HELMUT SCHMIDT UNIVERSITÄT

Subject-Specific Programme and Examination Regulations[1]

for the
Bachelor's Programme in

Engineering Science

and the
Master's Programme in

Engineering Science: Defence Systems

both taught in English
at the

Helmut Schmidt Universität / Bundeswehr Universität, Hamburg

(FSPO EngSci)

[1] The English translation is for information purposes only. In cases of doubt or differences of interpretation, the German version shall prevail over the English text.

Based on Section 112(1) and (3), first sentence, of the Hamburg Higher Education Act (HmbHG) as of 18 July 2001 (Hamburg Law Gazette, HmbGVBl., p. 171), as amended, in connection with the Notification of Transfer issued by the Hamburg Departmental Authority of Science and Research on 23 October 1978, revised edition of 5 July 2007, these Subject-Specific Programme and Examination Regulations for the Bachelor's Programme in Engineering Science and the Master's Programme in Engineering Science: Defence Systems, both taught in English, were

adopted by the Faculty Council of the Faculty of Electrical Engineering on 18 October 2018,

adopted by the Faculty Council of the Faculty of Mechanical Engineering on 18 October 2018,

endorsed by the Academic Senate on 8 November 2018,

approved by the Ministry of Science, Research and Equalities of the Free and Hanseatic City of Hamburg on 23 November 2018,

approved by the Federal Ministry of Defence on 30 November 2018

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Preamble

These Subject-Specific Programme and Examination Regulations will supplement the General Examination Regulations of the Helmut Schmidt Universität / Bundeswehr Universität, Hamburg, for Bachelor's and Master's programmes as amended.

I. Supplementary Provisions

Re Section 2
Programme Objectives, Examination Purpose, Academic Degrees

(1) [1]Objectives of the Bachelor's programme in Engineering Science include imparting fundamental technical, methodological and general professional skills enabling students to enter a related profession or study for a Master's degree. [2]As an interdisciplinary scientific course of study, the programme conveys the basics of mechanical and electrical engineering to enable students to carry out scientific work and make informed judgements on general issues in the field of engineering science and also imparts specialist knowledge that is necessary to fully understand complex technical interactions and to analyse technical systems while working in an international environment. [3]The intention is to also equip students with the abilities they will need to complete a subsequent Master's programme.

(2) [1]The Bachelor's degree examination, if passed, is the first professional and academic degree. [2]This is how students demonstrate that they have achieved the programme objectives in accordance with paragraph 1. [3]The Electrical Engineering and Mechanical Engineering Faculties will jointly award the academic degree of »Bachelor of Science (B.Sc.)« to those who have passed the Bachelor's degree examination.

(3) [1]Knowledge and skills acquired previously will be consolidated and extended in the Master's programme. [2]As a result, students will obtain a second professional and academic degree. [3]The objective is to enable students to grasp the contexts of their subject and to work independently according to scientific methods and on the basis of scientific findings. [4]The Electrical Engineering and Mechanical Engineering Faculties will jointly award the academic degree of »Master of Science (M.Sc.)« to those who have passed the Master's degree examination.

Re Section 4
Programme Content and Structure

Re Section 4(1):

[1]The programmes consist of modules in the fields of mechanical and electrical engineering as well as of modules to develop general professional skills. [2]The chronological sequence of the various modules as well as type, admission requirements, duration and weighting of examinations have been enclosed as annexes. [3]Courses will be taught in English and examinations will generally be held in English, too. [4]Courses and examinations in compulsory elective modules of the Master's programme may be offered in German. [5]Further information on programme content and structure is provided in the module handbook as amended.

Re Section 4(4):

[1]The programmes integrate interdisciplinary studies in the form of the technical modules specifically described in the annexes. [2]In the Bachelor's programme, students must, in addition to providing evidence of English language skills required for admission to the programme (see the Supplementary Provisions on Section 5(4), first sentence), complete additional foreign language training accounting for 12 credits. [3]Foreign students without advanced German skills above the B2 level of the Common European Framework of Reference for Languages have to undergo German language training.

Re Section 5
Programme Admission Requirements

Re Section 5(4), first sentence:

[1]Applicants for the Bachelor's programme must not only meet the general admission requirements, but also have sufficient knowledge of the English language to successfully complete the programme and the examinations. [2]A Standardised Language Profile (SLP) of 3332 as certified by the Federal Office of Languages or an equivalent examination will be accepted as proof of this knowledge. [3]Applicants whose first language is English will be exempted from this obligation.

Re Section 5(4), second sentence:
[1]The subjects of the Bachelor's programme specified in these regulations or of other Bachelor's degree studies equivalent in content are relevant to the Master's programme as defined in Section 5(3), first sentence. [2]The provisions of Section 9 will apply mutatis mutandis. [3]In cases of doubt, the Examination Committee will decide whether there is equivalence in content. [4]The Committee may admit to the Master's programme graduates who have completed programmes not equivalent in content subject to certain conditions.

Re Section 5(5):
[1]The admission interview will take 15 to 30 minutes. [2]Participants will include the examinee and one full-time professor each from the Mechanical Engineering and Electrical Engineering Faculties with one of them taking the minutes. [3]The admission interview may also take place in a group of several examinees if all examinees have given their consent in writing. [4]The examinees will be informed about the results right after the admission interview. [5]A positive result will only result in admission to the Master's programme if the other conditions are met as well. [6]The admission interview should take place as soon as possible after the overall grade of the Bachelor programme has been determined.

Re Section 7
Examination Committees

Re Section 7(2):

[1]The Examination Committee comprises the following members involved with the programmes:

1. one professor from the Faculty of Electrical Engineering,
2. one professor from the Faculty of Mechanical Engineering,
3. another professor from the Faculty of Electrical Engineering or the Faculty of Mechanical Engineering,
4. two students from the Bachelor's or Master's programme in Engineering Science.

[2]The Faculty Council of the Faculty of Electrical Engineering will elect the members in accordance with the first sentence, No. 1, and one of the members in accordance with the first sentence, No. 4, as well as their deputies. [3]The Faculty Council of the Faculty of Mechanical Engineering will elect the members in accordance with the first sentence, No. 2, and one of the members in accordance with the first sentence, No. 4, as well as their deputies. [4]The Faculty Councils of the Faculties of Electrical Engineering and of Mechanical Engineering will take turns in electing the member in accordance with the first sentence, No. 3, depending on their terms of appointment. [5]The Faculty Council of the other Faculty will elect the deputy.

Re Section 10
Admission to Module Examinations

Re Section 10(3):

[1]Students generally must attend laboratory exercises as part of their technical studies. [2]Regular attendance of laboratory exercises means that students did not miss any classes or caught up on all missed classes on alternative dates offered.

Re Section 10(6):

In cases where students fail to apply for admission in accordance with Section 10(1) No. 4, they will still be admitted to the forthcoming examinations in the compulsory modules of their subject-related term and their chosen compulsory elective modules if they meet the criteria specified in paragraph 1 Nos. 1 to 3.

Re Section 11
Module Examinations

Re Section 11(3):

The admission requirements for module examinations, the type and scope of required examinations and the credits assigned to each module are specified in the annexes to these Regulations.

Re Section 11(4):

At the request of the examiners, the Examination Committee may determine that a written examination be resat as an oral examination.

Re Section 11(5), first sentence:

[1]First-time examinations in modules whose courses end in a spring term will take place during the programme or no later than six weeks after the beginning of the following term; the latter will not apply to the fifth term of the Master's programme. [2]In the compulsory modules, written examinations other than second re-examinations must be taken during the programme within three examination periods per year assigned to each of the three terms. [3]The date of an examination – or of the last course examination if an examination consists of course examinations – will be within the examination period assigned to the term in which the courses of the module end. [4]The examination periods will follow the university-wide dates of the beginning and end of the teaching period. [5]The examination period in the autumn term will begin two weeks before the end of the teaching period and will end in the week when the lectures of the following term start. [6]The examination period in the winter term will begin two weeks before the end of the teaching period and will end on the day before the beginning of the teaching period of the following term. [7]In contrast to the above, the examination period of the eighth term of the Bachelor's programme will begin ten weeks and will end six weeks before the end of the teaching period. [8]The examination period of the spring term will be divided into two parts. [9]The first part will begin one week before the end of the teaching period and will end one week after the end of the teaching period. [10]The second part will begin two weeks before the beginning of the teaching period of the following term and will end on the day before the beginning of the teaching period of the following term; in the fifth term of the Master's programme this will be 30 September. [11]Where justified, the Examination Committee may grant exemptions.

Re Section 11(5), third sentence:

Examinations in the compulsory modules must be assessed within six weeks of completion; examinations in the first part of the examination period during the spring term must be assessed by 30 September.

Re Section 12
Interdisciplinary Studies

Re Section 12(2), third sentence:

Interdisciplinary studies within the programme (see the Supplementary Provisions on Section 4(4)) are not subject to Section 12(3) to (7), but are subject to the provisions of the General Examination Regulations (APO) and these Subject-Specific Programme and Examination Regulations (FSPO) applicable to the other technical modules of the programme.

Re Section 13
Examination Types

Re Section 13(1):

The following types of examination are admissible:

(1) [1]Written, invigilated examinations are not open to the public and involve set tasks to be completed by the student independently and only using the aids permitted by the examiner. [2]When assessing written examinations, previous achievements reached by students during the programme may be taken into account to a limited extent. [3]The type of previous achievement and the scope of crediting will be announced by the examiner at the beginning of the course and specified in the module description.

(2) [1]Oral examinations are examination interviews between examiners and examinees. [2]Descriptions, illustrations and calculations performed by examiners or examinees in the course of oral examinations may also be outlined in writing. [3]Oral examinations will last 15 to 45 minutes per examinee.

(3) Talks are oral presentations of work results taking up to 30 minutes with a subsequent discussion and question and answer session.

(4) Project papers are contributions documented in writing and presented in a talk of up to 20 minutes designed to solve project tasks within no more than 30 hours in total multiplied by the number of credits of the module.

(5) [1]Internship reports are written records documenting problems, possible solutions and results concerning tasks performed during internships. [2]The total time spent on internship reports is 10 to 20 hours.

(6) [1]Laboratory exercise reports are written records documenting problems, possible solutions and results concerning tasks performed during laboratory exercises. [2]The time spent on laboratory exercise reports is 10 to 20 hours per task.

Re Section 13(2):

Written examinations may, in whole or in part, take the form of multiple choice examinations.

Re Section 14
Final Theses

Re Section 14(5):

(1) [1]The Bachelor's thesis is worth twelve credits and must be completed within ten weeks. [2]The Master's thesis is worth 30 credits and must be completed within four months.

(2) [1]Part of the module credit is a presentation of the thesis of up to thirty minutes' duration; the presentation will account for 25 % of the supervisor's assessment of the final thesis. [2]The presentation is due shortly before submission of the final thesis. [3]The latest permissible time for the presentation will be two weeks after submission.

(3) Preparation of the final thesis at a non-university facility must be approved by the chairperson of the Examination Committee.

Re Section 14(6):

(1) If the Bachelor's thesis is not accepted by 1 November of the seventh term, the grade "unsatisfactory" will be awarded in accordance with Section 17.

(2) If the Master's thesis is not accepted by 1 April of the fifth term, the grade "unsatisfactory" will be awarded in accordance with Section 17.

Re Section 14(7), second sentence:

[1]As a general rule, final theses must be submitted in English or, with the consent of the supervisor, in German. [2]An abstract in the other language must be added.

Re Section 14(10), third sentence:

The examiners' written reports on final theses should be forwarded no later than 4 weeks after submission of the paper.

Re Section 15
Assessment of Examinations and Grading

Re Section 15(4), second sentence:

For modules specifically described in the annexes and whose module examination consists of several course examinations, each course examination must be passed.

Re Section 15(5):

For the foreign language modules as well as for the modules specifically described in the annexes, the student will only be awarded the grade "pass" or "fail".

Re Section 16
Resitting Examinations

Re Section 16(3):

(1) [1]First re-examinations in the compulsory modules must be taken in the next examination period in accordance with the Supplementary Provisions on Section 11(5), first sentence. [2]Notwithstanding this, first re-examinations in compulsory modules from the first part of the spring term examination period must be taken as early as in the second part of the same examination period, if dates have already been determined. [3]First re-examinations in modules whose courses end in the seventh term nevertheless will take place within the first six weeks of the following term.

(2) [1]Second re-examinations in compulsory modules conducted as written examinations will take place no earlier than six weeks after the date of the first re-examination and no later than the date of the first-time examination for students of the following year. [2]Second re-examinations in compulsory modules conducted as oral examinations will take place no later than six weeks after the final result of the first re-examination has been announced. [3]If the first re-examination was taken in June or July, the second re-examination can be scheduled by 30 September of the same year.

(3) Re-examinations in compulsory elective modules must be taken within four months of the first-time examinations or first re-examinations.

(4) Second re-examinations in the technical studies will take place in the same form as the first exam or as oral examinations of 20 to 60 minutes' duration, notwithstanding paragraph 2 of the Supplementary Provisions on Section 13(1).

Re Section 16(4):

[1]If the first re-examination in a compulsory module is a written examination, the examinee may apply for admission to an additional oral examination if he or she failed the examination with a grade of 4.3. [2]The request must be submitted to the Examination Office no later than

two weeks after the announcement of the result and the examination must be taken within another four weeks. [3]The oral examination is subject to paragraph 2 of the Supplementary Provisions on Section 13(1). [4]Before taking the oral examination, the examinee must be allowed to view to his/her examination scripts. [5]The grade of the module examination is the arithmetic mean of the grade of 4.3 and the grade received in the oral examination.

Re Section 16(7):

(1) If the resubmitted Bachelor's thesis is not accepted by 1 April of the third academic year, it is graded "unsatisfactory" in accordance with Section 17.

(2) [1]If the resubmitted Master's thesis is not accepted by 15 August of the fifth term, it is graded "unsatisfactory" in accordance with Section 17. [2]If the first-time Master's thesis is graded "unsatisfactory" on the basis of paragraph 2 of the Supplementary Provisions on Section 14(6), its resubmission must be accepted by 31 May in the fifth term, otherwise the resubmitted thesis will also be graded “unsatisfactory”.

Re Section 22
Pass or Failure

Re Section 22(2):

Failing a compulsory elective module may be compensated by passing alternative modules with the required minimum of credits.

Re Section 23
Certificate, Diploma and Diploma Supplement

Re Section 23(5):

In consultation with the Examination Committee, the Examination Office will decide on how to record the relative performance taking into account statistical and data privacy requirements.

II. Annexes

Annex 1: Bachelor's Programme in Engineering Science

Title	Type	Credits	Type of Examination	Admission Requirements	Assigned Term
Technical Studies					
Preliminary Online Mathematics Course	E	6	K2	-	In advance
Calculus and Linear Algebra 1	C	6	K2	-	1
Calculus and Linear Algebra 2	C	12	K3	-	2, 3
Programming	C	11	K1.5+K2+K2*)	-	1, 2, 3
Electrical Engineering	C	12	K2+K2*)	-	1, 2
Electromagnetics	C	10	K3	-	4
Engineering Mechanics	C	15	K2+K2+K2*)	-	1, 2, 3
Materials Science	C	11	K3	AP	1, 2
Thermal/Fluids Engineering	C	12	K2+K2*)	-	5, 6
Communication Systems	C	8	K3	-	4
Introduction to Electro-Optics	C	4	K1.5	-	6
Sensor Systems	C	8	K3	-	5
Practical Training	C	3	LAB	AP	6
Drives and Propulsion	C	8	K3	-	5
Control Systems	C	8	K3	-	4
Student's Project	E	6	PA	-	6-7
Bachelor Thesis	C	12	AA	SP	**)
Compulsory Elective Courses	CEC	3 * 4	Alt2 each	-	3-7
Three of the following modules must be completed:					
Mechatronics/Multibody Simulation					5
Sensors and Actuators					5
Design Methods					6
Heat Transfer					6
Vehicle Dynamics					7
Quality and Knowledge Management					7
Production Engineering					7
General Professional Skills					
Interdisciplinary Studies	IDS	2 * 3	Alt2 each	-	4, 5, 6
Language Training 1	C	8	LT	AP	1, 2, 3
Language Training 2	C	4	LT	AP	4, 5, 6
Academic English and Skills	C	4	PA	AP	4-7
		180			

*) The grades achieved in each course examination are included equally into the module grade.
**) See Supplementary Provisions on Section 14(6) and Section 16(7)

Key:

Type:

C	=	compulsory module
E	=	compulsory elective module; students must opt for one of the two compulsory elective modules E.
CEC	=	compulsory elective modules from "Compulsory Elective Courses". Not all modules stated will be offered in every academic year
IDS	=	compulsory elective modules from "Interdisciplinary Studies" in accordance with Annex 3

Type of examination:

AA	=	final thesis in accordance with Section 14
Kx	=	written examination over a total of x hours
x+y	=	module examination consisting of course examinations x and y (or more) each of which must be passed individually
LAB	=	laboratory tests including a report stating "pass" or "failed"
M	=	oral examination
PA	=	project paper
Alt2	=	K2 or M
LT	=	"oral" (15 minutes) and "written" (60 minutes) within the meaning of Section 13(8) APO

Admission requirement:

SP	=	earn the required credits in one of the two compulsory elective modules E
AP	=	attendance is compulsory in accordance with Section 10(3) APO

Annex 2: Master's Programme in Engineering Science: Defence Systems

Title	Type	Credits	Type of Examination	Admission Requirements	Assigned Term
Technical Studies					
Numerical Mathematics	C	4	K1.5	-	1
Operating Systems and Secure Computer Networks	C	8	Alt2	-	3, 4
Specialisation stage	E	4 * 4	Alt2 each	-	1, 2, 3, 4
Students must choose one of the following specialisation stages, from which they need to complete four modules:					
High Performance Computing and Applications:					
Hardware Architecture of HPC Systems					2
Advanced Numerical Mathematics					2
Computational Fluid Dynamics					2
Computational Electromagnetics					3
HPC Techniques and Software Development					3
Parallel Computing for Multiscale and Multiphysics Problems					4
Special Applications of HPC in Defence Technology					4
Computational Material Design:					
Continuum Mechanics					1
Materials Modelling					2
Modelling Advanced Processing Technologies					3
Simulating High Strain Deformation					3
Statistical Thermodynamics					3
Computational Design of Surfaces and Interfaces					4
Electro-Optics:					
Laser Technology					1
Technical Optics					2
High-Power Electromagnetics and Laser Systems *)					4
Infrared Technologies and Applications					4
Complementary stage	E	5 * 4	Alt2 each		2, 3, 4
Students must complete another five modules from the specialisation stages offered with at least one module each from the areas not chosen previously.					
Defence Systems and Technologies	E	total of 24	Alt2 each	-	1, 2, 3
Modules amounting to a total of at least 24 credits must be completed:					
Failure Analysis and Maintenance		4			1 or 2
Material Handling and Warehouse Technology		4			1 or 2
Electrochemical Power Sources for Military Applications		4			1 or 2
Improvised Explosive Devices Disposal		4			1 or 2
Corrosion and Corrosion Protection		4			1 or 2
CBRN		8			2, 3
Naval Shipbuilding		8			2, 3
Systems Engineering for Land Vehicles		8			2, 3
Ammunition and Weapon Technology		8			2, 3
Ballistics 1		4			2
Ballistics 2		4			3
Terramechanics and Off-Road Vehicle Engineering		4			3
Laboratory Project	C	9	PA	-	4
Master Thesis	C	30	AA	-	**)
General Professional Skills					
Interdisciplinary Studies	IDS	3 * 3	Alt2 each	-	1-4
		120			

*) Courses and examinations in these modules may also take place in German.
**) See Supplementary Provisions on Section 14(6) and Section 16(7)

Key:
Type:
- C = compulsory module
- E = compulsory elective module. Not all modules stated will be offered in every academic year.
- IDS = compulsory elective modules from "Interdisciplinary Studies" in accordance with Annex 3

Type of examination:
- AA = final thesis in accordance with Section 14
- Kx = written examination over a total of x hours
- x+y = module examination consisting of course examinations x and y (or more) each of which must be passed individually
- M = oral examination
- PA = project paper
- Alt2 = K2 or M

Annex 3: Interdisciplinary Studies

The interdisciplinary studies' modules can be taken both for the Bachelor's and Master's programmes. Each module may only be completed once during the Bachelor's and the Master's programmes. Students who have completed their Bachelor's programme in accordance with the Subject-Specific Programme and Examination Regulations for the Bachelor's Programme in Engineering Science dated 19 November 2015 / 19 May 2016 (University Gazette No. 08/2016), please take note of the transitional arrangement.

Not all modules stated will be offered in every academic year.

Title	**Credits**
International Law	3
Transportation Law	3
Public Procurement Law	3
EU Regulations in Information Technology	3
Tactics and Strategies	3
Leadership and Psychology in Organizations	3
Artificial Intelligence and Robotics: Historical Developments and Present State	3

III. Transitional arrangement

Students who have completed their Bachelor’s programme in accordance with the Subject-Specific Programme and Examination Regulations for the Bachelor's Programme in Engineering Science dated 19 November 2015 / 19 May 2016 (University Gazette No. 08/2016) and who are participating in the Master’s Programme in Engineering Science: Defence Systems are not allowed to choose compulsory elective modules whose content corresponds to those they had already chosen in their Bachelor’s programme and which have been part of the Bachelor degree.

IV. Entry into Force, Expiration

These Regulations will enter into force on 1 October 2018. They will apply for the first time to students who have taken up their Bachelor’s studies in the 2018 autumn term or their Master’s studies in the 2019 winter term. At the same time, the Subject-Specific Programme and Examination Regulations for the Bachelor’s Programme Engineering Science dated 19 November 2015 / 19 May 2016 (University Gazette No. 08/2016) as first amended on 19 October 2017 (University Gazette No. 02/2018), will expire with the reservation that they continue to apply to students who had already taken up their studies before the 2018 autumn term.