Executive Master Program
Production & Operations Management

Technology + Management
The HECTOR School of Engineering & Management offers **seven Executive Master Programs**. The HECTOR School – named after Dr. Hans-Werner Hector, one of the co-founders of the software company SAP – is the **Technology Business School of the Karlsruhe Institute of Technology (KIT)**.

The Master Programs are **more than typical MBA programs**, because they combine management with engineering topics. The primary goal is to enable professionals to take a holistic approach when managing highly interdependent processes and to be aware of the latest state of technology in the respected field of expertise.

All programs share **five Management Modules**, providing the participants with general **leadership know how for engineers**: knowledge in Finance, Accounting, Marketing, Business Strategy, International Project Management and Intellectual Property Rights. On this basis they can consider commercial implications of business decisions. Workshops and case studies allow ample opportunity to explore the direct application of the know-how, simulating the real business environment.

Essential part of the HECTOR School is the part-time philosophy of its Master Programs. Intermittend periods of lectures are scheduled to allow participants to **continue with demanding careers** while acquiring new skills & knowledge.
Master Program
Production & Operations Management

Production technology and supply chain topics shape the future of the manufacturing industry in this world. Fundamental concepts are conveyed for the analysis, design and realization of innovative concepts for operations management (e.g. Industry 4.0) and also for methods of screening the performance of a manufacturing industry.

Graduates of the Master Program Production & Operations Management (POM) are able to analyze and optimize the efficiency of value-added processes within the operation of production and service systems. They can understand and analyze service and production processes, capture and formally describe requirements, frame boundary conditions and targets and achieve a targeted improvement by means of the skills they acquired in the Master Program concerning production management with special focus on production processes, information technology, logistics and human resources as well as on the technical methods and tools required.

The graduates are familiar with state-of-the-art concepts and methods and are able to apply those problem-oriented and further them. Methods and techniques in conjunction with decision making are especially focused on in Operations Management.

In addition, graduates can identify the possibilities and limitations of formal methods and models as well as the challenges that represent the transmission between the modeled world and reality and handle them in a solution-driven way. Given that nowadays in production and logistics the flow of data, products and money are closely interconnected, graduates are able to solve problems taking into account these tree factors and multi-disciplinary solution approaches.

Join us to acquire the tools that will guide your career path in this exciting field of production and operations.

Prof. Dr.-Ing. Kai Furmans
Academic Director HECTOR School
Program Director Production & Operations Management
Head of the Institute of Material Handling & Logistic Systems, former endowed chair of Logistics H. Hübner Foundation, Karlsruhe Institute of Technology (KIT)
Introduction Production and Operations Management

Industrial management and engineering is of holistic character. So far, industrial engineering has been aimed at integrating man, material, equipment, and funds in production systems. Now, activities also focus on the IT and technology infrastructure to control complex systems. Hence, the industrial engineer concept was enlarged from an “efficiency expert” and “productivity expert” by the concept of a “knowledge worker”.

Today, industrial engineering also deals with the development, optimization, installation, and management of holistic systems, consisting of man, materials, and infrastructure, for any type of production or service. This module enables graduates to understand all necessary concepts and underlying methods of industrial management.

Methods of Operations Management

The ever-growing integration and globalization of production structures lead to an increasing importance of logistics for cost and performance development in operations networks. The design phase of products and processes is followed by the operations phase. Consequently, module EM3 focuses on the further development of the corresponding skills and competences in this field.
Participants are to enhance their knowledge in order to be able to understand production and supply chain management taking into account human resources.

At the same time, mapping of the physical world onto the world of controlling has to be understood. On this basis, this module concentrates on applying the lessons learned as well as on the further development of the methodology and its integration in the teamwork at the production company.

Networks of Supply & Production Systems

Today’s competitive environment regarding supply chains has dramatically changed. Emerging economies such as China have become key players and have changed the view on modern network systems. Supply Chain Management plays a key role in Production and Operations Management. Having understood the individual objects in the added value chain, these have to be combined in the supply chain. This includes the internationalization of processes of values added, their distribution to physical and dispositive processes as well as methods for their planning and control.

For this purpose, new models have to be generated and existing models have to be further developed and adapted. Multidisciplinary analysis of the production logistics point of view and its mathematical modeling are of particular significance. In this way, the participants can derive profound statements relating to the performance of novel network structures.

Production and Distribution Systems

In the final engineering module participants will be introduced to comprehensive topics in production and distribution systems, such as the important role of information technology for logistic systems and quality management within operations management.

Finally the participants will be able to apply their knowledge of the whole Master Program in an industrial management case study, which deals with managing and restructuring a company in an international setting, using simulation tools and applying methods and strategies in production planning and control, monitoring logistic characteristics, analyzing and optimizing production costs, defining improvement approaches, establishing project management and re-engineering by work structuring.

Overview Engineering Modules (EM)

EM 1: Introduction Production and Operations Management
Courses: Introduction to Industrial Engineering • Production & Logistics Controlling • Information Systems I • Operations Research I

EM 2: IT Support of Production Systems
Courses: Industrial Services • Information Systems II • Simulation of Production Systems • Operations Research II

EM 3: Methods of Operations Management
Courses: Supply Network Management I • Production Engineering • Ergonomics & Human Factors • Stochastic Models of Manufacturing Systems

EM 4: Networks of Supply & Production Systems
Courses: Supply Network Management II & III • Distribution Networks • International Production

EM 5: Production and Distribution Systems
Courses: Information Technology for Logistic Systems • Quality Management • Industrial Management Case Study
Management Modules - Topics

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.

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<td><strong>MM 1: International Project Management</strong></td>
<td><strong>MM 2: Finance for Executives</strong></td>
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International Project Management is a key to the world of business. Participants will get familiar with objectives of project management and scheduling, analysing planned projects and controlling project execution. Particular attention is paid to the construction of project networks and Gantt charts, heuristic solution procedures and rescheduling. Modelling, planning and scheduling, which arise in a great variety of practical situations, are also emphasized.

Finance for Executives provides participants with an understanding of the key financial statements and its underlying accounting principles. The course gives an overview of investment rules and financial decisions.

Human Resource Management addresses challenges head on, exploring the key elements of innovation, creativity and leadership as well as the steps necessary to implement and manage it successfully. This multidisciplinary module provides valuable experience in implementing the techniques needed to ensure the company’s continuing success.

Business Strategy, Marketing & Controlling

This module comprises three important challenges in companies, Business Strategy, Marketing and Controlling. Particular emphasis is placed upon the process of strategic management containing strategic analysis, formulation and evaluation based on competitive advantage, and portfolio strategy. In addition to these concepts approaches of modern marketing that show a strong reference to business strategy are presented.

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, e.g. 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 about international patent, trademark and copyright law.
The academic calendar for the next program starting on October 5, 2015 consists of 10 intensive modules, each with a duration of 10 days. At the end, the Master Program concludes with a Master Thesis.

The Master Thesis is set up as a project work in the company, starting after the successful completion of at least nine modules according to the personal study plan.

Participants of the Master Program Production & Operations Management also need to take part in a 2-day crash course in probability & statistics (date t.b.a.).