

English language Master programme Renewable Energy and E-Mobility

Target, Background

A rethink in the area of energy supply and use is indispensable in times of climate change and finite nature and instability of fossil fuel supply. Particular attention is given to the use of renewable energy sources such as solar radiation in PV and solar thermal systems, biomass, wind and hydropower as well as the development of electric vehicles. The electrification of the automobile can be a major step towards avoiding the consequences of climate change and at the same time a major step towards the future competitiveness of our automotive industry. The new study program is designed to address these future topics and help to meet the growing need for engineers. There is no equivalent offer in the north of Germany.

Our long-term international experience with a series of English-language lectures as a special offer for the Master of Electrical Engineering with a focus on Renewable Energies as well as the postgraduate course "Renewable Energy and Hydrogen Technology" have been incorporated into this master's program. Synergies can be used with these offers. Our faculty also has a number of cooperative relations with foreign universities, which can be deepened by means of this master program through double-degree agreements.

The study program is aimed at students who have a bachelor's degree in electrical engineering, mechanical engineering and related degrees, and physics.

Study course

The Master's program is offered in a three and four-semester variant because foreign students often come to us with a 180 ECTS bachelor's degree. The four-semester variant includes an additional internship semester. The student can choose from a number of optional modules and in the fields of renewable energies or E-mobility. In two semesters, lectures are held, the third or fourth semesters are used to work on the master's thesis. In addition to compulsory modules based on mathematical and technical principles as well as interdisciplinary qualifications, such as energy and environmental management or quality management in the automotive industry, application-specific expertise is conveyed in compulsory subject areas on various subject areas of the two focus areas. The curriculum is structured as follows:

1. **Mathematical-scientific basics**
Modelling of Physical Systems, System Theory
2. **Specialized technical bases of renewable energy technology**
Regenerative Energy Systems, Methods of Power Engineering, Power Electronics
3. **Application-oriented basic knowledge**
(elective modules, min. 4 or 5 modules have to be chosen)
Current Topics of renewable energy use, Solar Systems, Wind Power Plants, Hydrogen Technology, Project Renewable Energy, Sustainable non-fossil mobility, Fuel cell systems, Control of Electrical Drives, Advanced Power Electronics, Project Seminar E-Mobility, Project Renewable Energy, Vehicle Management Systems, Vehicle Simulation & Test Drive
4. **Interdisciplinary qualifications**(1 from 2)
Quality in Automotive Industry, Environmental Management
5. **Intership semester or project work and 3 free elective modules**
(only 4 semester model)
6. **Master Thesis**

General Requirements

Completed first degree in electrical engineering, energy technology, renewable energies, mechanical engineering, physics or related degrees

Proof of knowledge in the following fields:

- Measurement technology of at least four hours per week for one semester or 5 ECTS points
- Control engineering amounting to at least four hours per week for one semester or 5 ECTS points
- Fundamentals of electrical engineering amounting to at least four hours per week for one semester or 5 ECTS points
- Electrical machines amounting to at least two hours per week for one semester or 3 ECTS points and
- The usual mathematical foundations underlying these fields

Proof of English proficiency (level B2 according to the European Framework of Reference for Languages)

An average mark of the Bachelor's degree of at least 2.0

An average mark of 2.1 to 2.3 is subject to a special individual assessment. For this purpose, a letter of motivation in German or English (approx. 500 words) and, if applicable, further proof of the subject-specific and programme-specific qualification have to be submitted.

Curriculum 3-semester-model

Course	Type	1.	2.	3.	SWH	ECTS
Mathematical-scientific and technical bases					8	12
REEMM1300 - System Theory	CM		4+0		4	6
REEMM2140 – Modelling of Physical Systems	CM	2+2			4	6
Specialized technical bases of renewable energy					12	18
REEMM1400 - Renewable Energy Systems	CM	4+0			4	6
REEMM2130 - Power Electronics ^A	CM	3+1			4	6
REEMM2200 - Methods of Power Engineering	CM		3+1		4	6
Application-oriented profiling, elective modules					16	24
REEMM2010 - Elective Module (AO) I	EM	4			4	6
REEMM2020 - Elective Module (AO) II	EM		4		4	6
REEMM2030 - Elective Module (AO) III	EM		4		4	6
REEMM2040 - Elective Module (AO) IV ^B	EM		4		4	6
Interdisciplinary qualifications (1 from 2)					4	6
REEMM3600 - Quality in Automotive Industry	EM *)	3+1			4	6
REEMM3800 - Energy and Environmental Management	EM *)		3+1		4	6
Master-Thesis with colloquium	CM			6M	6M	30
Total		20	20	6M	40 + 6M	90

Curriculum 4-semester-model without internship-semester

Course	Type	1.	2.	3.	4	SWH	ECTS
Mathematical-scientific and technical bases						8	12
REEMM1300 - System Theory	CM		4+0			4	6
REEMM2140 - Modelling of Physical Systems	CM	2+2				4	6
Specialized technical bases of renewable energy						12	18
REEMM1400 - Renewable Energy Systems	CM	4+0				4	6
REEMM2130 - Power Electronics ^A	CM	3+1				4	6
REEMM2200 - Methods of Power Engineering	CM		3+1			4	6
Application-oriented profiling, elective modules						16	24
REEMM2010 - Elective Module (AO) I	EM	4				4	6
REEMM2020 - Elective Module (AO) II	EM		4			4	6
REEMM2030 - Elective Module (AO) III	EM		4			4	6
REEMM2040 - Elective Module (AO) IV ^B	EM		4			4	6
Interdisciplinary qualifications (1 from 2)						4	6
REEMM3600 - Quality in Automotive Industry	EM *)	3+1				4	6
REEMM3800 - Energy and Environmental Management	EM *)		3+1			4	6
Internship semester	CM			21W		21W	30
Master-Thesis with colloquium	CM				6M	6M	30
Total		20	20	5M	6M	40+11M	120

Curriculum 4-semester-model with internship-semester

Course	Type	1.	2.	3.	4	SWH	ECTS
Mathematical-scientific and technical bases						8	12
REEMM1300 - System Theory	CM		4+0			4	6
REEMM2140 - Modelling of Physical Systems	CM	2+2				4	6
Specialized technical bases of renewable energy						12	18
REEMM1400 - Renewable Energy Systems	CM	4+0				4	6
REEMM2130 - Power Electronics ^A	CM	3+1				4	6
REEMM2200 - Methods of Power Engineering	CM		3+1			4	6
Application-oriented profiling, elective modules						28	42
REEMM2010 - Elective Module (AO) I	EM	4				4	6
REEMM2020 - Elective Module (AO) II	EM		4			4	6
REEMM2030 - Elective Module (AO) III	EM		4			4	6
REEMM2040 - Elective Module (AO) IV ^B	EM		4			4	6
REEMM2060- Elective Module (F) I	EM			4		4	6
REEMM2070 - Elective Module (F) II	EM			4		4	6
REEMM2080 - Elective Module (F) III	EM			4		4	6
Interdisciplinary qualifications (1 from 2)						4	6
REEMM3600 - Quality in Automotive Industry	EM *)	3+1				4	6
REEMM3800 - Energy and Environmental Management	EM *)		3+1			4	6
REEMM4100 Project work	CM			360h		360h	12
Master-Thesis with colloquium	CM				6M	6M	30
Total		20	20	12 +360h	6M	52+6M +360h	120

List of elective modules

Category Application Oriented (AO)

- Hydrogen Technology
- Solar Systems
- Wind Power Plants
- Advanced Power Electronics
- Vehicle Management Systems
- Control of electrical drives
- Project Seminar Electromobility
- Current Topics of renewable energy use I and II
- Project Renewable Energy
- Sustainable non-fossil mobility
- Vehicle Simulation & Test Drive
- Fuel Cell Systems

Category Free (F)

- Power Electronics
- Electrical Energy Conversion and Transmission
- International Accounting
- Selected Topics of control engineering
- German as a foreign Language I
- German as a foreign Language II
- Human Resources Management

- This list also contains all modules of the list AO.
- It is also possible to choose one of the modules "Quality in Automotive Industry" or "Energy and Environmental Management" if it was not chosen in the category interdisciplinary qualifications.

Explanations:

- CM = Compulsory module
- EM = Elective module
- ^A = If students have already taken the subject Power Electronics according to §3 FPO, they must choose a module from the list of elective modules (F) or (AO) instead.
- ^B = If, according to §3 FPO, students do not have a bachelor's degree in electrical engineering or a related program, they must take the module REMMM 2120 "Electrical Energy Conversion and Transmission" instead. In this case, the module may not be chose again as an elective.
- *) = One of these two modules must be selected; on request, additional modules from the area of "Interdisciplinary qualification" from other Master's degree courses in the Department of Electrical Engineering and Computer Science can also be selected.
- 6M = 6 months
- 360h = 360 hours
- x + y = Lecture-/ seminar-style tuition- / exercise hours + laboratory-/seminar hours

The subdivision of the semester week hours (SWH) during lecture-/ seminar-style tuition- / exercise hours + laboratory-/seminar hours is a proposal, which can be varied by the instructor in his / her own direction.

Contact

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