Curriculum for the Master's Degree Programme

Electrical and Electronics Engineering

Curriculum 2025

This curriculum was approved by the Senate of Graz University of Technology during its meeting on 23 June 2025. The legal bases of this degree programme are the Universities Act 2002 (UG) and the Excerpt of Statutes: Legal Regulations for Academic Affairs of TU Graz, as amended.

(Please note: The English version of this document is a courtesy translation. Only the German version is legally binding.)

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I. General

§ 1 Subject matter of the degree programme and qualification profile

The Master's Degree Programme Electrical and Electronics Engineering (abbrev. EEE) is an engineering degree. Graduates of this degree programme are awarded the academic degree "Diplom-Ingenieurin" or "Diplom-Ingenieur," abbreviated as "Dipl.-Ing." or "DI." The international equivalent of this university degree is "Master of Science", abbreviated as "MSc."

The Master's Degree Programme Electrical and Electronics Engineering is provided as a foreign-language degree programme in English.

(1) Subject matter of the degree programme

The Master's Degree Programme Electrical and Electronics Engineering focuses on teaching students the in-depth specialist knowledge, theory and methodology needed for work in the fields of electrical engineering, information and communication technology, electronics and electrical power engineering as well as the associated necessary mathematical and scientific knowledge, supplemented with soft skills and basic knowledge in the field of sustainability. Students can select a major (primary specialisation) and a minor (secondary specialisation) in the master's degree programme according to their personal interests from the following subject areas:

- Automation Systems Engineering
- Electronic Systems and IC Design
- Power Engineering
- Sensing, Control and Artificial Intelligence
- Wireless Networks and Communication Systems

The degree programme offers an in-depth education in topics related to sustainable digitalisation and energy supply. Courses that are particularly relevant for environmental protection and sustainability are indicated in § 7 and § 8 with the 🌳 symbol.

(2) Qualification profile and competences

Graduates of the Master's Degree Programme Electrical and Electronics Engineering have the following knowledge, skills and competencies:

Knowledge and understanding

Graduates

- have in-depth and expanded subject-specific knowledge in the fields of electrical engineering, information and communications technology, electronics, signals and systems, measurement technology, and electrical power engineering.
- have thus fundamental knowledge that allows them to develop and/or apply ideas, often in a research context.
- can define and interpret the special features, limits, terminology and schools of thought of their field.
- have acquired in-depth knowledge in several of the following subject areas: automation systems engineering; electronic systems and IC design; power

engineering; sensing, control and artificial intelligence; wireless networks and communication systems.

Application of knowledge

Graduates are able to

- apply advanced scientific methods.
- work on engineering tasks independently.
- apply their knowledge and problem-solving abilities in new and unfamiliar situations.

Evaluation and assessment

Graduates are able to

- deal with complex situations.
- formulate reasoned opinions in the terms of the relevant disciplines, including taking account of incomplete or limited information.
- take account of societal, social and ethical consequences of their actions as experts in their subject.

Communicative and social skills

Graduates

- have mastered communication and presentation techniques and can use them appropriately.
- are able to write scientific and academic texts.
- can communicate information, ideas, problems and their solutions clearly and unambiguously to an audience of both specialists and non-specialists.
- are flexible, adaptable, capable of critically assessing the consequences of their work and able to work in a team, particularly in interdisciplinary and English-speaking environments.

Organisational skills

Graduates are able to

- use learning strategies that enable them to further develop their knowledge independently.
- work independently or in teams, motivating themselves and others.
- take initiative and lead project groups and organisational units.

(3) Need and relevance of the degree programme for science and the labour market

The Master’s Degree Programme Electrical and Electronics Engineering provides an in-depth education and teaches skills for sustainable digitalisation and energy supply in society, thus addressing key social challenges of the 21st century. Consequently, graduates are well prepared for a wide variety of career fields. The master’s degree programme also provides students with the skills required for independent scientific work within the framework of a doctoral programme. Furthermore, the broad education with additional in-depth specialisations opens up career opportunities for graduates in many areas, such as industry, the energy sector, public administration, and services. Energy technology, electronics, automation, digitalisation, production, automotive engineering, and aerospace are some of the sectors of special relevance. In particular, graduates of the degree programme are qualified for leading professional positions in these fields.

§ 2 Admission requirements

(1) The Master's Degree Programme Electrical and Electronics Engineering builds upon the content of the Bachelor's Degree Programme Electrical and Electronics Engineering of Graz University of Technology. Graduates of this bachelor's degree programme thus meet the admission requirements for the Master's Degree Programme Electrical and Electronics Engineering. Furthermore, the following degree programmes are eligible for admission to the Master's Degree Programme Electrical and Electronics Engineering without further requirements:

- Any bachelor's degree programme in electrical and electronics engineering at another Austrian, German or Swiss university.
- Any diploma degree programme in electrical and electronics engineering at another Austrian, German or Swiss university.
- Any master's degree programme in electrical and electronics engineering at another Austrian, German or Swiss university.
- Bachelor's Degree Programme Information and Computer Engineering at TU Graz. In such cases, a bridge module must be completed instead of the minor (see § 3 or § 6).
- Bachelor's Degree Programme Biomedical Engineering at TU Graz. In such cases, a bridge module must be completed instead of the minor (see § 3 or § 6).
- Bachelor's Degree Programme Electrical Engineering and Audio Engineering at TU Graz / KUG Graz. In such cases, a bridge module must be completed instead of the minor (see § 3 or § 6).
- Bachelor's Degree Programme Digital Engineering at TU Graz. In such cases, a bridge module must be completed instead of the minor (see § 3 or § 6).

(2) Any degree programmes that are not mentioned in (1) are considered eligible for admission if at least 120 ECTS credit points have been positively completed in the following subject areas:

a. at least 20 ECTS credit points from courses on mathematics
b. at least 20 ECTS credit points from courses on electrical engineering, measurement technology and electrical networks
c. at least 10 ECTS credit points from courses on electronic engineering
d. at least 10 ECTS credit points from courses on signal processing and control engineering
e. at least 10 ECTS credit points from courses on electrical power engineering

(3) Any degree programmes that are not mentioned in (1) and that do not meet the requirements of (2) are not considered equivalent to a subject-related degree programme. If the previously completed degree programme is generally professionally relevant and only a few additional qualifications are missing to achieve full equivalence, full equivalence may be established by requiring supplementary examinations. Additional completion of supplementary examinations may be required to the extent of a maximum of 30 ECTS credit points. Supplementary examinations worth a maximum of 5 ECTS credit points may be recognised as free-choice subjects for this master's degree programme.

(4) Any degree programmes that are not mentioned in (1) and do not meet the requirements of (2) and (3) are not close enough in subject matter to establish full equivalency. In such cases, admission to the Master's Degree Programme Electrical and Electronics Engineering is not possible.

(5) Proof of sufficient English language skills is a prerequisite for admission to the degree programme. The type of proof required is specified in a regulation issued by the Rectorate.

§ 3 Structure of the degree programme

(1) The Master's Degree Programme Electrical and Electronics Engineering with a total workload of 120 ECTS credit points comprises four semesters and is structured into modules as follows.

(2) To complete the degree programme, students must complete Compulsory Module A, one major and one minor, as well as the free-choice subjects in the scope of ECTS credit points listed below and the master's thesis.

	ECTS
Compulsory Module A: Advanced Basics EEE	20.5
Major	42
Minor	21
Master's thesis	30
Free-choice subjects	6.5
Total	120

The following specialisations can be chosen as majors and/or minors:

- Automation Systems Engineering
- Electronic Systems and IC Design
- Power Engineering
- Sensing, Control and Artificial Intelligence
- Wireless Networks and Communication Systems

Individual minor:
Alternatively, students can create an individual minor in consultation with a mentor (a list of mentors is available in the Dean's Office).

International minor:
Furthermore, in consultation with the relevant officer responsible for study matter (Dean of Studies), a minimum of 21 ECTS credit points and a maximum of 30 ECTS credit points worth of courses may be taken at a recognised foreign post-secondary educational institution as a minor. In total, 21 ECTS credit points may be allocated to the international minor, and any remaining ECTS credit points can be allocated to the chosen major.

Any study periods abroad must be applied for in a timely manner through the International Office – Welcome Center at TU Graz.

Bridge module minor:

Graduates of the Bachelor's Degree Programmes Information and Computer Engineering, Biomedical Engineering, Electrical Engineering and Audio Engineering, and Digital Engineering in accordance with § 2 (1) must complete the corresponding bridge module listed in § 6 as their minor.

The following graph serves to illustrate the structure of the curriculum for better understanding:

<table>
<tr><td></td><td colspan="8">Compulsory Module A (20.5 ECTS)</td></tr>
<tr><td>Major
(42 ECTS)

Compulsory Module B
(12–15 ECTS)
+ Elective Module C
(30–27 ECTS)</td><td>**A**utomation **S**ystems **E**ngineering</td><td colspan="2">**E**lectronic **S**ystems and IC **D**esign</td><td colspan="2">**P**ower **E**ngineering</td><td>**S**ensing, **C**ontrol and **A**rtificial Intelligence</td><td colspan="2">**W**ireless **N**etworks and **C**ommunication Systems</td></tr>
<tr><td>Minor
(21 ECTS)

Elective Module D
(21 ECTS)</td><td>ASE</td><td>ESD</td><td>PE</td><td>SCA</td><td>WNC</td><td>Individual</td><td>International</td><td>Bridge Module</td></tr>
<tr><td></td><td colspan="8">Master's thesis (30 ECTS)</td></tr>
<tr><td></td><td colspan="8">Free-choice subjects (6.5 ECTS)</td></tr>
</table>

(3) In order to ensure that a bachelor's degree programme and subsequent subject-related master's degree programme combined comprise a total workload of 300 ECTS credit points, one and the same course cannot be recognised for both the bachelor's degree programme qualifying the student for admission to a master's degree programme, and the master's degree programme in question.

§ 4 Group sizes

The following maximum numbers of participants (group sizes) have been established:

Lecture (VO) Lecture part of lecture with integrated exercises (VU)	no restriction
Exercise (UE) Exercise part of lecture with integrated exercises (VU)	25
Laboratory course (LU)	6
Seminar (SE) Seminar project (SP) Project (PT)	20

§ 5 Guidelines for the allocation of places in courses

(1) If the number of students exceeds the number of available places, students are allocated places on a course according to the following priority criteria, whereby the individual criteria are to be applied in the order given:

a. Position of the course in the curriculum (acc. to § 6 and § 7): Priority is given to students for whom the course is compulsory according to their curriculum over those who are taking the course as part of an elective module or free-choice subject.

b. Total of completed/recognised ECTS credit points for the degree programme: All study achievements completed in the degree programme for which the student wants to take the course are taken into account for the ranking. Students with the highest total of ECTS credit points already completed in their current degree programme are ranked preferentially.

c. Number of semesters spent studying the degree programme so far: Students are ranked according to the number of semesters they have already studied in the degree programme. Priority is given to those who have studied for longer.

d. Decision by lot: If it is not possible to rank students according to the above criteria, admission to the course is decided by lot.

(2) Up to 10% of the existing places on the course are reserved for students completing part of their studies at TU Graz as part of a mobility programme.

II. Degree Programme Content and Structure

§ 6 Modules, courses and semester assignment

The individual courses of this master's degree programme and their module structure are listed below. The knowledge, methods or skills to be taught in each course are described in detail in Appendix I. The assignment of courses to particular semesters ensures that the sequence of courses is best able to build on prior knowledge and that the workload of an academic year does not exceed 60 ECTS credit points.

Master's Degree Programme Electrical and Electronics Engineering								
					ECTS credit points per semester			
Module	**Course**	**SSt**	**Type**	**ECTS**	**I**	**II**	**III**	**IV**
Compulsory Module A: Advanced Basics EEE								
A.1	Advanced Mathematics (EEE)	3	VU(1)	4	4			
A.2	Optimization I	2	VU(2)	3	3			
A.3	Electromagnetic Fields II	2	VO	3	3			
A.4	Electromagnetic Fields II	1	UE	1.5	1.5			
A.5	Computational Intelligence	2	VO	3		3		
A.6	Computational Intelligence	1	UE	1.5		1.5		
A.7	Master Seminar Project (EEE)	3	SP	4.5			4.5	
Subtotal Compulsory Module A		**14**		**20.5**	**11.5**	**4.5**	**4.5**	
Major Automation Systems Engineering								
Elective Compulsory Module B1				**12**				

Elective Module C1	**30**				
Total Major Automation Systems Engineering	**42**				
Major Electronic Systems and IC Design					
Elective Compulsory Module B2	**12**				
Elective Module C2	**30**				
Total Major Electronic Systems and IC Design	**42**				
Major Power Engineering					
Elective Compulsory Module B3	**15**				
Elective Module C.3	**27**				
Total Major Power Engineering	**42**				
Major Sensing, Control and Artificial Intelligence					
Elective Compulsory Module B4	**13.5**				
Elective Module C4	**28.5**				
Total Major Sensing, Control and Artificial Intelligence	**42**				
Major Wireless Networks and Communication Systems					
Elective Compulsory Module B5	**13.5**				
Elective Module C5	**28.5**				
Total Major Wireless Networks and Communication Systems	**42**				
Minor Automation Systems Engineering					
Elective Module D1	**21**				
Minor Electronic Systems and IC Design					
Elective Module D2	**21**				
Minor Power Engineering					
Elective Module D3	**21**				
Minor Sensing, Control and Artificial Intelligence					
Elective Module D4	**21**				
Minor Wireless Networks and Communication Systems					
Elective Module D5	**21**				
Individual Minor	**21**				
After consultation with a mentor (a list of mentors is available in the Dean's Office), students may create an individual minor. The individual minor must have a scope of 21 ECTS credit points in courses taken from the Master's Degree Programme Electrical and Electronics Engineering.					
International Minor	**21**				
In consultation with the relevant officer responsible for study matter (Dean of Studies), a minimum of 21 ECTS credit points and a maximum of 30 ECTS credit points worth of courses may be taken from an equivalent master's degree programme at a foreign university as a minor. In total, 21 ECTS credit points may be allocated to the international minor, and any remaining ECTS credit points can be allocated to the chosen major.					
Bridge Module Minor	**21**				
Graduates of the degree programmes in accordance with § 2 (1) must complete the corresponding bridge module listed in § 6 as their minor.					
Master's thesis	**30**				**30**
Free-choice subjects acc. to § 8	**6.5**				
Overall total	**120**	**30**	**30**	**30**	**30**

[1:] 2/3 semester course hours lecture part, 1/3 semester course hours exercise part.
[2:] 1/2 semester course hours lecture part, 1/2 semester course hours exercise part.

Please note:

The numbering of the Elective Compulsory Module B and Elective Module C for the major and the Elective Module D for the minor in the table above refers to the corresponding specialisation:

B1, C1 and D1: Specialisation Automation Systems Engineering
B2, C2 and D2: Specialisation Electronic Systems and IC Design
B3, C3 and D3: Specialisation Power Engineering
B4, C4 and D4: Specialisation Sensing, Control and Artificial Intelligence
B5, C5 and D5: Specialisation Wireless Networks and Communication Systems

Further explanation on the major:

Elective Compulsory Module

For the Elective Compulsory Module B of the specialisation chosen for the major, courses marked with * in the following tables for the chosen specialisation must be completed in the above-specified scope. If this scope is exceeded, any excess ECTS credit points are to be allocated to the Elective Module C of the chosen specialisation.

Elective Module

For the Elective Module C of the specialisation chosen for the major, courses from the following tables for the chosen specialisation must be completed in the above-specified scope.

Further explanation on the minor:

Elective Module

For the Elective Module D of the specialisation chosen for the minor, courses from the following tables for the chosen specialisation must be completed in the above-specified scope.

Bridge Modules

Bridge Module Information and Computer Engineering			
Course	**SSt**	**Type**	**ECTS**
Basics of Electrical Power Systems	2	VO	3
Introduction to Electric Drive Systems	2	VO	3
Fundamentals in Electric Machines, Laboratory	1	LU	1.5
High Voltage Engineering, Basic Course	2	VO	3
Energy system modeling and optimization	2	VU	3
Power Electronics	2	VO	3
Sensor Systems	2	VO	3
Sensor Systems, Laboratory	1	LU	1.5

Bridge Module Biomedical Engineering			
Course	**SSt**	**Type**	**ECTS**
Automatic Control	2	VO	3
Electromagnetic Fields I	2	VO	3
Introduction to Electric Drive Systems	2	VO	3

Power Electronics	2	VO	3
Sensor Systems	2	VO	3
Basics of Electrical Power Systems	2	VO	3
High Voltage Engineering, Basic Course	2	VO	3

Bridge Module Electrical Engineering and Audio Engineering			
Course	**SSt**	**Type**	**ECTS**
Automatic Control	2	VO	3
Sensor Systems	2	VO	3
Basics of Electrical Power Systems	2	VO	3
Introduction to Electric Drive Systems	2	VO	3
High Voltage Engineering, Basic Course	2	VO	3
Energy system modeling and optimization	2	VU	3
Power Electronics	2	VO	3

Bridge Module Digital Engineering			
Course	**SSt**	**Type**	**ECTS**
Probability and Stochastic Processes	2	VO	3
Electronic Circuit Design 2	2	VO	3
Electromagnetic Fields I	2	VO	3
Power Electronics	2	VO	3
Sensor Systems	2	VO	3
Basics of Electrical Power Systems	2	VO	3
High Voltage Engineering, Basic Course	2	VO	3

§ 7 Elective modules

(1) For the elective module, courses totalling 42 ECTS credit points (if chosen as a major) or 21 ECTS credit points (if chosen as a minor) must be completed from the following elective module catalogues.

Specialisation Automation Systems Engineering (ASE)

The following table lists the courses that can be selected within the framework of Modules B1, C1 and D1.

				Semester allocation	
Course	**SSt**	**Type**	**ECTS**	**WS**	**SS**
Electric Machines and Drives					
ASE.1 – Control of Electric Drives and Machines*	2	VO	3	3	
ASE.2 – Control of Electric Drives and Machines, Laboratory*	2	LU	3	3	
ASE.3 – Electric Drives for Automotive Applications	3	VU(2)	4.5		4.5
ASE.4 – Electric Machines for Electric Drives	2	VO	3		3
ASE.5 – Fractional Horsepower Motors	2	VO	3	3	

Power Electronic Systems					
ASE.6 – Converter Contest	2	PT	4		4
ASE.7 – Design of Power Electronic Systems	2	VO	3		3
ASE.8 – Power Electronic Systems(1) (4)	2	VO	3	3	
ASE.9 – Power Electronic Devices	2	VO	3	3	
ASE.10 – Power Electronic Systems 2*	2	VO	3		3
ASE.11 – Wireless Power Technologies for Sustainable Electronics	2	VO	3		3
Modelling and Simulation					
ASE.12 – Advanced Electrodynamics, Laboratory	2	LU	3		3
ASE.13 – Finite Element Method: Basics and Implementation(1) (4)	2	VU(3)	3		3
ASE.14 – Multiphysical Simulation I*	2	VO	3	3	
ASE.15 – Multiphysical Simulation I*	1	UE	1.5	1.5	
ASE.16 – Multiphysical Simulation II	2	VO	3		3
ASE.17 – Multiphysical Simulation II	1	UE	1.5		1.5
Electronics					
ASE.18 – Analog Circuit, Laboratory	3	LU	3		3
ASE.19 – Development of Electronic Systems	4	VO	6	6	
ASE.20 – Electromagnetic Compatibility of Electronic Systems	2	VO	3	3	
ASE.21 – Electromagnetic Compatibility of Electronic Systems, Laboratory	1	LU	1.5	1.5	
ASE.22 – Electronic Circuit Design 3	2	VO	3	3	
Signal Processing Systems					
ASE.23 – Adaptive Systems	2	VO	3	3	
ASE.24 – Adaptive Systems	1	UE	1.5	1.5	
ASE.25 – Digital Signal Processing and Communications Laboratory (4)	2	LU	3	3	
ASE.26 – Mixed-Signal Processing Systems Design	2	VU(3)	3	3	
Control Systems					
ASE.27 – Computer Aided System Modelling(1) (4)	2	VO	3	3	
ASE.28 – Mechatronic Systems Modelling	2	VO	3		3
ASE.29 – Mechatronic Systems Modelling	1	UE	1.5		1.5
ASE.30 – Optimisation and Control*	2	VO	3		3
ASE.31 – Optimisation and Control, Laboratory*	1	LU	1.5		1.5
ASE.32 – Process Automation(1) (4)	2	VO	3		3
ASE.33 – State Estimation and Filtering	2	VO	3	3	
ASE.34 – State Estimation and Filtering	1	UE	1.5	1.5	
Embedded Systems					
ASE.35 – Computer Engineering(1) (4)	3	VU(3)	4.5	4.5	
ASE.36 – Distributed Embedded Systems, Seminar	3	SE	4.5	4.5	

ASE.37 – Embedded Automotive Software	2	VU(3)	3	3	
ASE.38 – Embedded Systems*	2	VO	3		3
ASE.39 – Embedded Systems, Laboratory*	1	LU	1.5		1.5
ASE.40 – Fault-Tolerant Computing Systems	2	VO	3		3
ASE.41 – Fault-Tolerant Computing Systems	1	UE	1.5		1.5
ASE.42 – Hardware Description Languages	2	VO	3	3	
ASE.43 – Hardware Description Languages	1	UE	1.5	1.5	
ASE.44 – Industrial Software Development and Quality Management	2	VO	3		3
ASE.45 – Industrial Software Development and Quality Management	1	UE	1.5		1.5
ASE.46 – Real-Time Bus Systems(4)	1	VO	1.5	1.5	
ASE.47 – Real-Time Bus Systems, Laboratory(4)	1	LU	1.5	1.5	
ASE.48 – Real-Time Operating Systems	2	VO	3		3
ASE.49 – Real-Time Operating Systems, Laboratory	3	LU	4.5		4.5
ASE.50 – Smart Service Development	2	VO	3		3
ASE.51 – Smart Service Development	1	UE	1.5		1.5
Measurement Systems					
ASE.52 – Automotive Measurement	2	VO	3		3
ASE.53 – Automotive Measurement, Laboratory	1	LU	1.5		1.5
ASE.54 – Energy Storage Systems	2	VO	3		3
ASE.55 – Energy Storage Systems, Laboratory	1	LU	1.5		1.5
ASE.56 – Measurement Electronics*	2	VO	3		3
ASE.57 – Signal Analysis	2	VO	3	3	
ASE.58 – Signal Analysis	1	UE	1.5	1.5	

1: This course is held in German.
2: 2/3 semester course hours lecture part, 1/3 semester course hours exercise part.
3: 1/2 semester course hours lecture part, 1/2 semester course hours exercise part.
4: These courses are from the Bachelor’s Degree Programme Electrical and Electronics Engineering (and are recommended for students who have changed specialisation from the bachelor’s degree programme to the master’s degree programme; they can be completed as part of a major or minor).

Specialisation Electronic Systems and IC Design (ESD)

The following table lists the courses that can be selected within the framework of Modules B2, C2 and D2.

Course	SSt	Type	ECTS	Semester allocation WS	SS
Electronic Systems - Analog					
ESD.1 – Analog Circuit, Laboratory	3	LU	3		3
ESD.2 – Design of Power Electronic Systems	2	VO	3		3
ESD.3 – Development of Electronic Systems*	4	VO	6	6	
ESD.4 – Electromagnetic Compatibility of Electronic Systems*	2	VO	3	3	
ESD.5 – Electromagnetic Compatibility of Electronic	1	LU	1.5	1.5	

Systems, Laboratory					
ESD.6 – Electronic Circuit Design 3	2	VO	3	3	
ESD.7 – Power Electronic Devices	2	VO	3	3	
Electronic Systems - Digital					
ESD.8 – Computer Engineering(1) (4)	3	VU(3)	4.5	4.5	
ESD.9 – Computer Engineering, Laboratory	2	LU	3		3
ESD.10 – Hardware Description Languages	2	VO	3	3	
ESD.11 – Hardware Description Languages	1	UE	1.5	1.5	
ESD.12 – Hardware-Software-Codesign*	2	VO	3		3
ESD.13 – Hardware-Software-Codesign	1	UE	1.5		1.5
ESD.14 – Microcontroller Design, Laboratory*	4	LU	6		6
ESD.15 – Microcontroller(1) (4)	1.5	VO	2	2	
ESD.16 – Microcontroller(1) (4)	2	UE	3	3	
ESD.17 – Power-Aware Computing	2	VU(2)	3	3	
ESD.18 – Power-Aware Computing, Laboratory	1	LU	1.5	1.5	
ESD.19 – Processor Architecture (4)	2	VO	3		3
ESD.20 – Processor Architecture, Laboratory (4)	1	LU	1.5		1.5
Integrated Circuit Design and Application					
ESD.21 – Advanced Analog IC Design 1	3	VU(3)	4.5	4.5	
ESD.22 – Advanced Analog IC Design 2	3	VU(3)	4.5		4.5
ESD.23 – Advanced Layout Techniques	1	VU(3)	1.5	1.5	
ESD.24 – Analog IC Design 1*	2	VO	3	3	
ESD.25 – Analog IC Design 1*	2	UE	3	3	
ESD.26 – Analog IC Design 2	2	VO	3		3
ESD.27 – Analog IC Design 2	2	UE	3		3
ESD.28 – Analog IC Layout 1	2	UE	3		3
ESD.29 – Digital Circuit, Laboratory	3	LU	4	4	
ESD.30 – Evaluation of ICs, Laboratory	3	LU	4.5		4.5
ESD.31 – Fundamentals of Microelectronics (4)	2	VO	3	3	
ESD.32 – Compact Modelling and Robust IC Design	1	VU(3)	1.5		1.5
ESD.33 – Practical Analog Circuit Design(4)	2	UE	3		3
ESD.34 – Practical Analog Circuit Design, Laboratory(4)	1	LU	1		1
ESD.35 – Electromagnetic Compatibility of ICs	1	VO	1.5		1.5
ESD.36 – Electromagnetic Compatibility of ICs, Laboratory	1	LU	1.5		1.5
ESD.37 – IC Design Fundamentals*	2	VO	3	3	
ESD.38 – IC Design Fundamentals	2	UE	3	3	
ESD.39 – IC Design Project Management and Quality	1	VO	1.5		1.5
ESD.40 – Methods for IC Evaluation and Failure Analysis	2	VU(3)	3	3	
ESD.41 – Mixed Signal IC Design	2	VO	3	3	
ESD.42 – Mixed Signal IC Design	2	UE	3	3	
ESD.43 – Noise and Crosstalk in ICs	2	VU(3)	3		3

ESD.44 – Production Test and Design for Test	2	VO	3		3
ESD.45 – Reliable Integrated Circuits in Design and Application	1	VO	1.5		1.5
ESD.46 – Smart Power and High Voltage Circuits	2	VO	3	3	
Radio Frequency Systems and Signal Processing					
ESD.47 – Analog RF Filter Design	2	VU(2)	3	3	
ESD.48 – Fundamentals of RF Measurement Techniques	2	VU(2)	3	3	
ESD.49 – Guided Wave Propagation and Components	2	VO	3		3
ESD.50 – Guided Wave Propagation and Components	1	UE	1.5		1.5
ESD.51 – Mixed-Signal Processing Systems Design*	2	VU(3)	3	3	
ESD.52 – Nonlinear Signal Processing	2	VO	3	3	
ESD.53 – Nonlinear Signal Processing	1	UE	1.5	1.5	
ESD.54 – RF Systems, Laboratory	2	LU	3		3
ESD.55 – Satellite Technology	2	VO	3		3

1: This course is held in German.
2: 2/3 semester course hours lecture part, 1/3 semester course hours exercise part.
3: 1/2 semester course hours lecture part, 1/2 semester course hours exercise part.
4: These courses are from the Bachelor's Degree Programme Electrical and Electronics Engineering (and are recommended for students who have changed specialisation from the bachelor's degree programme to the master's degree programme; they can be completed as part of a major or minor).

Specialisation Power Engineering (PE)

The following table lists the courses that can be selected within the framework of Modules B3, C3 and D3.

Course	**SSt**	**Type**	**ECTS**	Semester allocation **WS**	 **SS**
Electric Drives and Power Electronics					
PE.1 – Design of Electric Machines	2	VO	3	3	
PE.2 – Design of Electric Machines	2	PT	4		4
PE.3 – Electric Drives and Machines, Laboratory	2	LU	3	3	
PE.4 – Electric Drives for Automotive Applications	3	VU(2)	4.5		4.5
PE.5 – Electric Machines for Electric Drives*	2	VO	3		3
PE.6 – Electric Machines for Power Engineering	2	VO	3	3	
PE.7 – Fundamentals in Electric Machines, Laboratory(1)(4)	1	LU	1.5		1.5
PE.8 – Power Electronic Systems(1) (4)	2	VO	3	3	
PE.9 – Photovoltaic (PV) Systems(1) (4)	3	VU(2)	4		4
PE.10 – Power Electronic Devices	2	VO	3	3	
PE.11 – Power Electronics for Power Engineering*	2	VO	3	3	
PE.12 – Power Electronics for Power Engineering	1	UE	1.5	1.5	
Electrical Power Systems					
PE.13 – Grid Operation of Electrical Power Systems(1)	2	VO	3	3	
PE.14 – Electrical Power Systems 1(1) (4)	2	VO	3	3	

PE.15 – Electrical Power Systems 2(1)(4)	2	VO	3		3
PE.16 – Modern Power Systems	2	VO	3	3	
PE.17 – Modern Power Systems, Laboratory	2	LU	3	3	
PE.18 – Planning and Operation of Electrical Power Systems*	2	VO	3	3	
PE.19 – Planning and Operation of Electrical Power Systems in Practice(1)	1	VO	1.5		1.5
PE.20 – Power Stations and Thermal Units	2	VO	3		3
PE.21 – Power Systems Control and Stability	2	VO	3	3	
PE.22 – Protection and Security of Supply in Electrical Power Systems	1	VO	1.5		1.5
PE.23 – Protection and Security of Supply in Electrical Power Systems, Laboratory	1	LU	1.5		1.5
PE.24 – Reliability Engineering	1	VO	1.5		1.5
PE.25 – Safety and Protective Measures	1	VO	1.5	1.5	
PE.26 – Safety and Protective Measures, Laboratory	1	LU	1.5	1.5	
PE.27 – Simulation of Electrical Power Systems	1	SE	1.5		1.5
PE.28 – Switching in Electrical Power Systems	2	VO	3	3	
High Voltage Engineering					
PE.29 – Power Equipment for HVDC(1)	2	VO	3		3
PE.30 – Lightning Discharges, Overvoltage Protection and Lightning Protection, Laboratory(1)	1	LU	1.5		1.5
PE.31 – DC Technologies in Power Engineering, Laboratory(1)	3	LU	4.5	4.5	
PE.32 – Diagnostics of high voltage components(1)	1	VO	1.5	1.5	
PE.33 – Digital Automation and Measurement Techniques in High Voltage Engineering(1)	2	VU(3)	3	3	
PE.34 – Electrical Insulation Systems	2	SE	3		3
PE.35 – FEM Simulation for Power Engineering	2	VU(3)	3	3	
PE.36 – High Voltage Engineering 2, Laboratory	2	LU	3	3	
PE.37 – High Voltage Technology and Systems*	2	VO	3	3	
PE.38 – High Voltage Test Techniques	1	SE	1.5	1.5	
PE.39 – High Current Engineering(1)	1	VO	1.5		1.5
PE.40 – Instrument Transformers in AC/DC Grids	1	VO	1.5		
PE.41 – High-Voltage Transmission Lines(1)	1	VO	1.5	1.5	
PE.42 – Lightning Physics and Protection	1	VO	1.5		1.5
PE.43 – Switchgears(1)	2	VO	3		3
PE.44 – Partial discharge in the field of electrical engineering(1)	1	VO	1.5		1.5
PE.45 – Transient Stress on Power Equipment(1)	1	VU(3)	1.5	1.5	
Energy System Analysis and Optimisation					
PE.46 – Advanced Machine Learning for Energy Applications	2	VU(3)	3		3
PE.47 – Advanced Topics in Energy System Planning	2	VO	3		3

and Optimisation*					
PE.48 – Advanced Topics in Energy System Planning and Optimisation	1	UE	1.5		1.5
PE.49 – Electricity Markets	1	VO	1.5	1.5	
PE.50 – Energy Economics[1]	2	VO	3		3
PE.51 – Energy and the Environment	2	VO	3		3
PE.52 – How to Manage Waste and Resources in Terms of Climate and Sustainability	1	VO	1.5		1.5
PE.53 – Innovative Energy Technologies and Energy Efficiency	2	VO	3		3
PE.54 – Innovative Energy Technologies and Energy Efficiency	1	UE	1.5		1.5
PE.55 – Micro- and Macro-Economics for Electrical Engineers	2	VO	3		3
PE.56 – Practical Aspects of Renewable Energies	2	VU[3]	3	3	
PE.57 – Regulation Methods[1]	1	VO	1.5		1.5
PE.58 – Special Problems in Electricity Economics[1]	2	SE	3		3
PE.59 – Techno-economic aspects of the transmission system operator[1]	1	SE	1.5		1.5

1: This course is held in German.
2: 2/3 semester course hours lecture part, 1/3 semester course hours exercise part.
3: 1/2 semester course hours lecture part, 1/2 semester course hours exercise part.
4: These courses are from the Bachelor's Degree Programme Electrical and Electronics Engineering (and are recommended for students who have changed specialisation from the bachelor's degree programme to the master's degree programme; they can be completed as part of a major or minor).

Specialisation Sensing, Control and Artificial Intelligence (SCA)

The following table lists the courses that can be selected within the framework of Modules B4, C4 and D4.

				Semester allocation	
Course	**SSt**	**Type**	**ECTS**	**WS**	**SS**
Artificial Intelligence					
SCA.1 – Advanced Information Theory	2	VU[3]	3		3
SCA.2 – Computer Engineering[1] [4]	3	VU[3]	4.5	4.5	
SCA.3 – Context-Aware Computing	2	VO	3	3	
SCA.4 – Context-Aware Computing	1	UE	1.5	1.5	
SCA.5 – Embedded Machine Learning	2	VU[3]	3	3	
SCA.6 – Mobile Computing, Laboratory	2	LU	3		3
SCA.7 – Probabilistic Machine Learning*	2	VO	3	3	
SCA.8 – Probabilistic Machine Learning*	1	UE	1.5	1.5	
SCA.9 – Signal Processing and Machine Learning 1, Seminar	2	SE	3	3	3
Automatic Control					
SCA.10 – Advanced Control Concepts	2	VO	3		3
SCA.11 – Advanced Control Concepts	1	UE	1.5		1.5

SCA.12 – Computer Aided Control System Design*	2	VO	3	3	
SCA.13 – Computer Aided Control System Design*	1	UE	1.5	1.5	
SCA.14 – Control of Distributed Parameter Systems	2	VO	3		3
SCA.15 – Control of Distributed Parameter Systems	1	UE	1.5		1.5
SCA.16 – Discrete-Time Control	2	VO	3	3	
SCA.17 – Discrete-Time Control, Laboratory	1	LU	1.5	1.5	
SCA.18 – Basics of Nonlinear Control Systems(1) (4)	2	VO	3		3
SCA.19 – Mechatronic Systems Modelling	2	VO	3		3
SCA.20 – Mechatronic Systems Modelling	1	UE	1.5		1.5
SCA.21 – Multivariable Systems	2	VO	3		3
SCA.22 – Multivariable Systems	1	UE	1.5		1.5
SCA.23 – Nonlinear Control Systems	2	VO	3	3	
SCA.24 – Nonlinear Control Systems	2	UE	3	3	
SCA.25 – Optimal Feedback Design	2	VO	3		3
SCA.26 – Optimal Feedback Design	1	UE	1.5		1.5
SCA.27 – Optimization and Control	2	VO	3		3
SCA.28 – Optimization and Control, Laboratory	1	LU	1.5		1.5
SCA.29 – Process Automation(1) (4)	2	VO	3		3
SCA.30 – State Estimation and Filtering	2	VO	3	3	
SCA.31 – State Estimation and Filtering	1	UE	1.5	1.5	
Modelling and Simulation					
SCA.32 – Actuators	2	VO	3		3
SCA.33 – Actuators	1	UE	1.5		1.5
SCA.34 – Advanced Electrodynamics, Laboratory	2	LU	3		3
SCA.35 – Finite element method: basics and implementation(1) (4)	2	VU(3)	3		3
SCA.36 – Multiphysical Simulation I	2	VO	3	3	
SCA.37 – Multiphysical Simulation I	1	UE	1.5	1.5	
SCA.38 – Multiphysical Simulation II	2	VO	3		3
SCA.39 – Multiphysical Simulation II	1	UE	1.5		1.5
SCA.40 – Optimisation II	2	VO	3		3
SCA.41 – Optimisation II	1	UE	1.5		1.5
Sensing					
SCA.42 – Applied RF Measurement Techniques	2	VU(2)	3		3
SCA.43 – Energy Harvesting Systems	2	VO	3	3	
SCA.44 – Environmental Sensing	2	VO	3	3	
SCA.45 – Fundamentals of RF Measurement Techniques	2	VU(2)	3	3	
SCA.46 – Fundamentals of Photonics	2	VO	3	3	
SCA.47 – Fundamentals of Photonics, Laboratory	1	LU	1.5	1.5	
SCA.48 – Physical Effects for Sensors	2	VO	3		3

SCA.49 – Physical Effects for Sensors	1	UE	1.5		1.5
SCA.50 – Quantum Sensing and Measurement	2	VU(2)	3		3
SCA.51 – Signal Analysis*	2	VO	3	3	
SCA.52 – Signal Analysis*	1	UE	1.5	1.5	
Signal Processing					
SCA.53 – Adaptive Systems	2	VO	3	3	
SCA.54 – Adaptive Systems	1	UE	1.5	1.5	
SCA.55 – Audio Signal Processing Applications	2	VO	3		3
SCA.56 – Measurement Uncertainties	2	VU(2)	3		3
SCA.57 – Multi-Sensor Data Fusion, Laboratory	1	LU	1.5	1.5	
SCA.58 – Nonlinear Signal Processing	2	VO	3	3	
SCA.59 – Nonlinear Signal Processing	1	UE	1.5	1.5	
SCA.60 – Statistical Signal Processing	2	VO	3		3
SCA.61 – Statistical Signal Processing	1	UE	1.5		1.5

1: This course is held in German.
2: 2/3 semester course hours lecture part, 1/3 semester course hours exercise part.
3: 1/2 semester course hours lecture part, 1/2 semester course hours exercise part.
4: These courses are from the Bachelor's Degree Programme Electrical and Electronics Engineering (and are recommended for students who have changed specialisation from the bachelor's degree programme to the master's degree programme; they can be completed as part of a major or minor).

Specialisation Wireless Networks and Communication Systems (WNC)

The following table lists the courses that can be selected within the framework of Modules B5, C5 and D5.

Course	SSt	Type	ECTS	Semester allocation WS	SS
Communications					
WNC.1 – Advanced Digital Communications*	2	VO	3	3	
WNC.2 – Advanced Digital Communications*	1	UE	1.5	1.5	
WNC.3 – Advanced Information Theory	2	VU(3)	3		3
WNC.4 – Advanced Telecommunications, Laboratory	2	LU	3		3
WNC.5 – Digital Signal Processing and Communications Laboratory (5)	2	LU	3	3	
WNC.6 – Information Theory and Coding (5)	2	VO	3	3	
WNC.7 – Information Theory and Coding (5)	1	UE	1.5	1.5	
WNC.8 – Optoelectronical Communication Engineering	3	VO	4.5	4.5	
WNC.9 – Optoelectronical Communication Engineering	1	UE	1.5	1.5	
WNC.10 – Satellite Communications	2	VO	3	3	
WNC.11 – Satellite Communications	1	UE	1.5	1.5	
Communication and Sensing Systems					
WNC.12 – Bayesian Inference for Localisation, Sensing and Communications	2	VU(2)	3	3	

WNC.13 – Communication and Sensing Systems, Seminar	1.5	SE	2	2	
WNC.14 – Estimation and Detection Theory for Communications	2	VO	3		3
WNC.15 – Estimation and Detection Theory for Communications	1	UE	1.5		1.5
WNC.16 – Introduction to Radar Systems	2	VO	3	3	
WNC.17 – Opportunistic Remote Sensing	2	VO	3		3
WNC.18 – Satellite Technology	2	VO	3		3
Speech Signal Processing and AI					
WNC.19 – Automatic Speech Recognition	2	VO	3	3	
WNC.20 – Human Speech Production, Perception and Pathologies	2	VU(3)	3		3
WNC.21 – Linguistic Foundations of Speech and Language Technology	2	VU(2)	3	3	
WNC.22 – Signal Processing and Machine Learning 1, Seminar*	2	SE	3	3	3
WNC.23 – Speaking and Listening Machines, Laboratory (5)	2	LU	3		3
WNC.24 – Speech Signal Processing	2	VO	3	3	
WNC.25 – Speech Signal Processing	1	UE	1.5	1.5	
WNC.26 – Speech Synthesis	2	VU(2)	3	3	
WNC.27 – Spoken Language in Human and Human-Computer Dialogue	2	VU(2)	3		3
Audio Signal Processing and Acoustics					
WNC.28 – Advanced Acoustics and Audio Engineering A	1	VU(2)	1.5		1.5
WNC.29 – Advanced Acoustics and Audio Engineering B	1	VU(2)	1.5		1.5
WNC.30 – Audio Signal Processing Applications	2	VO	3		3
WNC.31 – Electro Acoustics(1)	2	VO	3		3
WNC.32 – Psychoacoustics 01(1)	2	VO	2	2	
WNC.33 – Room Acoustics(1)	2	VO	3	3	
WNC.34 – Technical Audiology	2	VO	3		3
Networking					
WNC.35 – Computer Engineering(1) (5)	3	VU(3)	4.5	4.5	
WNC.36 – Computer Systems and Networks*	2	VO	3	3	
WNC.37 – Computer Systems and Networks*	1	UE	1.5	1.5	
WNC.38 – Embedded Internet (5)	2	VU(2)	3	3	
WNC.39 – Embedded Internet, Laboratory (5)	2	LU	3	3	
WNC.40 – Fault-Tolerant Distributed Algorithms	2	VU(3)	3	3	
WNC.41 – Mobile Computing, Seminar	3	SE	4.5		4.5
WNC.42 – Low-Power Wireless Localisation Systems	2	VU(4)	3	3	

WNC.43 – Sensor Networks	2	VU(2)	3		3
WNC.44 – Sensor Networks, Laboratory	2	LU	3		3
Microwave Engineering					
WNC.45 – Applied RF Measurement Techniques	2	VU(2)	3		3
WNC.46 – Fundamentals of RF Measurement Techniques	2	VU(2)	3	3	
WNC.47 – Guided Wave Propagation and Components	2	VO	3		3
WNC.48 – Guided Wave Propagation and Components	1	UE	1.5		1.5
WNC.49 – RF Systems, Laboratory	2	LU	3		3
WNC.50 – Wireless Power Technologies for Sustainable Electronics	2	VO	3		3
Antennas and Propagation					
WNC.51 – Antennas and Wave Propagation*	2	VO	3	3	
WNC.52 – Antennas and Wave Propagation*	1	UE	1.5	1.5	
WNC.53 – Computational Electromagnetics	2	VO	3		3
WNC.54 – Computational Electromagnetics	1	UE	1.5		1.5
WNC.55 – Modelling of Wireless Propagation Channels	2	VO	3		3
WNC.56 – Simulation of Electronic Systems(1) (5)	1	VO	1.5		1.5
WNC.57 – Simulation of Electronic Systems(1) (5)	2	UE	3		3
WNC.58 – Smart Antennas	2	VU(3)	3		3

1: This course is held in German.
2: 2/3 semester course hours lecture part, 1/3 semester course hours exercise part.
3: 1/2 semester course hours lecture part, 1/2 semester course hours exercise part.
4: 1/3 semester course hours lecture part, 2/3 semester course hours exercise part.
5: These courses are from the Bachelor's Degree Programme Electrical and Electronics Engineering (and are recommended for students who have changed specialisation from the bachelor's degree programme to the master's degree programme; they can be completed as part of a major or minor).

(2) Courses with the title "Selected Topics of [Specialisation] (Subtitle)" are assigned to the corresponding elective module, with one semester hour per week generally corresponding to 1.5 ECTS credit points. These courses are offered with characteristic subtitles for 1-3 semester hours as lectures (VO), lectures with integrated exercises (VU) or seminars (SE) and/or 1–2 semester hours as laboratory courses (UE). Courses with different subtitles should be evaluated as different courses.

§ 8 Free-choice subjects

(1) The courses to be completed as part of the free-choice subjects in the Master's Degree Programme Electrical and Electronics Engineering are designed to provide individual strategic focus and further development of the students. They may be freely selected from the courses offered by any recognised national or international universities and also recognised national or international post-secondary educational institutions.

(2) If a specific free-choice course does not have an allocation of ECTS credit points, each semester hour (SSt) of this course is counted as one ECTS credit point. However, if such courses are lecture-type courses (VO), they are assigned 1.5 ECTS credit points for each semester course hour.

(3) Additionally, the possibility exists, in accordance with § 11, to complete a professionally-oriented internship or short study period abroad as part of the free-choice subjects for up to 6 ECTS credit points.

§ 9 Master’s thesis

(1) The purpose of the master’s thesis is to demonstrate a student’s ability to work on scientific topics on their own, both with regard to content and methodology. The scope of the master’s thesis must be determined in such a way that its completion can be reasonably and feasibly accomplished by the student within a period of six months.

(2) The topic of the master’s thesis must be taken from or meaningfully related to the Compulsory Modules or the Elective Modules in accordance with § 6 and § 7.

(3) The master’s thesis must be registered with the respective officer responsible for study matters via the Dean’s Office before beginning work on it.

§ 10 Registration requirements for courses/examinations

To register for the final master’s examination before a committee, the student must provide proof of positive assessment of all study achievements/examinations outlined in § 6 to § 8 as well as positive assessment of the master’s thesis.

§ 11 Stays abroad and internships

(1) Recommended stays abroad

It is recommended for students to spend time abroad in the course of their studies. In this master’s degree programme, the 3rd semesters are particularly suitable for this purpose.

It is also possible to obtain recognition of work done during shorter stays abroad, for example while participating in summer or winter schools, as part of the free-choice subjects, by application to the officer responsible for study matters.

(2) Internships

It is possible to include professionally-oriented internships/work experience in the free-choice subjects.

Each week of full employment corresponds to 1.5 ECTS credit points. Active participation in an academic event may also count as an internship. This internship must be approved by the officers responsible for study matters and considered a useful addition to the degree programme. Additionally, the possibility exists to complete a professionally-oriented internship or short study period abroad as part of the free-choice subjects for up to 3 ECTS credit points.

§ 12 Double Degree Programme

As part of this degree programme, it is possible to participate in a Double Degree Programme with the Technical University of Darmstadt (TUDa), Germany. The total scope of the degree programme is 120 ECTS credit points.
This programme is a double degree programme in accordance with § 51 (2) 26 of the Universities Act 2002 (UG) and is established as a specialisation in energy-efficient and sustainable microelectronics.
Admission to the double degree programme is subject to the regulations of the cooperation agreement between TUDa and TU Graz.

(1) Students whose home university is TU Graz:

Students participating in the Double Degree Programme with TU Graz (home university) must complete at least the following courses and study achievements with a total scope of 60 ECTS credit points. These ECTS credit points are recognised for “Core Competencies,” “Communication Hardware Specialisation,” or “Studium Generale” of the Master’s Degree Programme Information and Communication Engineering at TUDa.

1. The compulsory courses A.1, A.2, A.3, A.4, A.5, and A.6 of the Compulsory Module A, totalling 16 ECTS credit points, must be completed at TU Graz.
2. Courses from the Elective Compulsory Module B2 “Major Electronic Systems and IC Design” (marked with an “*”), totalling 12 ECTS credit points, must be completed. The following courses (or equivalent courses) are mandatory for admission to TUDa:
   a. ESD.4 - Electromagnetic Compatibility of Electronic Systems
   b. ESD.34 - IC Design Fundamentals
   c. ESD.48 - Mixed-Signal Processing Systems Design
3. Courses from the Elective Module C2 “Major Electronic Systems and IC Design”, totalling 26 ECTS credit points, must be completed. The following courses (or equivalent courses) are mandatory for admission to TUDa:
   a. ESD.5 - Electromagnetic Compatibility of Electronic Systems, Laboratory
   b. ESD.35 - IC Design Fundamentals
   c. ESD.46 - Guided Wave Propagation and Components
   d. ESD.47 - Guided Wave Propagation and Components
4. In addition, the following courses (or equivalent courses) from the Elective Module D5 “Wireless Networks and Communication Systems” (6 ECTS credit points) must be completed for admission to TUDa:
   a. WNC.3 - Advanced Information Theory
   b. WNC.4.- Advanced Telecommunications, Laboratory

At the host university TUDa in the second year of the degree programme, students must complete at least the following courses and study achievements with a total scope of 60 ECTS credit points:

5. Courses from the Master’s Degree Programme Information and Communication Engineering – Specialisation in Communication Hardware and Studium Generale, totalling 30 ECTS credit points, must be completed in accordance with the degree programme guidelines. The following courses (or equivalent courses) are mandatory:
   a. Seminar A (18-ho-2160) or Seminar B (18-ho-2161) or another IC hardware design seminar with at least 4 ECTS credit points, offered at the Department of Electrical Engineering and Information Technology (etit) at TUDa (equivalent to TU Graz compulsory course A.7 “Master’s Seminar Project (EEE)” in Compulsory Module A).

b. Students without sufficient German language skills must complete at least one language course for “Studium Generale” at the TUDa Language Center. All other students must take a module related to language skills (e.g., “Academic Work and Writing”), which may be completed in either German or English.

6. The module “Master Thesis” (see § 3 below) is worth 30 ECTS credit points. The topic of the master’s thesis must be a meaningful expansion of the skills acquired in the modules taken.

(2) Students whose home university is TUDa:

Students participating in the Double Degree Programme with TUDa (home university) must complete at least the following courses and study achievements with a total scope of 60 ECTS credit points.

1. Courses from the Specialisation Electronic Systems and IC Design (ESD), totalling 18 ECTS credit points, must be completed. The following courses (or equivalent courses) are excluded, as equivalent courses were already completed in the first year of study at the home university:
   a. ESD.4 - Electromagnetic Compatibility of Electronic Systems
   b. ESD.5 - Electromagnetic Compatibility of Electronic Systems, Laboratory
   c. ESD.34 - IC Design Fundamentals
   d. ESD.35 - IC Design Fundamentals
   e. ESD.46 - Guided Wave Propagation and Components
   f. ESD.47 - Guided Wave Propagation and Components
   g. ESD.48 - Mixed-Signal Processing Systems Design

2. Courses from any specialisation (“Automation Systems Engineering”, “Electronic Systems and IC Design”, “Power Engineering”, “Sensing, Control and Artificial Intelligence” or “Wireless Networks and Communication Systems”), totalling 6 ECTS credit points, must be completed. The following courses (or equivalent courses) are excluded, as equivalent courses were already completed in the first year of study at the home university:
   a. WNC.3 - Advanced Information Theory
   b. WNC.4.- Advanced Telecommunications, Laboratory
3. A total of 6 ECTS credit points worth of free-choice subjects according to § 8 must be completed.
4. A master’s thesis (see (3)) must be completed totalling 30 ECTS credit points. The topic of the master’s thesis is to be chosen in accordance with § 9 (2).

(3) Regulations regarding the master’s thesis

For students of the Double Degree Programme, the master’s thesis includes a thesis written in English and an oral presentation and defence of this paper before a committee. The written thesis must be submitted at the respective host university.

The research project and the written thesis are supervised by a main supervisor at the host university. Co-supervision of these two study achievements by the home university is optional.

Master’s examinations taken at TU Graz must be completed in accordance with the applicable examination regulations of TU Graz (see § 13).

Master’s examinations taken at TUDa must be completed in accordance with the applicable examination regulations of TUDa.

(4) Academic degree within the framework of the Double Degree Programme

Graduates of the Master's Degree Programme Electrical and Electronics Engineering who have completed the Double Degree Programme are awarded the academic degree "Diplom-Ingenieurin" or "Diplom-Ingenieur", abbreviated as "Dipl.-Ing." or "DI", by TU Graz and the academic degree "Master of Science", abbreviated as "MSc" by the Technical University of Darmstadt as a double degree in accordance with § 87 (5) of the Universities Act 2002 (UG).

III. Examination Regulations and Conclusion of Studies

§ 13 Assessment of modules

The overall grade for a module is the average grade of all examinations completed as part of the module, weighted according to ECTS credit points. The grade is rounded up if the decimal place exceeds 0.5. Otherwise, the grade is rounded down. Examinations that are assessed only as "successfully completed/not completed" are not included in the calculation of the overall module assessment. Positive assessment of a module requires the positive assessment of all individual examinations to be completed within the module.

§ 14 Master's examination

(1) The master's examination is an oral examination before a committee and consists of

- the presentation of the master's thesis (max. 30 minutes),
- the defence of the master's thesis (examination interview before a committee on the subject matter of the master's thesis and other subject-related areas).

(2) The total duration of the master's examination before a committee is usually 60 minutes and must not exceed 75 minutes.

(3) The examination committee for the mater's examination includes the supervisor of the master's thesis and two other members who are nominated by the officer responsible for study matters, after hearing any recommendations from the candidate. The examination committee must be chaired by one of the members who is not the supervisor of the master's thesis.

(4) The master's examination is graded by the committee based on the performance during the examination.

§ 15 Completion of studies

(1) The master's degree programme is completed once all academic achievements pursuant to § 3 have been assessed positively.

(2) Successful completion of the degree programme is documented by issuing a certificate. The master's degree certificate for the Master's Degree Programme Electrical and Electronics Engineering is composed of:

a. the chosen major and minor,
b. a list of all completed modules set out in § 3 (along with their ECTS credit points) and their assessments,
c. the title and assessment of the master's thesis,
d. the assessment of the master's examination,
e. the total in ECTS credit points completed in free-choice subjects, as defined in § 8, and
f. the overall assessment.

IV. Entry Into Force and Transitional Provisions

§ 16 Entry into force

This 2025 curriculum shall enter into force on 1 October 2025.

§ 17 Transitional provisions

Students of the Master's Degree Programme Electrical and Electronics Engineering who are subject to the 2019 curriculum in its **2021 version** when this curriculum enters into force on **1 October 2025**, are entitled to complete their studies according to the provisions of the **2019 curriculum** in its 2021 version by **30 September 2028**. If the degree programme is not completed by **30 September 2028**, students become subject to the curriculum as amended. Students are entitled to voluntarily opt for the new curriculum at any time within the admission periods. To this end, an irrevocable written declaration must be sent to the officer responsible for study matters. The equivalence between those examinations completed within the framework of the curriculum **2019** and those completed within the framework of the curriculum **2025** is established in Appendix III: Equivalence List.

Appendices to the curriculum of the Master's Degree Programme Electrical and Electronics Engineering

Appendix I: Module Descriptions

Compulsory Module A	Advanced Basics EEE
ECTS credit points:	20.5
Contents:	Systems of ordinary differential equations, stability theory based on linearisation, Lyapunov theory, classification of critical points, fundamentals of the calculus of variations, partial differential equations (Laplace equation, diffusion equation, wave equation), statistics. Mathematical foundations of optimisation, definition of a minimum with and without constraints (Kuhn-Tucker condition), deterministic optimisation methods of the 0th order (simplex method, pattern search), 1st order (steepest descent, conjugate gradient, quasi-Newton method), and 2nd order (Newton method, Levenberg-Marquardt method), sensitivity analysis using the adjoint variable method, least squares method (Gauss-Newton method), Lagrange method for linear constraints, elimination method for linear constraints; linear programming (table method, active set method), quadratic programming. Classification of electrodynamics, fundamentals of network theory, energy conversions in electromagnetic fields and the unique solvability of Maxwell's equations, boundary value problems for the scalar potential, analytical solution methods for Laplace's equation: method of fictitious charges (reflection principle), separation of variables in Cartesian and cylindrical coordinates, conformal mapping, numerical solution methods for boundary value problems for the scalar potential: finite difference method, variational methods (Ritz method), finite element method (FEM), integral equations for the scalar potential: elements of potential theory, integral equation for the surface charge density, boundary element method (BEM), boundary value problems for the vector potential: one-component vector potential for plane and rotationally symmetric 2D problems, calibration of the vector potential for 3D problems, quasi-stationary fields, complex notation, current displacement in infinite half-space and in a conducting plate, plane waves, electromagnetic waves in infinite, homogeneous space, retarded potentials, Hertzian dipole, guided waves, 2D wave equation for TM and TE modes, solution of the 2D wave equation, waveguides. This introductory lecture covers key concepts and methods from the fields of machine learning and pattern recognition. In particular, the theoretical foundations of machine learning, linear data transformations, neural networks, support vector machines, hidden Markov models used with sequential data and unsupervised learning methods will be discussed.
Learning outcomes:	After completing this module, students are able to • solve systems of ordinary differential equations. • determine the stability of critical points using linearisation or Lyapunov's direct method. • solve problems using the calculus of variations. • solve partial differential equations. • apply statistical methods.

	• understand optimality conditions. • apply deterministic optimisation methods to solve problems with and without constraints. • understand analytical and numerical methods for solving Maxwell's equations for static and quasi-stationary problems, as well as for electromagnetic wave problems. • master the fundamentals and key concepts of machine learning. • understand the most important learning algorithms (neural networks, support vector machines, k-nearest neighbour, regression, Bayesian and maximum likelihood estimation, linear transformations, etc.). • apply the most important concepts of statistical data analysis (e.g., regularisation, data splitting).
Prerequisites for participation:	Any prerequisites are listed in TUGRAZonline
Frequency in which the module is provided:	Every academic year

Module B1, C1, D1	**Automation Systems Engineering**
ECTS credit points:	21–63
Contents:	Advanced topics in functional description and modelling of electrical machines and drives for various application areas. Design, layout, and control of power electronic circuits for different requirements. Active and passive components of power electronics. Finite element methods for the numerical solution of electromagnetic field problems in machines and drives, particularly multiphysical calculations of electromagnetics, mechanics, thermals, and acoustics. Advanced topics in the field of electronic circuit design for analogue signal conditioning and sensor interfaces, robust electronic systems, and electromagnetic compatibility. Principles, algorithms, and concepts of adaptive systems in signal processing and control engineering. Description of continuous-time and discrete-time systems, filter algorithms, and discrete Fourier transformation. Wave propagation on high-frequency lines and in free space. Optimisation in control systems, fundamentals of state estimation systems and constant parameter estimation. Modelling of electrical, mechanical, and hydraulic systems Introduction and various aspects of platform-oriented development, embedded systems, including those with real-time requirements, including operating system kernels. Aspects of fault tolerance, reliability and quality of software and overall systems, as well as functional safety. Core concepts of IT-based service business models and the theoretical foundations of hardware description languages. Measurement signals and methods for their processing; the structure and functionality of sensors and the use of signals for in-vehicle applications. Structure, function, and properties of various energy storage devices.
Learning outcomes:	After completing this module, students are able to • understand the design, application, and parameterisation of electric drive motors and their control systems, and describe their functions. • describe, dimension, and parameterise different circuit concepts, including their control systems, for power electronics applications. • explain the fundamentals of multiphysical fields and implement

	and successfully apply the finite element method, interpreting its results correctly from a physical perspective. • design, build, and test complex electronic circuits, as well as explain and adhere to guidelines for EMC-compliant design. • critically compare fundamental problems of adaptive systems with fixed systems and to systematically describe, analyse and simulate required algorithms, as well as understand fundamental aspects of signal processing of mixed-signal systems and design corresponding systems. • understand and apply methods for designing state estimators and optimal control systems. • challenges and tasks related to embedded systems and apply acquired methods to synthesize simple problems, understand, design, and implement operating system kernels. • understand analysis, system, hardware, and software design for safety-critical systems, as well as apply concepts for the design of digital systems using hardware description languages. • fundamentally understand and apply the analysis of measurement signals, handle and apply today's common automotive electronic sensors and measurement systems, as well as compare different energy storage systems and to identify their special features.
Prerequisites for participation:	Any prerequisites are listed in TUGRAZonline
Frequency in which the module is provided:	Most courses every academic year, some only every other academic year

Module B2, C2, D2	**Electronic Systems and IC Design**
ECTS credit points:	21–63
Contents:	Advanced topics of electronic circuit technology including the system level. Key areas include power electronics, device development, electromagnetic compatibility, analogue electronic systems (amplifier topologies, noise, parasitic effects in electronic components), digital electronic systems (microprocessors, bus systems, hardware description languages, power-aware computing), and the design of integrated circuits (ICs) from circuit input/description to testing. Circuit technology and signal processing in the high-frequency range. Most courses are focused on practical application (course types VU, UE, LU).
Learning outcomes:	After completing this module, students are able to • analyse and design complex electronic systems. • master the requirements of power electronics. • develop digital hardware and understand the underlying circuit architectures (processors, bus systems). • develop mixed analogue-digital integrated circuits throughout the entire design cycle (from design to production and testing) and independently use appropriate software tools. • develop and master the challenges of electromagnetic compatibility at the system and IC levels, while simultaneously developing these solutions. • master the fundamentals of high-frequency technology (measurement technology, wave propagation, components, filters) and thus address the challenges in this area, from signal processing to broadband communication.

Prerequisites for participation:	Any prerequisites are listed in TUGRAZonline
Frequency in which the module is provided:	Most courses every academic year, some only every other academic year

Module B3, C3, D3	**Power Engineering**
ECTS credit points:	21–63
Contents:	Advanced topics in the areas of power electronics, drive technology, and electrical machines, planning and operation of electrical grids, fault calculation and protection technology, grid dynamics and grid control, design and diagnostics of electrical insulation systems and equipment in power engineering, lightning physics and protection, applied aspects of energy planning and modelling, energy-environment interactions, electricity markets, and regulatory methods
Learning outcomes:	After completing this module, students are able to • analyse electrical energy systems and their complex interrelationships, both at the level of individual components and at the system level. • independently handle specific aspects of the planning and operation of electrical energy systems. • handle advanced tasks in the areas of power electronics, electrical drive technology, and electrical machines. • handle basic tasks in the planning, modelling, and analysis of electrical power grids. • assess the essential high-voltage characteristics of electrical equipment in power engineering. • analyse and technically describe electrical insulation systems. • recognise and independently address specific issues in the field of electricity economics and energy innovation.
Prerequisites for participation:	Any prerequisites are listed in TUGRAZonline
Frequency in which the module is provided:	Most courses every academic year, some only every other academic year

Module B4, C4, D4	**Sensing, Control and Artificial Intelligence**
ECTS credit points:	21–63
Contents:	These modules focus on teaching, among other things, knowledge and skills needed for simulating the behaviour of dynamic systems using physical or data-driven modelling in simulation studies. For this purpose, the basic approach to solving multi-field problems using the finite element method, methods from the fields of machine learning and pattern recognition, and their combination are covered. Furthermore, approaches and options for deriving mathematical descriptions of overall systems, which require the integration of different physical disciplines (e.g., electrostatic mechanics, electromagnetic mechanics, mechanics-acoustics, piezoelectrics, and electromagnetic-thermal mechanics), are covered. In addition, the fundamentals of sensor and actuator technology are discussed in such a way that students become able to consider these components in the modelling of the overall system. Physical effects exploited in the design and manufacture of sensors and actuators, approaches to state detection using local system information, and the fundamentals of radar technology for use as a sensor are further covered in the modules. Courses on the methods for processing

	sensor signals and information, as well as algorithms for model- and signal-based estimation, are also included in the modules. In parallel, mathematical modelling skills are expanded to include competencies in model-free and model-based controller design for continuous-time and discrete-time systems, ultimately giving students the ability to impart desired dynamic behaviour to the modelled overall systems. For this, they learn, among other things, methods from linear and nonlinear signal, system, and control theory, how to implement designed algorithms, and how to incorporate the knowledge gained from simulation studies into the development and design of the overall systems under consideration.
Learning outcomes:	After completing this module, students are able to • derive data-driven and physically motivated multiphysical models of dynamic systems and implement them for simulation studies. • describe the effects of common sensors and actuators and incorporate them into the implementation of mathematical models. • optimise the design and operation of the systems under consideration by applying optimisation methods. • design and implement methods that estimate system-relevant variables based on measurement signals and the derived models. • implement independently designed algorithms for signal processing, control engineering, and machine learning on discrete-time hardware.
Prerequisites for participation:	Any prerequisites are listed in TUGRAZonline
Frequency in which the module is provided:	Most courses every academic year, some only every other academic year

Module B5, C5, D5	**Wireless Networks and Communication Systems**
ECTS credit points:	21–63
Contents:	Advanced fundamentals of digital communications engineering and information theory. Structure and modelling of communication and sensing systems and signal processing methods for these systems. Technical approaches to the processing, recognition, and synthesis of speech and speech signals, fundamentals of linguistics and human speech understanding. Fundamentals of electroacoustics, room acoustics, and psychoacoustics, and signal processing in the field of acoustics. Technologies of the Internet of Things, sensor networks, and computer networks, in particular the structure, functionality, implementation, and optimisation of these systems, as well as fault-tolerant, distributed algorithms. Components of microwave technology, electronic systems constructed from them, and microwave measurement technology. Wave propagation and antennas, their numerical modelling, and multi-antenna systems.
Learning outcomes:	After completing this module, students are able to • develop digital communication and sensing systems (such as radar), communication networks, and their components, and model and optimise the function and performance of the overall system. • model the influence of transmission channels and system components on the performance of such systems and develop systems that are robust against these influences. • design, optimise, and characterise components of microwave systems using measurement technology. • apply signal processing algorithms and artificial intelligence methods to process information signals (especially speech, audio, and

	radio signals) and use them to design new applications. • implement the principles and models of acoustics and human hearing in technical applications.
Prerequisites for participation:	Any prerequisites are listed in TUGRAZonline
Frequency in which the module is provided:	Most courses every academic year, some only every other academic year

Appendix II: Recommended Free-Choice Subjects

Students can choose free-choice subjects as desired in accordance with § 8 of this curriculum.

For students to broaden their knowledge, courses in the fields of foreign languages, social competence, technological impacts assessment and women's and gender studies are recommended. In particular, the following institutions and service departments are offered:

- Languages, Key Competencies and In-House Training of TU Graz,
- Science, Technology and Society Unit (STS Unit) of TU Graz,
- Treffpunkt sprachen – Centre for Language, Plurilingualism and Didactics at Uni Graz,
- the transfer initiative for management and entrepreneurship fundamentals, awareness, training and employability ("TIMEGATE"), and
- Centre for Social Competence of Uni Graz.
- Furthermore, TU Graz offers a certificate programme for key competencies in four different areas: Entrepreneurship, STS – Science, Technology and Society, Gender and Diversity, and Languages (between 8 and 16 ECTS credit points).

Additionally, the following courses are recommended:

Course	**SSt**	**Type**	**ECTS**	**Semester**
Gender & Technology 1	2	SE	5	WS
Gender & Technology 2	2	SE	4	SS

Appendix III: Equivalence List

(1) Equivalency of courses when switching from the expiring Master's Degree Programme Electrical and Electronics Engineering curriculum 2019 in the version 2021 to the new curriculum version 2025

The courses of the current curriculum are listed on the left-hand side of the table. The corresponding equivalent courses in the expiring curriculum version of the Master's Degree Programme Electrical and Electronics Engineering are listed on the right-hand side of the table. Any courses of the expiring curriculum that have no equivalent course according to this list may be taken as free-choice courses. If the ECTS credit points of already completed courses are reduced due to the equivalence lists, the ECTS credit points lost in this way can be recognised for free-choice subjects.

Courses that have the same name and type, number of ECTS credit points and the number of semester hours are considered to be equivalent and are thus not explicitly listed in the equivalence list.

Curriculum Electrical and Electronics Engineering in the version of 2025					Expiring curriculum Electrical and Electronics Engineering 2019 in the version of 2021				
	Course	Course type	ECTS	SSt		Course	Course type	ECTS	SSt
A.3	Electromagnetic Fields II	VO	3	2	A.1	Theory of Electrical Engineering	VO	3	2
A.4	Electromagnetic Fields II	UE	1.5	1	A.2	Theory of Electrical Engineering	UE	1.5	1
A.7	Master Seminar Project (EEE)	SP	4.5	3		Master seminar project (ET)	SP	4.5	3
Specialisation Automation Technology and Mechatronics									
					Compulsory Module				
ASE.56	Measurement Electronics	VO	3	2	D1.3	Measurement Signal Processing	VO	3	2
SCA.56	Measurement Uncertainties	VU	3	2	D1.4	Measurement Uncertainties and Measurement Uncertainties	VO UE	3 1.5	2 1
					Elective Module				
ASE.49	Real-Time Operating Systems, Laboratory	LU	4.5	3	E1.1	Real-Time Operating Systems, Laboratory	LU	1.5	1
SCA.57	Multi-Sensor Data Fusion, Laboratory	LU	1.5	1	E1.2	Multi-Sensor Data Fusion, Laboratory	LU	3	2
SCA.16	Discrete-Time Control	VO	3	2	E1.3	Image Based Measurement	VO	3	2

SCA.17	Discrete-Time Control, Laboratory	LU	1.5	1	E1.3	Image Based Measurement, Laboratory	LU	1.5	1
SCA.46	Fundamentals of Photonics	VO	3	2	E1.3	Photonic Sensors	VO	3	2
SCA.47	Fundamentals of Photonics, Laboratory	LU	1.5	1	E1.3	Photonic Sensors, Laboratory	LU	1.5	1
A.2	Optimization I	VU	3	2	E1.4	Optimization I	VO	3	2
Specialisation Energy Engineering									
					Compulsory Module				
PE.37	High Voltage Technology and Systems	VO	3	2	B2.1	High Voltage Engineering and Systems	VO	3	2
PE.36	High Voltage Engineering 2, Laboratory	LU	3	2	B2.2	High Voltage Engineering 2, Lab.-Exercise	LU	3	2
PE.18	Planning and Operation of Electrical Power Systems	VO	3	2	B2.3	Planning and Operation of Electrical Power Sys-tems	VO	3	2
PE.21	Power Systems Control and Stability	VO	3	2	B2.4	Control and Stability of Electrical Networks	VU	3	2
PE.48	Advanced Topics in Energy System Planning and Optimisation	UE	1.5	1	C2.3	Energy Planning Methods	VO	1.5	1
PE.49	Electricity Markets	VO	1.5	1	C2.5	Electricity Markets	VO	1.5	1
PE.22	Protection and Security of Supply in Electrical Power Systems	VO	1.5	1	D2.2	Protection and Security of Supply in Electrical Power Systems	VO	1.5	1
PE.45	Transient Stress on Power Equipment	VU	1.5	1	D2.5	Transient Stress of Power Systems	VO	1.5	1
					Elective Module				
ASE.10	Power Electronic Systems 2	VO	3	2	E2.1	Power Electronics 2	VO	3	2
PE.11 PE.12	Power Electronics for Power Engineering and Power Electronics for Power Engineering	VO UE	3 1.5	2 1	E2.1	Power Electronics for Power Engineering	VO	3	2
PE.27	Simulation of Electrical Power Systems	SE	1.5	1	E2.2	Electrical Grid Simulation	SE	3	2
PE.23	Protection and Security of Supply in Electrical Power Systems, Laboratory	LU	1.5	1	E2.2	Protection and Security of Supply in Electrical Power Systems, Laboratory	LU	1.5	1
PE.25	Safety and Protective Measures	VO	1.5	1	E2.2	Safety and Protective Measures	VO	3	2
PE.26	Safety and Protective Measures, Laboratory	LU	1.5	1	E2.2	Safety and Protective Measures, Laboratory	LU	1.5	1

T.8	Power Quality and Network Reliability *(from Bachelor's Degree Programme Electrical and Electronics Engineering)*	VU	3	2	E2.2	Power Quality and Network Reliability	VO	3	2
PE.17	Modern Power Systems, Laboratory	LU	3	2	E2.2	Modern Power Systems, Laboratory	LU	4.5	3
PE.19	Planning and Operation of Electrical Power Systems in Practice	VU	1.5	1	E2.2	Fault Calculation in Electrical Energy Systems	VO	3	2
PE.42	Lightning Physics and Protection	VO	1.5	1	E2.3	Physics of Lightning and Lightning Location or Lightning Protection and Protection Concepts	VO VO	1.5 1.5	1 1
PE.35	FEM Simulation for Power Engineering	VU	3	2	E2.3	Electric Field Calculation	VU	3	2
PE.34	Electrical Insulation Systems	SE	3	2	E2.3	Electrical Insulating Materials in Power Engineer-ing	SE	3	2
PE.38	High Voltage Test Techniques	SE	1.5	1	E2.3	High Voltage Test Techniques	SE	1.5	1
PE.30	Lightning Discharges, Overvoltage Protection and Lightning Protection, Laboratory	LU	1.5	1	E2.3	Overvoltage Protection and Lightning Protection, Lab.	LU	1.5	1
PE.47	Advanced Topics in Energy System Planning and Optimisation	VO	3	2	E2.4	Applied Energy Planning	VU	3	2
PE.51	Energy and the Environment	VO	3	2	E2.4	Energy and Environment	VO	3	2
PE.52	How to Manage Waste and Resources in Terms of Climate and Sustainability	VO	1.5	1	E2.4	Waste Management	VO	1.5	1
PE.56	Practical Aspects for Renewable Energies	VU	3	2	E2.4	Practical Aspects of Renewable Energies	VU	2	3
PE.53	Innovative Energy Technologies and Energy Efficiency	VO	3	2	E2.4	Innovative Energy Technologies and Energy Effi-ciency	VO	3	2
PE.54	Innovative Energy Technologies and Energy Efficiency	UE	1.5	1	E2.4	Innovative Energy Technologies and Energy Effi-ciency	UE	1.5	1
PE.59	Techno-Economic Aspects of Transmission System Operation	SE	1.5	1	E2.4	Practical Aspects of Regulation	VU	3	2
PE.58	Special Problems in Electricity Economics	SE	3	2	E2.4	Special Problems in Electricity Economics, Seminar	SE	3	2

PE.55	Micro- and Macro-Economics for Electrical Engineers	VO	3	2		Micro- and Macro-Economics for Electrotechnicians *(from the Master's Degree Programme Electrical Engineering and Business)*	VO	3	2
Specialisation Information and Communications Engineering									
					Compulsory Module				
WNC.4	Advanced Telecommunications, Laboratory	LU	3	2	B3.3	Communications Systems, Laboratory	LU	3	2
WNC.1	Advanced Digital Communications	VO	3	2	C3.5	Mobile Radio Systems	VO	3	2
					Elective Module				
WNC.41	Mobile Computing, Seminar	SE	4.5	3	E3.1	Mobile Computing, Seminar	SE	5	3
WNC.14	Estimation and Detection Theory for Communications	VO	3	2	E3.2	Design of Digital Modems	VO	3	2
WNC.46	Fundamentals of RF Measurement Techniques	VU	3	2	E3.2	Microwave Measurement Techniques	VU	3	2
WNC.8	Optoelectronical Communication Engineering	VO	4.5	3	E3.2	Optoelectronical Communication Engineering	VO	4.5	3
WNC.9	Optoelectronical Communication Engineering	UE	1.5	1	E3.2	Optoelectronical Communication Engineering	UE	1.5	1
ESD.47	Analog RF Filter Design	VU	3	2	E3.2	RF and Microwave Component Design	VU	3	2
WNC.50	Wireless Power Technologies for Sustainable Electronics	VO	3	2	E3.2	RFID Systems	VO	3	2
WNC.18	Satellite Technology	VO	3	2	E3.2	Telecommunication Systems	VO	3	2
WNC.5	Digital Signal Processing and Communications Laboratory	LU	3	2	E3.3	Digital Signal Processing, Laboratory	LU	3	2
SCA.57	Multi-Sensor Data Fusion, Laboratory	LU	1.5	1	E3.3	Multi-Sensor Data Fusion, Laboratory	LU	3	2
Specialisation Microelectronics and Circuit Technology									
					Compulsory Module				
ASE.56	Measurement Electronics	VO	3	2	D4.1	Measurement Signal Processing	VO	3	2
					Elective Module				

ESD.48	Fundamentals of RF Measurement Techniques	VU	3	2	E4.1	Microwave Measurement Techniques	VU	3	2
ESD.47	Analog RF Filter Design	VU	3	2	E4.1	RF and Microwave Component Design	VU	3	2
SCA.56	Measurement Uncertainties	VU	3	2	D1.4	Measurement Uncertainties and Measurement Uncertainties	VO UE	3 1.5	2 1
SCA.46	Fundamentals of Photonics	VO	3	2	E4.3	Photonic Sensors	VO	3	2
SCA.47	Fundamentals of Photonics, Laboratory	LU	1.5	1	E4.3	Photonic Sensors, Laboratory	LU	1.5	1
WNC.13	Communication and Sensing Systems, Seminar	SE	2	1.5	E4.3	Radar, Seminar	SE	2	1.5
	no equivalency				D2.3	Electro Magnetic Interference and Electro Magnetic Compatibility	VO	1.5	1
	no equivalency				D2.6	Renewable Energies	VO	3	2
	no equivalency				E1.4	Optimisation I	UE	1.5	1
	no equivalency				B4.5	Microsystems	VO	1.5	1

(2) Regulations for continuing with the expiring Master's Degree Programme Electrical and Electronics Engineering curriculum 2019 in the version of 2021

The courses of the expiring Master's Degree Programme Electrical and Electronics Engineering are listed on the left-hand side of the table. On the right side of the table is a list of courses from the new curriculum that may be completed instead of the courses originally listed in the curriculum if the student wishes to remain in the expiring curriculum and the original courses are no longer offered. If the ECTS credit points of already completed courses are reduced due to the equivalence lists, the ECTS credit points lost in this way can be recognised for free-choice subjects.

Courses that have the same name and type, number of ECTS credit points and the number of semester hours are considered to be equivalent and are thus not explicitly listed in the equivalence list.

Expiring curriculum Electrical and Electronics Engineering 2019 in the version of 2021					**Curriculum Electrical and Electronics Engineering in the version of 2025**				
	Course	Course type	ECTS	SSt		Course	Course type	ECTS	SSt
A.1	Theory of Electrical Engineering	VO	3	2	A.3	Electromagnetic Fields II	VO	3	2
A.2	Theory of Electrical Engineering	UE	1.5	1	A.4	Electromagnetic Fields II	UE	1.5	1
	Master seminar project (ET)	SP	4.5	3	A.7	Master Seminar Project (EEE)	SP	4.5	3
Specialisation Automation Technology and Mechatronics									
Compulsory Module									
D1.3	Measurement Signal Processing	VO	3	2	ASE.56	Measurement Electronics	VO	3	2
D1.4 D1.5	Measurement Uncertainties and Measurement Uncertainties	VO UE	3 1.5	2 1	SCA.56	Measurement Uncertainties	VU	3	2
Elective Module									
E1.1	Real-Time Operating Systems, Laboratory	LU	1.5	1	ASE.49	Real-Time Operating Systems, Laboratory	LU	4.5	3
E1.2	Multi-Sensor Data Fusion, Laboratory	LU	3	2	SCA.57	Multi-Sensor Data Fusion, Laboratory	LU	1.5	1
E1.3	Image Based Measurement	VO	3	2	SCA.16	Discrete-Time Control	VO	3	2
E1.3	Image Based Measurement, Laboratory	LU	1.5	1	SCA.17	Discrete-Time Control, Laboratory	LU	1.5	1
E1.3	Photonic Sensors	VO	3	2	SCA.46	Fundamentals of Photonics	VO	3	2

E1.3	Photonic Sensors, Laboratory	LU	1.5	1	SCA.47	Fundamentals of Photonics, Laboratory	LU	1.5	1
E1.4 E1.4	Optimisation I and Optimization I	VO UE	3 1.5	2 1	A.2	Optimization I	VU	3	2
Specialisation Energy Engineering									
Compulsory Module									
B2.1	High Voltage Engineering and Systems	VO	3	2	PE.37	High Voltage Technology and Systems	VO	3	2
B2.2	High Voltage Engineering 2, Lab.-Exercise	LU	3	2	PE.36	High Voltage Engineering 2, Laboratory	LU	3	2
B2.3	Planning and Operation of Electrical Grids	VO	3	2	PE.18	Planning and Operation of Electrical Power Systems	VO	3	2
B2.4	Control and Stability of Electrical Networks	VU	3	2	PE.21	Power Systems Control and Stability	VO	3	2
C2.3 E2.4	Energy Planning Methods and Applied Energy Planning	VO VU	1.5 3	1 2	PE.47 PE.48	Advanced Topics in Energy System Planning and Optimisation and Advanced Topics in Energy System Planning and Optimisation	VO UE	3 1.5	2 1
C2.5	Electricity Markets	VO	1.5	1	PE.49	Electricity Markets	VO	1.5	1
D2.2	Protection and Security of Supply in Electrical Power Systems	VO	1.5	1	PE.22	Protection and Security of Supply in Electrical Power Systems	VO	1.5	1
D2.3 E2.2	Electro Magnetic Interference and Electro Magnetic Compatibility and Electro Magnetic Interference and Electro Magnetic Compatibility, Laboratory	VO LU	1.5 1.5	1 1	ASE.20	Electromagnetic Compatibility of Electronic Systems	VO	3	2
D2.5	Transient Stress of Power Systems	VO	1.5	1	PE.45	Transient Stress on Power Equipment	VU	1.5	1
D2.6	Renewable Energies	VO	3	2	T.5	Fundamentals of Renewable Energies and Sector Coupling *(from Bachelor's Degree Programme Electrical*	VO	3	2

						and Electronics Engineering)			
Elective Module									
E2.1	Power Electronics 2	VO	3	2	ASE.10	Power Electronic Systems 2	VO	3	2
E2.2	Electrical Grid Simulation	SE	3	2	PE.27	Simulation of Electrical Power Systems	SE	1.5	1
E2.2	Protection and Security of Supply in Electrical Power Systems, Laboratory	LU	1.5	1	PE.23	Protection and Security of Supply in Electrical Power Systems, Laboratory	LU	1.5	1
E2.2	Safety and Protective Measures	VO	3	2	PE.25	Safety and Protective Measures	VO	1.5	1
E2.2	Safety and Protective Measures, Laboratory	LU	1.5	1	PE.26	Safety and Protective Measures, Laboratory	LU	1.5	1
E2.2	Power Quality and Network Reliability	VO	3	2	T.8	Power Quality and Network Reliability *(from Bachelor's Degree Programme Electrical and Electronics Engineering)*	VU	3	2
E2.2	Modern Power Systems, Laboratory	LU	4.5	3	PE.17	Modern Power Systems, Laboratory	LU	3	2
E2.2	Fault Calculation in Electrical Energy Systems	VO	3	2	PE.19	Planning and Operation of Electrical Grids in Practice	VU	1.5	1
E2.3	Physics of Lightning and Lightning Location or Lightning Protection and Protection Concepts	VO VO	1.5 1.5	1 1	PE.42	Lightning Physics and Protection	VO	1.5	1
E2.3	Electric Field Calculation	VU	3	2	PE.35	FEM Simulation for Power Engineering	VU	3	2
E2.3	Electrical Insulating Materials in Power Engineering	SE	3	2	PE.34	Electrical Insulation Systems	SE	3	2
E2.3	High Voltage Test Techniques	SE	1.5	1	PE.38	High Voltage Test Techniques	SE	1.5	1
E2.3	Overvoltage Protection and Lightning Protection, Lab.	LU	1.5	1	PE.30	Lightning Discharges, Overvoltage Protection and Lightning Protection, Laboratory	LU	1.5	1
E2.4	Decision Making in Electricity Economics	VU	3	2	PE.46	Advanced Machine Learning for Energy Applications	VU	3	2
E2.4	Energy and Environment	VO	3	2	PE.51	Energy and the Environment	VO	3	2
E2.4	Waste Management	VO	1.5	1	PE.52	How to Manage Waste and Resources in Terms of Climate and Sustainability	VO	1.5	1

E2.4	Practical Aspects of Renewable Energies	VU	3	2	PE.56	Practical Aspects for Renewable Energies	VU	3	2
E2.4	Innovative Energy Technologies and Energy Efficiency	VO	3	2	PE.53	Innovative Energy Technologies and Energy Efficiency	VO	3	2
E2.4	Innovative Energy Technologies and Energy Efficiency	UE	1.5	1	PE.54	Innovative Energy Technologies and Energy Efficiency	UE	1.5	1
E2.4	Practical Aspects of Regulation	VU	3	2	PE.59	Techno-Economic Aspects of Transmission System Operation	SE	1.5	1
E2.4	Special Problems in Electricity Economics, Seminar	SE	3	2	PE.58	Special Problems in Electricity Economics	SE	3	2
Specialisation Information and Communications Engineering									
Compulsory Module									
B3.3	Communications Systems, Laboratory	LU	3	2	V.7	The Communications Challenge, Laboratory *(from Bachelor’s Degree Programme Electrical and Electronics Engineering)*	LU	3	2
C3.5	Mobile Radio Systems	VO	3	2	WNC.1	Advanced Digital Communications	VO	3	2
Elective Module									
E3.1	Mobile Computing, Seminar	SE	5	3	WNC.41	Mobile Computing, Seminar	SE	4.5	3
E3.2	Design of Digital Modems	VO	3	2	WNC.14	Estimation and Detection Theory for Communications	VO	3	2
E3.2	Microwave Measurement Techniques	VU	3	2	WNC.46	Fundamentals of RF Measurement Techniques	VU	3	2
E3.2	Optoelectronical Communication Engineering	VO	4.5	3	WNC.8	Optoelectronical Communication Engineering	VO	4.5	3
E3.2	Optoelectronical Communication Engineering	UE	1.5	1	WNC.9	Optoelectronical Communication Engineering	UE	1.5	1
E3.2	RF and Microwave Component Design	VU	3	2	ESD.47	Analog RF Filter Design	VU	3	2
E3.2	RFID Systems	VO	3	2	WNC.50	Wireless Power Technologies for Sustainable Electronics	VO	3	2
E3.2	Telecommunication Systems	VO	3	2	WNC.18	Satellite Technology	VO	3	2
E3.3	Digital Signal Processing, Laboratory	LU	3	2	WNC.5	Digital Signal Processing and Communications Laboratory	LU	3	2

E3.3	Multi-Sensor Data Fusion, Laboratory	LU	3	2	SCA.57	Multi-Sensor Data Fusion, Laboratory	LU	1.5	1
Specialisation Microelectronics and Circuit Technology									
Compulsory Module									
B4.5	Microsystems	VO	1.5	1	ESD.41	Mixed Signal IC Design	VO	3	2
D4.1	Measurement Signal Processing	VO	3	2	ASE.56	Measurement Electronics	VO	3	2
Elective Module									
E4.1	Microwave Measurement Techniques	VU	3	2	ESD.48	Fundamentals of RF Measurement Techniques	VU	3	2
E4.1	RF and Microwave Component Design	VU	3	2	ESD.47	Analog RF Filter Design	VU	3	2
E4.3 E4.3	Measurement Uncertainties and Measurement Uncertainties	VO UE	3 1.5	2 1	SCA.56	Measurement Uncertainties	VU	3	2
E4.3	Photonic Sensors	VO	3	2	SCA.46	Fundamentals of Photonics	VO	3	2
E4.3	Photonic Sensors, Laboratory	LU	1.5	1	SCA.47	Fundamentals of Photonics, Laboratory	LU	1.5	1
E4.3	Radar, Seminar	SE	2	1.5	WNC.13	Communication and Sensing Systems, Seminar	SE	2	1.5