



**New  
2019\***

\*Subject to the approval procedure of KIT and the ministry for science, research and art in Baden-Wuerttemberg



## Executive Master Program

Information Systems Engineering & Management  
*Digital Transformation of Products, Services, and Organizations*

Technology + Management

The HECTOR School is the Technology Business School of the Karlsruhe Institute of Technology (KIT). It is named after Dr. Hans-Werner Hektor, one of the co-founders of SAP SE.

The school aims to provide professionals with **state-of-the-art technological expertise and management know-how within part-time education programs**. The HECTOR School fosters lifelong learning within industry. Participants are supported in their career development with executive master degree programs, certificate courses, and customized partner programs.

The benefits of the executive master programs are numerous for participants as well as for the companies they work for:

- **Unique Holistic Approach:** A combination of technology expertise and management know-how.
- **State-of-the-Art Knowledge:** Direct transfer from the Karlsruhe Institute of Technology (KIT) research.
- **Part-Time Structure:** Allows participants to continue with their demanding careers whilst acquiring new skills.
- **Master Thesis to set up Innovation Projects:** Companies gain outstanding added value through the consultation of such projects by professors from KIT.
- **Excellent Networking Opportunities:** Professional networking is fostered across industries and on an international scale.



**Portrait of the HECTOR School**  
on our YouTube Channel



## Key Facts: Part-Time Master of Science (M.Sc.) Programs

### Program Structure

- Part-time, 10 x 2-week modules
- Duration: part-time lecture period of ~15 months
- Master thesis: project work in the company, 6 months
- 5 Engineering and 5 Management Modules
- Teaching language: English
- Yearly program start: October

### Academic Degree

Master of Science (M.Sc.) from the KIT (90 ECTS)

### Admission Requirements

- A first academic degree: e.g. Bachelor, Master or Diploma
- At least 1-2 years work experience (depending on the level of the first degree, recommended > 3 years)
- If English is not your mother tongue nor has it been the language of instruction for the last five years, language proficiency test certificate (e.g. TOEFL score of at least 570 PBT; 230 CBT; 90 iBT or IELTS at least 6,5 points).

### Accreditation

The KIT is system-accredited by AAQ. The master program ISEM currently underlies the approval procedure of the KIT and the Ministry of Science, Research and Art Baden-Wuerttemberg with the focus on starting in October 2019. It aims for the accreditation by the internal quality assurance system of the KIT, as all other master programs are already accredited.



# Master Program

## Information Systems Engineering & Management (ISEM)

**MARKETING & DATA SEMANTIC  
WEB IT SAFETY & SECURITY  
AUTONOMOUS ROBOTICS AGILE  
& SELF-ORGANIZING NETWORKS  
DECISIONS & RISK SERVICE  
SYSTEMS CLOUD ENGINEERING  
IOT & INDUSTRY 4.0 SERVICE  
PRICING FINANCE & VALUE MOBILE  
BUSINESS & COMMUNICATION BIG  
DATA ARTIFICIAL INTELLIGENCE  
DIGITALIZATION STRATEGY &  
PEOPLE INNOVATION & PROJECTS  
MACHINE LEARNING DISTRIBUTED  
SYSTEMS SERVICE ENGINEERING**

*»We are living in a digital world. Rapidly evolving information technologies drive the digital transformation of products, services, and organizations. Successful enablers of digital transformation require a profound understanding and integration of business and information technology.«*

Prof. Dr. Alexander Maedche

During the last decades, we witnessed a growing importance of information technology (IT) in business and society alongside increasing speed of innovation cycles. IT has become core for businesses from an operational company-internal and external customer perspective. Today, companies have to rethink their way of doing business. Digital products and services will characterize tomorrow's world and organizations are digitally transformed across all functional areas. Capturing the emerging opportunities requires globally thinking visionaries and managers, who are able to combine profound competence in information technology with excellent know-how in management.

The Master Program Information Systems Engineering & Management (ISEM) qualifies graduates to drive digital transformation of products, services, and organizations from a business and IT perspective. Graduates encounter digitalization challenges with an engineering orientation and solve them with the help of modern management methods. They are also in a position to make efficient and effective use of information technologies within organizations following a socio-technical paradigm. Competitive and innovative digital products and services are developed and optimized to successfully accompany and direct digital changes in organizations and business networks.



Prof. Dr. Alexander Maedche  
Institute of Information Systems and Marketing, KIT

Prof. Dr. Andreas Oberweis  
Institute of Applied Informatics & Formal  
Description Methods, KIT

Prof. Dr. Martin E. Ruckes  
Institute of Finance, Banking, and Insurance, KIT

**Program Directors ISEM**

The program empowers graduates to apply an interdisciplinary approach to problems and trains adequate solution with a systems-oriented mindset. From an engineering perspective, graduates understand the role and potential of digital platforms from an enterprise and market point of view including state-of-the-art technologies such as Internet-of-Things and Blockchain. They know modern software and system engineering techniques with a specific emphasis on the cloud computing paradigm.

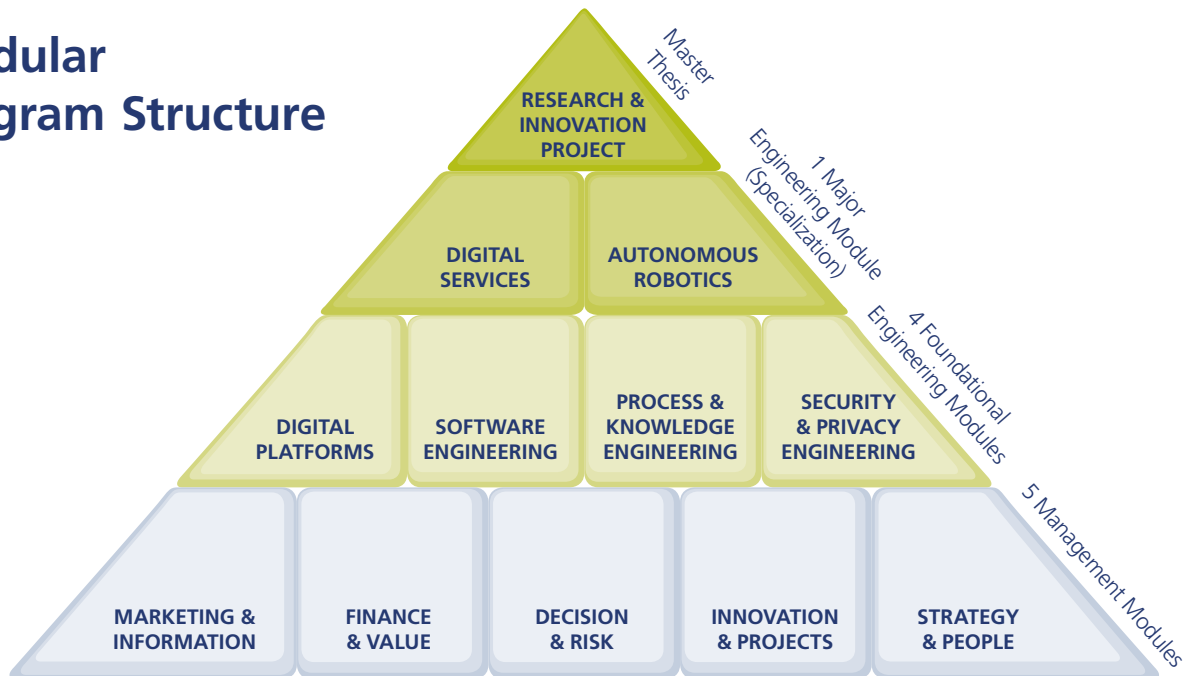
ISEM graduates can design and optimize business processes following a top-down and bottom-up approach. They also know how to transform (big) data to actionable knowledge following an engineering approach. These competencies are enriched with security and privacy engineering concepts and technologies complemented with real-world cases on critical infrastructure management. Finally, ISEM graduates can specialize in digital services or cognitive systems & data science. In the respective specialization modules, they collect deep knowledge in one of the two fields.

In addition to the engineering expertise, ISEM graduates share five management modules with other master programs at HECTOR School. This fosters interdisciplinary networking across industries and provides the participants with state-of-the-art business knowledge in strategy, finance, accounting, marketing, innovation management, project management, decision and risk management and human resource management. Therefore, they can consider the commercial implications of technology-centric decisions and develop a holistic view on business and IT.

# Engineering Modules (EM)

Digital Transformation of Products, Services, and Organizations

## Modular Program Structure



### EM 1: Digital Platforms

The module enables participants to understand and design digital platforms for organizations and markets in order to drive internal and external digitalization. The module first introduces state-of-the-art Enterprise System platform architectures and concepts covering a process-, information-, and people-centric perspective. Furthermore, participants understand trade-offs between standardization and flexibility and know how to leverage digital platforms in organizations in order to find a good balance. Complementing the organizational perspective, market engineering puts an emphasis on the design of information-centric markets and services in order to realize new digital business models. Finally, this module also introduces key concepts and technologies of the Internet of Things (IoT) and Blockchain as an enabler for realizing contemporary digital platforms.

### EM 2: Software Engineering

This module focuses on two important aspects: first, the fundamental principles, methods and tools behind state-of-the-art software & systems engineering are introduced, and second principles for advanced Web applications as well as cloud computing concepts and technologies are explained. In a first step, the participants obtain a detailed overview of the stages of software systems development and they are qualified to apply the required methods and tools in the development process. Both, the well-established software systems development

lifecycle as well as the agile software development approach will be introduced and discussed. Current modeling and programming languages e.g., HTTP, SOAP or WSDL, explain the architecture of Web applications. The participants will learn how advanced Web applications need to be engineering on this basis. Finally, cloud computing concepts and technologies taught within the module enable the participants to assess the opportunities and challenges of web-scale service applications.

### EM 3: Process & Knowledge Engineering

In organizations, processes and knowledge are known to be closely linked to one another. In this module, the participants gain the ability to effectively and efficiently adapt the particular demands of business processes following an engineering approach leveraging appropriate methods and tools. Furthermore, participants learn methods and tools of process mining that follows a data-driven approach for process analysis and optimization. Understanding the need for data & knowledge engineering in businesses, participants of this module are also able to implement concepts for the modeling, representation, and management of data and knowledge. Finally, with the rise of Big Data participants acquire the necessary skills to implement and manage large-scale Big data solutions.

### EM 4: Security & Privacy Engineering

Today's information systems are required more than ever to guarantee security and privacy. This module enables participants to acquire the necessary knowledge to

systematically engineer security and privacy in information systems. This module first introduces information security to prevent, detect, document and counter threats to information. Second, key concepts of applied cryptography are introduced. Legal aspects play a critical role in security & privacy engineering. Therefore, the fundamental legal concepts of data protection regulation are explained. Complementing the security perspective, information privacy and privacy enhancing technologies are discussed. The module is complemented with a specific emphasis on critical infrastructures and the role security & privacy engineering plays in these infrastructures.

### EM 5: Specialization

**Digital Services Services** already account for more than 60% of the gross value added of developed economies. Even product companies try to increasingly tap into the application processes of their customers (“servitization”); thus, comprehensive knowledge on how to strategically use, design, engineer, and manage services are key. Current trends, like Digital nature, Data & analytics and System & platform perspectives make the familiarity with digital services a must for any future leader.

**Digital nature:** Digital creation and delivery of these services trigger a number of options like immediate globalization capabilities, agile development and deployment (DevOps), simple inclusion of open innovation concepts, or the individualization of delivered solutions.

**Data & analytics:** Availability of “big data” (e.g., created via sensors or social media) and sophisticated AI-based analytics enable to build customer intimacy, to improve internal efficiency as well as to augment or completely innovate customer offerings.

**System & platform perspectives:** The notion of service (eco)systems connected via digital services opens up a variety of innovation options in interorganizational or co-competitive business models (“smarter systems”, e.g. in supply, health care, mobility or energy systems).

**Autonomous Robotics** The Specialization „Autonomous Robotics“ will introduce you to the possibilities and challenges of designing, creating, and controlling autonomous robots in a production or logistics context. Working in teams in a lab, you will be introduced to the fundamental concepts of autonomous control in robotics. At the same time, you will be working on a task, which requires collaborating robots. Successively over the period of the module, you will be spending more time working in your team. Finally, you will connect your devices with those developed by other teams to jointly solve a task.



## Engineering Modules

EM 1: Digital Platforms

Courses: Enterprise Systems, IoT Technologies & Platforms, Market Engineering, Platform Economics & Blockchain

EM 2: Software Engineering

Courses: Software & Systems Engineering, Advanced Web Applications, Cloud Computing

EM 3: Process & Knowledge Engineering

Courses: Business Process Engineering, Process Mining, Data & Knowledge Engineering, Big Data Management

EM 4: Security & Privacy Engineering

Courses: Information Security, Applied Cryptography, Critical Infrastructures Part I and II, Data Protection Regulations, Information Privacy & Privacy Enhancing Technologies

### Specialization

EM 5: Digital Services

Courses: Service Innovation, Service Design Thinking, Digital Service Business Models & Transformation, Artificial Intelligence in Service Systems

EM 5: Autonomous Robotics

Courses: Business Data Strategy, Business Intelligence Systems, Business Analytics, Smart Manufacturing and Automation with Industry 4.0

*Curriculum may be subject to change.*

### Crash Course: Probability and Statistics

We highly recommend all applicants to participate in the course to update the technical knowledge, as it might be the crucial factor for a successful degree at HECTOR School.

# Management Modules (MM)

## Economic Know-How for Successful Managers



## Management Modules

### MM 1: Marketing & Information

Courses: Designing and Selling Solutions (incl. Negotiation Training), Information Systems Management, Big Data Methods, Legal Aspects of Information

### MM 2: Finance & Value

Courses: Management Accounting, Financial Accounting, Strategic Financial Management, Case Studies

### MM 3: Decisions & Risk

Courses: Decision Modeling, Risk Aware Decisions, Interactive Decisions, Robust and Stochastic Optimization

### MM 4: Innovation & Projects

Courses: Technology Driven Innovation, International Intellectual Property Law, Project Management, Multi-Project Management in an International Setting

### MM 5: Strategy & People

Courses: Business Management, Managerial Economics, Business Organization and Corporate Law, Strategic Human Resource Management, Leadership and Conflict Management

*Curriculum may be subject to change.*



Order your free course guide book with detailed contents of the Master Program!

### MM 1: Marketing & Information

Many of today's most successful businesses excel in satisfying customer needs, because their decisions are based on data instead of gut feeling. This is what this module is about. One week looks at how to use data for designing customer solutions (and get paid according to their value). The other week looks more generally at issues surrounding the use of (big) data for business decision-making.

### MM 2: Finance & Value

Modern corporate governance is based on the creation of values. In the Finance & Value module, students learn essential methods of measuring, processing, and communicating the value added by corporate decisions that enable effective planning, management, and monitoring of corporate activity and corporate units. External value-based communication makes it possible to win stakeholders who are committed to the company over the long term.

### MM 3: Decisions & Risk

Management implies making decisions. A valid data warehouse forms the basis for these decisions. The aim of this module is to give students a toolkit of various quantitative decision-making models, so that the possibilities and limitations of methodical decision-making support (among others also optimization methods) can be used efficiently in the day to day running of projects.

### MM 4: Innovation & Projects

Numerous paradigm shifts are currently being driven by the development and extensive use of new technologies. Profound changes in rapidly changing markets flow directly from this. Consequently, apart from classic project management, new management tools and methods are required, because agility and innovation are some of the success factors in the current business climate. The module thus focuses on one of KIT's unique selling points: technology-driven innovation.

### MM 5: Strategy & People

The key to corporate success lies in the correct strategy. But how do you recognize opportunities, develop a viable concept, and successfully implement it? In times of scarce human capital, it is more important than ever before to ensure employees are a perfect fit for their position and to motivate them to implement the strategy together. The module imparts state-of-the-art management techniques and know-how on evidence-based human resources management, people analytics, and leadership approaches.

# A HECTOR School Master: Leadership Know-How for Demanding Careers.



Oliver Gündling  
Managing Director  
ITynamics Business Solutions GmbH

»The master program offers an excellent synergy of the disciplines informatics, business administration and international law. Close collaboration with lectures and applied studies in small groups with students from several industries supported me to share knowledge and bring state-of-the-art expertise into my business. Thanks to the well organized program and compact lecture sessions, I was able to successfully manage my studies alongside my job. In summary, the master program enriched both my expert knowledge and professional career.«

**Alumni Voices**  
on our YouTube Channel

## Academic Calendar

September 2019							October 2019							November 2019							December 2019										
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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28	29	30	EM5	28	29	30	31	23	24	25	26	27	28	29	28	29	30	31													

- MM Management Modules
- EM Engineering Modules
- Exams

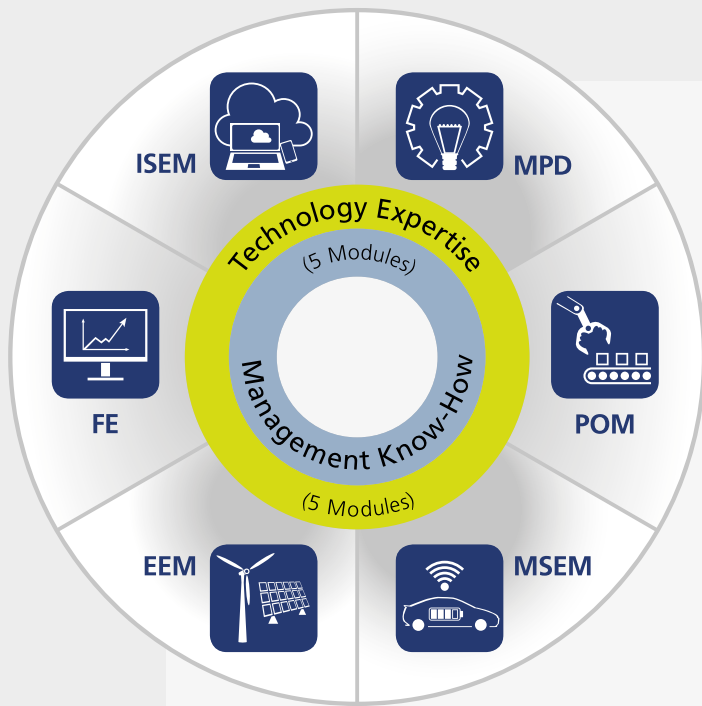
Crash Course 2-day seminar in Probability and Statistics

The academic calendar for each program starts annually in October. It consists of 10 modules, each with a duration of 10 days. All programs conclude with a master thesis.

>> **Master Thesis:** 6 months project work

Please note: Dates are subject to change.

# More Master Programs



## Six Part-Time Master of Science Programs in

- Management of Product Development (MPD)
- Production & Operations Management (POM)
- Mobility Systems Engineering & Management (MSEM)
- Energy Engineering & Management (EEM)
- Financial Engineering (FE)
- Information Systems Engineering & Management (ISEM)\*



In addition to the master programs, the HECTOR School also offers **certificate courses** (3 - 5 day seminars on state-of-the-art technology topics) and **partner programs**.



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## HECTOR School of Engineering & Management

International Department of the  
Karlsruhe Institute of Technology (KIT) gGmbH  
Schlossplatz 19  
76131 Karlsruhe/Germany

Phone +49 (0)721-608 47880  
Fax +49 (0)721-608 47882  
E-mail [info@hectorschool.com](mailto:info@hectorschool.com)  
Web [www.hectorschool.com](http://www.hectorschool.com)



Order your free course guide book with detailed contents of the master program!

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Publisher: Marketing Department HECTOR School of Engineering & Management  
Edition: 10/2018  
Photos: International Department gGmbH, Karlsruhe Institute of Technology (KIT), iStock

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