

Energy Engineering & Management

Executive Master's Program Future Energy Systems and Technologies



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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
Alumnus 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**



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

Graduates of the program stand out due to an extensive overview on present and future technology for new energy systems. They are able to significantly participate in the successful introduction of new sustainable energy systems and to appraise not only the sustainability but also the aspects of operating efficiency, availability and safety as well and can evaluate them adequately.

Graduates can therefore understand, quantitatively describe, evaluate and optimize the elements of energy systems and their complex interactions. They are able to understand innovation processes and can effectively and successfully apply their knowledge either in existing companies or when founding "start-ups". Professional, methodical, process and management knowledge is essential for this, as it is imparted in the modules of Energy Engineering & Management.

Program Directors



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

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

Additionally, internationalization and mobility are key factors of the master program since the energy sector operates internationally. This is emphasized by the cooperation with the Knowledge Innovation Centre InnoEnergy and therefore supports the aims of the European Union to achieve a climate neutral and sustainable energy supply. Furthermore, one result of the cooperation is an exchange module with the worldwide renowned Business School ESADE in Barcelona/Spain.

In addition to the engineering expertise, Energy Engineering & Management shares five management modules with the other master programs. This fosters networking across industries and provides the participants with general knowledge in finance, accounting, marketing, international multi-project management, international law, and human resource management. Therefore, they can 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 starts with a general introduction to the challenges of energy supply, examining the historic and future developments of global energy requirements as well as existing primary energy sources and reserves. Aside from this, it 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, ecological and socio-economic aspects are highlighted.

During the presentation of energy systems based on renewable sources of energy, the focus is placed on wind and hydroelectric power as well as geothermal and solar thermal energy. For didactic reasons, systems based on other renewables, such as photovoltaics and biomass, are dealt with in other engineering modules.

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 provides an overview on thermal processes for power and heat production from fossil and biogenic fuels. The whole range of fuel to energy via thermal processes is covered, starting from the combustion process, coal and gas fired power plants, gas and steam turbines, CO₂ reduction by capture and storage, and finally special aspects of biomass utilization.

Based on a sound knowledge of the technical fundamentals, the module will lead to the understanding of complex energy conversion systems and typical plants. The participants develop and improve their evaluation skills with regards to technology, economy and ecology.

Activate the Progress of Intelligent Energy Systems and Energy Transition

EM 3: Electricity Generation & Energy Storage

In this module, the focus is on the generation of electricity on the one side and energy storage on the other. The most commonly used power generator in electrical power stations is the gas turbine. Understanding and knowledge of critical issues related to synchronous generator operation is provided.

In addition, photovoltaics is one of the most discussed forms of renewable energy generation. It converts solar radiation directly into electrical energy. Participants will understand photovoltaics as an energy source, its working principle and mechanisms to improve efficiency. This will provide insights into the public as well as scientific discussion and highlights boundary conditions with regard to requirements of energy storage.

Batteries and fuel cells are one way to store the power. The participants will become familiar with the concepts of electrochemical energy storage and the design of efficient batteries. The module discusses the available state-of-the-art fuel cell technologies and their efficiencies as well as the respective opportunities and limitations.

EM 4: Smart Networks & Energy Distribution

This module gives an overview of major power system components, structure and main operation behavior. It starts with an introduction to power systems and basic knowledge of high voltage engineering. The second part focuses on the main components and describes mainly the function, state-of-the-art and their behavior. The main transmission and distribution aspects are covered in the third part of the module, including network calculation and control. Due to recent and future changes in power systems a strong focus in part four is on smart grids and their performance. Additionally, building performance with respect to energy balance and energy sources is included.

EM 5: Energy Economics

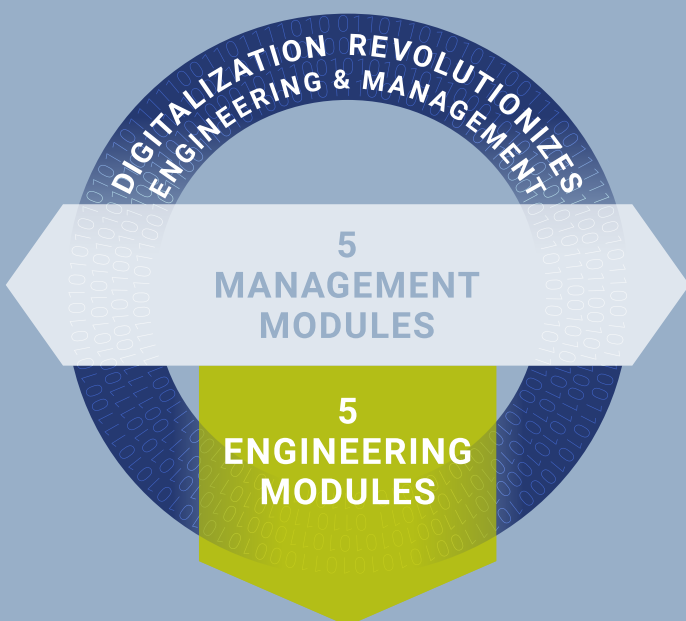
Various peculiarities of the energy market (energy efficiency on the supply and demand side, electric mobility, market opening, regulation, etc.) are analyzed from a techno-economic point of view within this module.

In order to be able to identify optimal strategies within this complex sector, there is an introduction into energy systems analysis at the beginning of the module. Energy systems analysis considers the totality and the interactions of energy systems, among other things, with the commodities industry, the building trade, industry and transport. The integration of energy systems and e-mobility concludes this module.



Management Modules (MM)

Economic Know-How for Successful Managers



MM 1	Marketing & Data Science
Courses	Data Driven Marketing, Information Systems Management, Data Analytics, Legal Aspects of Information
MM 2	Finance & Value
Courses	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	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	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.

Big Picture Management Modules

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), see innovation as an integrated system (CORPORATE INNOVATION & INTRAPRENEURSHIP) from the perspective of the market (MARKETING), the employees (STRATEGY & PEOPLE), and the company (FINANCE & VALUE).

All Master's Programs share five management modules conveying the latest theories and methods in management. 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.

MM 1: Marketing & Data Science

Learn how information can be used to improve business performance, covering issues such as the implementation of information systems, the analysis of (big) data, machine learning, and legal requirements. Another focus is on learning how to create value from information using customer solutions.

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: Corporate Innovation & Intrapreneurship

The module provides knowledge regarding strategies on how to manage innovation within the company and how to apply tools, models and processes that are necessary to generate innovative ideas. It focuses on issues like corporate innovation, corporate entrepreneurship, measuring innovation and innovation in practice. Participants will acquire skills such as understanding the organizational context, managing change, decision-making and innovation. It takes place at the ESADE Business School in Barcelona/ Spain.



»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.«

Daniel Keller

Alumnus of Intake 2013



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.



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 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's degree programs, certificate courses, and customized partner programs.

The benefits of the executive Master's 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



Employability Ranking 2022



Germany

Europe

Worldwide

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 academics and industry partners worldwide.

3 Management & Engineering

combined makes our programs unique

and ensures long term sustainability and competitiveness.

4 Part-Time Programs

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

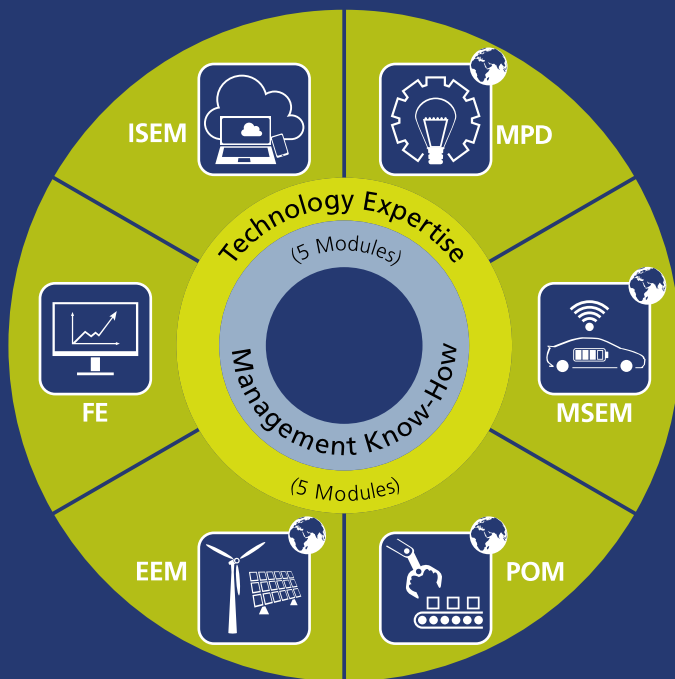
4 REASONS

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							October 2025							November 2025							December 2025							
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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15	16	17	18	19	20	21	13	14	15	16	17	18	19	EM1	11	12	13	14	15	16	15	16	17	18	19	20	21	
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MM2	13	14	15	16	17	18	09	10	11	12	13	14	15	09	10	11	12	13	14	15	MM3	14	15	16	17	18	19
19	20	21	22	23	24	25	16	17	18	19	20	21	22	16	17	18	19	20	21	22	20	21	22	23	24	25	26
26	27	28	29	30	31		EM2	24	25	26	27	28		23	24	25	26	27	28	29	27	28	29	30			
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May 2026							June 2026							July 2026							August 2026							
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11	12	13	14	15	16	17	15	16	17	18	19	20	21	EM4	14	15	16	17	18	19	10	11	12	13	14	15	16	
18	19	20	21	22	23	24	22	23	24	25	26	27	28	20	21	22	23	24	25	26	17	18	19	20	21	22	23	
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September 2026							October 2026							November 2026							December 2026							
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MM4	15	16	17	18	19	20	12	13	14	15	16	17	18	09	10	11	12	13	14	15	14	15	16	17	18	19	20	
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28	29	30					EM5	27	28	29	30	31		23	24	25	26	27	28	29	28	29	30	31				

- Welcome Event
- MM Management Modules
- EM Engineering Modules
- Exams

Please note: Dates are subject to change.

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**:

>> 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.



Judith Elsner
Managing Director
HECTOR School



Nico Jäckel
Head of Sales and Marketing
HECTOR School



Stefan Franck
Team Leader Operations
HECTOR School



Martina Waldner
Senior Program Consultant
HECTOR School



Yaxian Liu
Program Consultant
HECTOR School



Miriam Heinrich
Manager Operations Examinations
HECTOR School



Hanna Meinzer
Manager Operations Master's Thesis
HECTOR School



Lea Skiljo
Manager Operations
HECTOR School Academy



Sabrina Wunderlich
Manager Operations
HECTOR School



Janina Guptill
Marketing Manager
HECTOR School



Jelena Parassides
Marketing Manager
HECTOR School



Katrin Olböter
Junior Manager
Recruitment and Admissions
HECTOR School



Jolana Lang
Sales Assistant
HECTOR School



Temir Vinokhodov
Junior Program Consultant
HECTOR School



Celine Decker
Junior Manager Operations
HECTOR School

International Department of the Karlsruhe Institute of Technology (KIT) gGmbH

Schlossplatz 19 | 76131 Karlsruhe/Germany

Phone +49 (0)721-608 47880

E-mail info@hectorschool.kit.edu

Web www.hectorschool.kit.edu

More about



Our Services

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