Executive Education for Engineers

Part-Time Master Programs & Certificate Courses
»Professional development in the sense of lifelong learning, talent management, and human resources development strategies are drivers for the success of globally acting companies in the future. Even highly qualified professionals need to continuously update their know-how, since paradigm shifts in technology develop very frequently. As we are the first who developed an academic part-time program for professionals in which they can participate in while they continue working in their field, we can assure you that all our experience is integrated to guarantee a successful Master-degree and sustainable achievements in the industry.«

*Current rankings prove the quality of KIT, e.g.
Part-Time Academic Programs for Professionals
Quality Made by the Karlsruhe Institute of Technology (KIT)

Technology Business School of the KIT
The Karlsruhe Institute of Technology (KIT) is the largest institution for research and education in Germany. Globally known for its technology expertise in German engineering, KIT is famous for its research, excellent scientific education, lifelong learning, comprehensive advanced training, and a sustainable culture of innovation.

Continuous Education on the Highest Academic Level
The HECTOR School is the Technology Business School of the KIT named after Dr. Hans-Werner Hector, one of the co-founders of SAP AG. The school endeavors to provide professionals with state-of-the-art technology expertise and management know-how in part-time education formats. With Executive Master Programs, Certificate Courses, and Customized Partner Programs, the HECTOR School fosters lifelong learning approaches of its industry partners and the executive development of its graduates.

Your Success is Our Vision
The HECTOR School strives for sustainable and continuous education on the highest academic level, building on more than 10 years of experience. The growing need for qualified engineers, computer scientists, and economists demonstrates HECTOR School’s vision: sustainable success of our graduates & their companies.

Executive Education @ HECTOR School
4 Reasons for the Technology Business School of the KIT

1. Technology Transfer & Innovation from one of the best engineering universities worldwide, the Karlsruhe Institute of Technology (KIT).

2. Management & Technology: the combination makes our programs unique. This ensures the sustainable competitiveness of companies.

3. Power of Networks is supported professionally between academia and industry as well as across industries worldwide.

4. Part-Time Programs guarantee perfect planning for participants as well as for their companies and enable simultaneous study and work.
A Strong Cooperation with Industry
Lifelong Learning Programs Foster Innovation and Competitiveness

Challenges for Industry
Battle for talents, retaining talents, employability, talent management: With the focus on lifelong learning in strategic HR development, companies strengthen their image, address current challenges and gain attractiveness for high potentials and professionals.

Advantages for Industry
According to the first results of the Bologna Process, employers need to be aware that bachelor graduates plan on completing master programs, even after starting their professional careers. By offering clear development structures, companies attract motivated employees and enhance their retaining factor. On the other hand, professionals optimize their competency profile and their employability by participating in continuous education programs. In times of fast changing markets and globally oriented companies, this will be a key factor for personnel career development for companies as well as for the employees.

The advantages of lifelong learning programs in cooperation with universities, given a highly academic yet practical oriented approach, are manifold:

- **Technology Transfer & Innovation**
  Industry benefits from state-of-the-art research findings at KIT. Participants of HECTOR School programs are trained at the highest academic level. They will act as interfaces between their companies and KIT. The master thesis for master programs, for example, is often the start of an intensive cooperation through joint innovation projects.

- **Management & Technology**
  Equipped with scientific methods and state-of-the-art knowledge in their field of technology expertise, combined with management and digitalization know-how, participants increase the creativity and innovative potential of their company. Furthermore, professionals become prepared for future career steps in executive positions.

- **Power of Networks**
  In times of global and cross-linked markets, a network of international peers and partners is indispensable. The HECTOR School graduates will not only gain valuable contacts within KIT but also to an extensive professional network of alumni worldwide.

- **Part-Time Programs**
  The HECTOR School programs allow their participants to gain high-level academic further qualification while being able to work at the same time. Due to the part-time approach of all programs, professionals can continue their challenging careers.
HECTOR School: Strategic Partner for the SIEMENS AG

»The master programs at the HECTOR School are a great opportunity to advance qualified employees. We appreciate especially the fact that our employees gain latest results of research of the KIT. The part-time structure and the modular composition enable us to integrate the participation in our operational work. For these reasons the master programs are an established method to be one-step ahead of our competitors for several years.«

Examples for companies where HECTOR School participants are employed:

ABB AG • Alcatel Transport Solutions Deutschland GmbH • Alcatel-Lucent Deutschland AG • Audi AG
• BASF • BASF Business Services GmbH • B&B Bank eG • Behr GmbH & Co. KG • Behr-Hella Thermocontrol GmbH • Blohm+Voss Nordseeverke GmbH • BMW Group • Bombardier Transportation GmbH • Robert Bosch GmbH • Brose • Continental AG • Daimler AG • DB Fernverkehr AG • DB ProjektBau GmbH • DZ Bank AG • Elienmann • El-Khayyat • ELO Digital Office GmbH • EnBW • Endress+Hauser GmbH & Co. KG • EnpowerEnergy Corp. • EUROHYPO AG • Fine Hygienic Paper Co. Ltd/Nuqu Group • Freescale Semiconductor Inc. • Hikma Pharamceuticals PLC • Howaldtswerke-Deutsche Werft GmbH • IBM • Karl Dungs GmbH & Co. KG • Krones AG • KSB AG • Landesbank Baden-Württemberg (LBBW) • Lufthansatechnik Hamburg • MAG IAS GmbH • MAN Nutzfahrzeuge AG • MBtech Consulting GmbH • MELEC GmbH • Melexis GmbH • MTU UK Ltd. • Navistar International • OBE, Ohnmacht & Baumgärtner GmbH & Co KG • P3 Ingenieursgesellschaft mbH • Parsons Brickerhoff • Porsche AG • PROMATIS software GmbH • Reuters AG • Rexroth Star GmbH • Rothe Erde GmbH • SAMARCO Brazil • SAS Automotive Systems • Schaeffler KG • SEW-EURODRIVE GmbH & Co KG • Sictel • Siemens AG • Telekom AG • Thales Transportation Systems GmbH • ThyssenKrupp Marine Systems AG • ThyssenKrupp Technologies AG • TI Automotive • T-Systems • Unilever • Vale • Verband der Deutschen Bahnnindustrie (VDB) • Vibracoustic GmbH & Co. KG • XING AG

Executive Master of Science: 6 Programs Combining Engineering & Management Know-how

State-of-the-Art Technology Expertise in Compact Education Formats:
Adaptive Further Education Programs on ADAS Customized Qualifications for Companies | MBA Fundamentals Program | Certificate Courses
The HECTOR School offers six part-time master programs designed for professionals in leading positions. The master programs are more than typical MBA programs as they combine management with engineering expertise. The primary goal is to enable professionals to take a holistic approach when managing highly interdependent processes. All programs are completed with a Master of Science degree from the Karlsruhe Institute of Technology (KIT).

Leadership Know-How for Engineers

All programs share five management modules providing the participants with general knowledge in finance, accounting, marketing, international multi-project management, international law, human resource management or innovation management. Therefore, they can consider the commercial implications of project decisions.

Technology Expertise: More Than Just an MBA

In addition to the management modules, five engineering modules in each specialization convey state-of-the-art technology know-how and the methodology necessary to master the scope of new technologies.

Aquire Competencies to Succeed with Digitalization

Products, services and processes are translated into a digital representation – aiming higher productivity and efficiency. To fulfill this, corporate divisions are asked to develop a systematic and holistic approach for the increased use of digital components. All Master’s programs consider digitalization on a comprehensive level.

Part-Time Structure for Professionals

The academic calendar for the master programs starts annually in October. It consists of 10 modules, each with a duration of 10 days. Intermittent periods of lectures are scheduled to allow participants to continue with their demanding careers whilst acquiring new skills.

All master programs are taught in English. They are completed within approximately 20 months. Workshops and case studies provide ample opportunities to explore the direct applications of the module contents simulating a real business environment.

Master Thesis as an Innovation Project

The master thesis allows participants to work independently, reflecting their own company’s needs and their specific business environment. Most companies and participants take this opportunity to set up innovation projects as a master thesis and gain outstanding added value through the consultation of such projects by professors from KIT.

International Orientation for Global Success

At HECTOR School, the participants benefit from the vivid intercultural exchange with fellow students from all over the world. The international orientation is also anchored in the curriculum. All course content is considered in international settings and global contexts. Furthermore, certain modules are taught on-site at one of HECTOR School’s international partner institutions, e.g. at the ESADE Business School in Barcelona or the KIT China Branch in Suzhou.
Management Modules within all Master Programs

The six different Master Programs all share five management modules where the latest theories and methods in management are conveyed. Participants from different branches and international locations can exchange their expertise, discuss current technological and commercial challenges from different viewpoints and build up a sustainable network of peers.

**Management Modules**

| MM 1 | Marketing & Information |
| MM 2 | Finance & Value |
| MM 3 | Decisions & Risk |
| MM 4 | Innovation & Projects |
| MM 5 | Strategy & People |

Management is becoming increasingly complex and networked in data-driven companies (INFORMATION). Therefore, engineers and managers must obtain a holistic understanding of all corporate divisions to be able to make complex decisions (DECISIONS & RISK) in a future and result-oriented manner (INNOVATION & PROJECTS) from the perspective of the market (MARKETING), the employees (STRATEGY & PEOPLE), and the company (FINANCE & VALUE).
Six Master of Science Programs (M.Sc.)
State-of-the-Art Technology Combined with Management Skills

**M.Sc. in Management of Product Development (MPD)**

Prof. Dr.-Ing. Dr. h.c. Albert Albers
Institute of Product Engineering, KIT
Program Director MPD

»Product development is the driver of innovation. In MPD, you learn to manage product development in an efficient, methodical, creative and success-oriented way. With the scientifically sound and practice-oriented training program for professionals, you become qualified to be the driving force for successful product innovation in your company.«

**Engineering Modules**

1. Integrated Product Development by ASD – Agile Systems Design
2. Design & Validation Process and Information Systems for Product Development (PD)
3. Simulation and Target Values in PD
4. Validation and Verification in PD
5. Tools and Methods of Product Engineering

**M.Sc. in Production & Operations Management (POM)**

Prof. Dr.-Ing. Kai Furmans
Institute for Material Handling & Logistics, KIT
Academic Director of the HECTOR School and Program Director POM

»The design and operation of production systems and supply chains is undergoing a rapid change. Driven by new technology, as reflected by industry 4.0, the education of the past is no longer sufficient to guide companies through the changes. A master in POM equips participants with the necessary competences, bridging the gap between up-to-date theories and advanced technologies.«

**Engineering Modules**

1. Collaborative Engineering in Production and Operations Management
2. Digital Engineering Ecosystems
3. Modern Operations Management for Supply Chain Networks
4. Networks of Supply & Production Systems
5. Global Production & Distribution Systems

**M.Sc. in Mobility Systems Engineering & Management (MSEM)**

Prof. Dr.-Ing. Eric Sax
Institute for Information Processing Technology, KIT
Program Director MSEM

»The Master Program MSEM offers a unique combination of courses in emerging technologies & systems engineering. Processes, methods and tools for the challenges of future mobility in e-drive, autonomous driving, communication-over-the-air, and worldwide release & configuration management are introduced on the engineering as well as on the management side.«

**Engineering Modules**

1. Processes, Methods & Tools of Systems Engineering
2. Systems Design
3. Systems Integration & Validation

**Specialization**

Advanced Driver Assistance Systems (ADAS)

1. Functions of ADAS
2. Components & Technologies of ADAS

**Specialization e-Mobility**

1. E-Mobility: Political & Technical Framework
2. E-Mobility: Components & Technology
M.Sc. in Energy Engineering & Management (EEM)

Future Energy Systems and Technologies

Engineering Modules
EM 1 Renewables
EM 2 Thermal Energy Conversion
EM 3 Electricity Generation & Energy Storage
EM 4 Smart Networks & Energy Distribution
EM 5 Energy Economics

»The energy transition is associated with many challenges, such as an increase in efficiency of energy conversion systems based on renewable energies and their integration into future energy systems. This requires e.g. the development of capable energy storage systems and an intelligent demand side management. EEM covers all these aspects and provides the skills to successfully face the challenges.«

M.Sc. in Financial Engineering (FE)

Data Science, Machine Learning and Predictive Analytics

Engineering Modules
EM 1 Digital Financial Markets
EM 2 Financial Economics for Data Scientists
EM 3 Machine Learning for Data-Driven Decision Making
EM 4 Engineering Aspects of Financial Markets
EM 5 Alternative Data and Machine Learning for Business Applications

»Building more accurate models reduces uncertainty around future events and paths the way to better decision making. A mix of broad decision-making applications, sound data and modeling work, paired with an entrepreneurial drive to solve innovation challenges using modern software and financial thinking makes Financial Engineering unique.«

M.Sc. in Information Systems Engineering and Management (ISEM)

Digital Transformation of Products, Services, and Organizations

Engineering Modules
EM 1 Digital Platforms
EM 2 Software Engineering
EM 3 Process & Knowledge Engineering
EM 4 Security & Privacy Engineering
Specialization
EM 5 Digital Services
EM 5 Autonomous Robotics

»Digitalization enables new business models, creates new service opportunities and redefines existing products. This transforms our economy towards software realized added values in an unprecedented way. Hence, the capabilities of efficiently developing high quality software are becoming crucial for nearly for all enterprises. In our Master’s program accordingly we concentrate on software engineering, software quality, in particular security, cloud service engineering and AI.«
Unique Combination: Management & Engineering
Part-Time, English-Taught, Duration of 20 Months

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

Program Structure
- Part-time, 10 x 2-week modules
- Duration of approx. 20 months
- Master thesis = project work in the company
- 5 Engineering and 5 Management Modules
- Teaching language: English
- Yearly program start: October

Academic Degree
Master of Science (M.Sc.) from the KIT

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 is required, e.g. test certificate (e.g. TOEFL score of at least 570 PBT; 230 CBT; 90 iBT or IELTS at least 6,5 points) or appropriate proof of C1 level.

Accreditation
The KIT is system-accredited by AAQ.
All HECTOR School master programs are accredited by the internal quality assurance system of the KIT.

The academic calendar for each program starts annually in October. It consists of 10 modules, each with a duration of 2 weeks. All programs conclude with a master thesis.

**Master Thesis**:
- IME: 6 months project work
- IMMP, IMMPD, IMMPM, IMMPD, IMIME: 9 months project work

**Welcome Event**

**Crash Courses**
- Nov 08–12, 2021: 5-day seminar in Selected Topics of "Electrical Engineering" or "Thermodynamics, and Fluid Mechanics"
- Nov 12–13, 2021: 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 2 weeks. All programs conclude with a master thesis.

**Master Thesis IME, IFE**: 6 months project work
**Master Thesis IMMP, IMMPD, IMMSE, IMIME**: 9 months project work

Welcome Event
Global Network of Industry Partner & Peers

HECTOR School participants come from all over the globe. This fosters intercultural exchange with other professionals. Due to the holistic approach of the HECTOR School, participants share the management modules with peers from different industries and backgrounds. This guarantees a worldwide and interdisciplinary network lasting a lifetime.

After graduation, the HECTOR School offers a professional network with alumni activities, reaching from social media channels to alumni meetings in cooperation with exclusive industry partners.
State-of-the-Art Technology Expertise in Compact Education Formats
Tailor-made programs for Managers and Engineers

**HECTOR School Academy**

Customized lifelong learning solutions form one of the key competencies of the HECTOR School. Paradigm shifts in technology call for high-end trainings for engineers. Engineers in all industries need a regular update in state-of-the-art technology expertise to secure their personal career path as well as the future technology development of their companies.

The HECTOR School Academy addresses these needs and provides programs to equip employees with specialized training in their specific field. Companies master the digital transformation with current know-how from a world class university. Further, small groups offer a strong knowledge growth and enhance team building.

With customized trainings for companies lifelong learning is settled. In addition, current scientific expertise in new technologies is taught in a practical way. This is implemented by means of didactics appropriate for adults.

Modern class rooms and living labs: Our further qualification programs combine theoretical and practical elements. It is crucial to guarantee a high level of planning security for all participants in order to ensure that the demanding further qualification is compatible with the demanding professional environment.

> »The qualified colleagues are all very contented and dedicate themselves with great enthusiasm and motivation to their mostly new tasks. The imparting of the professional knowledge at the HECTOR School as well as the perfect organization took a major part in this. We also appreciate very much the constant and open exchange with the team«

**Dr. Philippe Gorse**
Director Fuel Cell Technologies at mtu solutions
Companies and employees in the process of change

Through a forward-looking re-qualification of engineers, the HECTOR School Academy supports companies with the Customized Qualification for Companies program in the transformation process. It focuses especially in mastering challenges in the KIT areas of expertise: energy, information, and mobility systems. This bond ensures that the participants receive exclusive access to the latest trends in technology and innovation.

Companies are enabled to accelerate the change process with a customized further education approach in i.e. e-mobility, renewables, or digitalization. The targeted continuing education guarantees a high degree of planning security and a direct transfer into the company. The HECTOR Schools close cooperation with industry guarantees that the methods taught out in the courses are relevant and pertinent to the needs of the modern workforce.

Best Practice Workflow for Your Transformation Projects

<table>
<thead>
<tr>
<th>Basis</th>
<th>e.g. a selected group of engineers will be trained in current scientific know-how on new technologies.</th>
</tr>
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<tbody>
<tr>
<td>Specialization</td>
<td>e.g. 80% of your employees will get further insights to implement the transformation process.</td>
</tr>
<tr>
<td>Experts</td>
<td>e.g. the top 10% will gain additional knowledge in engineering and management topics to lead the digitalization process in the company.</td>
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Keyfacts: Customized Qualifications for Companies

- **Group Size**: 15-20 people
- **Topics**: Latest know-how will be transferred with a strong focus on topics that are transformation drivers to your company. E.g.: e-mobility, renewable energies, digitalization, global production with Industry 4.0 components.
- **Methodology**: Intensive exchange with lecturers on specific technical topics, together with a classification of these topics into wider contexts to ensure high acceptance and learning success.
- **Structure**: 2 to 3 weeks Basis, followed by 1 to 2 weeks Specialization can be finalized by the Master’s program for the experts (approx. 20 months).
MBA Fundamentals Program

For Researchers that want to boost their career with management expertise.

This compact MBA Program is characterized by its focus on participants with an natural sciences or engineering background. It provides research-oriented and scientific methods and a high level of flexibility.

Six of the seven units offered can be taken in any order and at any start. Each unit lasts five days and set current management issues in the context of present research and relate them to accepted business practices and solutions.

The units are designed to be taken parallel to the job. And for those who want to go further, the credit points for the MBA Fundamentals Program can be recognized internationally within full MBA programs.

* The course Intercultural Training is not mandatory for the completion of the certificate and do not grant credits. However, participation is strongly advised when completing the full program.
Certificate Courses

Compact Part-Time Education Formats

In compact 3- to 5-day seminars, professionals get updated with technology expertise directly derived from the latest KIT research. On a high academic level and yet practically oriented, the Certificate Courses qualify engineering professionals in current technology issues. The seminars are offered in four highly topical fields of technology.

International Certificate Courses

In order to provide first-hand insights into specific technological environments and to foster intercultural exchange, the Certificate Courses are not only offered in Germany, but also at various international locations (e.g. in Suzhou/China).

Organized in cooperation with partner institutions worldwide, HECTOR School equips engineers with high-level special expertise. Current research know-how is conveyed to the participants by using a smart combination of lectures and case studies, either on- or off-site.

Exemplary Fields of the Certificate Courses:

Industry 4.0
- Smart Manufacturing & Automation with Industry 4.0
- Quality & Supplier Management in China
- Systems & Software Engineering

Digitalization
- Internet of Things: Modern Network Infrastructures
- Information & Knowledge Management
- Digitalization of Service Systems
- Data Science

Mobility
- Technology of Hybrid & Electronic Vehicles
- Digital Signal Processing
- Integrated Photonics
- Charging & Energy Management

Energy
- Renewables Generation & Grid Integration
- Battery Technology
- Electrical Engineering

The indicated courses serve as examples. The HECTOR School also offers customized seminars upon request and regularly updates the range of courses.

Key Facts: Certificate Courses

Program Structure
3- to 5-day seminars, max. 15 participants

Admission Requirements
An academic degree (e.g. bachelor, master, or diploma) and > 5 years of relevant work experience recommended

Academic Degree
Certificate from the Karlsruhe Institute of Technology (KIT), correlation: 1-3 ECTS