Executive Master Program
Green Mobility Engineering

Technology + Management
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 the SAP AG.

The school envisions 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.

The benefits of the executive master programs are manifold, for participants as well as for their companies:

- **Unique holistic approach**: combination of technology expertise with management know-how
- **Direct transfer of state-of-the-art knowledge**: from research of the Karlsruhe Institute of Technology (KIT)
- **Part-time structure**: allows participants to continue with demanding careers whilst acquiring new skills
- **The master thesis provides an excellent opportunity to set up innovation projects**: companies gain outstanding added value through the consultation of such projects by professors from KIT
- **Excellent network opportunities**: professional networking is fostered across industries and on an international scale

About one-third of all energy consumed in a country is attributed to mobility. Transport emissions strongly influence global warming and air quality. Thus, mankind will naturally strive for 'green mobility' systems. This vision of green mobility requires engineers who are committed and develop new green technologies.

Graduates of Green Mobility Engineering (GME) are able to meet the requirements of future mobility systems regarding the conversation of natural resources and environment protection as well as social acceptance, and to drive the re-orientation regarding energy and utilization efficiency, zero emission level, neutral CO2-balance, safety, comfort and affordability. They are capable to analyze complex systems by means of innovative solutions and to bring innovative mobility concepts successfully to the market. GME combines technical subjects with economics and legal aspects in a unique way.

Even in Central Europe the climate change has become a reality by now. For the future it is therefore increasingly urgent to develop renewable and climate-friendly technologies for individual and public mobility. In order to bring innovative mobility concepts successfully to the market, GME combines technical subjects with economics and legal aspects in a unique way.

Even in Central Europe the climate change has become a reality by now. For the future it is therefore increasingly urgent to develop renewable and climate-friendly technologies for individual and public mobility. In order to bring innovative mobility concepts successfully to the market, GME combines technical subjects with economics and legal aspects in a unique way.

Prof. Dr. Martin Doppelbauer & Prof. Dr. rer. nat. Gauterin
Institute of Electrical Engineering, KIT
Prof. Dr. rer. nat. Frank Gauterin
Institute of Vehicle System Technology (FAST), KIT
Prof. Dr. Martin Klaremann
Institute of Information Systems & Marketing, KIT
Program Directors GME

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, 9 months
- 5 Engineering and 5 Management Modules
- Teaching language: English
- Yearly program start in October

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

**Admission Requirements**
- An academic degree: e.g. Bachelor, Master, or Diploma
- 1-2 years work experience (depending on the first degree’s level; recommended > 3 years)
- TOEFL score of at least 230 or 90 iBT

**Accreditation**
All M.Sc. programs are accredited by ASIIN. ASIIN was acknowledged as the first European continental accreditation agency by the Washington Accord (W.A.) in 2003.

»Even in Central Europe the climate change has become a reality by now. For the future it is therefore increasingly urgent to develop renewable and climate-friendly technologies for individual and public mobility. In order to bring innovative mobility concepts successfully to the market, GME combines technical subjects with economics and legal aspects in a unique way.«

Prof. Dr.-Ing. Martin Doppelbauer & Prof. Dr. rer. nat. Gauterin
Institute of Electrical Engineering, KIT
Prof. Dr. rer. nat. Frank Gauterin
Institute of Vehicle System Technology (FAST), KIT
Prof. Dr. Martin Klaremann
Institute of Information Systems & Marketing, KIT
Program Directors GME

About one-third of all energy consumed in a country is attributed to mobility. Transport emissions strongly influence global warming and air quality. Thus, mankind will naturally strive for 'green mobility' systems. This vision of green mobility requires engineers who are committed and develop new green technologies.

Graduates of Green Mobility Engineering (GME) are able to meet the requirements of future mobility systems regarding the conversation of natural resources and environment protection as well as social acceptance, and to drive the re-orientation regarding energy and utilization efficiency, zero emission level, neutral CO2-balance, safety, comfort and affordability. They are capable to analyze complex systems by means of innovative solutions and to bring innovative mobility concepts successfully to the market.

For this purpose, they acquire an extensive and structured system-knowledge, divided into the subsystems automotive (with its components, functional elements and materials), driver, traffic, infrastructure, markets and society. They are capable to analyze complex systems by taking relevant inter-dependencies between subsystems and level of details into account and deriving approaches for sustainable mobility and automotive concepts.

Methods and processes needed for an efficient development of technical, economical and in the market successful and innovative solutions are familiar to the graduates. Moreover they are capable to reduce complexity by means of innovative problem solution methods and further creativity approaches.

For that, they will attain knowledge, skills, capabilities and competences in the fields of energy efficient combustion machines, regenerative fuels, energy sources and storages, safe and efficient propulsion systems, efficient use of available energy in the car, lightweight design, control and regulation concepts, architectures and technologies, E-Engines, power electronics, embedded electronic systems, sensor data processing, production systems for electro mobility, drivability, models of human behavior, noise and vibration comfort, advanced driver assistance systems, car-to-car and car-to-infrastructure communication systems, automated perception of environment by cars, autonomous vehicles, mobility supply and demand, holistic CO2-balance and smart supply of energy.

On top the master program shares five management modules with the other master programs. This fosters the network across industries and provides the participants with general knowledge in finance, accounting, marketing, international multiproject management, international law, and human resource management. By this they can consider the commercial implications of project decisions and develop a holistic view.
The most important control system in the car is the driver. Understanding its sensation, cognition, and action is very important to create attractive vehicle concepts and to get the driver’s acceptance. This module addresses different aspects of the driver-vehicle interaction. The drivability deals with the usability of a vehicle by the driver including ease of use, fulfillment of driver’s expectations concerning safe, comfortable and efficient driving, degree of complexity of the driver vehicle interface, and predictability of vehicle’s action and reaction. Many different methods to evaluate the driver needs, benefits and acceptance exist and will be presented in this module.

EM 4: Vehicle Traffic Interaction

This module extends the scope of green mobility to the perspective of multiple cars interacting on the road and with traffic-related infrastructure. Cars will become able to perceive their environment and react autonomously to reduce the risk of accidents, to improve driving efficiency and comfort. Autonomous driving has the potential to improve traffic flow, reduce traffic congestions and save energy. Enhanced traffic management systems will increase the ability of the driver to interact with the car and the surrounding traffic.

This module introduces technologies for vehicle perception based on lidar, radar and visual camera sensors. The interpretation of the sensor signals to obtain a consistent model of the environment is demonstrated. Latest developments of car-to-x-communication systems are presented and improvements in safety and traffic flow are discussed. Finally, models of traffic flow and traffic management are introduced. Traffic demand modeling as a core concept for modern traffic management is included in this module.

EM 5: Success Factors of Green Mobility

Developing future ‘Green Mobility’ products requires advanced technologies and production systems as well as an understanding of demand and supply in transportation markets. Those factors are boundary conditions for the successful implementation of future mobility systems.

This module introduces lightweight strategies and methods of manufacturing as well as production systems for e-mobility. Key aspects of electric energy distribution systems and management are addressed. Participants are enabled to evaluate vehicle concepts based on total cost of ownership and well-to-wheel CO2-emission scenarios. Transportation markets and their specific mechanisms, trends in travelling demand and economy as well as political regulations are further topics. Finally participants are enabled to analyze market opportunities for future projects.

EM 3: Vehicle Driver Interaction

Modern vehicles are becoming more and more intelligent. Sensors and control units detect and communicate with the environment, recognize other vehicles and other road users, interpret and predict their behavior and improve road safety dramatically. Based on detailed road, infrastructure and traffic data and by using predictive green routing and vehicle operation management a comfortable, economic and time efficient drive is realized.

Many components of actual and future cars are coming along with properties which differ significantly from those in classical vehicles as high torque at zero speed, limited cruising range, new battery charging infrastructure and cost accounting systems, high voltage safety requirements, different noise and vibration, autonomous actions etc. Consequently new vehicle concepts and operation strategies are needed which also affects the human machine interaction. In the vehicle many control units are used.
Management Modules (MM)
Fundamental economic know-how for successful managers

MM 1: International Project Management
International Project Management is a key to the world of business. Participants will get familiar with objectives of project management and scheduling, analysing planned projects and controlling project execution. Particular attention is paid to the construction of project networks and Gantt charts, heuristic solution procedures and rescheduling. Modelling, planning and scheduling, which arise in a great variety of practical situations, are also emphasized.

MM 2: Finance for Executives
Finance for Executives provides participants with an understanding of the key financial statements and its underlying accounting principles. The course gives an overview of investment rules and financial decisions.

MM 3: Business Strategy, Marketing & Controlling
This module comprises three important challenges in companies, Business Strategy, Marketing and Controlling. Particular emphasis is placed upon the process of strategic management containing strategic analysis, formulation and evaluation based on competitive advantage, and portfolio strategy. In addition to these concepts approaches of leadership as well as the steps necessary to implement and to ensure the company's continuing success.

MM 4: Human Resource Management
Human Resource Management addresses challenges head on, exploring the key elements of innovation, creativity, risk and ambiguity, bargaining and basic incentive theory. In addition, fundamental problems regarding world economics are discussed, e.g. stagnation and economic growth, unemployment and international division of labor, and harmonization of the international monetary system. The legal section is divided into lectures about the law of business organizations about international patent, trademark and copyright law.

MM 5: Law & Contracts
This module comprises both economics and legal sections. In the economics section, a groundwork is laid through introducing decision theory, expected utility, risk and ambiguity, bargaining and basic incentive theory. In addition, fundamental problems regarding world economics are discussed, e.g. stagnation and economic growth, unemployment and international division of labor, and harmonization of the international monetary system. The legal section is divided into lectures about the law of business organizations about international patent, trademark and copyright law.

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

Alexander Spies
Master in Green Mobility Engineering
Behr GmbH & Co. KG

The five Engineering Modules give a deep insight into the new challenges of the automotive industry. Highly experienced lecturers show the state-of-the-art research in the topics of electro engines, batteries, but also cognitive systems or embedded systems. This broad variety of subjects combined with the five Management Modules with a lot of case studies are the perfect fundament for a further personnel development. On top, you are still able to continue your current job and to introduce the new methods to your daily business life.

Curriculum may be subject to change.
More Master Programs.

Seven Part-time Master Programs

- Production & Operations Management (POM)
- Green Mobility Engineering (GME)
- Management of Product Development (MPD)
- Electronic Systems Engineering & Management (ESEM)
- Energy Engineering & Management (EEM)
- Service Management & Engineering (SME)
- Financial Engineering (FE)

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

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
Web    www.hectorschool.com

Our Social Media Channels

Imprint
Publisher: Marketing Department HECTOR School of Engineering & Management
Edition: 1/2016
Photos: International Department gGmbH, fotolia.com, Karlsruhe Institute of Technology (KIT), Barcodes generated with TEC-IT Barcode Software