OFFICIAL TRANSLATION OF

Fachspezifische Bestimmungen für den Studiengang Nanowissenschaften (M.Sc.)
(Amtliche Bekanntmachung Nr. 77 vom 4. Oktober 2018)

THIS TRANSLATION IS FOR INFORMATION ONLY – ONLY THE GERMAN VERSION SHALL BE LEGALLY VALID AND ENFORCEABLE!

Subject-Specific Provisions for the Master of Science in Nanosciences (MSc)

dated 4 April 2018

On 26 August 2018 in accordance with Section 108 subsection 1 of the Hamburg higher education act (Hamburgisches Hochschulgesetz, HmbHG) the Executive University Board of Universität Hamburg ratified the Subject-Specific Provisions for the Master of Science adopted on 4 April 2018 by the Faculty of Mathematics, Informatics and Natural Sciences in accordance with Section 91 subsection 2 no. 1 HmbHG dated 18 July 2001 (HmbGVBl. p. 171) and amended 28 November 2017 (HmbGVBl. p. 336).

Preamble

These Subject-Specific Provisions supplement the Examination Regulations of the Faculty of Mathematics, Informatics and Natural Sciences with the designation Master of Science (MSc) dated 11 April 2012 and 4 July 2012, as amended, and provide a description of the modules for nanosciences as a subject.

I. Supplemental provisions

Section 1
Program and examination objectives, academic degree, and implementation of the degree program

Section 1 subsection 1:
(1) The Master of Science in Nanosciences (MSc) is a research-oriented degree program.

(2) The master's degree program is a graduate degree program that provides graduates with an in-depth and research-related, scientific education in nanosciences.

(3) Students are able to take up complex problems and solve them using scientific methods, even beyond the current state of knowledge.

(4) The program provides the subject-specific methods required for the challenges of a changing professional world and interdisciplinary applications, and expands skills and knowledge to enable students to work scientifically, apply and critically evaluate scientific knowledge, and act responsibly
Program objectives focus primarily on:
a) specialized knowledge oriented to current research questions on the basis of in-depth fundamental knowledge;
b) methodological and analytical skills that lead to independent expansion of scientific knowledge centered on research methods;
c) imparting in-depth expertise and scholarly knowledge that enables analysis and resolution of problems of basic research, applied research, and technology previously not addressed;
d) enabling students to work independently, with a problem-oriented, interdisciplinary, and responsible approach to solving problems from current research in nanosciences and conclusively present the results;
e) professionally relevant key qualifications.

Section 4
Program and examination structure, modules, and ECTS credits

Section 4 subsections 2 and 3:
(1) The master's degree program is divided into three phases, a development phase, an advanced specialization phase, and a research phase:
– In the development phase, the fundamentals of nanosciences acquired in a bachelor's degree program are supplemented with required modules in solid state physics, physical chemistry, nanochemistry, material chemistry, and structural chemistry. This phase is also used to align the knowledge of students transferring from other degree programs or other educational institutions, and should be

completed within the first or second semester if possible. The development phase encompasses 16 ECTS credits.

- The advanced specialization phase provides the advanced knowledge required for independent work in the field of nanosciences. It includes required elective modules totaling 53 ECTS credits, which are oriented towards research areas and the research foci of the departments of chemistry and physics.
  At least 21 ECTS credits in both of the core subjects of chemistry and physics must be taken. ECTS credits from modules administered jointly by both departments are divided among the subjects equally. The remaining courses set forth in the required elective modules for chemistry and/or physics and/or from the area entitled "other advanced modules" may be used to accumulate the remaining 11 ECTS credits.
- Students may freely select from courses offered at Universität Hamburg a total of 6 ECTS credits as electives. A reasonable coherence of elective modules with respect to content should be stipulated with mentors.
- The research phase of 45 ECTS credits consists of a project study (15 ECTS credits) in chemistry or physics and the master's thesis (30 ECTS credits). The project study should be geared towards the master's thesis and must be coordinated with the future supervisor of the master's thesis.

(2) All module descriptions are provided in Annex A to the Subject-Specific Provisions for the Master of Science in Nanosciences—Table of Modules. A detailed description of the modules is provided in the module catalog for the master degree program in nanosciences.

Section 5
Course types

Section 5 sentence 2:
Typically, the advanced phase is made up of a combination of lectures and group work, such as exercises and practical courses and internships, and the research phase is made up of projects and seminars.

Section 5 sentence 3:
If course attendance is compulsory, this must be indicated in the module descriptions.

Section 13
Completed coursework and module examinations

Section 13 subsection 5:
Examinations are held in either German or English. As a rule, an examination will be held in the language in which the course was conducted. If the examiner and the

student agree, the examination may also be taken in a language other than the language of the module.

Section 14
Master's thesis

Section 14 subsection 1:
A colloquium consisting of a presentation and an academic discussion of the subject matter of the master's thesis as part of an academic seminar is a mandatory component for the thesis module. The presentation comprises one-sixth of the grade for the master's thesis. The presentation should be given no later than six weeks after submission of the thesis.
Both examiners should evaluate the presentation and the discussion which should be scheduled no later than six weeks after the submission of the thesis.
Students who have successfully completed all required modules and earned at least 75 ECTS credits, including the project study, may commence work on the master's thesis. The project study should be geared towards the master's thesis and must be coordinated with the future supervisor of the master's thesis.

Section 14 subsection 4:
The master's thesis may be written in either German or English. This decision must be mutually agreed between the student and the supervisor.

Section 14 subsection 5:
The workload for the master's thesis equates to 30 ECTS credits. The master's thesis must be completed within six months.

Section 15
Evaluation of examinations

Section 15 subsection 3 sentence 5:
If a module is comprised of multiple course examinations, the grade for the module is calculated on the basis of the average grades for each component weighted according to the assigned ECTS credits.

Section 15 subsection 3 sentence 9:
The overall final grade for the master's degree program is calculated by averaging the module grades weighted by ECTS credits, whereby

- required subjects and required elective modules have a single weighting
- the project study has single weighting, and
- the master's thesis has triple weighting.

Elective area examination grades are not used to calculate the overall final grade.

Section 15 subsection 4:
The overall final grade “with distinction” will be awarded if a grade of 1.0 is earned for the master’s thesis and the average overall grade of all module examinations is not less than 1.3. Given the lack of comparability, ungraded modules such as those graded as “passed” will not be counted towards the calculation of the overall final grade.

Section 23 Effective date

These subject-specific provisions (FSBs) become effective on the day following official publication by Universität Hamburg. They shall first apply to students commencing their studies in Winter Semester 2018/19.

Hamburg, 4 October 2018
Universität Hamburg

Annex A: Table of Modules for the Subject-Specific Provisions for the Master of Science in Nanosciences

Applicable: To students who commence their studies in or after Winter Semester 2018/19

Information about the module						Courses					Examinations		
Duration in semesters	**Frequency**	**Recommended semester**	**Module prerequisites**	**Module type: Required (Req.), Required Elective**	**Module number/code**	**Module**	**Course title**	**Course Type**	**Cr. Hrs. per week**	**Examination prerequisites 1**	**Type of examination**	**Graded**	**ECTS credits**
Required modules (61 ECTS credits)													
1	annually in the summer semester	first or second	none	Req.	PHY-MV-FN-E01	**Advanced solid-state physics**				none	written examination or oral examination.	yes	8
							Advanced solid-state physics	L, PC	4				
							Exercises in advanced solid-state physics	L, PC	2				
Intended learning results: Students have in-depth knowledge of the latest scientific research in solid-state and nanostructure physics. They also possess sufficient in-depth expertise to conduct an experimental master's thesis in the field of solid-state and nanostructure physics.													
1	annually in the winter semester	first or second	none	Req.	CHE 103	**Physical chemistry**				PCC	written examination	yes	6

							Advanced physico-chemistry	L	3				
							Exercises in advanced physico-chemistry	PC	1				
Intended learning results: Students possess knowledge and skills in the field of physical chemistry													
1	annually in the winter semester	first or second	none	Req.	CHE 101 N	**Nano, solid-state and structural chemistry**				none	written examination	yes	2
							Structural chemistry	L	1				
Intended learning results: Students possess knowledge and skills in the field of solid-state and structural chemistry.													
1	every semester	third	none	Req.	PHY-N-PS	**Nanosciences project study**				LCC	presentation	yes	15
Intended learning results: Students are able to successfully apply the subject area knowledge, and the specific experimental and/or theoretical methods gained from their preparatory projects to issues from which the topic of the master's thesis should arise. Planning and structuring of the intended research project.													
1	every semester	fourth	See FSB Section 14 subsection 2	Req.	PHY-N-MA	**Final module—master's thesis**					master's thesis (five-sixths), colloquium (one-sixth)	yes	30
Intended learning results: Candidates are able to familiarize themselves with an issue taken from current research, apply appropriate scientific methods with increasing independence, and present the results in an academically appropriate form.													
Advanced specialization phase Chemistry (at least 21 ECTS credits)													
1	annually in the	first, second, or third	none	RE	CHE 016	**Inorganic chemistry III**				none	written examination	yes	6

	winter semester												
							Inorganic chemistry III	L	3				
							Exercises in inorganic chemistry III	PC	1				
Intended learning results: Students possess an in-depth understanding of complex and molecular chemistry as well as the main groups of organometallic chemistry.													
1	every semester	first, second, or third	Basic laboratory course in inorganic chemistry	RE	CHE 020	**Integrated synthesis laboratory course in inorganic and organic chemistry**				none	oral examinations IC (40%), oral examination OC (40%), presentation (20%)	yes	12
							Integrated synthesis laboratory course in organic and inorganic chemistry incl. complementary seminar	Req.	11				
Intended learning results: Students are able to perform modern and sophisticated synthesis methods. Students possess key skills (particularly methodological competence, planning work, social skills/teamwork, ability to prepare protocols using chemistry-specific software, and mastery of literature research) in conjunction with the acquisition of expertise.													
1	annually in the summer semester	first, second, or third	none	RE	CHE 017	**Organic chemistry III**				none	written examination	yes	6
							Organic chemistry III	L	3				
							Exercises in organic chemistry III	PC	1				

Intended learning results: Students understand more complex reaction mechanisms, principles of stereoselective synthesis, and modern synthetic methods for stereoselective synthesis.													
1	every semester	first, second, or third	none	RE	CHE 037	**Required elective laboratory course in chemistry**				none	completion of laboratory course (presentation and/or written paper)	yes	6
							laboratory course, seminar	Req.	6				
Intended learning results: Students know and can apply current and sophisticated synthesis methods or modern techniques and procedures. Students possess key skills (particularly methodological competence, planning work, social skills/teamwork, preparation of protocols using chemistry-specific software, delivering a scientific presentation, and literature research) and chemistry content.													
1	annually in the winter semester	first, second, or third	none	RE	CHE 112 A	**Regenerative energy conversion—lecture module**				none	written or oral examination	yes	3
							Regenerative energy conversion	L	2				
Intended learning results: Students have knowledge and skills in energy conversion and energy storage; they also understand their associated materials and methods and can apply these in research.													
1	annually in the winter semester	first, second, or third	CHE 112 A	RE	CHE 112 B	**Regenerative energy conversion—laboratory course module**				LCC	PCom	yes	6
							Regenerative energy conversion—research laboratory course	Req.	6				

Intended learning results: Students have knowledge and skills in energy conversion and energy storage; they also understand their associated materials and methods and can apply these in research. Students are able to work independently and plan research within a research project in cooperation with a team, independently source information (literature research), and prepare qualified scientific protocols.													
1	annually in the summer semester	first, second, or third	none	RE	CHE 114 A	**Energy**				none	written examination or oral examination.	yes	3
							Fuel cells, batteries, and gas storage: new materials for energy production and storage	L	2				
Intended learning results: Students have knowledge and skills in the field of energy conversion and storage and related methods and can apply these in research.													
1	annually in the winter semester	first, second, or third	none	RE	CHE 134	**Quantum chemistry I**				none	written examination or oral examination.	yes	6
							Quantum chemistry I	L	2				
							Exercises in quantum chemistry I	PC	2				
Intended learning results: Students possess a solid basic knowledge of theoretical chemistry and quantum chemistry, especially Hartree-Fock theory.													
1	annually in the summer semester	first, second, or third	none	RE	CHE 135	**Quantum chemistry II**				none	written examination or oral examination.	yes	6
							Quantum chemistry II	L	2				
							Exercises in quantum chemistry II	PC	2				

Intended learning results: Students possess advanced basic knowledge of theoretical chemistry and quantum chemistry, especially correlation methods and density functional theory.													
1	annually in the summer semester	first, second, or third	none	RE	CHE 136	**Molecular electronics and spintronics**				none	term papers	yes	3
							Molecular electronics and spintronics	L	2				
Intended learning results: Students possess knowledge and skills in the field of molecular electronics and spintronics, the underlying theory, and potential applications. Students are familiar with simple simulation tools.													
1	annually in the summer semester	first, second, or third	none	RE	CHE 137 A	**Soft (nano)matter—lecture module**				none	written examination or oral examination.	yes	6
							Soft (nano)matter	L	4				
Intended learning results: Students possess knowledge and skills in the field of soft materials and related methods and can apply these in research.													
1	annually in the summer semester	first, second, or third	CHE 137 A	RE	CHE 137 B	**Soft (nano)matter practice module**				LCC	PCom	yes	6
							Soft (nano)matter practice	Req.	6				
Intended learning results: Students possess knowledge and skills in the field of soft materials and related methods and can apply these in research. Students are able to work independently and plan research within a research project in cooperation with a team; independently source information (literature research); and prepare qualified scientific protocols.													
1	annually in the	first, second, or third	none	RE	CHE 138 A	**Optical spectroscopy and microscopy on nanomaterials—lecture module**				none	written examination	yes	3

	winter semester										or oral examination.		
							Spectroscopy and microscopy on nanomaterials	L	2				
Intended learning results: Students possess knowledge and skills in the field of spectroscopy and microscopy for an in-depth understanding of the optical and electronic properties of nanostructures.													
1	annually in the winter semester	first, second, or third	CHE 138 A	RE	CHE 138 B	**Optical spectroscopy and microscopy on nanomaterials — practice module**				LCC	PCom	yes	6
Intended learning results: Students possess knowledge and skills in the field of spectroscopy and microscopy for an in-depth understanding of the optical and electronic properties of nanostructures. Students are able to work independently and plan research within a research project in cooperation with a team; independently source information (literature research); and prepare qualified scientific protocols.													
1	annually in the summer semester	first, second, or third	none	RE	CHE 139	**Nanoelectronics and sensors**				none	presentation	yes	6
							Nanoelectronics and sensors	L	3				
							Seminar on nanoelectronics and sensors	S	1				
Intended learning results: Students possess knowledge and skills in the field of electronic properties of nanostructures and related methods and their application to research and technology. Students are able to independently source information (literature research), and prepare qualified scientific presentations.													
1	annually in the	first, second, or third	none	RE	CHE 146	**Introduction to membrane technology**				none	written examination	yes	3

	winter semester										or oral examination.		
							Introduction to membrane technology	L	2				
Intended learning results: Students possess knowledge and skills in the field of membrane processes for the separation of multicomponent mixtures and associated materials and methods and can apply these in research.													
1	annually in the summer semester	first, second, or third	none	RE	CHE 149	**Hybrid materials**				none	written examination or oral examination.	yes	3
							Hybrid materials	L	2				
Intended learning results: Students understand the fundamental properties, synthesis procedures, and characterization methods of inorganic-organic (hybrid) materials.													
1	annually in the winter semester	first, second, or third	none	RE	CHE 152	**Chemistry in confined spaces**				none	written examination or oral examination.	yes	3
							Chemistry in confined spaces	L	2				
Intended learning results: Students possess knowledge and skills in the areas of nanoporous solids and the physicochemical properties of host specimens within confined pore spaces (confinement).													
Advanced specialization phase Physics (at least 21 ECTS credits)													
1	annually in the winter semester		none	RE	PHY-MV-BP-E01	**Biomedical physics I**				none	oral examination	yes	5
							Biomedical physics I	L	3				

							Exercises in biomedical physics I	PC	2				
Intended learning results: Students are familiar with current medical imaging (PET, SPECT, MRI, CT, multi-modal) and basic radiotherapy techniques.													
1	annually in the summer semester		none	RE	PHY-MV-BP-E02	**Biomedical physics II**				none	oral examination	yes	5
							Biomedical physics II	L	2				
							Exercises in biomedical physics II	PC	2				
Intended learning results: Students are familiar with structures of macromolecules, cells and tissues, as well as with key factors in cellular and extracellular biochemistry as they relate to disease, including cancer.													
1	annually in the winter semester		none	RE	PHY-MV-FN-E02	**Nanostructure physics I: physics and technology of semiconductors and nanostructures**				none	written examination or oral examination.	yes	8
							Nanostructure physics 1	L	4				
							Practical courses in nanostructure physics 1	PC	2				
Intended learning results: Students are able to summarize the main findings on the synthesis of and research into semiconductor nanostructures and devices.													
1	annually in the summer semester		none	RE	PHY-MV-FN-E04	**Nanostructure physics II: surfaces and magnetism**				none	written examination or oral examination.	yes	8
							Nanostructure physics 2: surfaces and magnetism	L	4				

							Practical courses in nanostructure physics 2: surfaces and magnetism	PC	2				
Intended learning results: Students are able to summarize the main current scientific developments in the fields of magnetism and nanomagnetism. Students can summarize and provide detailed descriptions of the main experimental techniques in magnetic surface imaging. They are able to select and apply specialized techniques of theoretical description of magnetic phenomena.													
1	annually in the summer semester		none	RE	PHY-MV-FN-E11	**Nanostructure physics IV: nanobiotechnology**				none	written examination or oral examination.	yes	4
							Nanobiotechnology	L	2				
							Practical courses in nanobiotechnology	PC	1				
Intended learning results: Students are able to summarize the main research results on the application of nanostructures and nanomaterials in the field of medicine and biotechnology.													
1	annually in the summer semester		none	RE	PHY-MV-FN-E12	**Modern methods of characterizing surfaces and nanostructures**				none	written examination or oral examination.	yes	5
							Modern methods of characterizing surfaces and nanostructures	L	2				
							Exercises	PC	2				
Intended learning results: - Students understand a range of methods for the structural and chemical characterization of nanostructures and surfaces. - Students are able to make sound decisions when selecting methods for the chemical and structural characterization of nanostructures and surfaces.													
1	every semester		none	RE	PHY-MV-FN-E16	**Seminar on close-range interfacial physics and nanotechnology**				none	presentation	yes	3

							seminar	L	2				
Intended learning results: In-depth knowledge of and interesting insights into current developments in research in solid state and nanostructure physics.													
1	annually in the winter semester		none	RE	PHY-MV-FN-E18	**Bio- and nanointerfaces**				none	written examination or oral examination.	yes	6
							Bio- and nanointerfaces	L	4				
Intended learning results: - Students have an overview of the main biophysical interface processes - Students have a fundamental and interdisciplinary understanding for further lectures and final theses in this interdisciplinary field.													
1	annually in the summer semester		none	RE	PHY-MV-FN-E23	**X-ray analytics and microscopy in nanosciences**				none	term papers	yes	4
							X-ray analytics and microscopy in nanosciences	L	2				
							Practical courses in x-ray analytics and microscopy in nanosciences	PC	1				
Intended learning results: Students are able to summarize the main current x-ray analysis and x-ray microscopic methods for the examination of functional nanomaterials.													
1	annually in the winter semester		none	RE	PHY-MV-FN-E31	**The art of computer-based modeling and simulation of experimental data**				none	final project report	yes	9
							The art of computer-based modeling and simulation of experimental data	L	2				

							exercises and project	S	5				
Intended learning results: Students understand the mathematical description of experimental data in explicit consideration of numerical and experimental errors.													
1	annually in the winter semester		none	RE	PHY-MV-FN-E32	**Quantum transport and experimental quantum physics**				none	presentation and oral examination	yes	4
							Quantum transport and experimental quantum physics	L	2				
							seminar	S	1				
Intended learning results: - Students have expanded knowledge of important principles of semiconductor and solid-state physics and introduction of new, exotic states of matter. - Students understand important quantum effects in solid-state matter and how to investigate them using experiments.													
1	annually in the winter semester		none	RE	PHY-MV-FN-E34	**Methods in nanobiotechnology**				none	presentation and written or oral examination	yes	7
							Methods in nanobiotechnology	L	2				
							Exercises in methods in nanobiotechnology	PC	2				
							Practical: Methods in nanobiotechnology	Req.	2				
Intended learning results: Students have an advanced introduction to current methods and aspects of nanobiotechnology, and are able to conduct scientific work related to this topic.													
1	every semester		none	RE	PHY-MV-FN-E37	**Required elective laboratory course in physics**				none	completion of laboratory course (presentation	yes	6 - 15

										and/or written paper)		
							laboratory course, seminar	Req., S	6-15				
Intended learning results: Students know and can apply current and sophisticated methods and knowledge of current techniques and processes. Students possess key skills (in particular methodological competence, work planning, social competence/teamwork, preparation of documentation, scientific presentation practice, literature research) and can apply this in the physics context.													
1	annually in the summer semester		none	RE	PHY-MV-LP-E06	**Molecular and cluster physics**				none	written examination or oral examination.	yes	8
							Molecular and cluster physics	L	4				
							Practical courses in molecular and cluster physics	PC	2				
Intended learning results: - Students are familiar with the fundamental knowledge, application of and latest scientific research on clusters. - Students are able to calculate the geometrical and electronic structures of small clusters. - Students have insight into the field sized between atoms and solid-state physics. - Students possess sufficient specialist knowledge to successfully complete an experimental master's thesis in the field of very small nanostructures.													
Advanced specialization phase: other advanced modules (max. 11 ECTS credits)													
1	annually in the summer semester	first, second, or third	none	RE	CHE 455 A	**RNA biochemistry A**				none	presentation (40%) + written examination (60%)	yes	6
							RNA biochemistry	L	2				

							Seminar on RNA biochemistry	PC	2				
Intended learning results: Students possess knowledge related to ribonucleic acids (RNA), including RNA structural and functional relationships, RNA-mediated regulation mechanisms, and RNA-mediated protein expression, and current methods for the analyses of RNAs.													
1	annually in the winter semester	first, second, or third	CHE 021 A, CHE 021 B	RE	CHE 475	**Membrane proteins**				PCom, oral examination	written examination (70%) + presentation (30%)	yes	6
							Membrane proteins	L	1				
							Seminar on membrane proteins	S	1				
							Laboratory course: membrane proteins	Req.	3				
Intended learning results: Students possess knowledge of the function and structure of membrane proteins as well as methods for their characterization.													
1	every semester	first, second, or third	none	RE	CHE 498 A	**Synthetic cell biology**				none	presentation (40%) + written or oral examination (60%)	yes	3
							Synthetic cell biology	L	1				
							Seminar on synthetic cell biology	S	1				
Intended learning results: Students understand the link between theoretical teaching content by means of practical work on an independently developed idea. Students have conceptually developed their own project for presentation in the seminar using critical reading of literature and scientific publication presentation techniques.													

1	annually in the winter semester	first, second, or third	none	RE	PHY-MV-LP-E05	**Methods of modern x-ray physics—spectroscopy**				none	written examination or oral examination.	yes	8
							Methods of modern x-ray physics—spectroscopy	L	4				
							Exercises	PC	2				
Intended learning results: Students have dealt with the fundamentals of modern x-ray physics. They possess introductory and applied knowledge of the use of x-rays to investigate a range of systems. Students possess sufficient well-founded technical knowledge to successfully complete an experimental master's thesis in the field of interactions of x-rays with material.													
1	annually in the summer semester	first, second, or third	none	RE	PHY-MV-LP-E10	**Methods of modern x-ray physics II—structure and dynamics of condensed matter**				none	written examination or oral examination.	yes	8
							Methods of modern x-ray physics II—structure and dynamics of condensed matter	L	4				
							Exercises	PC	2				
Intended learning results: - Students possess in-depth knowledge of the latest scientific experimental research into solid-state physics, using current x-ray physics methods. - Students possess in-depth expertise in experimentation sufficient to successfully complete an experimental master's thesis in the field of solid-state and nanostructure physics.													
1	annually in the summer semester	first, second, or third	none	RE	PHY-E6	**Atoms, molecules and laser physics**					written examination	yes	7
							Atoms, molecules and laser physics	L	4				

							Exercises	PC	2				
Intended learning results: Students possess an overview of the methods and results of experimental atomic, molecular, and laser physics and their interpretation in the context of theoretical models.													
1	annually in the summer semester	first, second, or third	none	RE	PHY-T2	**Quantum mechanics I**					written examination	yes	9
							Quantum mechanics I	L	4				
							Exercises	PC	2				
Intended learning results: - Students are familiar with the systematic treatment of non-relativistic quantum mechanics - Students understand the fundamental extension of physical conceptualization compared to classical physics - Students are able to mathematically describe quantum mechanical systems													
Elective area (6 ECTS credits)													
1	every semester	first or second		E		**Elective area**					Final module exams	no	6
								L, PC, S or laboratory course					
Intended learning results: There are no restrictions in the choice of the subject area, students should follow their inclinations and interests. The aim of the module is to provide basic knowledge in a freely elected subject area. To develop interdisciplinary collaboration skills.													

[1] PCC: PCC: Practical course completion; LCC: Laboratory course completion; SC: Seminar completion; PCom: Project completion