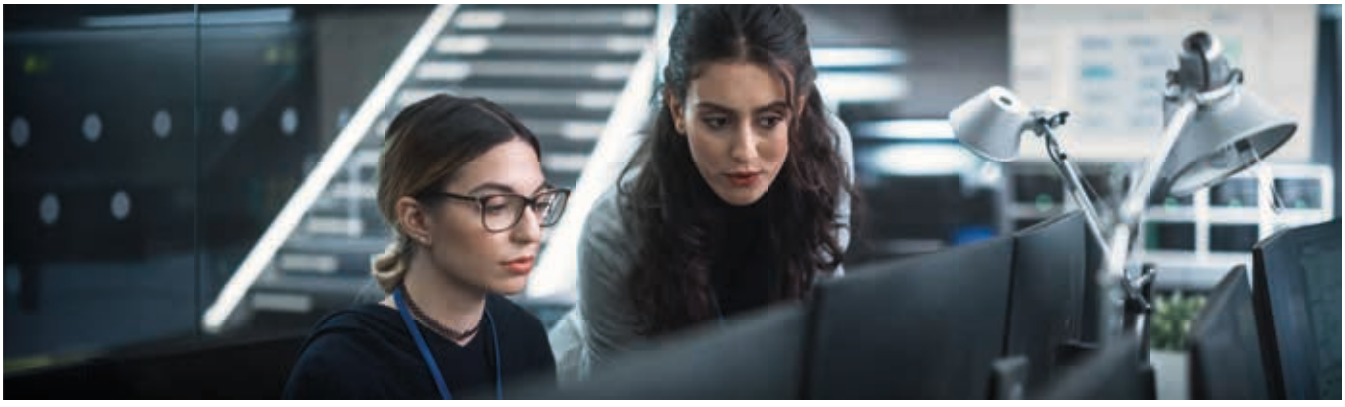
Degree programmes ++ NEW ++

Degree: Master of Science (M.Sc.)

Automotive Systems Engineering & Management



The transformation of the automotive industry is creating a strong demand for professionals who can combine advanced engineering expertise with management skills.

The Master's degree programme "Automotive Systems Engineering & Management" at the FOM University of Applied Sciences prepares you to take on technical and managerial responsibilities in the international automotive and mobility industry. You learn to analyse and develop modern vehicle systems, including electric powertrains, battery technologies, connected vehicles and autonomous systems. The programme also enables you to assess technologies such as artificial intelligence, sensor systems and software-defined vehicle architectures, while taking economic, regulatory and societal aspects into account.

The Master's programme "Automotive Systems Engineering & Management" is taught entirely in English and will be completed with the academic degree Master of Science (M. Sc.).

Support for all issues relating to your study

Phone: +49 201 81004 864 WhatsApp: +49 171 3338539
Monday to Friday from 9:00 a.m. to 4:00 p.m. German time
E-Mail: Send us an email to: **incomings@fom.de**

More information
on the degree programme

Locations
Munich

Duration
4 Semester including thesis

Credit Points
120 ECTS

Accreditation
FOM University of Applied Sciences is accredited by the German Council of Science and Humanities and was the first private university in Germany to be system-accredited by FIBAA in 2012. This means that all FOM degree programmes are state and internationally recognised.

Total fee
€ 23,850
(including examination fee and immatriculation fee)

Your career prospects
You can take on the following jobs:

Automotive Systems Engineer
Technical Project Manager
Product Manager Automotive
E-Mobility Specialist
Vehicle Integration Engineer
Innovation Manager Mobility

1st semester

Electric Powertrain & Battery Technology (6 CP)
- Fundamentals of electric drive systems and electric machines used in vehicles
- Battery technologies for electric vehicles, including structure, properties, and lifecycle
- Integration of battery and powertrain systems into vehicle architectures
- Control and optimization strategies for electric powertrains
- Safety, efficiency, and durability aspects of electric powertrain systems

Automotive Informatics (6 CP)
- Structure and development of electrical/electronic vehicle systems
- Integration of software and hardware components in modern vehicles
- Principles of systems engineering and software architecture
- Software development processes, testing strategies, and quality models
- Documentation and modelling of software systems using UML

Automotive Sensor Technologies (6 CP)
- Physical principles and operating mechanisms of automotive sensors
- Selection and application of sensors for vehicle control tasks
- Digital measurement data acquisition and sensor data analysis
- Sensor technologies for driver assistance and environment perception (e.g., radar, LiDAR)
- MEMS sensors and their integration in automotive electronic systems

German (6 CP)
- Basic German language skills for everyday communication
- Development of vocabulary and fundamental grammar structures
- Understanding and reading simple written messages and texts
- Basic oral communication in typical everyday situations
- Learning strategies for independent language acquisition

Research Methods in STEM (6 CP)
- Foundations of scientific research methods in engineering and information systems
- Development of research designs for academic projects
- Application of qualitative and quantitative research methods
- Literature-based research and systematic literature reviews
- Preparation for academic research and the Master's thesis

2nd semester

Energy Management & Charging Infrastructure (6 CP)
- Energy management strategies for electric and hybrid vehicles
- Charging technologies, charging standards, and infrastructure concepts
- Integration of vehicles into smart grids and energy systems (e.g., V2G)
- Planning and evaluation of charging infrastructure and energy networks
- Simulation and modelling of energy and charging systems

AI & Machine Learning in Vehicles (6 CP)
- Fundamentals and development of artificial intelligence and machine learning
- Automotive applications of AI such as perception and predictive analytics
- Supervised, unsupervised, and deep learning methods
- Implementation of machine learning models using Python libraries
- Ethical and societal implications of AI technologies

Vehicle Connectivity (V2X communication) (6 CP)
- Concepts and architectures of connected vehicle technologies (V2X)
- Communication technologies and standards (e.g., ITS-G5, 5G)
- Applications of connected mobility and cooperative driving systems
- Cybersecurity and data protection for connected vehicles
- Regulatory frameworks and market developments in connected mobility

Autonomous Systems (6 CP)
- Architecture and functional principles of autonomous vehicle systems
- Sensor fusion and environment perception for automated driving
- Planning algorithms and decision-making for autonomous systems
- Application of reinforcement learning and intelligent agent systems
- Evaluation of safety, reliability, and regulatory requirements

Production Systems & Management for Electric Cars and Drives (6 CP)
- Fundamentals of production systems in the electric mobility industry
- Manufacturing processes for electric vehicles, batteries, and drives
- Production planning, layout planning, and capacity management
- Lean production, quality management, and Industry 4.0 concepts
- Analysis of global supply chains and production strategies

3rd semester

Security, Safety & Regulatory Management (6 CP)
- Fundamentals of functional safety and cybersecurity in automotive systems
- Key standards and regulations (e.g., ISO 26262, ISO 21434)
- Risk and threat analysis for electric and automated vehicles
- Safety and security management methods (e.g., HARA, TARA)
- Regulatory approval processes and compliance management

Automotive UX/UI Design (5 CP)
- Principles of user experience and user interface design in vehicles
- Human–machine interaction and driver-centered interface design
- Development of multimodal interaction concepts (touch, voice, gestures)
- Prototyping and evaluation of UX/UI concepts through usability testing
- Trends in automotive interfaces for connected and automated vehicles

Vehicle Architecture & System Integration (6 CP)
- Principles of vehicle architectures for modern electric vehicles
- Integration of key subsystems such as drive, energy storage, and software
- Systems engineering approaches for complex vehicle systems
- Identification and resolution of system integration challenges
- Evaluation of future vehicle architectures such as software-defined vehicles

Mobility Concepts & Infrastructures of the Future (6 CP)
- Foundations of modern mobility systems and mobility infrastructures
- Comparison of individual and shared mobility concepts
- Fleet management strategies and mobility service models
- Economic and infrastructure analysis of mobility solutions
- Evaluation of future mobility and logistics concepts

Applied Project I (6 CP)
- Investigation of practical research questions in a project context
- Application of scientific methods to real-world problems
- Transfer of theoretical knowledge into professional practice
- Independent research and project implementation
- Presentation and discussion of project results

4th semester

Master's Thesis (19 CP)
- Independent research on a practice-oriented scientific topic
- Application of appropriate research methods and analytical techniques
- Structured documentation and presentation of research results
- Integration of theoretical knowledge and practical applications
- Completion of a comprehensive scientific thesis

Oral Defence (6 CP)
- Presentation of the Master's thesis and its key findings
- Defence of research methodology and results
- Discussion of subject-specific and interdisciplinary aspects
- Justification of conclusions and recommendations
- Reflection on the scientific research process

Applied Project II (6 CP)
- Investigation of practical research questions in a project context
- Application of scientific methods to real-world problems
- Transfer of theoretical knowledge into professional practice
- Independent research and project implementation
- Presentation and discussion of project results

Academic degree:
Master of Science (M.Sc.)