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First amendment to the examination and study regulations for the Master's degree programme Hybrid Electric Propulsion Technology (M. Sc.) dated 04 February 2025

On the basis of Section 5 para. 1 sentence 2, Section 10 para. 5 sentence 2 in conjunction with Section 20 para. 2 sentence 1, Section 23 para. 2 sentence 1, Section 70 para. 2 no. 8 and Section 81 para. 2 sentence 1 no. 1 of the Brandenburg Higher Education Act (BbgHG) of 9 April 2024 (GVBl.I/24, [No.12]) GVBl.I/24, [. 12]No), amended by Article 2 of the Act of 21 June 2024 (GVBl.I/24, [No.30] , p. 32) and Section 16 (2) No. 1 and Section 29 (4) Sentence 1 No. 1 of the Constitution of the Brandenburg University of Technology Cottbus-Senftenberg (GO BTU) of 8 January 2016, as last amended by the third party. January 2016, last amended by the Third Amendment Statute of 26 September 2024 (AMbl. 38/2024) and Section 1 of the General Examination and Study Regulations for Master's study programmes at BTU Cottbus-Senftenberg (RahmenO-MA) of 12 September 2016 (AMbl. 14/2016), last amended by the Fifth Amendment Statute (AMbl. 30/2024 of 29.08.2024), the Brandenburg University of Technology Cottbus-Senftenberg (BTU) has adopted the following statutes:

Article 1

The subject-related Examination and Study Regulations for the Master's degree programme Hybrid Electric Propulsion Technology (M. Sc.) dated 05 July 2024 (AMbl. 19/2024) are amended as follows:

1. **§ Section 5 (2)** is replaced by:

"The programme starts in the winter semester."

2. **¹Annex 3 "Subject-related studies"** is amended as follows:

Module **13918 (6 CP)** is renamed: "**Fundamentals in Battery Systems**"

²Annex 3 shall be amended as shown in the Annex to these Regulations.

Annex 3: Subject-related studies

Module no.	Module name	LP	Focus on "Engine Technology" ¹	Focus on "Electrical Propulsion Technology" ¹
13802	Core Engine Design 1	6	X	
13803	Core Engine Design 2	6	X	
13804	Engine Integration	6	X	
13805	Lifetime Assessment and Fracture Mechanics	6	X	
13926	Hydrogen and Fuel Cells	6	X	
13919	Testing and Certifications of Flight Propulsion Systems	6	X	
14050	Environmental Impact of Aero Engines	6	X	
13806	Compressor Aerodynamics	6	X	
13763	Flow Modelling with Machine Learning	6	X	
13519	CFD 1	6	X	
13762	CFD 2	6	X	
12887	Engineering Acoustics - Sound Fields	6	X	
13920	Unsteady Aero-Thermodynamics of Turbomachinery	6	X	
13921	Lightweight Design and Construction	6	X	
14055	Thermal Management Systems in Hybrid-Electric Propulsion Aviation	6	X	
11221	Fundamentals in Power Electronics	6		X
35437	Power Electronic Applications in Drive Systems	6		X
11747	Control Engineering 2	6		X
13918	Fundamentals in Battery Systems	6		X
13919	Testing and Certifications of Flight Propulsion Systems	6		X
14050	Environmental Impact of Aero Engines	6		X
11191	EMC in Electrical Power Installations	6		X
13836	Electrical Machines for Flight Applications	6		X
11496	Research Seminar in Power Electronics	6		X
12887	Engineering Acoustics - Sound Fields	6		X
14055	Thermal Management Systems in Hybrid-Electric Propulsion Aviation	6		X

Article 2 Publication authorisation

The President may publish the wording of the examination and study regulations in the version of these amendment statutes in the Official Gazette of the BTU.

Article 3 Efficacy

(1) These amending statutes shall enter into force in the summer semester 2025.

(2) From the beginning of the summer semester 2025, these regulations in the version of these First Amendment Statutes shall apply to all enrolled students of the Master's study programme Hybrid Electric Propulsion Technology (M. Sc.).

Issued on the basis of the resolution of the Faculty Council of Faculty 3 - Mechanical Engineering, Electrical and Energy Systems of 18 September 2024, the opinion of the Senate of 17 October 2024 and the approval by the President of the Brandenburg University of Technology Cottbus-Senftenberg of 4 February 2025.

Cottbus, 04 February 2025

Prof. Dr Gesine Grande
President

Reading version

Subject-related Examination and Study Regulations for the Master's degree programme Hybrid Electric Propulsion Technology dated 05 July 2024 in the version of the First Amendment Statutes to the Examination and Study Regulations for the Master's degree programme Hybrid Electric Propulsion Technology M. Sc. dated 04 February 2025

On the basis of Section 5 (1) sentence 2, Section 10 (5) sentence 2 in conjunction with Section 20 (2) sentence 1, Section 23 (2) sentence 1, Section 70 (2) no. 8, Section 81 (2) sentence 1 no. 1 of the Brandenburg Higher Education Act (BbgHG) of 9 April 2024 (GVBl.I/24, [no. 12]) and Section 16 (2) No. 1 of the Constitution of the Brandenburg University of Technology Cottbus-Senftenberg (GO BTU) dated 8 January 2016, last amended by the Second Amendment Statute dated 21 October 2021 (AMbl. 24/2022) and § Section 1 of the General Examination and Study Regulations for Master's study programmes at BTU Cottbus-Senftenberg dated 12 September 2016 (AMbl. 14/2016), last amended by the Fourth Amendment Statutes (AMbl. 15/2024 dated 24 June 2024), corrected by the correction of the Fourth Amendment Statutes (AMbl. 18/2024 dated 1 July 2024), the Brandenburg University of Technology Cottbus-Senftenberg (BTU) has adopted the following statutes:

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§ 1 Scope of validity

¹These statutes regulate the subject-related features of the Master's degree programme Hybrid Electric Propulsion Technology. ²They supplement the General Examination and Study Regulations for Master's study programmes at BTU (RahmenO-MA) in their current version.

§ 2 Content profile of the study programme, goals of the programme

(1) ¹The international Master's degree programme "Hybrid Electric Propulsion Technology" (HEPT) teaches the scientific approaches and techniques that enable graduates to develop technologies aimed at significantly reducing emissions in aviation and other mobility sectors. ²The study programme is committed to the goal of internationality and interdisciplinarity. ³The Master's programme provides students with state-of-the-art knowledge of hybrid propulsion systems to prepare them for the expanding industries in the field of next-generation Propulsion Technology. ⁴In terms of content, the study programme concentrates on the two main areas of "Propulsion Technology" and "Electrical Propulsion Technology" as well as interdisciplinary study components that fulfil the requirements for employment in companies or scientific institutions in both fields.

(2) ¹In the study programme, students acquire in-depth theoretical and practical engineering knowledge and skills in the fields of aircraft propulsion systems, electric propulsion technology, aerothermodynamics, combustion science, structural mechanics, design, manufacturing and approval procedures as well as life cycle analysis and control engineering. ²This enables students to work independently and in an interdisciplinary manner on tasks and solve problems and to assess work results and processes, including the development of alternative courses of action and interactions with neighbouring subject areas.

(3) ¹The interdisciplinary technical content of the study programme qualifies graduates for a career in the expanding industry for hybrid Propulsion Technology in the field of air, road and sea transport for small to large companies as well as for independent work in this field. ²Graduates are able to contribute to the design and analysis, optimisation and construction of hybrid-electric drives. ³It is also possible to continue scientific work in the research and development sector of the private sector or a public research institution.

§ 3 Graduation, Degree

Upon successful completion of the Master's study programme Hybrid Electric Propulsion Technology, the academic degree "Master of Science" (M. Sc.) is awarded.

§ 4 Special admission and enrolment requirements

(1) Enrolment for the Master's degree programme requires proof of a Bachelor's degree in Engineering, in particular in Mechanical Engineering, Aerospace Engineering, Electrical Engineering, Energy Engineering and related study programmes.

(2) ¹The Master's degree programme Hybrid Electric Propulsion Technology is an international study programme. ²The language of teaching and examination is English. ³For admission to the course, all applicants must therefore provide proof of sufficient language skills in accordance with Section 3 (3) of the BTU Enrolment Regulations dated 22 January 2020 (AMbl. 01/2020).

§ 5 Credits for and regular duration of the standard programme

(1) The degree programme comprises 120 credits (LP) with a regular duration of the standard programme of four semesters, whereby one LP corresponds to 30 hours of work.

(2) The programme begins in the winter semester.

(3) The study programme is offered as a full-time study programme with the option of individual part-time studies in accordance with § 6 RahmenO-MA.

§ 6 Structure and form of the programme

(1) ¹The curriculum is shown in Annex 1. ²The degree programme offers extensive freedom of

choice with recommendations for suitable module combinations to achieve a subject specialisation.

(2) ¹The study programme consists of:

- the compulsory elective modules of the subject specialisation area amounting to 36 CP (Annex 2),
- the compulsory elective modules in subject-related studies totalling 42 CP (Annex 3)
- the project study programme with 6 LP,
- General Studies (FÜS) with 6 LP,
- a compulsory internship with 12 LP,
- the Master Thesis with 18 LP.

²It is recommended that students choose modules from one of the two specialisations in their subject-related studies

- "Engine technology"
- "Electrical Propulsion Technology"

to the extent of 42 CP. ³If 42 CP from a specialisation have been completed and passed, this specialisation will be shown on the certificate. ⁴It is possible to select modules from the specialisations; in this case, however, only the modules passed will be listed on the certificate. ⁵The standard programme plan shown in Annex 4 provides a recommendation for the timing of the degree programme when commencing studies in the winter semester.

(3) ¹The range of compulsory elective modules can be adjusted on a semester-by-semester basis if necessary. ²The ability to study within the regular duration of the standard programme must be guaranteed in any case. ³The director of studies must notify the administration (Campus Management System) one month before the start of the semester of any changes to the compulsory electives offered.

(4) ¹A compulsory internship of at least eight weeks must be completed as part of the degree programme. ²Further details on the requirements of the internship can be found in Annex 5.

(5) ¹Each student chooses a mentor during their studies. ²Eligible mentors shall be assigned to each year group from among the teaching staff. ³A change of mentor should only take place in justified cases. ⁴Within the first three weeks of the first semester, each student shall draw up a binding study plan for the intended further

course of study. ⁵The study plan and any changes during the course of the degree programme must be discussed with the mentor and confirmed by him or her. ⁶The confirmed study plan must then be submitted to Admissions and Registrar's Office by the end of the first semester at the latest.

(6) ¹Mobility windows for completing a period of study abroad are available either after the first or after the third semester, depending on the progress of studies and adherence to the standard programme plan. ²Students are recommended to make use of individual subject-related student guidance and counselling on how to organise their time abroad.

§ 7 Special regulations for organisation of examinations

There are no special regulations for organisation of examinations.

§ 8 Master Thesis

(1) ¹The Master Thesis module comprises 18 CP. ²It consists of the written or creative work and a defence. ³The processing time for the written or creative part of the Master Thesis is four months from registration.

(2) Admission to the Master Thesis is granted to students who have achieved at least 78 CP at the time of registration for the Master Thesis, 36 of which have been passed in the area of subject specialisation.

(3) The Master Thesis must be written in English.

§ 9 Further supplementary regulations

There are no further supplementary regulations.

§ 10 Efficacy and expiry

(1) These regulations come into force in the winter semester 2024/25.

(2) It applies to all students on the Master's degree programme Hybrid Electric Propulsion Technology who start their studies from the winter semester 2024/2025.

(3) These examination and study regulations shall expire after the last enrolment at the end of the regular duration of the standard programme plus four semesters.

Issued on the basis of the resolution of the faculty council of the Faculty of Mechanical Engineering, Electrical and Energy Systems of 18 October 2023, the opinion of the Senate of 26 October 2023 and the approval by the President of the Brandenburg University of Technology Cottbus-Senftenberg of 22 February 2024.

Cottbus, 05 July 2024

Prof. Dr Gesine Grande
President

First Amendment Statutes issued on the basis of the resolution of the Faculty Council of Faculty 3 - Mechanical Engineering, Electrical and Energy Systems of 18 September 2024, the opinion of the Senate of 17 October 2024 and the approval by the President of the Brandenburg University of Technology Cottbus-Senftenberg of 4 February 2025

Annex 1: Overview of modules, status, credits (LP)

Module no.	Complexes and modules	Status	Valuation	credits
Professional specialisation				36
	Compulsory elective modules from the area of specialisation ¹	WP	Check	36
Subject-related studies				42
	Compulsory elective modules from the area of subject-related studies ²	WP	Check	42
studies				6
13793	Study Project	P	Check	6
Expertise-enhancing studies				6
	General Studies (FÜS) ³	WP	Check	6
Compulsory internship				12
13790	Industrial Internship	P	SL	12
Final thesis				18
13789	Master Thesis	P	Check	18
Total				120

Exam: Performance verification, SL: Academic performances, LP: Credits

P: Compulsory module, WP: Compulsory elective module

¹ Pursuant to §6 (2) selectable from Annex 2

² Pursuant to §6 (2) selectable from Annex 3

³ can be selected from the current range of General Studies programmes (FÜS) at BTU

Annex 2: Specialist Specialisation

Module no.	Module name	LP
14049	Electrified Aero Engine	6
13956	Thermal Turbo Machines (Cycle Processes)	6
13801	Fundamentals of Engine Technology	6
13916	Fundamentals of Electrical Power Engineering	6
13835	Fundamentals of Electrical Drive Technology	6
11494	Control Engineering 1	6
13917	Aviation Industry Safety Processes and Standards	6
13249	Introduction to Gas Dynamics	6
11938	Thermodynamics, Heat and Mass Transfer	6

Annex 3: Subject-related studies

Module no.	Module name	LP	Focus on "Engine Technology"¹	Focus on "Electrical Propulsion Technology"¹
13802	Core Engine Design 1	6	X	
13803	Core Engine Design 2	6	X	
13804	Engine Integration	6	X	
13805	Lifetime Assessment and Fracture Mechanics	6	X	
13926	Hydrogen and Fuel Cells	6	X	
13919	Testing and Certifications of Flight Propulsion Systems	6	X	
14050	Environmental Impact of Aero Engines	6	X	
13806	Compressor Aerodynamics	6	X	
13763	Flow Modelling with Machine Learning	6	X	
13519	CFD 1	6	X	
13762	CFD 2	6	X	
12887	Engineering Acoustics - Sound Fields	6	X	
13920	Unsteady Aero-Thermodynamics of Turbomachinery	6	X	
13921	Lightweight Design and Construction	6	X	
14055	Thermal Management Systems in Hybrid-Electric Propulsion Aviation	6	X	
11221	Fundamentals in Power Electronics	6		X
35437	Power Electronic Applications in Drive Systems	6		X
11747	Control Engineering 2	6		X
13918	Fundamentals in Battery Systems	6		X
13919	Testing and Certifications of Flight Propulsion Systems	6		X
14050	Environmental Impact of Aero Engines	6		X
11191	EMC in Electrical Power Installations	6		X
13836	Electrical Machines for Flight Applications	6		X
11496	Research Seminar in Power Electronics	6		X
12887	Engineering Acoustics - Sound Fields	6		X
14055	Thermal Management Systems in Hybrid-Electric Propulsion Aviation	6		X

¹ Section 6 (2) applies to recognition as a specialisation

Annex 4: Standard programme plan (allocation of modules and credits to semesters)

Focal points and modules	Credits (LP) in the semester				Total LP
	1	2	3	4	
Specialisation¹					36
Compulsory elective module 1	6				
Compulsory elective module 2	6				
Compulsory elective module 3	6				
Compulsory elective module 4	6				
Compulsory elective module 5	6				
Compulsory elective module 6		6			
Subject-related studies²					42
Compulsory elective module 1		6			
Compulsory elective module 2		6			
Compulsory elective module 3		6			
Compulsory elective module 4		6			
Compulsory elective module 5			6		
Compulsory elective module 6			6		
Compulsory elective module 7			6		
Project studies					6
Study Project			6		
Expertise-enhancing studies³					6
General Studies (FÜS)			6		
Compulsory internship					12
Industrial Internship				12	
Final thesis					18
Master Thesis				18	
Total expenditure	30	30	30	30	120
Total LP achieved	30	30	30	30	120

¹ in accordance with §6 Para. 2 selectable from Annex 2

² in accordance with §6 Para. 2 selectable from Annex 3

³ can be selected from the current range of General Studies programmes (FÜS) at BTU

Annex 5: Internship regulations

1. Scope of validity

¹ These internship regulations apply to interns completing an internship as part of the Hybrid Electric Propulsion Technology Master's study programme. ²Interns within the meaning of these regulations are BTU students on the Hybrid Electric Propulsion Technology Master's degree programme.

2. Purpose of the internship

¹The internship is mandatory for students in order to familiarise themselves with the essential work processes of engineers and to apply the acquired skills in practice. ²It enables students to independently apply the theoretical knowledge and methods acquired during their studies. ³The students analyse operational processes and the technologies used in a working environment with a predominantly researching, developing, planning or controlling activity character and further develop operational processes and technologies using the methods they are familiar with. ⁴The internship helps to supplement key qualifications such as the organisation and management of teamwork and communication in their practical relevance. ⁵An essential aspect of the internship is experiencing and reflecting on economic and sociological events in the company. ⁶Students should understand the company as a social entity and, in particular, familiarise themselves with the relationship between managers and employees. ⁷As a result, students will be able to use the professional skills acquired during the internship in the preparation of their Master's thesis - if this is written afterwards - as well as personal skills in their future professional life.

3. The internship position

¹ The internship can be carried out in private companies (in particular medium-sized and large companies), engineering offices or external research institutions. ²Students are responsible for finding their own work placement.

4. Time scope of the internship

¹The internship consists of an industrial placement of at least eight weeks. ²One internship week corresponds to the regular weekly working hours of the respective company. ³Working hours lost due to holidays, illness or company closures do not count as internship time and must be made up. ⁴If necessary, a contract extension should be requested in order to complete an internship that has already begun. ⁵The internship can be split between different companies. ⁶It is recommended to voluntarily complete further internships in relevant companies.

5. Supervisor of interns and internship reports

¹The internship must be supervised by a university lecturer from the BTU university department and a mentor with an engineering education at the target institute or company. ²A written internship report must be prepared on the internship. ³The internship and the internship report are examined and recognised by the mentor. ⁴The reports must reflect the trainee's own activities, observations and findings. ⁵The profile should include the internship company's fields of activity and products as well as information on the size of the company (e.g. number of employees) and social and organisational structures, approximately half an A4 page in length. ⁶The reports must be written in English. ⁷In justified cases, the report may be written in German.

6. Recognition of the internship

¹The following documentation is required for the internship to be recognised:

- a signed and stamped internship certificate with details of the internship company, surname and first name of the intern, start and end of the internship with details of the weekly working hours and, if applicable, details of the number of days absent,
- an internship report.

¹A professional activity or a working student activity can be recognised as equivalent to the work placement, provided that the content and time of the work placement complies with the provisions of these work placement regulations. ²The final decision on the recognition of the internship and the module completion is made by the internship coordinator after reviewing the complete documentation.