Faculty of Mathematics and Natural Sciences

Subject-Specific Study and Examination Regulations for the International Master's Programme Science of Materials

Interdisciplinary Compulsory Elective Area for Other Master's Programmes

Note: This English translation is provided as a service only and is not legally binding. Only the German version is legally binding.

Subject-Specific Study Regulations

for the International Master's Programme “Science of Materials”

Pursuant to § 17 para. 1 no. 3 of the Constitution of Humboldt-Universität zu Berlin in the version of 24 October 2013 (Official Gazette of Humboldt-Universität zu Berlin No. 47/2013), the Faculty Council of the Faculty of Mathematics and Natural Sciences enacted the following study regulations on _____:[1]

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[Translator's note on abbreviations: SWS = Semesterwochenstunden (contact hours per week over a semester); CP = credit points (Leistungspunkte/LP in the German original); VL = lecture; SE = seminar; UE = tutorial; LTP = laboratory practical; CompP = computer practical (“CP” in the German original).]

§ 1 Scope of Application

These study regulations contain the subject-specific provisions for the international Master's programme Science of Materials. They apply in conjunction with the subject-specific examination regulations for the international Master's programme Science of Materials and the Cross-Faculty Statute Governing Admission, Studies and Examinations (ZSP-HU) in their respective applicable versions.

§ 2 Commencement of Studies

Studies may be commenced in the winter semester.

§ 3 Objectives of the Programme; Language of Instruction

(1) The programme aims to impart to graduates of the international Master's programme Science of Materials extended and in-depth knowledge in all areas of materials science. They are familiar with the terminology, particularities and limits of materials science and are able to apply their subject knowledge to new problems and situations, including in an interdisciplinary context. In selected areas they have knowledge and practical skills reflecting the current state of research. They are able to analyse and critically assess materials science problems, to develop solution strategies independently and to evaluate their effects in a broader context. They have the opportunity to specialise to a particular degree in the fields of energy materials, experimental materials science, or computational materials science. Graduates are able to act on their own responsibility and to acquire knowledge independently. They can develop creative solutions to chemical, physical or technological questions within materials science and have the perseverance required to solve them. They can connect knowledge and, in doing so, also take interdisciplinary aspects into account. They can present and explain project results coherently, both orally and in writing. They can formulate hypotheses, examine them critically and defend them argumentatively. Taking gender and diversity aspects into account, they can communicate and cooperate in a team in a goal-oriented manner.

(2) Successful completion of the programme qualifies graduates for a professional career in the academic and industrial fields of materials science, for work in research and development, in process and application engineering, in production and analytics, or for founding their own company. They are furthermore qualified

[1] The University Leadership confirmed the study regulations on _____.

for activities in patent matters, in knowledge management, in marketing and sales, in education, in management, in the IT sector, in consulting or in the media sector.

(3) The Master's programme at Humboldt-Universität zu Berlin also offers the opportunity, in particular, to address cross-disciplinary questions and to participate at an early stage and independently in research and development projects in the field of materials science at the interface between fundamentals, applications and society.

(4) The programme is designed as an international Master's programme pursuant to § 5 para. 1 sentence 3 no. 1 ZSP-HU. All courses are offered exclusively in English, both in subject-specific and in academic communication. The module descriptions, examination requirements, study materials and the supervision of Master's theses are conducted entirely in English. The international orientation corresponds to the global dynamics of the discipline.

§ 4 Types of Courses

(1) In addition to the types of courses specified in the ZSP-HU, laboratory practicals and computer practicals are also offered.

(2) Laboratory Practicals (LTP): Laboratory practicals serve to impart and acquire experimental abilities and practical knowledge in the field of materials science. They comprise the performance, recording and evaluation of experiments and may be completed in block form or alongside the regular course of study. As a rule, a mandatory preliminary discussion (Antestat) is held before each experiment. Safety aspects in the handling of hazardous substances and equipment are imparted. Usually, a safety briefing is conducted before each LTP begins. Attendance at the safety briefing is a prerequisite for participation in the respective course.

(3) Computer Practicals (CompP): In this type of course, students are to acquire in-depth knowledge in the field of computational materials science. They acquire or expand their abilities in handling relevant software. The practical offers the opportunity to understand, develop and/or implement (new) theoretical methods. It may be completed in block form or alongside the regular course of study.

§ 5 Modules

The Master's programme Science of Materials comprises the following modules, totalling 120 credit points (CP):

(a) Compulsory Area (90 CP)

M1: Basic Principles in Natural Sciences (10 CP)

M2: Structure, Properties and Characterisation of Materials (10 CP)

M3: Synthesis, Processing and Applications of Materials (10 CP)

M4: Theory, Data, Computational Methods and AI (10 CP)

M5: Sustainable Materials and Entrepreneurial Thinking (5 CP)

FB: Research Course (15 CP)

MA: Master's Thesis (30 CP)

(b) Subject-Specific Compulsory Elective Area (20 CP)

WPP1: Experimental Practical Course (5 CP)

WPP2: Practical Course with Focus on Computational Materials Science (5 CP)

WPP3: Advanced Spectroscopy (5 CP)

WPP4: Dynamics, Structure and Function of Chemical Systems (5 CP)

WPP5: Organic Chemistry of Materials (5 CP)

WPP6: Materials and Fundamentals of Lithium-Ion Batteries (5 CP)

WPP7: Chemistry of Solar Cells (5 CP)

WPP8: Nanomaterials (5 CP)

WPP9: Principles of Solid State and Main Group Chemistry (5 CP)

WPP10: Modern Methods of Electron Structure Theory (5 CP)

WPP11: Supramolecular Chemistry (5 CP)

WPP12: Specialisation Module Advanced Materials Science (5 CP)

From the compulsory elective area, at least one of the two practicals WPP1 or WPP2 must be chosen.

(c) Interdisciplinary Compulsory Elective Area (10 CP)

In the interdisciplinary compulsory elective area, modules from the module catalogues of other subjects or central institutions designated for this purpose are to be completed, totalling 10 CP, by free choice.

§ 6 Modules for the Interdisciplinary Compulsory Elective Area of Other Master's Programmes

The following modules are offered for the interdisciplinary compulsory elective area of other Master's programmes:

M5: Sustainable Materials and Entrepreneurial Thinking (5 CP)

§ 7 Entry into Force

These study regulations enter into force on the day after their publication in the Official Gazette of Humboldt-Universität zu Berlin.

Annex 1: Module Descriptions

The following modules have been adopted from the study regulations of the Master's programme in Chemistry in their respective applicable versions. These modules are not offered on a regular basis. The current offer of courses for these modules is announced via the electronic course catalogue.

WPP3: Advanced Spectroscopy (5 CP) — The description of module WPC1 of the study regulations of the Master's programme in Chemistry applies.

WPP4: Dynamics, Structure and Function of Chemical Systems (5 CP) — The description of module WPC3 of the study regulations of the Master's programme in Chemistry applies.

WPP5: Organic Chemistry of Materials (5 CP) — The description of module WOC3 of the study regulations of the Master's programme in Chemistry applies.

WPP8: Nanomaterials (5 CP) — The description of module KM1 of the study regulations of the Master's programme in Chemistry applies.

WPP9: Principles of Solid State and Main Group Chemistry (5 CP) — The description of module CA1 of the study regulations of the Master's programme in Chemistry applies.

WPP10: Modern Methods of Electron Structure Theory (5 CP) — The description of module KM3 of the study regulations of the Master's programme in Chemistry applies.

WPP11: Supramolecular Chemistry (5 CP) — The description of module WOC4 of the study regulations of the Master's programme in Chemistry applies.

M1: Basic Principles in Natural Sciences

Credit Points: 10 | Total Workload: 300 hours

Learning Outcomes: Students acquire competencies in the fundamental principles of chemistry and physics that are necessary to complete a materials science programme. Building on the methodological competencies acquired, students are able to present and address scientific questions independently. Within the module they are enabled to apply chemical and physical concepts in order to understand the properties and functions of materials.

Subject-specific prerequisites for successful participation in the module: none

Course Type	**Contact Time / Workload**	**Credit Points & Requirement for Award**	**Topics and Content**
VL (Lecture) 4 SWS	120 hours 45 h contact time, 75 h preparation and follow-up	4 CP, Participation	Introduction to material classes (by chemical and physical criteria) From atom to material (types of interactions and bonds, structure, electronic properties, defects) Optical, electrical, magnetic, thermal and mechanical properties of materials Materials chemistry (reactions of inorganic and organic materials, phase diagrams) Overview of experimental methods of materials characterisation Concepts of theoretical modelling of materials Structure–property–function relationships
SE (Seminar) 4 SWS	120 hours 45 h contact time, 75 h preparation and follow-up	4 CP, Participation	Deepening and specialisation of the content covered in the lecture, as well as critical analysis and discussion of current scientific publications directly related to the respective lecture topics.
Module Final Examination	60 hours	2 CP, Pass	Written examination (180 minutes) or oral examination (45 minutes) and preparation
Module Duration	1 Semester		
Module Start	Winter Semester		

M2: Structure, Properties and Characterisation of Materials

Credit Points: 10 | Total Workload: 300 hours

Learning Outcomes: Building on the scientific methodological competencies acquired, students are able to work on, evaluate and present scientific questions independently. They have acquired competencies in investigating and characterising the structure and properties of materials. This module addresses the fundamental relationships between the structure of materials and their physical, chemical and mechanical properties. Students get to know and apply various characterisation techniques in order to analyse the structure of materials at different scales. They develop the ability to interpret the data obtained and to place it in a broader scientific context. The module fosters their ability to solve complex materials science problems and to communicate their results clearly and precisely.

Subject-specific prerequisite for successful participation in the module: none

Course Type	**Contact Time / Workload**	**Credit Points & Requirement for Award**	**Topics and Content**
VL-1 (Lecture) 2 SWS	60 hours 25 h contact time, 35 h preparation and follow-up	2 CP, Participation	Selected topics in materials, e.g.: inorganic semiconductor materials, organic semiconductor materials, nanoscale materials, hybrid materials, energy materials, catalysis materials
SE-1 (Seminar) 2 SWS	60 hours 25 h contact time, 35 h preparation and follow-up and specific coursework	2 CP, Participation; specific coursework (see Annex 2)	Deepening and specialisation of the content covered in the lecture, as well as critical analysis and discussion of current scientific publications directly related to the respective lecture topics.
VL-2 (Lecture) 2 SWS	60 hours 25 h contact time, 35 h preparation and follow-up	2 CP, Participation	Selected topics in materials characterisation, e.g.: X-ray diffraction methods, optical microscopy, scanning electron microscopy, transmission electron microscopy, scanning probe microscopy
SE-2 (Seminar) 2 SWS	60 hours 25 h contact time, 35 h preparation and follow-up and specific coursework	2 CP, Participation; specific coursework (see Annex 2)	Deepening and specialisation of the content covered in the lecture, as well as critical analysis and discussion of current scientific publications directly related to the respective lecture topics.
Module Final Examination	60 hours	2 CP, Pass	Written examination (180 minutes) or oral examination (45 minutes) and preparation. The written examination may be held as an in-person examination, a digital in-person examination pursuant to § 96b para. 2 ZSP-HU, or a digital remote examination pursuant to § 96b para. 3 ZSP-HU.
Module Duration	1 Semester		
Module Start	Winter Semester		

M3: Synthesis, Processing and Applications of Materials

Credit Points: 10 | Total Workload: 300 hours

Learning Outcomes: Building on the scientific methodological competencies acquired, students are able to work on, evaluate and present scientific questions independently. They have acquired competencies in the synthesis, processing and application of materials. This module imparts the fundamental methods of materials production and processing and examines their fields of application. Students get to know various synthesis and processing techniques in order to produce and modify materials with specific properties. The module fosters their ability to develop innovative solutions to materials science challenges and to communicate their results effectively.

Subject-specific recommendations for successful participation in the module: completed module M1

Course Type	**Contact Time / Workload**	**Credit Points & Requirement for Award**	**Topics and Content**
VL-1 (Lecture) 2 SWS	60 hours 25 h contact time, 35 h preparation & follow-up	2 CP, Participation	Organic, inorganic and hybrid materials in devices Synthesis, growth and processing; Internal and external interfaces; Nature of excited states and transport; Introduction to electronic and optoelectronic device concepts; Photovoltaic elements; Light-emitting diodes and lasers; Field-effect transistors; Memory and logic components; Sensors
UE-1 (Tutorial) 2 SWS	60 hours 25 h contact time, 35 h preparation & follow-up & specific coursework	2 CP, Participation; specific coursework (see Annex 2)	Application, deepening and consolidation of the content imparted in the lecture through independent work on selected tasks and problems, as well as joint discussion of solution approaches.
VL-2 (Lecture) 2 SWS	60 hours 25 h contact time, 35 h preparation and follow-up	2 CP, Participation	Self-assembly and self-organisation based on reversible non-covalent and covalent interactions Hierarchical self-assembly in 2D, 3D and at interfaces: physisorbed/chemisorbed monolayers, liquid crystals, nanophase separation, amphiphiles/detergents, block copolymers, nanoparticles Porous materials: metal-organic and covalent-organic frameworks, mesoporous silicates, membranes Templates, binding/release, passive/active transport, biomimetic and bioinspired systems, supramolecular transport and catalyst systems, dynamic self-organised or (self-)replicating systems
SE-2 (Seminar) 2 SWS	60 hours 25 h contact time, 35 h preparation & follow-up & specific coursework	2 CP, Participation; specific coursework (see Annex 2)	Deepening and specialisation of the content covered in the lecture, as well as critical analysis and discussion of current scientific publications directly related to the respective lecture topics.
Module Final Exami-nation	60 hours	2 CP, Pass	Written examination (180 minutes) or oral examination (45 minutes) and preparation. The written examination may be held as an in-person examination, a digital in-person examination pursuant to § 96b para. 2 ZSP-HU, or a digital remote examination pursuant to § 96b para. 3 ZSP-HU.
Module Duration	1 Semester		
Module Start	Summer Semester		

M4: Theory, Data, Computational Methods and AI

Credit Points: 10 | Total Workload: 300 hours

Learning Outcomes: Building on the scientific methodological competencies acquired, students are able to work on, evaluate and present scientific questions independently. They have acquired competencies in applying theoretical models, computational simulations and artificial intelligence (AI) in materials science. This module addresses the fundamental principles of solid-state theory, modelling and multiscale simulation methods, as well as the use of AI and data-driven approaches. Students learn how to handle, process and store scientific data effectively in order to use it for various materials science applications. The module fosters their ability to understand and apply complex theoretical and computational approaches.

Subject-specific recommendation for successful participation in the module: completed module M1

Course Type	**Contact Time / Workload**	**Credit Points & Requirement for Award**	**Topics and Content**
VL-1 (Lecture) 2 SWS	60 hours 25 h contact time, 35 h preparation and follow-up	2 CP, Participation	Fundamentals of electronic structure theory Modern many-body concepts of condensed matter Electronic excitations Electron–boson interaction
UE-1 (Tutorial) 2 SWS	60 hours 25 h contact time, 35 h preparation and follow-up and specific coursework	2 CP, Participation; specific coursework (see Annex 2)	Application, deepening and consolidation of the content imparted in the lecture through independent work on selected tasks and problems, as well as joint discussion of solution approaches.
VL-2 (Lecture) 2 SWS	60 hours 25 h contact time, 35 h preparation and follow-up	2 CP, Participation	Big data and artificial intelligence (AI) in materials science
UE-2 (Tutorial) 2 SWS	60 hours 25 h contact time, 35 h preparation and follow-up and specific coursework	2 CP, Participation; specific coursework (see Annex 2)	Application, deepening and consolidation of the content imparted in the lecture through independent work on selected tasks and problems, as well as joint discussion of solution approaches.
Module Final Examination	60 hours	2 CP, Pass	Written examination (180 minutes) or oral examination (45 minutes) and preparation
Module Duration	1 Semester		
Module Start	Summer Semester		

M5: Sustainable Materials and Entrepreneurial Thinking

Credit Points: 5 | Total Workload: 150 hours

Learning Outcomes: Building on the scientific methodological competencies acquired, students are able to work on, evaluate and present scientific questions independently. They acquire and expand their knowledge in interdisciplinary research on sustainable materials and cultural perspectives. This module imparts the fundamental principles of sustainability in materials science as well as methods for developing and implementing innovative business ideas. Students learn how sustainable materials are viewed and developed from different cultural perspectives, and how biology-inspired materials can be designed for a sustainable future. In addition, they acquire basic knowledge in the areas of patent law, start-up financing, business planning, and the economic and legal aspects of entrepreneurial activities. This module strengthens their ability to develop innovative and sustainable solutions, taking gender and diversity aspects into account, and to translate these successfully into an entrepreneurial context using the entrepreneurial mindsets acquired.

Subject-specific recommendation for successful participation in the module: completed module M1

Course Type	**Contact Time / Workload**	**Credit Points & Requirement for Award**	**Topics and Content**
SE-1 (Seminar) 2 SWS	60 hours 25 h contact time, 35 h preparation and follow-up and specific coursework	2 CP, Participation; specific coursework (see Annex 2)	Social and ethical dimensions of sustainable materials Circular economy Materials from a cultural perspective Biology-inspired concepts for materials Historical and cultural developments in the use of materials Ecological and economic aspects of sustainable materials Principles of bionics and biomimetic materials
SE-2 (Seminar) 2 SWS	60 hours 25 h contact time, 35 h preparation and follow-up and specific coursework	2 CP, Participation; specific coursework (see Annex 2)	Fundamentals of patent law and protection of intellectual property Strategies for patenting and exploiting inventions Overview of financing sources for start-ups Preparing and presenting funding applications Developing a business plan Market analysis, competitive analysis and marketing strategies Company formation and legal framework Economic fundamentals and business models Gender aspects in science and in business
Module Final Examination	30 hours	1 CP, Pass	Multimedia examination (30 minutes) and preparation
Module Duration	1 Semester		
Module Start	Summer Semester		

FB: Research Course

Credit Points: 15 | Total Workload: 450 hours

Learning Outcomes: Students are familiar with research-oriented laboratory work. They are able to organise their laboratory work independently: scheduling laboratory experiments, handling relevant software, and structured and conscientious documentation of the results obtained.

Subject-specific prerequisites: completed module M1

Course Type	**Contact Time / Workload**	**Credit Points & Requirement for Award**	**Topics and Content**
LTP or CompP	360 hours	12 CP, Performance and documentation	Current research questions from one of the fields of materials science. The module may be closely interwoven with the topic of the Master's thesis.
SE (Seminar) 2 SWS	60 hours 25 h contact time, 35 h preparation and follow-up and specific coursework	2 CP, Participation; specific coursework (see Annex 2)	Current materials science research topics of a research group
Module Final Examination	30 hours	1 CP, Pass	Multimedia examination (30 minutes) and preparation
Module Duration	1 Semester		
Module Start	Winter Semester		

MA: Master's Thesis

Credit Points: 30 | Total Workload: 900 hours

Learning Outcomes: In the Master's thesis, students demonstrate that they are able to work on a topic from the field of Science of Materials independently and in a scholarly manner.

Subject-specific prerequisite for participation in the module: 70 CP from the compulsory area and the subject-specific compulsory elective area

Course Type	**Contact Time / Workload**	**Credit Points & Requirement for Award**	**Topics and Content**
Master's Thesis	675 hours	22.5 CP, Pass	Scholarly project on a theoretical and/or experimental topic with substantive reference to the Master's programme. Current materials science research topics of a research group oriented towards materials science. Development of a research project in the field of materials science. Period for completion: 26 weeks; length of the Master's thesis approx. 90,000 characters (excluding spaces).
Defence	225 hours	7.5 CP, Pass	Oral defence (30-minute presentation on the thesis) followed by discussion (15 minutes).
Module Duration	1 Semester		
Module Start	Winter Semester Summer Semester		

WPP1: Experimental Practical Course

Credit Points: 5 | Total Workload: 150 hours

Learning Outcomes: Students gain insights into research-oriented laboratory work. They learn the basic methods for producing, processing and characterising materials. Further learning content is the structured and conscientious documentation of the results obtained.

Subject-specific recommendations for successful participation in the module: completed module 1

Course Type	**Contact Time / Workload**	**Credit Points & Requirement for Award**	**Topics and Content**
LTP	120 hours 45 h contact time, 75 h preparation and follow-up	4 CP, Participation, performance and written practical report (see Annex 2)	Laboratory practical in a research group in order to acquire in-depth abilities in the synthesis, processing and characterisation of materials.
Module Final Examination	30 hours	1 CP, Pass	Multimedia examination (30 minutes)
Module Duration	1 Semester		
Module Start	Winter Semester Summer Semester		

WPP2: Practical Course with Focus on Computational Materials Science

Credit Points: 5 | Total Workload: 150 hours

Learning Outcomes: Students gain insights into research-oriented work in the field of computational materials science. They learn the basic methods for modelling, calculating and analysing materials and material properties by means of computational methods. Further learning content is the structured and conscientious documentation of the results achieved, as well as the application and interpretation of simulation techniques for predicting and optimising material properties. Students also develop the ability to process complex data and place it in a scientific context.

Subject-specific recommendations for successful participation in the module: completed module 1

Course Type	**Contact Time / Workload**	**Credit Points & Requirement for Award**	**Topics and Content**
CompP	120 hours 45 h contact time, 75 h preparation and follow-up	4 CP, Performance and written practical report (see Annex 2)	Numerical calculation and simulation of material properties; use of databases; use of AI for predicting material properties.
Module Final Examination	30 hours	1 CP, Pass	Multimedia examination (30 minutes)
Module Duration	1 Semester		
Module Start	Winter Semester Summer Semester		

WPP6: Materials and Fundamentals of Lithium-Ion Batteries

Credit Points: 5 | Total Workload: 150 hours

Learning Outcomes: Students acquire knowledge of the production and mode of operation of lithium-ion batteries and are able to apply the knowledge acquired in a research-oriented manner and to convey it to others in a presentation.

Subject-specific prerequisites for successful participation in the module: none

Note: This module is not offered on a regular basis. The current offer of courses for this module is announced via the electronic course catalogue.

Course Type	**Contact Time / Workload**	**Credit Points & Requirement for Award**	**Topics and Content**
VL (Lecture) 2 SWS	60 hours 25 h contact time, 35 h preparation and follow-up	2 CP, Participation	Production and properties of lithium-ion batteries Specific materials aspects of anodes, cathodes and electrolytes Physicochemical fundamentals Modern applications Insight into current research topics Alternative battery technologies
SE (Seminar) 2 SWS	60 hours 25 h contact time, 35 h preparation and follow-up and specific coursework	2 CP, Participation; specific coursework (see Annex 2)	Deepening and specialisation of the content covered in the lecture, as well as critical analysis and discussion of current scientific publications directly related to the respective lecture topics.
Module Final Examination	30 hours	1 CP, Pass	Written examination (90 min), or oral examination (approx. 30 min), or multimedia examination (30 min), and preparation
Module Duration	1 Semester		
Module Start	Winter Semester		

WPP7: Chemistry of Solar Cells

Credit Points: 5 | Total Workload: 150 hours

Learning Outcomes: Students acquire knowledge of the mode of operation, production and chemistry of modern solar cells and are able to apply the knowledge acquired in a research-oriented manner and to convey it to others in a presentation.

Subject-specific recommendations for successful participation in the module: basic knowledge of theoretical solid-state physics

Note: This module is not offered on a regular basis. The current offer of courses for this module is announced via the electronic course catalogue.

Course Type	**Contact Time / Workload**	**Credit Points & Requirement for Award**	**Topics and Content**
VL (Lecture) 2 SWS	60 hours 25 h contact time, 35 h preparation and follow-up	2 CP, Participation	Introduction to the fundamentals of solar energy conversion Overview of various solar cell technologies and classifying comparison Production and properties of solar cells Fundamental experiments Modern applications Insight into current research topics
SE (Seminar) 2 SWS	60 hours 25 h contact time, 35 h preparation and follow-up and specific coursework	2 CP, Participation; specific coursework (see Annex 2)	Deepening and specialisation of the content covered in the lecture, as well as critical analysis and discussion of current scientific publications directly related to the respective lecture topics.
Module Final Examination	30 hours	1 CP, Pass	Written examination (90 minutes) or oral examination (30 minutes) or multimedia examination (30 minutes) and preparation
Module Duration	1 Semester		
Module Start	Winter Semester		

WPP12: Specialisation Module Advanced Materials Science

Credit Points: 5 | Total Workload: 150 hours

Learning Outcomes: Students acquire in-depth knowledge in a sub-field of materials science. They are able to assess materials science questions directed at them and to develop structured, scientific concepts for answering them.

Subject-specific prerequisites for successful participation in the module: none

Note: This module is not offered on a regular basis. The current offer of courses for this module is announced via the electronic course catalogue.

Course Type	**Contact Time / Workload**	**Credit Points & Requirement for Award**	**Topics and Content**
VL (Lecture) 2 SWS	60 hours 25 h contact time, 35 h preparation and follow-up	2 CP, Participation	Knowledge and concepts from a research-oriented sub-field of modern materials science or another science with content of relevant reference to current materials science research
UE (Tutorial) 2 SWS	60 hours 25 h contact time, 35 h preparation and follow-up and specific coursework	2 CP, Participation; specific coursework (see Annex 2)	Application, deepening and consolidation of the content imparted in the lecture through independent work on selected tasks and problems, as well as joint discussion of solution approaches.
Module Final Examination	30 hours	1 CP, Pass	Written examination (90 minutes) or oral examination (30 minutes) or multimedia examination (30 minutes) and preparation
Module Duration	1 Semester		
Module Start	Winter Semester Summer Semester		

Annex 2: Overview of Specific Coursework

Specific coursework — 1 CP each

(1) Seminar presentation (30 minutes) with slides and subsequent academic discussion

(2) Written practical report (22,500–30,000 characters excluding spaces) documenting the experiments conducted during a practical and their results

(3) Successful completion of at least 50% of the tutorial exercises (typically 4–6 exercises per week)

(4) Creation of software related to scientific questions (approx. 500 to 3,000 lines of code)

Annex 3: Ideal-Typical Study Plan[2]

Here you will find a distribution of the modules across the semesters that corresponds to an ideal-typical, but non-binding, course of study. A course of study following this study plan is only possible if studies are commenced in the winter semester.

Module No.	1st Semester	2nd Semester	3rd Semester	4th Semester
M1: Basic Principles in Natural Sciences	8 SWS / 10 CP			
M2: Structure, Properties and Characterisation of Materials	8 SWS / 10 CP			
M3: Synthesis, Processing and Applications of Materials		8 SWS / 10 CP		
M4: Theory, Data, Computational Methods and AI		8 SWS / 10 CP		
M5: Sustainable Materials and Entrepreneurial Thinking		4 SWS / 5 CP		
WPP1, WPP2: Compulsory Elective Practical			5 CP	
WPP3–WPP12: Compulsory Elective Courses	4 SWS / 5 CP	4 SWS (+ where applicable 30 h LTP) / 5 CP	4 SWS / 5 CP	
FB: Research Course			2 SWS (+ 360 h LTP/CompP) / 15 CP	
ÜWP: Interdisciplinary Compulsory Elective Area	5 CP		5 CP	
MA: Master's Thesis				30 CP
Total SWS / CP per semester	**20 SWS + ÜWP / 30 CP**	**24 SWS (+ where applicable 30 h LTP) / 30 CP**	**12 SWS (+ LTP/CompP + ÜWP) / 30 CP**	**30 CP**

[2] The 3rd semester is particularly suitable for a study period abroad at a foreign university. To simplify the recognition of academic achievements and examinations completed at the foreign university, the prior conclusion of a Learning Agreement is recommended.

Subject-Specific Examination Regulations

for the International Master's Programme “Science of Materials”

Pursuant to § 17 para. 1 no. 3 of the Constitution of Humboldt-Universität zu Berlin in the version of 24 October 2013 (Official Gazette of Humboldt-Universität zu Berlin No. 47/2013), the Faculty Council of the Faculty of Mathematics and Natural Sciences enacted the following examination regulations on _____:[3]

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§ 1 Scope of Application

These examination regulations contain the subject-specific provisions for the international Master's programme Science of Materials. They apply in conjunction with the subject-specific study regulations for the international Master's programme Science of Materials and the Cross-Faculty Statute Governing Admission, Studies and Examinations (ZSP-HU) in their respective applicable versions.

§ 2 Standard Period of Study

The Master's programme Science of Materials has a standard period of study of four semesters.

§ 3 Examination Committee

The Examination Committee Science of Materials is responsible for the examination matters of the Master's programme Science of Materials.

§ 4 Module Final Examinations

(1) Oral module final examinations are conducted in the presence of a qualified assessor, unless two examiners are appointed in accordance with the ZSP-HU. The assessor observes and records the examination. The assessor does not participate in the examination discussion or in the assessment.

(2) Module final examinations are conducted in English.

(3) Failed module final examinations may be repeated ten times.

§ 5 Master's Thesis

(1) Passed Master's theses must be defended.

(2) When calculating the grade of the Master's thesis, the grade for the written part and the grade for the defence are weighted in a ratio of three to one.

(3) Spectra and other measurement or calculation results may be attached in an appendix and do not count towards the length of the actual thesis. The thesis must be written in English.

§ 6 Free Attempts

Passed module final examinations registered within the standard period of study may be repeated once for the purpose of grade improvement.

§ 7 Withdrawal of Examination Registrations

Examination registrations may be withdrawn without giving reasons up to the end of the last day before an examination date or the start of a processing period.

§ 8 Final Grade

(1) The final grade of the Master's programme Science of Materials is calculated from the grades of the module final examinations and the grade of the final module, weighted

[3] The University Leadership confirmed the examination regulations on _____.

according to the credit points indicated for the modules in the Annex.

(2) In the subject-specific compulsory elective area, the grades of the module final examinations totalling five credit points are taken into account when calculating the final grade. If either WPP1 or WPP2 is completed, two further modules totalling ten credit points from the subject-specific compulsory elective area are not included in the calculation of the final grade. If both WPP1 and WPP2 are completed, one further module of five credit points from the subject-specific compulsory elective area remains unconsidered. In both cases the following applies: for the calculation of the final grade, the best-graded modules or the best-graded module respectively are taken into account.

(3) If more modules are completed than those necessary to achieve the degree pursuant to the study regulations, these modules remain unconsidered. Decisive for the consideration of the modules is the chronological order of the examination dates (date and time) of the passed module final examinations.

(4) Module final examinations that are not graded, or that are merely shown as “passed” in the context of a credit transfer due to the absence of comparable grading systems, as well as the credit points indicated for the corresponding modules, are not taken into account in the calculations under para. 1.

§ 9 Academic Degree

Those who have successfully completed the Master's programme Science of Materials are awarded the academic degree “Master of Science” (abbreviated “M.Sc.”).

§ 10 Entry into Force

These examination regulations enter into force on the day after their publication in the Official Gazette of Humboldt-Universität zu Berlin.

Annex: Overview of Examinations

Master's Programme Science of Materials

Compulsory Area[4]

Module No.	Module Name	CP	Subject-Specific Prerequisites for the Examination	Form, Duration/Processing Time/Length, and where applicable Language of the Examination within the meaning of § 108 para. 2 ZSP-HU	Graded
M1	Basic Principles in Natural Sciences	10	none	Written examination (180 minutes) or oral examination (45 minutes)	yes
M2	Structure, Properties and Characterisation of Materials	10	none	Written examination (180 minutes) or oral examination (45 minutes)	yes
M3	Synthesis, Processing and Applications of Materials	10	none	Written examination (180 minutes) or oral examination (45 minutes)	yes
M4	Theory, Data, Computational Methods and AI	10	none	Written examination (180 minutes) or oral examination (45 minutes)	yes
M5	Sustainable Materials and Entrepreneurial Thinking	5	none	Multimedia examination (30 minutes)	no
FB	Research Course	15	completed module M1	Multimedia examination (30 minutes)	yes
MA	Master's Thesis	30	70 CP from the compulsory area and the subject-specific compulsory elective area	Research project from a field of materials science; period for completion: 26 weeks; approx. 90,000 characters excluding spaces; oral defence (30-minute presentation and 15-minute discussion); grades of the written thesis and the defence weighted in a ratio of 3:1	yes

[4] All modules in the compulsory area must be completed.

Subject-Specific Compulsory Elective Area[5]

Module No.	Module Name	CP	Subject-Specific Prerequisites for the Examination	Form, Duration/Processing Time/Length, and where applicable Language of the Examination within the meaning of § 108 para. 2 ZSP-HU	Graded
WPP1	Experimental Practical Course	5	completed module M1	Multimedia examination (30 minutes)	no
WPP2	Practical Course with Focus on Computational Materials Science	5	completed module M1	Multimedia examination (30 minutes)	no
WPP3	Advanced Spectroscopy	5	In accordance with the subject-specific examination regulations for the Master's programme in Chemistry in their applicable version		yes
WPP4	Dynamics, Structure and Function of Chemical Systems	5	In accordance with the subject-specific examination regulations for the Master's programme in Chemistry in their applicable version		yes
WPP5	Organic Chemistry of Materials	5	In accordance with the subject-specific examination regulations for the Master's programme in Chemistry in their applicable version		yes
WPP6	Materials and Fundamentals of Lithium-Ion Batteries	5	none	Written examination (90 minutes) or oral examination (30 minutes) or multimedia examination (30 minutes)	yes
WPP7	Chemistry of Solar Cells	5	none	Written examination (90 minutes) or oral examination (30 minutes) or multimedia examination (30 minutes)	yes
WPP8	Nanomaterials	5	In accordance with the subject-specific examination regulations for the Master's programme in Chemistry in their applicable version		yes
WPP9	Principles of Solid State and Main Group Chemistry	5	In accordance with the subject-specific examination regulations for the Master's programme in Chemistry in their applicable version		yes
WPP10	Modern Methods of Electron Structure Theory	5	In accordance with the subject-specific examination regulations for the Master's programme in Chemistry in their applicable version		yes
WPP11	Supramolecular Chemistry	5	In accordance with the subject-specific examination regulations for the Master's programme in Chemistry in their applicable version		yes
WPP12	Specialisation Module Advanced Materials Science	5	none	Written examination (90 minutes) or oral examination (30 minutes) or multimedia examination (30 minutes)	yes

[5] In the subject-specific compulsory elective area, modules totalling 20 CP must be completed. At least one of the two practicals WPP1 or WPP2 must be completed.

Interdisciplinary Compulsory Elective Area

In the interdisciplinary compulsory elective area, modules from the module catalogues of other subjects or central institutions designated for this purpose are to be completed by free choice, totalling 10 CP. The modules are completed in accordance with the provisions of the other subjects or central institutions. The Examination Committee Science of Materials decides on the recognition of the achievements. The modules are taken into account without a grade.

Interdisciplinary Compulsory Elective Area for Other Master's Programmes

Module No.	Module Name	CP	Subject-Specific Prerequisites for the Examination	Form, Duration/Processing Time/Length, and where applicable Language of the Examination within the meaning of § 108 para. 2 ZSP-HU	Graded
M5	Sustainable Materials and Entrepreneurial Thinking	5	none	Multimedia examination (30 minutes), English	no