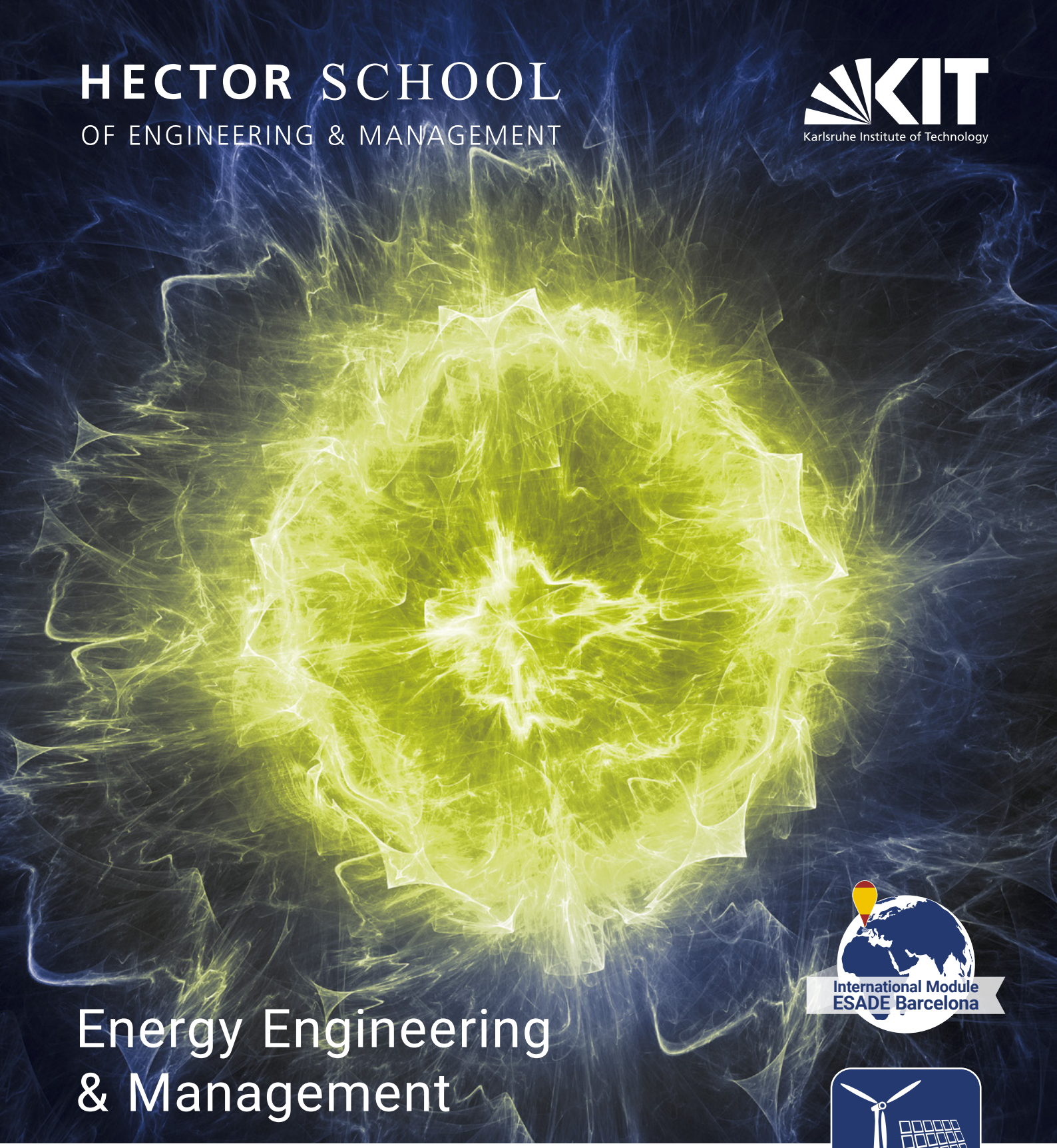
HECTOR SCHOOL
OF ENGINEERING & MANAGEMENT

Karlsruhe Institute of Technology



International Module
ESADE Barcelona

Energy Engineering & Management

Executive Master's Program

Future Energy Systems and Technologies

Download this brochure

Become a HECTOR School Master

Leadership Know-How for Demanding Careers

»KIT provides an intensive, exciting, and focused opportunity to improve every aspect of my business & technology skills. It was an immensely stimulating experience. Every day was intense but extremely rewarding. KIT expanded my mind.

After the master program, the world became smaller and my personal and professional goals grew bigger. Networking was valuable from a professional standpoint, but it was my classmates' real-life experiences and diverse backgrounds that broadened my perspective.

I developed solid relationships with many of my classmates. We often meet or email each other, and they are becoming something like a personal board of directors whose judgment I trust.

This was an inestimable feature of the master program, and it's something I did not expect.«

Marcus Welz, Vice President Smart Mobility at Hyundai
Alumus of Intake 2013

Voices
More Alumni

Executive Master's Program

Energy Engineering & Management

BATTERIES INTEGRATION OF RENEWABLES POWER GENERATION CORPORATE INNOVATION & ENTREPRENEURSHIP ENERGY SYSTEMS ANALYSIS FINANCE & VALUE WIND ENERGY PLANTS MARKETING & DATA ENERGY MARKET EMERGING TECHNOLOGIES DECISIONS & RISK ENERGY STORAGE SMART GRIDS & BUILDINGS EFFICIENCY POWER TO X E-MOBILITY

Program Directors

Prof. Dr.-Ing. Marc Hiller
Institute of Electrical Engineering, KIT

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

The Master's program in Energy Engineering & Management is designed for professionals working in companies involved in the generation, transportation, distribution, storage, and sale of energy (electrical, solar, thermal, etc.), their suppliers, and industrial sectors that rely heavily on energy.

Graduates of the program will have a comprehensive overview of current and future technologies for new energy systems. They will be able to contribute significantly to the successful introduction of new sustainable energy systems and will be able to assess and evaluate not only sustainability, but also operational efficiency, availability and safety.

Graduates will be able to understand, quantitatively describe, evaluate and optimize the elements of energy systems and their complex interactions. They are able to understand innovation processes and to apply their knowledge effectively and successfully either in existing companies or when founding start-ups. The technical, methodical, process-oriented and managerial knowledge that is taught in the Energy Engineering & Management modules is essential for this.

In addition, internationalization and mobility are key factors of the Master's program, as the energy sector operates internationally. This is underlined by the cooperation with the Knowledge Innovation Center InnoEnergy, which supports the goals of the European Union to achieve a climate-neutral and sustainable energy supply. Another result of the cooperation is an exchange module with the world-renowned business school ESADE in Barcelona, Spain.

Besides engineering expertise, Energy Engineering & Management shares five management modules with the other master 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 commercial implications of project decisions and develop a holistic view.

Engineering Modules (EM)

State-of-the-Art Technology Expertise in Energy Systems & Technologies

»The implementation of a sustainable energy system requires networked methods and models that provide companies, politics and society with the necessary basis for making scientifically sound decisions on the design of the energy system transformation. "Energy Engineering and Management" enables the students to play an active role in this transition process.«

Prof. Dr.-Ing. Marc Hiller
Institute of Electrical Engineering, KIT | Program Director EEM

EM 1	**Renewables**	
	Courses	Photovoltaics, Wind and Water Power, Solar and Geothermal Power
EM 2	**Energy Conversion**	
	Courses	Fuel Cells, Energy Carrier Hydrogen, Design of Fuel Cell Systems, Carbon Capture and Storage, Sector Coupling, Energy from Biomass
EM 3	**Electricity Generation & Energy Storage**	
	Courses	Power Generators, Power Electronics, Batteries, Thermal Storage, Battery Management Systems
EM 4	**Smart Networks & Energy Distribution**	
	Courses	Introduction to Power Systems/ High Voltage Engineering, Components of Power Systems, Transmission & Distribution, Smart Grids & Emerging Technologies
EM 5	**Energy Economics**	
	Courses	Energy Economics, Energy Markets, European Network Regulations, Energy Systems Analysis, Energy Efficiency (Supply and Demand Side), Integration of Energy Systems and E-Mobility

Crash Course	**Selected Topics of Electrical Engineering, Engineering Thermodynamics, and Fluid Mechanics**	
		We highly recommend all applicants to participate in the courses to update the technical knowledge, as it might be a crucial factor for a successful degree at the HECTOR School.

EM 1: Renewables

The module provides an overview of the energy cascade from the primary energy sources through the various stages of energy conversion, the transportation and distribution of energy to its ultimate use. Technical, environmental and socio-economic aspects are highlighted.

When presenting energy systems based on renewable energy sources, this module focuses on wind and hydro power, geothermal and solar thermal energy as well as photovoltaics (pv). PV is one of the most widely discussed forms of renewable energy generation. An in-depth understanding of its operating principles, structure and mechanisms is essential to understanding the limitations and opportunities of the technology.

For the processes covered in this course, the supply of renewable primary energy provided by nature is first described, before investigating the individual technical features of the power plants. Wind energy plants serve as an example to convey the interdisciplinary nature of energy conversion plants, in which fluid mechanical, static, mechanical, electrical and electronic considerations are all closely linked to systemic and economic aspects.

EM 2: Energy Conversion

The module on 'Energy Conversion' explores innovative solutions to address global sustainability challenges. Participants will gain comprehensive knowledge of fuel cell technology, hydrogen as an energy carrier, and carbon capture and storage approaches. Participants learn how to design energy systems tailored to specific applications while considering material properties, efficiency, and lifetime.

Additionally, participants will get deep insights into biomass conversion, examining technical, ecological, and economic factors, and explore sector coupling for integrated energy systems. Through these courses, participants will build a strong expertise in advanced energy technologies, fostering sustainable solutions for climate change and the transition to a low-carbon future.

Curriculum may be subject to change.

Activate the Progress of Intelligent Energy Systems and Energy Transition

EM 3: Electricity Generation & Energy Storage

The 'Electricity Generation & Energy Storage' module explores modern power technologies and the next generation of energy storage systems.

It begins with an in-depth look at power generators, teaching the fundamentals of synchronous machines and simulations in case studies. Next, students explore power electronics, which is essential for understanding the technology drivers of renewable energy, energy efficiency and propulsion, with a focus on conversion principles.

Later in the module, current and future battery technologies are compared, while innovations in the field of heat storage and the hydrogen economy are also discussed. Finally, the module focuses on battery management systems, including diagnostic techniques and state-of-charge and state-of-health estimates, to provide an understanding of the optimization parameters of lithium-ion batteries, for example.

EM 4: Smart Networks & Energy Distribution

This module provides a comprehensive overview of power systems, exploring their fundamental components, structural characteristics, and operational behaviors. It opens with an introduction to power systems and essential high voltage engineering concepts before delving into the functions, state-of-the-art technologies, and performance of key system elements. The discussion then extends to the intricacies of transmission and distribution networks, highlighting network calculation and control techniques. Finally, the module addresses contemporary shifts in power systems, emphasizing smart grid innovations and the role of building performance in optimizing energy balance and sources.

EM 5: Energy Economics

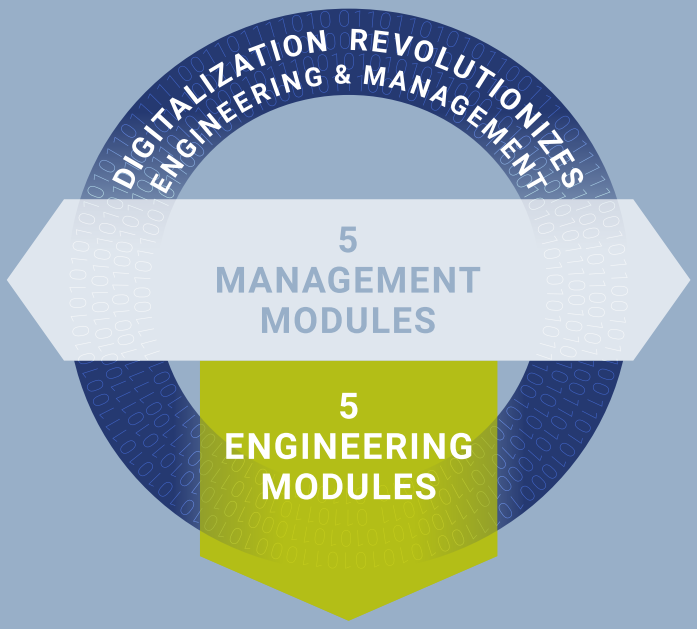
Against the backdrop of a rapidly evolving energy systems landscape, this module explores the unique challenges and opportunities shaping today's energy markets.

It examines key issues - from energy efficiency on both the supply and demand side, to electric mobility, market liberalization and regulatory frameworks - through a techno-economic lens.

The module covers energy systems analysis approaches, a holistic approach that considers the interactions between energy systems and industries such as commodities, construction, manufacturing and transport, and concludes by exploring the integration of energy systems with electric mobility.

Management Modules (MM)

Economic Know-How for Successful Managers



MM 1	Courses	**Marketing & Data Science** Data Driven Marketing, Information Systems Management, Data Analytics, Legal Aspects of Information
MM 2	Courses	**Finance & Value** Management Accounting, Sustainability, Strategic Financial Management, Case Studies
MM 3	Courses	**Decisions & Risk** Decision Modeling (+Computer Tutorials), Risk Aware Decisions (+Case Studies+Finance), Interactive Decisions, Robust and Stochastic Optimization
MM 4	Courses	**Corporate Innovation and Intrapreneurship** Corporate Entrepreneurship, Entrepreneurial Leadership, Strategic Innovation Management, Opportunity Development -Design Thinking, Exploring the Opportunity: Technology and Markets, Pitching Business Ideas, Creating Value through Business Models, New Product Development and Service Innovation, Measuring Innovation: Innovation Balanced Scorecard, Pitching Business Models
MM 5	Courses	**Strategy & People** Strategic Management, Managerial Economics, Business Organization and Corporate Law, Strategic Human Resource Management, Leadership and Conflict Management

Curriculum may be subject to change.

esade
RAMON LLULL UNIVERSITY

I have been at
ESADE Barcelona

Big Picture Management Modules

Management is becoming increasingly important in data-driven organizations, while at the same time becoming more complex and interconnected. Engineers and managers need to have a holistic understanding of all areas of the business in order to make the right decisions. This also means that innovation must be viewed and experienced as an integrated system from the perspective of the market, the employees and the company. All of the HECTOR School's Master's programs therefore include five management modules in which the latest theories and methods are taught.

Participants from different industries and international locations can share their expertise, discuss current technological and business challenges from different perspectives, and build a sustainable network of peers.

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 requires 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.

Daniel Keller
Alumnus of Intake 2013

»I have very fond memories, which are of course also due to the beautiful city of Barcelona. What was special about the Master's in Energy Engineering & Management was the module abroad. Our fellow students in the other modules were very envious of that. We especially learned a lot in the intercultural exchange - also with lecturers from different countries.«

MM 4: Corporate Innovation & Intrapreneurship

Based at the prestigious ESADE Business School in Barcelona, this module immerses participants in the dynamic world of business innovation and entrepreneurship. It covers key topics such as innovation-driven business models, design thinking, strategic innovation management, and opportunity development. Participants will explore new product development, market disruption, and entrepreneurial leadership skills while learning to measure and implement innovation strategies effectively. Practical courses on pitching business ideas and managing technology-market dynamics equip participants to drive impactful ventures, ensuring agility and success in today's rapidly evolving and competitive business landscape.

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.

Portrait of the HECTOR School

QS World University Ranking 2026

Worldwide Standing	Among the best	Ranking in Germany	Ranking in Europe
#98	7%	#5	#59

Executive Education @HECTOR School

1 Technology Transfer & Innovation

from the internationally renowned university - the KIT.

2 Power of Networks

benefit from a comprehensive professional network of academemics and industry partners worldwide.

3 Part-Time Programs

allow for simultaneous work and study for participants and their companies.

4 Management & Engineering

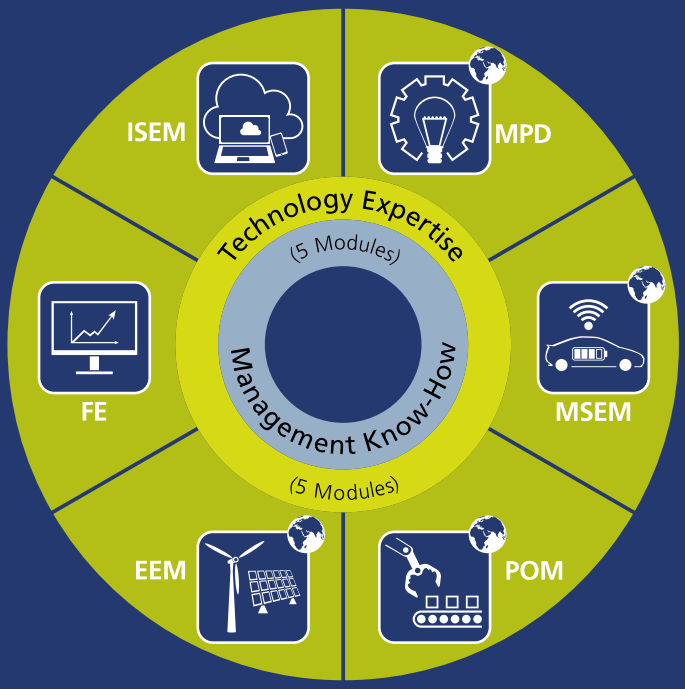
combined makes our programs unique and ensures long term sustainability and competitiveness.

4 REASONS

for the Technology Business School of the KIT

Executive Master of Science Programs

Cutting Edge Technology Combined with the Latest Management Expertise



EEM	Energy Engineering & Management
FE	Financial Engineering
ISEM	Information Systems Engineering & Management
MPD	Management of Product Development
MSEM	Mobility Systems Engineering & Management
POM	Production & Operations Management

= including module at another international location

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
01	02	03	04	05	06	07
08	09	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
MM1	30					

October 2025

Mon	Tue	Wed	Thu	Fri	Sat	Sun
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13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

November 2025

Mon	Tue	Wed	Thu	Fri	Sat	Sun
					01	02
03	04	05	06	07	08	09
EM1	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

December 2025

Mon	Tue	Wed	Thu	Fri	Sat	Sun
01	02	03	04	05	06	07
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22	23	24	25	26	27	28
29	30	31				

January 2026

Mon	Tue	Wed	Thu	Fri	Sat	Sun
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05	06	07	08	09	10	11
MM2	13	14	15	16	17	18
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26	27	28	29	30	31	

February 2026

Mon	Tue	Wed	Thu	Fri	Sat	Sun
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16	17	18	19	20	21	22
EM2	24	25	26	27	28	

March 2026

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April 2026

Mon	Tue	Wed	Thu	Fri	Sat	Sun
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MM3	14	15	16	17	18	19
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27	28	29	30			

May 2026

Mon	Tue	Wed	Thu	Fri	Sat	Sun
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June 2026

Mon	Tue	Wed	Thu	Fri	Sat	Sun
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EM3	09	10	11	12	13	14
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22	23	24	25	26	27	28
29	30					

July 2026

Mon	Tue	Wed	Thu	Fri	Sat	Sun
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EM4	14	15	16	17	18	19
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August 2026

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24	25	26	27	28	29	30
31						

September 2026

Mon	Tue	Wed	Thu	Fri	Sat	Sun
	01	02	03	04	05	06
07	08	09	10	11	12	13
MM4	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

October 2026

Mon	Tue	Wed	Thu	Fri	Sat	Sun
			01	02	03	04
05	06	07	08	09	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
EM5	27	28	29	30	31	

November 2026

Mon	Tue	Wed	Thu	Fri	Sat	Sun
						01
02	03	04	05	06	07	08
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16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

December 2026

Mon	Tue	Wed	Thu	Fri	Sat	Sun
	01	02	03	04	05	06
MM5	08	09	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Welcome Event
MM Management Modules
EM Engineering Modules
Exams

Please note: Dates are subject to change.

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**

Intake 2025

Our Programs

Course Guide Book

Timetable

HECTOR SCHOOL
OF ENGINEERING & MANAGEMENT

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

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More about our Services

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