HECTOR SCHOOL of engineering & management



Production and Operations Management

Executive Master's Program Global Production, Digital Transformation in Supply-Chain-Management and Logistics



International Module KIT China Branch



KIT – The Research University in the Helmholtz Association

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The KIT is system-accredited by

Become a HECTOR School Master

Leadership Know-How for Demanding Careers







»HECTOR School embodies international and cultural reach – aligned to our global marketplace, as well as, combines theory with practice – resulting in a new way of management thinking, and techniques to foster excellence. HECTOR School taught me how to think differently as a manager, and provided me with tools to support current and future successes of my company.«

David J. Judge Alumus of Intake 2007

»I have lively memories of my application interview for the HECTOR School and Prof. Kai Furman's promise: "We will make you push your limits." An inspiring international environment, people from different industries and working fields, and the link to a state-of-the-art understanding of production and logistic systems provided me with a solid basis for the progression of my professional career. A challenging and enriching experience – promise kept!«

Stefan Oehmke Alumnus of Intake 2008



Executive Master's Program

Production and Operations Management

STRATEGY & PEOPLE OPERATIONS RESEARCH DECISION & RISK QUALITY MANAGEMENT SMART MANUFACTURING & AUTOMATION INDUSTRY 4.0 LIFECYCLE MANAGEMENT SUSTAINABLE GLOBAL PRODUCTION PRESCRIPTIVE ANALYTICS SUPPLY NETWORK MANAGEMENT FINANCE & VALUE MACHINE LEARNING & AI VIRTUAL ENGINEERING AUTONOMOUS ROBOTICS SUSTAINABLE PRODUCTION & LOGISTICS INNOVATION & PROJECTS COMPUTER SCIENCE DIGITAL TWIN MARKETING & DATA SCIENCE



Production technology and supply chain issues are shaping the future of the manufacturing industry. Major developments in the context of Industry 4.0 require highly qualified engineers with comprehensive knowledge of state-of-the-

art technologies and methods to successfully implement innovative concepts. Only a multidisciplinary approach can meet the demands of today's interconnected flows of data, products, and money in production and logistics.

Graduates of the Production & Operations Management (POM) master's program will be able to analyze and optimize the efficiency of value-added processes in the operation of production and service systems. They will be able to understand and analyze service and production processes, capture and formally describe requirements, define constraints and goals, and achieve targeted improvement using the skills acquired in the Master's program in Production Management, with a special focus on production processes, information technology, logistics and human resources, as well as the technical methods and tools required. **Program Directors**



Prof. Dr.-Ing. Kai Furmans Institute for Material Handling and Logistics, KIT

Prof. Dr. Stefan Nickel Institute of Operations Research, KIT

Graduates are familiar with state-of-the-art concepts and methods, and are able to apply and develop them to solve problems. Methods and techniques related to decision making are particularly emphasized in Operations Management.

In addition, graduates will be able to identify and address the capabilities and limitations of formal methods and models, as well as the challenges that arise in the transfer between the modeled world and reality. As the flows of data, products and money are closely linked in today's production and logistics, graduates will be able to solve problems by taking these three factors into account and applying multidisciplinary solution approaches.

In addition, the master's program shares five management modules with the other master's programs. This promotes cross-industry networking and provides participants with general knowledge in finance, accounting, marketing, international multi-project management, international law and human resource management. This enables them to consider the business implications of project decisions and develop a holistic view.



Set the Agenda for Innovation, Automation, Optimization, and Globalization



»The design and operation of production systems and supply chains is undergoing 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.«

Prof. Dr.-Ing. Kai Furmans

Institute for Material Handling and Logistics, KIT | Program Director POM

EM 1	Data Driven Engineering & Al								
	Industrial Services, Data Structure and Algorithms for Intelligent Engineering, Machine Learning Production LAB, Processes, Resources, and Systems in Industrial Engineering								
EM 2	Model Driven Digital	Enginee	ering						
	IoT Solutions for Product L Stochastic Models of Manu Production Systems and D Logistics	IoT Solutions for Product Lifecycle Management (PLM), Stochastic Models of Manufacturing Systems, Simulation of Production Systems and Digital Twin, Sustainable Production and Logistics							
EM 3	Operations Management for Supply Chain Networks								
	Lean and Green Production, Strategic Supply Network Management, Human Factors & Ergonomics, Technologies of Distribution Networks								
EM 4	Networks of Supply	& Produ	ction Systems						
	Supply Network Managem Uncertain Environment, In Systems, Sustainable Glob Supply Network Managem	ent: Invent formation 7 pal Product ent	ory Management in an Fechnology for Logistic ion, Operational & Tactical						
Specia	lization	Speciali	zation ★ 🏋						
EM 5	Autonomous Robotics	EM 5	Global Production & Distribution Systems						
	Autonomous Robotics Lab		Quality Management, Supplier Management, Smart Manufacturing & Automation with Industry 4.0						

Probability and Statistics

Crash Course 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 the HECTOR School.

Curriculum may be subject to change

EM 1: Data Driven Engineering & AI

The module 'Data-driven Engineering & Al' examines how cutting-edge technologies and data-driven methods are influencing and shaping the future of manufacturing companies in all industries.

Beginning with an in-depth look at processes, resources, and systems, the module provides the foundation for understanding modern management methods in a production environment. As industries move toward servitization, the courses highlight this transformation and introduce the role of IT and mathematical methods in areas such as predictive maintenance and full-service contracts. With production environments generating massive amounts of data, students gain hands-on experience applying the entire machine learning pipeline to real-world challenges to improve operational efficiency. Finally, the module delves into data structures and algorithms that are essential for intelligent engineering and IoT-driven product lifecycle management.

EM 2: Model Driven Digital Engineering

This module immerses students in the digital transformation of production systems by integrating model-driven engineering, sustainability aspects, simulation, and IoT technologies. Participants explore rapid concept development and decision-making in product lifecycle management through IoT solutions, gain insights into stochastic models and queuing networks for lean manufacturing, and analyze production systems using digital twins and simulation tools.

In addition, approaches to sustainable production and logistics are examined so that students can design efficient, compliant and environmentally friendly systems. This equips engineers with cutting-edge skills for digital innovation in manufacturing and provides them with key skills as future decision-makers.

EM 3: Operations Management for Supply Chain Networks

The increasing integration and globalization of production structures has led to the growing importance of logistics for cost and performance development in operational networks. The design phase of products and processes is followed by the operations phase. Consequently, module EM3 focuses on the development of skills and competencies in this area. Participants will understand lean production systems and supply chain management from a technology point of view as well as from a human resources perspective.

At the same time, the mapping of the physical world to the controlling world must be understood. On this basis, this module focuses on the application of the lessons learned, as well as on the further development of the methodology and its integration into the teamwork in the production company.

Engineering Modules (EM)

State-of-the-Art Expertise in Production Systems & Supply Chains

EM 4: Networks of Supply & Production Systems

Today's competitive supply chain environment has changed dramatically. Emerging economies such as India have become key players and have changed the way modern network systems are viewed. Supply Chain Management continues to play a key role in Production & Operations Management.

After understanding the individual objects in the value chain, they need to be connected in the supply chain. This includes the internationalization of value-added processes, their distribution to physical and dispositive processes, as well as methods for their planning and control.

Therefore, new models have to be generated and existing models have to be developed and adapted. The multidisciplinary analysis of production logistics and its mathematical modeling are of particular importance. In this way, participants can derive profound statements about the performance of novel network structures and will be prepared for the current and future challenges in the field.

EM 5: Specialization Autonomous Robotics

The 'Autonomous Robotics' specialization introduces you to the opportunities and challenges of designing, building, and controlling autonomous robots in a manufacturing or logistics environment.

Working hands-on in teams in a logistic laboratory, you will be introduced to the fundamental concepts of autonomous control in robotics. At the same time, you will work on a task that requires collaborating robots. You will be able to design and optimize suitable software approaches for various collaboration scenarios. Finally, you will connect your devices with those developed by other teams in the module to solve challenging tasks together.



Global Education for Global Players

International Engineering Module (EM) in China







EM 5: Specialization Global Production & Distribution Systems – International Module in China

Production in China is increasingly important for companies. In 1990, China produced less than 3% of global manufacturing output by value; today, its share exceeds 28%, driving expansive supply chains throughout Southeast Asia. Global players are continually extending their production sites in China, attracted by its robust manufacturing ecosystem and competitive advantages. Consequently, the demand for engineers with advanced technological expertise and the versatility to think in terms of different requirements on site is rapidly increasing, enabling companies to integrate China's dynamic production capacities into their internal decision-making processes.

Therefore, the final engineering module takes place in Suzhou and Shanghai (China) in cooperation with GAMI and AMTC . It includes compact knowledge transfer in the form of lectures, case studies as well as excursions and company visits. The latter will give participants a deep insight into the practical implementation in a Chinese manufacturing environment. The module not only provides state-of-the-art knowledge transfer on site, but also allows for a exchange with professionals and executives working in China.





Management Modules (MM)

Economic Know-How for Successful Managers

Big Picture Management Modules

Management is increasingly vital in data-driven organizations, yet it is becoming more complex and interconnected. Engineers and managers require a holistic understanding of the business to make sound decisions. Innovation must be viewed as an integrated system, considering market, employees, and company perspectives. HECTOR School's Master's programs incorporate five management modules covering key topics: 'Information,' 'Marketing & Data Science,' 'Finance & Value,' 'Decisions & Risk,' 'Innovation & Projects,' and 'Strategy & People.'

Participants from diverse industries and countries discuss technological and business challenges with lecturers and peers, building a strong, lasting network.

MM 1: Marketing & Data Science

This module equips participants with the tools to harness data and technology for effective decision-making in marketing and business contexts. It covers techniques for analyzing and transforming data into actionable insights, managing information systems to bridge business and IT, and understanding the legal frameworks for data and privacy protection. Through practical case studies and applied learning, participants gain skills essential for thriving in today's data-driven, digital economy.

MM 2: Finance & Value

Modern corporate governance is based on value creation. This module empowers participants to navigate financial complexities and sustainability challenges. It covers cost analysis, decision-making, and planning tools for effective management while exploring the circular economy and key sustainability indicators. Participants also gain insights into investment valuation, capital budgeting, and corporate finance strategies. A hands-on group project enhances analytical and strategic skills, applying theoretical knowledge to real-world company valuations for informed decision-making.

MM 3: Decisions & Risk

Successful management involves making the right decisions. This module develops participants' ability to make informed decisions under uncertainty. It covers quantitative decision modeling, risk-aware strategies, and robust and stochastic optimization for managing in uncertain environments. Participants also gain a rigorous understanding of game theory and its applications in strategic interactions. Through practical computer tutorials and theoretical frameworks, the module equips participants to model, analyze, and optimize decisions in complex, interconnected systems with confidence and precision.

MM 1		Marketing & Data Science
	Courses	Data Driven Marketing, Information Systems Management, Data Analytics, Legal Aspects of Information
MM 2		Finance & Value
	Course	Management Accounting, Sustainability, Strategic Financial Management, Case Studies
MM 3		Decisions & Risk
	Courses	Decision Modeling (+Computer Tutorials), Risk Aware Decisions (+Case Studies+Finance), 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	Strategic Management, Managerial Economics, Business Organization and Corporate Law, Strategic Human Resource Management, Leadership and Conflict Management

Curriculum may be subject to change.

MM 4: Innovation & Projects

In this module, participants learn to develop products and business models based on technology-driven innovation, assess technological potential, and address intellectual property challenges. It also provides traditional and adaptive project management skills for dynamic, fast-paced markets. Through interactive lectures and exercises, participants gain tools to initiate, plan, and implement projects, balancing agility and discipline in evolving business environments.

MM 5: Strategy & People

In today's fast-paced business world, this module prepares participants to tackle strategic challenges while fostering employee engagement and creativity. Combining business strategy, corporate law, and HR development, the module addresses competitive advantage, corporate governance, and global teamwork. Participants explore leadership concepts, digital transformation, and incentive systems, applying evidence-based tools in case studies and practical exercises. Participants will be able to analyse and understand strategic corporate goals in dynamic markets from a human-centred perspective.



Technology & Management Know-How

Quality Made by the Karlsruhe Institute of Technology (KIT)

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

The school's mission is to provide working professionals with state-of-the-art technological expertise and management know-how through part-time educational programs. The HECTOR School promotes lifelong learning within the industry. Participants are supported in their career development through executive master's degree programs, certificate courses, and customized partner programs.

The benefits of the executive master's programs are numerous, both for the participants and 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 research at the Karlsruhe Institute of Technology (KIT).
- Part-Time Structure: Allows participants to continue with their demanding careers while 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.



Worldwide Standing #102 Worldwide Standing #6 Kanking in Germany #6



for the Technology Business School of the KIT



Executive Master of Science Programs

Cutting Edge Technology Combined with the Latest Management Expertise



Key Facts Part-Time Master's Program, English-Taught, Duration of 20 Months

Academic Degree

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

Accreditation

The KIT is system-accredited by AAQ.



All HECTOR School Master's Programs are accredited by the internal quality assurance system of 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.

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 Calendar

Job-Compatible Format and an Ideal Work-Study Balance

September 2025									
Mon	Tue	Wed	Thu	Fri	Sat	Sun			
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22	23	24	25	26	27	28			
MM1	30								

January 2026										
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MM2	13	14	15	16	17	18				
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May 2026											
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September 2026								
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	MM4	15	16	17	18	19	20	
	21	22	23	24	25	26	27	
	28	29	30					

Welcome Event

Exams

MM Management Modules

EM Engineering Modules

Please note: Dates are subject to change.

October 2025									
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EM5	27	28	29	30	31		23	24	
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November 2025									
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December 2025

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August 2026						
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December 2026						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
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MM5	08	09	10	11	12	13
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28	29	30	31			

The academic calender 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:

>> 9 months project work MPD, POM, MSEM, EEM

>> 6 months project work ISEM, FE

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Our Programs



Course Guide Book



Download Timetable



HECTOR SCHOOL of engineering & management

Do you have questions? We are looking forward to assisting you.



Judith Elsner Managing Director



Head of Business Development and Communications



Stefan Franck Team Leader Operations

Hanna Meinzei



Martina Waldner Senior Program Consultant



Lea Skiljo Manager Operations



Program Consultant



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