

Engineering Modules (EM)

State-of-the-Art for Financial Companies & Corporate Finance Departments



EM 1: Information & Service Management

Nowadays, service markets are characterized by a strong interrelation with information service management due to the original set-up of service markets. The overall objective of the module is therefore to provide fundamentals of market engineering with an emphasis on the design and the further development of information markets and services.

The module enables participants to understand and analyze business innovation & adaption processes and thus learn about, among other things, innovation diffusion. Innovation driver analysis helps participants to systematically identify the difference between invention and innovation.

Since the structure of information markets is also discussed, participants are able to develop an understanding of how market actors operate. In addition, consideration of service competition as a business strategy helps participants structure the impact of service competition on the design of businesses, markets, products, processes, and services.

EM 2: Global Financial Markets

Open up any quality newspaper and you will 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 hold financial assets to save for retirement. It is therefore natural to want 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 later be very useful for advanced courses and for one's 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 equity beats bond investments in the long-run, and why it is even more advantageous to combine both asset classes into a single portfolio.

EM 3: Valuation & Financial Analytics

Financial Engineering is an important component of quantitative finance and risk & asset management.

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

EM 4: Advanced Financial Engineering

This module provides a unified 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. Risk management tools enable the participants to carry out major risk assessments and sensitivity analyses. They learn how to use computer-assisted methods for the 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 a yield curve, apply option price theory to assess interest derivatives and acquire the ability to manage interest change risks.

EM 5: Risk Management

In this module, risk management is introduced through the following process aspects: risk analysis, risk sensitiveness, risk assessment, and risk rating regarding the economic and financial risks of an organization.

The graduates will be familiar with approaches to the dynamic optimization of risk-return profiles that are, for example, of importance to asset management in insurance companies or investment funds. Additionally, they will be acquainted with the possibilities of engineering contracts for the transfer of selected risks and learn that trading with such tools is an important risk management strategy.

During the courses on insurance, risk analysis and asset liability management, and credit risk and operational risk, the participants thoroughly cope with all these aspects of risk management and the limitations of the relevant methods. Hence, they are well prepared for career paths in e.g., banks, capital investment companies, insurance companies, consulting firms, and finance departments in large industrial enterprises in Germany and abroad.



Engineering Modules

EM 1: Information & Service Management

Courses: Introduction to Financial Engineering
Digital Transformation of Service Systems
Innovation of Services
Information & Market Engineering

EM 2: Global Financial Markets

Courses: Financial Prototyping with Python
Managing Equity Risk
Managing Fixed Income Risk

EM 3: Valuation & Financial Analytics

Courses: Corporate Financial Engineering
Tools for Financial Engineering

EM 4: Advanced Financial Engineering

Courses: Derivatives
Fixed Income

EM 5: Risk Management

Courses: Financial Modeling with Python
Financial Econometrics
Machine Learning for Risk and Asset Management



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