These degree program and examination regulations have been worded carefully to be up to date; however, errors cannot be completely excluded. The official German text available from L1 – Legal Affairs and Academic Quality Management is the version that is legally binding.

Note:
These degree program and examination regulations apply to students who start a Bachelor's or Master's degree program in Computational Engineering **from** the winter semester 2007/08.
Students who started a Master's degree program **before that** or who are starting in the winter semester 2007/08 may choose to be examined either according to these degree program and examination regulations or according to the **previous version of the degree program and examination regulations**
(http://www.uni-erlangen.de/universitaet/organisation/recht/studiensatzungen/TECH-FAK/FPO_CompEngineering_ALT.pdf).

Students who started their studies before the latest amendment came into effect are requested to also comply with previous amendments and the respective transitory provisions.

Degree Program and Examination Regulations for the Bachelor's and Master's degree programs in Computational Engineering at the Faculty of Engineering, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) – FPOCE –

dated September 19, 2007

amended by statutes of
July 25, 2008
December 3, 2009
July 30, 2010
July 31, 2012 (joint amendment statute)
July 29, 2013
July 24, 2014
January 18, 2016
January 16, 2018
July 30, 2018
April 21, 2022

Based on Section 13 (1)(2), Section 43 (4) and (5), Section 58 (1) and Section 61 (2)(1) of the Bavarian Higher Education Act (Bayerisches Hochschulgesetz, **BayHSchG**), FAU enacts the following degree program and examination regulations:

Contents:

Part I: General Provisions

Section 35 Scope

The degree program and examination regulations for the Bachelor's and consecutive Master's degree programs in Computational Engineering complement the currently valid General Examination Regulations for Bachelor's and Master's degree programs at the Faculty of Engineering at FAU – **ABMPO/TechFak**.

Section 36 Bachelor's Degree Program, Standard Duration of Studies, Related Degree Programs

(1) [1]The degree program consists of the orientation phase (Grundlagen- und Orientierungsphase), which consists of the modules of the first two semesters, and the Bachelor's phase, which consists of the remaining modules until the end of the standard duration of studies. [2]The modules and program structure can be found in **Appendix 1**.

(2) The standard duration of the Bachelor's degree program is six semesters.

(3) The provisions in Section 24 (1)(2)(2) **ABMPO/TechFak** do not apply to related degree programs.

Section 37 Master's Degree Program, Standard Duration of Studies, Start of Degree Program, Related Degree Programs

(1) [1]The standard duration of the Master's degree program is four semesters. [2]The modules and program structure can be found in **Appendix 3**.

(2) The Master's degree program may be started in the winter semester or in the summer semester.

(3) The provisions in Section 30 (3)(2) **ABMPO/TechFak** do not apply to related degree programs.

Section 38 Teaching Languages and International Orientation

[1]The degree program in Computational Engineering is bilingual. [2]The teaching units are usually held in German in the first four semesters of the Bachelor's degree program, in German or in English in the fifth and sixth semesters (depending on the modules chosen), and usually in English in the Master's degree program (first to fourth semesters). [3]Further details are stipulated in the module handbook. [4]The language of oral and written examinations shall correspond to the teaching language. [5]The Bachelor's thesis may be written in English. [6]The Master's thesis shall usually be written in English. [7]The degree certificate and final academic record shall be issued in German and English.

Section 39 Technical Application Fields

(1) [1]Several technical application fields are offered as part of the Bachelor's and Master's degree programs in Computational Engineering. [2]There is a representative for every technical application field. [3]The Degree Program Committee for CE shall appoint the representatives for the technical application fields.

(2) [1]The first learning outcome of the technical application field is to allow students to specialize in a focus area pursuant to Section 41a or, respectively, Section 47a. [2]The second learning outcome has a research focus, with students learning subject-related methods of research and exploring their subject in more depth. [3]Thirdly, the element of choice allows students to tailor their profile in view of their career plans. [4]During the Bachelor's degree program, basic skills and knowledge are acquired in the respective technical application field, whilst more specialized skills with a stronger focus on research are acquired during the Master's degree program.

(3) Due to the specific subject competencies that must be acquired as part of the learning outcomes of the respective degree program, each module can only be taken once during the Bachelor's degree program, the Master's degree program and the consecutive Bachelor's and Master's degree program.

Section 40
[revoked]

Section 40a Catalogs of Elective Modules

(1) [1]The catalogs of elective modules for the Bachelor's and Master's degree programs in Computational Engineering are determined by the CE Degree Program Committee on the basis of the learning outcomes of the respective compulsory elective subject areas. [2]The catalog of elective modules shall be announced in accordance with local practice at least one week before the semester begins. [3]Changes can be made by the Degree Program Committee, to take effect from the following semester.

(2) The CE Degree Program Committee can choose from the following modules to draw up the catalog of elective modules for the elective engineering modules in the Bachelor's degree program:

1. Elective modules in computer science shall be chosen from the modules offered in the Bachelor's degree program in Computer Science that are taught by a lecturer at the Department of Computer Science at the Faculty of Engineering
2. Elective modules in the technical application fields shall be chosen from the modules offered in Bachelor's degree programs at the Faculty of Engineering or the Department of Physics at the Faculty of Sciences which are taught by a lecturer at the Faculty of Engineering or the Department of Physics at the Faculty of Sciences, with the exception of modules offered by a lecturer at the Department of Computer Science at the Faculty of Engineering.

(3) The CE Degree Program Committee can choose elective modules for the Master's degree program in Computer Science from the modules offered in the Master's degree program in Computer Science that are taught by a lecturer at the Department of Computer Science at the Faculty of Engineering.

(4) The CE Degree Program Committee can choose from the following modules for the catalog of elective modules for the Master's degree program in Mathematics:

1. Modules from the Master's degree program in Mathematics or Industrial Mathematics taught by a lecturer at the Chair of Applied Mathematics at the Faculty of Sciences.
2. Modules from Master's degree programs at the Faculty of Engineering on mathematical topics taught by a lecturer at the Faculty of Engineering.

(5) When choosing modules for the catalog of elective modules in technical application fields in the Master's degree program, the CE Degree Program Committee can choose from modules in the Master's degree programs offered by the Faculty of Engineering or the Faculty of Sciences which are taught by a lecturer at the Faculty of Engineering or the Faculty of Sciences, with the exception of the modules which are taught by a lecturer at the Department of Computer Science at the Faculty of Engineering or the Department of Mathematics at the Faculty of Sciences.

Part II: Special Provisions for the Bachelor's Degree Program

Section 41 Choice of Technical Application Field, Elective Engineering Modules and Key Qualifications

(1) [1]Students choose a technical application field by registering for the first examination in a module from the group of compulsory modules in the chosen technical application field. [2]The compulsory modules for the technical application field are stipulated in **Appendix 2**. [3]The module catalog of the elective modules in the technical application field to be chosen pursuant to Section 43 (1)(4) can be amended by the CE Degree Program Committee with effect from the next semester. The module catalog shall be announced in accordance with local practice at the latest one week before the semester begins.

(2) The choice of the technical application field determines all compulsory modules to be taken in computer science, mathematics and the technical application field.

(3) A change of technical application field, elective engineering subject or key qualification module is only permitted in justified exceptional cases, with the approval of the CE Degree Program Committee.

Section 41a Technical Application Fields in the Bachelor's Degree Program

(1) Technical application fields which can be chosen in the Bachelor's degree program are:

1. Automatic control
2. Mechatronics
3. Information technology
4. Thermo and fluid dynamics
5. Mechanics and dynamics
6. Computational optics

(2) The individual technical application fields have the following learning outcomes:

1. In the technical application field in Automatic control, students acquire skills in the foundations of automatic control for analyzing and regulating dynamic systems.
2. In the technical application field in Mechatronics, students acquire skills in the areas of system integration and simulation, actuators and sensors and autonomous systems/robotics.
3. In the technical application field Information technology, students acquire basic skills relating to signal and systems theory and stochastic processes and how they can be applied in digital signal processing and messaging systems.
4. In the technical application field Thermo and fluid dynamics, students acquire skills in the areas of application of thermodynamics, fluid mechanics and heat and mass transfer.
5. In the technical application field Mechanics and dynamics, students acquire skills in the areas of application of statics, elastostatics, dynamics, mechanical vibrations and finite element methods.
6. In the technical application field Computational optics, students acquire skills in the areas of application of modern optics, photonics and quantum phenomena.

(3) [1]Teaching units in the various technical application fields may take the form of lectures, tutorials, practical modules or an internship. [2]Examinations can take the form of a written examination (60 to 180 minutes), electronic examination (60 to 180 minutes), oral examination (20 to 30 minutes), seminar achievement, tutorial achievement and

practical achievement pursuant to Section 6 (3) **ABMPO/TechFak**. [3]Section 6 (2)(3) **ABMPO/TechFak** stipulates that in justified exceptional circumstances, combinations of the individual achievements stated in sentence 2 may also be possible.

Section 41b Elective Engineering Modules

(1) [1]As part of the elective engineering modules, students choose modules from the catalog of elective modules in computer science (Section 40a (2)(1)) and the technical application field chosen pursuant to Section 41 (Section 40a (2)(2)). [2]At least one module must be chosen from each of the two catalogs of elective modules.

(2) [1]The first learning outcome of the engineering electives is to allow students to specialize further in the focus area chosen within the context of the technical application field. [2]The second learning outcome has a research focus, with students learning subject-related methods of research and exploring their subject in more depth. [3]Thirdly, the element of choice allows students to tailor their profile in view of their career plans.

(3) [1]Teaching units in the various elective engineering modules may take the form of lectures, tutorials, practical modules or an internship. [2]Examinations can take the form of a written examination (60 to 180 minutes), electronic examination (60 to 180 minutes), oral examination (20 to 30 minutes), seminar achievement, tutorial achievement and practical achievement pursuant to Section 6 (3) **ABMPO/TechFak**. [3]Section 6 (2)(3) **ABMPO/TechFak** stipulates that in justified exceptional circumstances, combinations of the individual achievements stated in sentence 2 may also be possible.

Section 42 Scope of the Grundlagen- und Orientierungsprüfung

[1]The preliminary examination (Grundlagen- und Orientierungsprüfung, GOP) according to Section 3 (1)(1) **ABMPO/TechFak** shall have been passed when modules from the first year of studies (first and second semester) worth 30 ECTS credits have been passed. [2]Modules which can be chosen are modules marked “GOP” in **Appendix 1**.

Section 43 Scope of the Bachelor’s Degree Program

(1) [1]The Bachelor’s degree program consists of:

1. Compulsory modules in computer science
2. Compulsory modules in mathematics
3. Compulsory modules in the technical application field to be chosen pursuant to Section 41 (1)(1) worth at least 35 ECTS credits
4. Engineering electives pursuant to Section 41b worth a maximum of 17.5 ECTS credits
5. Key qualifications worth 15 ECTS credits, consisting of one free choice module (5 ECTS credits) and one internship or practical module (10 ECTS credits)
6. Bachelor’s program seminar (5 ECTS credits)
7. Bachelor’s thesis module (15 ECTS credits)

according to **Appendix 1**. [2]Differences in the ECTS credits allocated to technical application fields according to (1)(3) caused by the varying scope of the compulsory modules in the respective technical application fields according to **Appendix 2** can be compensated for by taking additional or fewer engineering elective modules as defined in (1)(4).

(2) [1]The internship or practical module is worth 10 ECTS credits. The internship shall take the form of eight weeks of vocational practice (industrial internship) completed

according to the internship guidelines for the degree program in Computational Engineering before or during the degree program. Alternatively, students may choose a practical module from a catalog of eligible modules from other Bachelor's degree programs at the Faculty of Engineering. [2]The list of eligible practical modules shall be announced according to local practice one week before the beginning of the lecture period at the latest.

Section 44 Bachelor's Degree Examinations

(1) The type and scope of the examinations in the Bachelor's degree program shall be governed by **Appendix 1**, unless otherwise specified in the following paragraphs.

(2) [1]The type and scope of the examinations in the compulsory modules in the technical application field are stipulated in **Appendix 2**. [2]The type and scope of the examinations in the elective modules in the technical application field are stipulated in Section 41a (3)(2). [3]The type and scope of the examinations in the engineering elective modules are stipulated in Section 41b (3)(2).

(3) The "advanced seminar in the Bachelor's program" shall be graded and examined as follows:

1. If the advanced seminar is offered as part of another Bachelor's degree program at the Faculty of Engineering, the type and scope of the examinations shall be governed by the relevant **degree program and examination regulations**.
2. If the advanced seminar is offered as part of the degree program in Computational Engineering, a presentation of at least 45 minutes and completion of a written assignment on the same topic shall be required in order to pass the module.

Section 45 Bachelor's Thesis

(1) [1]The Bachelor's thesis is intended to enable students to learn to solve computational engineering problems independently. [2]Students are awarded 12 ECTS credits for their Bachelor's thesis; requirements for the thesis shall be such that it can be completed within five months and with a workload of approximately 360 hours. [3]The results of the Bachelor's thesis shall be introduced in a presentation lasting approximately 30 minutes (graded, 3 ECTS credits) followed by a discussion. [4]The date of the presentation shall be determined by the supervising lecturer either after the student has submitted their Bachelor's thesis or during the final stage of thesis work. [5]The date shall usually be within four weeks of the date on which the thesis was submitted; students shall be notified of the date at least two weeks in advance. [6]The Bachelor's thesis shall be graded as set forth in **Appendix 1**.

(2) [1]The Bachelor's thesis shall deal with a scientific subject from the field of computational engineering and shall be written under the supervision of a full-time lecturer from the Faculty of Engineering or the Faculty of Sciences involved in teaching the degree program. [2]Exceptions to the topic and permission to allow full-time lecturers from other faculties to supervise the Bachelor's thesis may be granted by the chair of the Degree Program Committee upon prior written request.

(3) [1]It is recommended that students begin work on the Bachelor's thesis no earlier than at the beginning of the fifth semester. [2]Admission to the Bachelor's thesis shall be governed by Section 27 (3)(2) **ABMPO/TechFak**.

Section 46 Evaluation of Achievements for the Bachelor's Degree Program

(1) [1]The Bachelor's degree program shall have been passed if all modules stipulated in **Appendix 1** worth 180 ECTS credits have been passed. [2]If an internship is chosen as part of the elective key qualifications, proof must be provided of an eight-week industrial internship recognized by the Internship Office (Praktikumsamt) according to the internship guidelines for the degree program in Computational Engineering.

(2) [1]The overall grade of the Bachelor's degree shall be calculated from the module grades, not including the elective key qualifications (free choice and internship/practical module). [2]The modules from the orientation phase (semesters 1 and 2) shall be weighted with a value of 0.75 and the modules from the Bachelor's phase (semesters 3 to 6) shall be weighted with a value of 1.0.

Part III: Special Provisions for the Master's Degree Program

Section 47 Choice of Technical Application Field

[1]Students shall declare their choice of technical application field to the Examinations Office in writing before registering for the first examination. [2]Students shall choose modules from the module catalog for their chosen technical application field as stipulated in **Appendix 3**. [3]Section 41 (3) shall apply accordingly.

Section 47a Technical Application Fields in the Master's Degree Program

(1) Technical application fields which can be chosen in the Master's degree program are:

1. Automatic control
2. Mechatronics
3. Information technology – digital transmission
4. Information technology – digital signal processing
5. Thermo and fluid dynamics
6. Mechanics and dynamics
7. Computational optics
8. Medical engineering
9. Computational material science

(2) The individual technical application fields have the following learning outcomes:

1. In the technical application field in Automatic control, students acquire skills in the application areas of analysis and control of nonlinear systems, optimal or model-predictive control and machine learning processes, in particular with reference to mechatronics and robotics.
2. In the technical application field in Mechatronics, students acquire skills in the areas of system integration and simulation, actuators and sensors and autonomous systems/robotics.
3. In the technical application field Information technology – digital transmission, students acquire in-depth skills in the application areas of wireless and wired digital transmission and communication networks.
4. In the technical application field Information technology – digital signal processing, students acquire in-depth skills in the areas of application of audio and video signal processing and multi-dimensional signals and systems.

5. In the technical application field Thermo and fluid dynamics, students acquire skills in the areas of application of numerical thermodynamics, turbulence and turbulence modeling and applied thermal fluid dynamics.
6. In the technical application field Mechanics and dynamics, students acquire skills in modeling and simulating problems in linear and nonlinear mechanics.
7. In the technical application field Computational optics, students acquire skills in the areas of application of computational optics, photonics and optical transmission.
8. In the technical application field Medical engineering, students acquire skills in the areas of application of medical image and data processing and pattern recognition.
9. In the technical application field Computational materials science, students acquire skills in simulating mechanical properties – including atomistic methods, continuum theories and FEM techniques.

(3) [1]Teaching units in the various technical application fields may take the form of lectures, tutorials, practical modules or an internship. [2]Examinations can take the form of a written examination (60 to 180 minutes), electronic examination (60 to 180 minutes), oral examination (20 to 30 minutes), seminar achievement, tutorial achievement and practical achievement pursuant to Section 6 (3) **ABMPO/TechFak**. [3]Section 6 (2)(3) **ABMPO/TechFak** stipulates that in justified exceptional circumstances, combinations of the individual achievements stated in sentence 2 may also be possible.

Section 48 Qualification for a Master's Degree, Certificates and Admission Requirements

(1) [1]A subject-specific degree within the meaning of Section 29(1)(1) **ABMPO/TechFak** is a Bachelor's degree in Computational Engineering. [2]According to paragraph (5)(4) **Appendix 1 ABMPO/TechFak**, applicants with a different degree to that specified in sentence 1 but in a related subject (degrees in applied mathematics, physics, computer science or engineering) may only be admitted to the Master's degree program by passing the admission examination according to (4).

(2) [1]The following additional documents as defined in paragraph (2)(4) of **Appendix 1 ABMPO/TechFak** shall be required:

1. proof of English language proficiency according to sentence 2
2. an English-language CV in tabular form, where applicable with proof of any relevant professional activity or internships which are relevant with regard to the subject of the Master's degree program.

[2]Proof of English language proficiency equivalent to at least level B2 of the Common European Framework of Reference (CEFR) or equivalent evidence (proof of language skills shall be provided either with school reports or certificates obtained for having completed a language course stating that the student has attended English lessons up to a level equivalent to B2 or evidence that certificate UNIcert II has been obtained); applicants who completed their university entrance qualifications or their first degree in English shall not be required to submit proof of proficiency in English.

(3) An applicant shall be considered qualified for the Master's degree program according to **Appendix 1**, (5)(2)(2) **ABMPO/TechFak** if modules from the third to sixth semesters in mathematics, computer science, a technical application field and elective engineering modules worth 50 ECTS credits have been passed with a minimum grade of 3.0.

(4) In the oral admission examination according to (5)(3) et seq. of **Appendix 1 ABMPO/TechFak**, applicants shall be evaluated according to the following criteria:

1. quality of basic knowledge of computer science and applied mathematics (50 percent)
2. quality of basic knowledge acquired during the Bachelor's degree program that forms the basis for specialization in one of the technical application fields in the Master's degree program; for the discussion, the applicant may choose one subject from those that are eligible for the technical application field (50 percent)

Section 49 Scope of the Master's Degree Program

(1) The Master's degree program comprises a total of 120 ECTS credits, consisting of

1. 85 ECTS credits in the three groups of compulsory elective modules
   a) in computer science
   b) in mathematics with the following compulsory modules:
      – Functional analysis for engineers (5 ECTS credits)
      – Optimization for engineers (7.5 ECTS credits)
   c) in a technical application field
   whereby at least 20 ECTS credits must be acquired for each group of compulsory elective modules
2. successful participation in the Master's program seminar (5 ECTS credits)
3. the Master's thesis module (30 ECTS credits)

according to **Appendix 3**.

(2) [1]During the compulsory elective modules in computer science, students acquire skills in pattern recognition, visual computing, system simulation, high-performance computing and computer architecture. [2]Students shall select modules from the module catalog pursuant to Section 40a (3) as stipulated in (1) and **Appendix 3**. [3]Teaching units may take the form of lectures, tutorials, practical modules or an internship. [4]Examinations can take the form of a written examination (60 to 180 minutes), electronic examination (60 to 180 minutes), oral examination (30 minutes), practical achievement or course achievement (ungraded) or a combination of the above in cases covered by Section 6 (2)(3) **ABMPO/TechFak**.

(3) [1]In the compulsory elective modules for mathematics, students acquire in particular skills in the areas of mathematical modeling, methods for solving partial differential equations and nonlinear optimization. [2]Students shall select modules from the module catalog pursuant to Section 40a (4) as stipulated in (1) and **Appendix 3**. [3]Teaching units may take the form of lectures, tutorials, practical modules or an internship. [4]Examinations can take the form of a written examination (60 to 180 minutes), electronic examination (60 to 180 minutes), oral examination (30 minutes), practical achievement or course achievement (ungraded) or a combination of the above in cases covered by Section 6 (2)(3) **ABMPO/TechFak**.

(4) Due to the specific subject competencies that must be acquired as part of the learning outcome of the Master's degree program, students are expected to prove that they will acquire additional skills in the Master's degree program in Computational Engineering compared to the skills acquired in their previous Bachelor's degree program when choosing modules for the technical application field.

Section 50 Master's Degree Examinations

(1) The type and scope of the examinations in the Master's degree program shall be governed by **Appendix 3**, unless otherwise specified in the following paragraphs.

(2) The type and scope of the examinations in the compulsory elective subjects shall be governed by Section 47a (3)(2) and Section 49 (2)(4) and (3)(4).

(3) The advanced seminar in the Master's degree program shall be examined as follows:

1. If the advanced seminar is originally offered as part of another Master's degree program at the Faculty of Engineering, the type and scope of the examination shall be governed by the relevant **degree program and examination regulations**.
2. If the advanced seminar is originally offered as part of the Master's degree program in Computational Engineering, a presentation of at least 45 minutes and completion of a written assignment on the same topic shall be required in order to pass the module.

Section 51 Requirements for Admission to Master's Thesis

Students shall pass modules worth a minimum of 70 ECTS credits to qualify for admission to the Master's thesis.

Section 52 Master's Thesis

(1) [1]The Master's thesis demonstrates students' ability to solve computational engineering problems independently. [2]The thesis shall have a workload of approximately 810 hours to be completed within six months. [3]An extension of two months shall only be permitted in exceptional cases. [4]The results of the Master's thesis shall be introduced in a presentation of approximately 30 minutes followed by a discussion. A grade shall be given for the presentation. [5]The date of the presentation shall be determined by the supervising lecturer either after the student has submitted their Master's thesis or during the final stage of thesis work. [6]The date shall usually be within four weeks of the date on which the thesis was submitted; students shall be notified of the date at least two weeks in advance.

(2) [1]The Master's thesis shall deal with a scientific subject from the field of computational engineering and shall be written under the supervision of a full-time lecturer from the Faculty of Engineering or the Faculty of Sciences involved in teaching the degree program. [2]Exceptions to the topic and permission to allow full-time lecturers from other faculties to supervise the Bachelor's thesis may be granted by the chair of the Degree Program Committee upon prior written request.

(3) 30 ECTS credits shall be awarded for the Master's thesis.

Section 53 Evaluation of Achievements for the Master's Degree Program

(1) The Master's degree program shall have been passed if all modules stipulated in **Appendix 3** worth 120 ECTS credits have been passed.

Part IV: Concluding Provisions

Section 54 Legal Validity and Transitory Provisions

(1) [1]These degree program and examination regulations shall come into effect on October 1, 2007. [2]They shall apply to all students who start the Bachelor's or Master's degree program in Computational Engineering in winter semester 2007/2008 or later.

(2) [1]All students already studying a Master's degree program in Computational Engineering at FAU in winter semester 2007/2008 or starting the Master's degree program in Computational Engineering at FAU in winter semester 2007/08 shall have the choice between continuing their studies under these degree program and examination regulations or completing their studies under the degree program and examination regulations for the Bachelor's and Master's degree program in Computational Engineering at FAU dated April 13, 2000 (KWMBl II, p. 940), last amended by statute from February 19, 2004. [2]Students shall apply in writing to the Examinations Office to change examination regulations by the end of winter semester 2007/08 at the latest. [3]The examinations of the Bachelor's examination and the Master's examination according to sentence 1 shall be conducted for the last time in the following examination periods:
1. Bachelor's examination: after winter semester 2010/2011
2. Master's examination: after winter semester 2009/2010

[4]Examinations after these examination periods shall be conducted according to these degree program and examination regulations.

(3) At the same time as these degree program and examination regulations come into effect, the Degree Program and Examination Regulations for the Bachelor's and Master's Degree Program in Computational Engineering at FAU from April 13, 2000 (KWMBl II, p. 940), last amended by statute from February 19, 2004, shall cease to be in force, subject to the provisions in (2).

(4) [1]The eighth amendment statute shall come into effect on the day after its publication. [2]It shall apply to all students starting a degree program from summer semester 2018 onwards.

(5) [1]The ninth amendment statute shall come into effect on the day after its publication. [2]It shall apply to all students starting a degree program from winter semester 2018/2019 onward.

(6) [1]The tenth amendment statute shall come into effect on the day after its publication. [2]It shall apply to all students starting a degree program from winter semester 2022/2023 onward. [3]Examinations in accordance with previous versions of these degree program and examination regulations will be offered for the last time in summer semester 2027 for the Bachelor's degree program and in winter semester 2025/2026 for the Master's degree program. [4]From the date stated in sentence 3, those students who are affected by the respective version of the examination regulations becoming invalid shall take their remaining examinations in accordance with the version of the degree program and examination regulations valid from this date on.

Appendix 1: Structure of the Bachelor's Degree Program

Module name	SWS (semester hours)				Total ECTS credits	Workload per semester in ECTS credits						Type and scope of the examination
	L	T	P	S		1st	2nd	3rd	4th	5th	6th	
Computer Science												
Foundations of programming (GOP)	see **FPOINF**				**5**	5						see **FPOINF**
Foundations of logic in computer science	see **FPOINF**				**5**	5						see **FPOINF**
Introduction to algorithms (GOP)	see **FPOINF**				**7.5**		7.5					see **FPOINF**
Computational engineering 1 (GOP)	4	2			**7.5**	7.5						EA (WE90) + CA (TA)
system programming	2	2	2		**10**		5	5				see **FPOINF**
Simulation and modeling 1	2	2			**5**					5		see **FPOINF**
Simulation and scientific computing 1	2	2	2		**7.5**					7.5		EA (WE90) + CA (TA)
Simulation and scientific computing 2	2	2	2		**7.5**						7.5	EA (WE90) + CA (TA)
Mathematics												
Mathematics for CE 1 [1)] (GOP)	4	2			**7.5**	7.5						EA (WE90) + CA (TA)
Mathematics for CE 1 [1)] (GOP)	6	2			**10**		10					EA (WE120) + CA (TA)
Mathematics for CE 3 [1)]	2	2			**5**			5				EA (WE60) + CA (TA)
Mathematics for CE 4 [1)]	2	2			**5**				5			EA (WE60) + CA (TA)
Numerics for engineers I	2	2			**5**			5				EA (WE60)
Numerics for engineers II	2	2			**5**				5			EA (WE60)
Technical application field (TAF) min 35 ECTS credits[2)]												
Experimental physics for natural scientists I (GOP)	4	1			**5**	5						EA (WE 90)
Experimental physics for natural scientists II (GOP)	4	2			**5**		5					EA (WE 90)
Computational engineering 2 (GOP)	2	2			**5**		5					EA (WE90) + CA (TA)
TAF – Modules [3)]	8	8			**20**			20				see Section 41a (3)
Elective engineering modules, max 17.5 ECTS credits [4)]	10	10			**17.5**			17.5				see Section 41b (3)
Elective key qualifications [5)]												
Free electives	4				**5**			5				CA
Practical/internship			8		**10**			10				CA: PA
Advanced seminar: Bachelor's program				2	**5**				5			see Section 44 (3)

Module name	SWS (semester hours)				Total ECTS credits	Workload per semester in ECTS credits						Type and scope of the examination
	L	T	P	S		1st	2nd	3rd	4th	5th	6th	
Bachelor's thesis					**15**					15		EA: written assignment (80 %) and presentation with discussion (approx. 30+15 mins; 20 %)
Total SWS (semester hours)	**66**	**47**	**16**	**2**								
Total ECTS					**180**	**30**	**32.5**	**27.5**	**30**	**30**	**30**	

Key:
GOP: preliminary examination (Grundlagen- und Orientierungsprüfung).
EA: examination achievement (graded).
CA: course achievement (ungraded).
WE60/WE90/WE120: written examination lasting 60, 90 or 120 min.
TA = tutorial achievement pursuant to Section 6 (5) **ABMPO/TechFak**
LA = laboratory achievement pursuant to Section 6 (3) **AMBPO/TechFak**
SA = seminar achievement pursuant to Section 6 (3) **ABMPO/TechFak**

1) The equivalence of the mathematics modules in the degree programs of the Faculty of Engineering shall be announced according to local practice.
2) Differences in the ECTS credits allocated to technical application fields according to Section 43 (1)(3) caused by the varying scope of the compulsory modules in the respective technical application fields can be compensated for by taking additional or fewer engineering elective modules within the meaning of Section 43 (1)(4).
3) Compulsory modules according to **Appendix 2**.
4) The engineering elective modules are governed by Section 41b
5) Free choice of modules offered at FAU with the exception of language courses in English. The type and scope of teaching units and examinations depend on the specific manner in which the respective module is taught and are regulated by the applicable **(degree program and) examination regulations** and/or the module handbook.

Appendix 2: Compulsory Modules for Technical Application Fields

TAF Regelungstechnik / Automatic control – compulsory modules

Module name	SWS (semester hours)				Total ECTS credits	Workload per semester in ECTS credits						Type and scope of the examination
	L	T	P	S		1st	2nd	3rd	4th	5th	6th	
Technical application field												
Introduction to control engineering[1]	see **FPOET**				**5**			5				see **FPOET**
Control engineering practical for CE			3		**5**				5			LA Laboratory achievement
Control engineering B (State-space methods)	see **FPOEEI**				**5**					5		see **FPOEEI**
Digital control	2	2			**5**						5	EA (WE 90)
Total SWS (semester hours)	**7**	**5**	**3**									
Total ECTS					**20**			**5**	**5**	**5**	**5**	

TAF Mechatronik / Mechatronics – compulsory modules

Module name	SWS (semester hours)				Total ECTS credits	Distribution of workload per semester in ECTS credits						Type and scope of the examination
	L	T	P	S		1st	2nd	3rd	4th	5th	6th	
Technical application field												
Foundations of electrical engineering I	see **FPOEEI**				**7.5**			7.5				see **FPOEEI**
Foundations of electrical engineering III	see **FPOEEI**				**5**					5		see **FPOEEI**
Introduction to control engineering[1]	see **FPOET**				**5**			5				see **FPOET**
Sensors	see **FPOEEI**				**5**					5		see **FPOEEI**
Total SWS (semester hours)	**11**	**7**										
Total ECTS					**22.5**			**12.5**		**10**		

TAF Information technology – compulsory modules

Module name	SWS (semester hours)				Total ECTS credits	Workload per semester in ECTS credits						Type and scope of examination
	L	T	P	S		1st	2nd	3rd	4th	5th	6th	
Technical application field												
Introduction to the foundations of electrical engineering for CE students	2				**2.5**			2.5				CA, ungraded
Signals and systems I	2.5	1.5	1		**5**			5				EA (see **FPOEEI**)
Signals and systems II	2.5	1.5	1		**5**				5			EA (see **FPOEEI**)
Information theory and coding	3	1			**5**					5		EA (see **FPOEEI**)
Digital signal processing	3	1	1		**5**					5		EA (see **FPOEEI**)
Total SWS	**13**	**5**	**3**									
Total ECTS					**22.5**			**7.5**	**5**	**10**		

TAF Thermo and fluid dynamics – compulsory modules

Module name	SWS (semester hours)				Total ECTS credits	Workload per semester in ECTS credits						Type and scope of the examination
	L	T	P	S		1st	2nd	3rd	4th	5th	6th	
Technical application field												
Technical thermodynamics I	3	2			**7.5**			7.5				EA (see FPOET)
Technical thermodynamics II	3	1			**5**				5			EA (see FPOET)
Fluid mechanics I	2	2			**5**				5			EA (see FPOCBI)
Heat and mass transfer	3	1			**5**						5	EA (see FPOET)
Total SWS (semester hours)	**11**	**6**										
Total ECTS					**22.5**			**7.5**	**10**		**5**	

TAF Solid mechanics and dynamics – Compulsory modules

Module name	SWS (semester hours)				Total ECTS credits	Workload per semester in ECTS credits						Type and scope of examination
	L	T	P	S		1st	2nd	3rd	4th	5th	6th	
Technical application field												
Statics, elastostatics, and mechanics of materials	5	4	4		**12.5**			5	7.5			WE (see FPOMB)
Dynamics of rigid bodies	3	2	2		**7.5**					7.5		WE (see FPOMB)
Total SWS (semester hours)	**8**	**6**	**6**									
Total ECTS					**20**			**5**	**7.5**	**7.5**		

TAF Computational optics – compulsory modules

Module name	SWS (semester hours)				Total ECTS credits	Distribution of workload per semester in ECTS credits						Type and scope of the examination
	L	T	P	S		1st	2nd	3rd	4th	5th	6th	
Technical application field												
Experimental physics 3: Optics and quantum phenomena	4	2			**7.5**			7.5				EA (see BMPO/Physik)
Modern optics I: Advanced optics	2	2			**5**					5		EA (WE120)
Photonics 1	2	2			**5**			5				EA (see **FPOEEI**)
Photonics 2	2	2			**5**				5			EA (O30)
Total SWS (semester hours)	**10**	**8**										
Total ECTS					**22.5**			**12.5**	**5**	**5**		

Key:
EA: examination achievement (graded).
CA: course achievement (ungraded).
O30 min = 30-minute oral examination.
WE60/WE90/WE120/WE180: written examination lasting 60, 90 120 or 180 min.
[1] The module “Dynamic systems and control” may be chosen as an alternative (5 ECTS credits, L/T = 2+2, EA WE90).

Appendix 3: Structure of the Master's Degree Program

Module name	SWS (semester hours)				Total ECTS credits	Distribution of workload per semester in ECTS credits				Type and scope of the examination
	L	T	P	S		1st	2nd	3rd	4th	
Computer Science										
Compulsory elective modules in computer science: Modules from the module catalog pursuant to Section 40a (3) (min. 20 ECTS) [1)]	12	8	4		**≥20**					see Section 49 (2)
Mathematics										
Functional analysis for engineers	2	2			**5**	5				EA (WE60) + CA (TA)
Optimization for engineers	3	2			**7.5**		7.5			EA (WE60) + CA (TA)
Compulsory elective modules in mathematics: Modules from the module catalog pursuant to Section 40a (4) (min. 7.5 ECTS) [1)]	6	3			**≥7.5**					see Section 49 (3)
Technical application fields (TAF)										
Compulsory elective modules in technical application field: Modules from the module catalog for the chosen TAF pursuant to Section 40a (5) (min. 20 ECTS) [1)]	12	8	4		**≥20**					see Section 40a (5)
Advanced seminar				2	**5**					see Section 50 (3)
Master's thesis					**30**				30	EA: written assignment and Presentation with discussion (approx. 30 + 15 min) (90% + 10%)
Total SWS (semester hours)	**35**	**23**	**8**	**2**						
Total ECTS					**120**	**30**	**30**	**30**	**30**	

Key:
GOP: preliminary examination (Grundlagen- und Orientierungsprüfung).
EA: examination achievement (graded).
CA: course achievement (ungraded).
WE 60: written examination lasting 60 mins.
TA = tutorial achievement pursuant to Section 6 (5) **ABMPO/TechFak**

LA = laboratory achievement pursuant to Section 6 (3) **AMBPO/TechFak**
SA = seminar achievement pursuant to Section 6 (3) **ABMPO/TechFak**

[1)] If after completing the minimum number of ECTS credits required in compulsory elective modules in this group the total number of ECTS credits that must be completed in all groups of compulsory elective modules (85 ECTS credits) has not been achieved, compulsory elective modules worth more than the minimum number of ECTS credits required must be taken in one of the other groups.