The efficient use and implementation of pricing and risk management methods on derivative and fixed income securities markets will be the main targets in this course.

EM 5: Risk Management

Insurance, Risk Analysis and Asset Liability Management

Contents of the course will be identification and valuation of risks in economic organization, quantitative methods for risk management and its implementation, and stochastic simulation of risk portfolios, and the consequences of activities for risk reduction. The participants are expected to identify, evaluate and control risks with quantitative methods, and to understand modern risk management techniques.

Credit Risk and Operational Risk

The course objective is to provide participants with thorough knowledge of the structure of credit risk and operational risk in the context of their dependence. Participants will be expected to assess, model, forecast, and possibly hedge these financial risks. They will learn to model, evaluate and hedge two of the major sources of financial risk: credit and operational risk.



Your Notes:

Keyfacts of our Master Programs

HECTOR School Master Programs

Energy Engineering & Management (EEM)
Embedded Electronic Systems Engineering (ESE)
Financial Engineering (FE)
Green Engineering Mobility (GME)
Management of Product Development (MPD)
Production & Operations Management (POM)
Service Management & Engineering (SME)

Academic Degree

Upon successful completion of the Master Program participants will be awarded a Master of Science (M.Sc.) degree of the Karlsruhe Institute of Technology (KIT).

Language

The programs are taught in English. Foreign students are encouraged to take advantage of supplementary courses (for example German language classes).

Program Structure

The programs are run on a part-time basis with a program duration of 18 months. They are divided into 10 teaching units of 2 weeks, so called modules. The Masters Thesis (4-6 months) is designed as an industrial project supervised by the KIT.

Admission Requirements

- First university degree: e.g., Bachelor, Diploma (Uni/FH/BA)
 - 3 years of relevant work experience with according references
 - TOEFL score of at least 100 iBT-based or equivalent test
 - Optional: GMAT, GRE or HECTOR School Assessment
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Cost

Tuition fees for one entire Master Program are 30.000 €.

Service

The Master Programs are embedded into the environment of the International Department GmbH which also provides services like extra-curricula lectures, excursions as well as an attractive living and working environment.

Program Start

Intake 2013: March 04, 2013
Intake 2014: September 2014

Program starts are every 18 month in March/September. For individual solutions (e.g. schedules) please contact our program consultancy.

The Master Program is accredited by



PEOPLE | POTENTIAL | PERSPECTIVE



HECTOR SCHOOL OF ENGINEERING AND MANAGEMENT

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