Executive Master Program
Management of Product Development

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.

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. Intermittent periods of lectures are scheduled to allow participants to continue with demanding careers while acquiring new skills & knowledge.
Product development is the process of entirely planning and prototyping novel technical systems. It ranges from finding the product profile to creating a concept, designing, making prototypes, testing and validating. The actual manufacturing phase follows subsequently and is the second and final stage of the product creation process.

Thus, product development is certainly one of the core means of adding value in companies and is crucial for their success through innovation. Creativity and performance potential define the success of product development.

Participants of the Master Program Management of Product Development (MPD) are able to analyse, design, operate and implement the product development process in their companies in an optimized way by means of acquired research- and application-oriented methods and processes.

Based on an integrated approach to product creation processes, the graduates can successfully implement innovative ideas and innovation into competitive products, whereas they draw a special focus on major criteria like customized product solutions, reduction of production costs as well as optimization of quality standards. Furthermore, they are capable to accompany and further innovation processes by means of creativity techniques.

Finally, due to the increasing performance and competition pressure in product development, graduates can counteract shorter development times and product life cycles with appropriate methods and techniques.

Join us to acquire the tools that will guide your career path in this exciting field of innovation.
**Engineering Modules - Topics**

**Design and Validation Process & Information Systems for Product Development**

The module gives an in-depth introduction in the product development processes and its challenges. Individual process steps and the organization are defined. Moreover, the product lifecycle is implemented in the form of the Product Lifecycle Management (PLM) system. When using virtual reality systems, it is important to identify both opportunities and limits of this new technology. The participants identify workflows relevant to data modeling.

The module also covers methods of validation in a Product Design Project (PDP) and specific environment simulations. The typical approach to planning and executing a simulation study is applied.

**Product Generation Development**

While EM1 and EM2 systematically explain and deepen into the principles of the product development process, this module focuses on further aspects for a successful product development. Crucial factors of success in product development, such as Total Quality Management (TQM) and Total Cost of Ownership (TCO), are explained and illustrated by examples.

Methods presented, such as FMEA (Failure Mode and Effects Analysis) and FTA (Failure Tree Analysis) as well as target costing, are efficient tools to support the product development process. Using examples, the participants learn to structure and systematically manage the design process in teams. The participants are aware of the significance and limits of modern standards, and modifications in CAx and VR systems. Knowledge of the background of information technology is an absolute necessity.

Participants realize the effects and impacts of design modifications as well as the influence of prototypes or simulations on the innovation process.

**Integrated Product Development**

One of the most important factors of success of product development is the systematic planning and use of adequate tools and methods. Application of the portfolio analysis, of mind mapping or Data Stream Management (DSM) is essential. Apart from these tools, it is important to understand the structures, and implications of design modifications as well as the influence of prototypes or simulations on the innovation process.

Participants realize the effects and impacts of design modifications as well as the influence of prototypes or simulations on the innovation process.

**For me it was a great experience and a challenge to master this study. MPD gave me a comprehensive understanding about today’s product development challenges. In addition, business and management basics courses expanded the knowledge needed for my professional work. In the master specific courses, I picked up a lot of new ideas and approaches, which are helpful in my job. My opinion is that this program was a very good professional development.”**

Thomas Kiefer
HECTOR School Intake 2005 & Graduate of the Master Program MPD

For detailed information on the course contents order our free course guide book.
interface technologies. They can assess and classify business strategies in terms of international competitiveness. Finally, one of the most current technologies is introduced: **Lightweight Design.**

**Systems & Cases**

Systems engineering is an interdisciplinary approach to the early definition of customers’ needs and functionalities, the documentation of requirements on the system to be developed, and the continuous synthesis and validation of the system along the development process. A wide range of **methodological aids** is available to support the developer in systems synthesis and analysis. **Eco-design methods** are adequate tools to use ecological aspects as chances for product innovations.

A final case study serves to acquire competence in the use of development methods. For this purpose, a development task is to be defined based on a concrete market situation and using the scenario technique. Then, this definition is to be implemented in a product concept. **Intuitive and discursive creativity techniques based on TRIZ-box or methods of cost control** are used under close-to-reality conditions. Based on this case study, all skills and theories learned are implemented in a practice-oriented environment. Product planning, product specification, and concept development processes are applied.

**Multi-technological Systems & Workshops**

Successful work on complex multi-technological systems requires work in interdisciplinary teams. Apart from the use of appropriate support methods, such as the **V-model, understanding of the varying perspectives of the team members** is required. This results in high requirements on the **quality assurance of interdisciplinary product development processes.** Basic principles are presented and made available in the form of a practical guide.

Finally, **key methods of product development are trained** in workshops and **first application competence** is acquired. Among others, **analysis methods, universal problem solution methods, and verification and validation methods (DoE, XiL – X-in-the-Loop)** are applied.

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**Overview Engineering Modules (EM)**

**EM 1:** Design and Validation Process & Information Systems for Product Development  
Courses:  
- Vision & Mission in Product Development  
- Basics in Product Development  
- Information Systems I  
- Test Based Development  
- Methods of Simulation

**EM 2:** Integrated Product Development  
Courses:  
- Integrated Product Development  
- Information Systems II  
- Industrial Design Engineering

**EM 3:** Product Generation Development  
Courses:  
- Target Costing  
- Strategic Product Portfolio  
- Variables for Efficiency Improvement in Product Development  
- Information Systems III  
- Production Engineering  
- Lightweight Design

**EM 4:** Systems & Cases  
Courses:  
- Systems Engineering  
- Eco-Design - Methodology for Sustainability  
- Case Study in Product Development

**EM 5:** Multi-technological Systems & Workshops  
Courses:  
- Introduction and Application to SysML  
- Quality Management  
- Patent Strategy in Industry  
- Workshop in Product Development
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.

### International Project Management (MM 1)

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 (MM 2)

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.

### Business Strategy, Marketing & Controlling (MM 3)

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.

### Human Resource Management (MM 4)

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.

### Law & Contracts (MM 5)

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.

### Overview Management Modules (MM)

- **MM 1: International Project Management**
  Courses: Project Management & Scheduling, Multi-Project Management in an International Setting, Development Management, Intercultural Management

- **MM 2: Finance for Executives**
  Courses: Introduction, Financial Accounting, Fundamentals of Finance

- **MM 3: Business Strategy, Marketing and Controlling**
  Courses: Business Strategy, Introduction to Management Accounting, Marketing

- **MM 4: Human Resource Management**
  Courses: Human Resource Management, Leadership & Conflict Management, Management Training

- **MM 5: Law & Contracts**
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.

Legend:
- MM Management Modules
- EM Engineering Modules
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