

**Study and Examination Regulations
for the master's degree programme
Electromobility, M.Sc.
at Deggendorf Institute of Technology**

of 15 November 2022

Based on Art. 13(2) Sentence 2, 58(1), 61(2) Sentence 1 of the Bavarian Higher Education Act (BayHSchG) of 23 May 2006 (GVBl. [law and official gazette] p. 245, BayRS 2210-1-1-WK), last amended by Section 2 of the Act of 23 December 2021 (GVBl. p. 669)

**Section 1
Aim of the study programme**

The master's degree programme of Electromobility is designed to enable graduates of *Diplom* or bachelor's programmes to substantiate the knowledge that they have acquired so far with theoretical, simulative and application-oriented knowledge, and thereby be especially well-equipped to meet the requirements of modern development tasks in high-tech areas. Building on the preceding course of study, the programme provides balanced instruction in conveying essential, advanced specialist knowledge of subareas of urban and mobile electrification. The aim of doing so is to further train the graduates' abilities to work creatively in the area of applied research and development.

**Section 2
Admission requirements, proof of language proficiency,
aptitude for the degree programme**

- (1) The qualifications required in order to be admitted to the master's programme are:
1. Successful completion of a bachelor's or *Diplom* degree in Electrical Engineering, Information Technology or a related subject worth 210 ECTS credits or an equivalent degree or qualification. The examinations committee decides on the equivalence of degrees and grades
- and
2. proof of programme-specific aptitude as part of a process in accordance with Section 7 of these by-laws.

Section 3

Structure of the programme, standard period of study

- (1) The standard period of study is three semesters.
- (2) A total of 90 ECTS credits are to be acquired.
- (3) Two potential specialisations are offered, as to enable students to determine their desired professional area of work. Students have to select one of the following two specialisations at the time of application:
 - Simulation of electromobility systems (SE)
 - Realisation of electromobility systems (RE)
- (4) No rights or entitlement exist to the master's programme being held in the event that an insufficient number of qualified students enrol. Likewise, no rights or entitlement exist to all elective modules being offered each semester.

Section 4

Proof of ECTS credits not yet obtained

If applicants provide proof of an admission-substantiating university degree, for which less than 210 ECTS credits but at least 180 ECTS credits have been awarded or are to be regarded as equivalent, then proof of the ECTS credits not yet obtained is a prerequisite for passing the master's examination. Missing ECTS credits to be obtained by the start of the third semester, may upon request to the Examination Committee be provided through additional relevant professional experience or by attending relevant university courses. Proof for each variant may be furnished only once. A maximum of 30 ECTS credits may be provided this way.

The following conditions apply for the proof:

1. relevant professional experience. 2 years of relevant professional experience in the field corresponds to up to 30 ECTS credits. The professional experience should be relevant and related to the subject. The contents of the profession should be in line with the completed or desired university degree.
2. specialised internship/work placement. Completion of a 6-month full-time internship in the fields of electrical engineering or information technology or related areas corresponds to up to 30 ECTS credits and can be considered for the course after discussion with the responsible Academic Advisor.
3. relevant university modules. Specific modules can be selected from the range of courses offered under the degree programme of Electrical Engineering and Information Technology after consultation with the Academic Advisor, provided their content does not essentially overlap with the content of the bachelor's programme. This regulation pertains exclusively to the initial degree that the applicant has submitted. The relevant study and examination regulations shall be binding.

Section 5 Modules and courses

- (1) The degree programme consists of modules, which can be made up of thematically related courses. Each module is assigned ECTS credits which reflect the time of study required of the students.
- (2) The compulsory and elective modules, the lectures, their number of hours, the type of courses, the examinations and the ECTS credits are specified in the Appendix to these by-laws. The regulations of subject-specific compulsory elective modules and compulsory elective subjects of general academic nature are supplemented by the curriculum.
- (3) All modules consist of compulsory modules, compulsory elective modules or optional modules:
 1. Compulsory modules are those modules held during the degree programme which are binding for all students.
 2. Compulsory elective modules are alternative modules offered individually or in groups. Students are required to select a certain number of modules based on these study and examination regulations. The selected modules will be treated as compulsory modules.
 3. Optional modules are modules that are not mandatory for the achievement of the study objective. They may be additionally selected from the courses offered by the Institute.
- (4) There is no guarantee that the scheduled specialisations, compulsory elective modules and optional modules will actually be offered. Similarly, the Language Centre is not under any obligation to actually administer the relevant courses if the number of attendees is insufficient.

Section 6 Curriculum

The responsible faculty, currently the Faculty of Electrical Engineering and Media Technology (EMT), will prepare a curriculum that ensures the relevant courses are offered and provides detailed information on the course of the programme to students.

The curriculum is approved by the Faculty Council and announced to the public before the start of the semester. The announcement of changes and/or new regulations must be made no later than at the beginning of the lecture period of the semester in which these changes are to be applied for the first time. In particular, the curriculum will contain regulations and information regarding:

1. the time allocation of the weekly semester hours per module and study semester incl. ECTS credits,
2. the names of the compulsory and compulsory elective modules as well as their respective number of weekly hours per semester;
3. the subject-related compulsory elective modules, including the number of hours involved;
4. the teaching format in the individual modules, provided this has not been conclusively defined in Appendix 2,
5. the examination format and exam duration;
6. detailed provisions for proofs of performance and attendance.

Section 7

Aptitude assessment

- (1) Programme-specific aptitude is determined through a written test that can also be conducted online. The test consists of complex tasks in the relevant topics of mathematics, physics and the basics of electrical engineering and information technology. The tasks are set and evaluated by a Selection Committee consisting of at least two professors of the faculty, and is appointed by the Faculty Council of the Faculty of Electrical Engineering and Media Technology for a period of two years. Programme-specific aptitude is considered as proven if the test is completed "*mit Erfolg*" ("successfully").
- (2) The Selection Committee can allow a candidate to take an aptitude test if they have successfully completed a bachelor's or *Diplom* programme in electrical engineering, information technology or related disciplines with an overall examination result of at least 2.5 or has above-average knowledge in mathematics, physics and the basics of electrical engineering.
- (3) The procedure for determining programme-specific aptitude is conducted every semester. Participants will receive an invitation by e-mail.
- (4) Applicants who are unable to furnish proof of programme-specific aptitude may take the test once again in the next semester. In justifiable cases of exception, taking the test at a later point in time will also be allowed. The test cannot be repeated thereafter.

Section 8

Assessment of examination performance; overall examination grade

- (1) ECTS credits are awarded for each successfully passed examination. The number of attainable points per examination is shown in the appendix.
- (2) ¹A student's overall grade is calculated using a weighted arithmetic average of their individual grades. ²The weighting of each individual grade equates to the number of ECTS credits allocated to the course for which the grade was awarded.
- (3) In addition to the overall examination grade as set out in paragraph 2, a relative grade shall be shown based on the numerical value achieved according to the ECTS User Guide in accordance with the regulations in Section 8 paragraph 6 of the General Examination Regulations of Deggendorf Institute of Technology.
- (4) Should an end-of-module examination comprise multiple module component examinations, a grade of "*nicht ausreichend*" ("insufficient") awarded in one module component examination may not be offset by a higher grade in another.

Section 9

Master's thesis

- (1) Attainment of the master's degree is contingent on a master's thesis being written. In their thesis students are to demonstrate, through an individual academic paper, their ability to apply the knowledge and skills acquired during the study programme to tasks of a complex nature.

- (2) Students wishing to register to write their master's thesis must have obtained at least 25 ECTS credits.
- (3) The time between the topic being assigned and the master's thesis being submitted shall be six months. The submission deadline may be extended by the Examination Committee upon application of a corresponding application and agreement with the examiner where pressing reasons apply.
- (4) The master's thesis may be repeated once if the student does not pass on their first attempt.
- (5) The master's thesis may be written in English or German.

Section 10 Certificate

On passing the master's examination, a corresponding certificate is issued in line with the sample shown in the appendix to the General Examination Regulations of Deggendorf Institute of Technology.

Section 11 Academic degree and diploma supplement

- (1) Upon successful completion of the master's examination, the academic degree "Master of Science", abbreviated as "M.Sc.", is awarded.
- (2) A certificate on the awarding of the academic degree shall be issued according to the respective template given in the appendix to the General Examination Regulations of Deggendorf Institute of Technology.
- (3) The certificate will be accompanied by an English translation and a bilingual Diploma Supplement outlining the essential course content forming the basis of the degree, the progression of the studies, and the qualification obtained by virtue of the degree.

Section 12 Coming into effect

These Study and Examination Regulations enter into force on 15 November 2022. They apply to all students commencing the degree programme as of the 2023 summer semester.

Appendix 1 to the Study and Examination Regulations for the Electromobility master's degree programme

Overview of modules and courses at Deggendorf Institute of Technology

| Electromobility, M.Sc. | | | | Semester hours per week (SWS) | | | | | | | Examinations | | |
|--|---|------------|------------------|-------------------------------|---------|---------|---------|-----------------|------|---------------------|------------------------|---------------------|----------------------|
| Module No. | Name of module | Course no. | Course Name | SWS | 1. Sem. | 2. Sem. | 3. Sem. | ECTS per course | ECTS | Type of instruction | Admission requirements | Type of examination | Examination duration |
| MEM-01 | Drive Technologies | MEM 1101 | | 4 | 4 | | | | 5 | SU/Ü | | schrP | 90min. |
| MEM-02 | Academic Working Methods and Requirement Engineering | MEM 1102 | | 4 | 4 | | | | 5 | SU/Ü | | PoP | |
| MEM-03 | Electrification of Different Transport Sectors | MEM 1103 | | 4 | 4 | | | | 5 | SU/Ü | | PoP | |
| MEM-04 | Model-Based Requirement Management and Hardware Design | MEM 1104 | | 4 | 4 | | | | 5 | SU/Ü | | schrP | 90min. |
| MEM-05 | Fuel Cell Technologies | MEM 2101 | | 4 | | 4 | | 2 | 5 | SU/Ü/Pr | | schrP | 90min. |
| | Practical Course - Fuel Cells | MEM 2102 | 3 | | | | | PB | | | | | |
| MEM-06 | Batteries and Super-capacitors for Advanced Students | MEM 2103 | | 4 | | 4 | | | 5 | SU/Ü | | schrP | 90min. |
| MEM-07 | Modern Methods of Control Engineering | MEM 2104 | | 4 | | 4 | | | 5 | SU/Ü | | PoP | |
| MEM-08 | Charging Stations and Charging Management | MEM 2105 | | 4 | | 4 | | 2 | 5 | SU/Ü/Pr | | schrP | 90min. |
| | Practical Course - Charging Stations | MEM 2106 | 3 | | | | | PB | | | | | |
| Field of specialisation – Simulation of electromobility systems (SE) | | | | | | | | | | | | | |
| MEM-09 | Modelling and Simulation of Mobile Systems | MEM 1105 | | 4 | 4 | | | | 5 | SU/Ü | | schrP | 90min. |
| MEM-10 | Electro-magnetic Simulation (FEM) | MEM 1106 | | 4 | 4 | | | | 5 | SU/Ü | | schrP | 90min. |
| MEM-11 | Model-based Controller Design and Protection (CPU and FPGA) | MEM 2107 | | 4 | | 4 | | 2 | 5 | SU/Ü/Pr | | schrP | 90min. |
| | Practical Course - Controller Design | MEM 2108 | 3 | | | | | PrA | | | | | |
| MEM-12 | Subject-specific Compulsory Elective Subject 1 | MEM 2109 | | 4 | | 4 | | | 5 | SU/Ü | | * | |
| Field of specialisation – Realisation of electromobility systems (RE) | | | | | | | | | | | | | |
| MEM-13 | Power Electronics in Electric and Fuel Cell Vehicles | MEM 1107 | | 4 | 4 | | | | 5 | SU/Ü/Pr | | schrP | 90min. |
| MEM-14 | Subject-specific Compulsory Elective Subject 2 | MEM 1108 | | 4 | 4 | | | | 5 | SU/Ü | | * | |
| MEM-15 | Electrochemical Energy Storage Systems in Practice | MEM 2110 | | 4 | | 4 | | | 5 | SU/Ü/Pr | | PStA | |
| MEM-16 | Thermal Management | MEM 2111 | | 4 | | 4 | | | 5 | SU/Ü | | schrP | 90min. |
| MEM-17 | Societal Challenges of Electromobility & Reliability, Maintainability, Sustainability | MEM 3101 | | 4 | | | 4 | | 5 | SU/Ü | | PoP | |
| MEM-18 | Master Module | MEM 3102 | Master's Seminar | 2 | | | 2 | | 25 | S | | mP | 30min. |
| | | MEM 3103 | Master's Thesis | | | | | | | | | MA | |
| | Total SWS | | | 54 | 24 | 24 | 6 | | | | | | |
| | Total ECTS | | | 90 | 30 | 30 | 30 | | | | | | |
| as of | Wednesday, 01 February 2023 | | | | | | | | | | | | |

* The format of the examination is determined by the relevant study and examination regulations of the selected subject specific elective (FWP)

| Abbreviations: | | | | | | | | | | | | | |
|----------------|---------------------------------|-------|-----------------------|--|--|--|--|--|---------|--|--|--|--|
| ECTS | European Credit Transfer System | schrP | Written examination | | | | | | S/SU/Ü | seminar, seminar-based lesson, practical course | | | |
| SWS | Semester hours per week | mP | Oral examination | | | | | | SU/Ü/Pr | Seminar-based lesson/practical course/internship | | | |
| | | PStA | Written assignment | | | | | | | | | | |
| | | PrA | Project work | | | | | | | | | | |
| | | PB | internship report | | | | | | | | | | |
| | | MA | Master's thesis | | | | | | | | | | |
| | | PoP | Portfolio examination | | | | | | | | | | |

Issued on the basis of the resolution passed by the Senate of Deggendorf Institute of Technology on 06 July 2022, the notification to the Bavarian State Ministry for Science and Arts of 03 August 2022 and the legal supervisory approval of the Vice-President of Deggendorf Institute of Technology of 15 November 2022.

Signed
Prof. Waldemar Berg
Vice-President

These by-laws were recorded at Deggendorf Institute of Technology on 15 November 2022. They were duly posted on 15 November 2022. Their day of announcement is therefore 15 November 2022.