Examination regulations for the Masters programme of Materials Science and Simulation At the Ruhr-University of Bochum

English translation

Only the German version is legally binding!

Examination Regulations for the Master degree course Materials Science and Simulation at the Faculty of Mechanical Engineering hosted by the Interdisciplinary Centre for Advanced Materials Simulation, ICAMS of Ruhr-Universität Bochum

from 23 September 2024

Pursuant to Sections 2 (4), 64 of the Law for the Universities of the State of North Rhine-Westphalia (Hochschulgesetz - HG) from 16 September 2014 (GV.NRW p. 547), last revision on December 5 2023 (GV. NRW. S. 1278) the Ruhr-Universität Bochum has decreed the following Examination Regulations:

Table of contents

I. General Principles

§ 1 Area of validity and aim of the course
§ 2 Academic degree
§ 3 Admission requirements
§ 4 Duration, course structure, types of teaching sessions and credit points (CP)
§ 5 Semesters abroad or practical semesters
§ 6 Examinations, examination performance, types of assessments and plagiarism checks
§ 7 Additional examinations
§ 8 Registration and entry to examinations or teaching sessions
§ 9 Assessment of examination performance and formation of the grades
§ 10 Passing and retaking modules and module examinations
§ 11 Compensation for disadvantages and statutory periods of protection
§ 12 Absence, withdrawal, deceit, infringement of regulations
§ 13 Credit for periods of study, study performance and examination performances
§ 14 Examination committee
§ 15 Examiners and invigilators

II. Master Examination and Master Thesis

§ 16 Type and scope of the Master examination
§ 17 Admission to the Master thesis
§ 18 Master thesis
§ 19 Acceptance and assessment of the Master thesis
§ 20 Retaking the Master thesis
§ 21 Passing the Master examination

III. Final Clauses

§ 22 Diploma, certificate and attestations
§ 23 Invalidity of the Master examination, withdrawal of the academic degree
§ 24 Access to the examination files
§ 25 Interim regulations
§ 26 Entry into force and publication

Appendix: Course guide

I. General Principles

§ 1 Area of validity and aim of the course

(1) These examination regulations apply for the Master course Materials Science and Simulation.

(2) The aim of the course is to impart the students the required subject-specific knowledge, competences, abilities and methods under consideration of the requirements and changes in the world of work, thus enabling them to conduct scientific work in accordance with recognised principles, to critically assess the scientific evidence and to act responsibly. The teaching and learning processes enable the students to study independently at an early stage and to pursue individual development perspectives. The framework for this development of a personal profile during the progression of the degree course is provided by the curriculum for the Materials Science and Simulation course and these examination regulations. The Master course builds on the knowledge and skills obtained by the students within the context of a relevant bachelor degree (see §2(2)) and serves to impart, broaden and deepen the knowledge and skills in the field of materials science and simulation. The course teaches graduates to process complex issues in the field of natural sciences and engineering, and particularly to undertake independent scientific work independently.

(3) The course imparts comprehensive, detailed and specialised knowledge in accordance with the latest insights in the fields of scale-bridging simulation and modern experimental characterisation techniques that are relevant for materials research. An individual specialisation is possible within the framework of the elective compulsory modules and elective modules. Following successful completion, the graduates have achieved specialised subject-specific and conceptional skills required to develop solutions for problems in the field of materials research through scientific approaches and are able to present and discuss subject-specific and interdisciplinary contents. They are able to define goals for new applications or research-oriented tasks under consideration of a variety of framework conditions, are able to use suitable means to achieve the goals and are able to independently acquire any additionally required knowledge.

(4) The teaching sessions of the Master course are held in English.

§ 2 Academic degree

On successful completion of the Master course, the Faculty of Mechanical Engineering grants the academic degree Master of Science (M. Sc.).

§ 3 Admission requirements

(1) Admission to the Master degree course Materials Science and Simulation is subject to completion of a bachelor degree course of at least six semesters in materials science and materials engineering, mechanical engineering, physics, chemistry, civil engineering, chemical engineering, nanotechnology, applied mathematics or a comparable degree course of at least 180 CP and completion with a final grade of at least 2.0 (German system) or "B" (European Credit Transfer System, ECTS) or with the confirmation that the candidate was among the top 30% of graduates of their year.

(2) A further admission requirement is evidence of:

- a total of 30 CPs in the subjects: materials science, solid-state physics (in particular quantum mechanics) and physical chemistry (in particular thermodynamics) or in comparable subjects.
- At least 20 CPs in the subjects: mathematics, numerical mathematics, higher programming languages or comparable subjects

(3) Course applicants who have not obtained their higher education entrance qualification at an English-language institution or who are not native English speakers must document the required knowledge of the English language at level B 2 of the European Framework of Reference for Languages using the following evidence: TOEFL 550 (in writing), 215 (computer-based), 79 (internet-based) or IELTS 6.0 or better. In exceptional cases, further equivalent evidence can be recognized by the examination board.

(4) Individuals who have conclusively failed a degree course in the subjects listed under (1) or a related or comparable degree course at a research university are not eligible for admission to the Master course.

(5) The determination whether the admission requirements in accordance with sections 1 to 4 have been met is made by the examination committee.

§ 4 Duration, course structure, forms of teaching, attendance obligation and credit points (CPs)

(1) The regular course duration including preparation of the Master thesis is 4 semesters. The course can generally be commenced at the start of the winter semester.

(2) The degree course consists of modules (compulsory modules, fundamental option modules, advanced option modules) totalling 90 CP in accordance with the study plan in the appendix as well as the Master thesis totalling 30 CP. Fundamental option modules (module group 6) can also be chosen as advanced option modules (module groups 7 and 8), as long as the number of CP matches.

(3) A module is a unit of teaching and learning that is self-contained in terms of content and time and that is successfully concluded by passing the corresponding module examination. A module should generally take no longer than one semester, with a maximum of two semesters. The individual modules contain the teaching and/or guided acquisition of a subject area and the corresponding competencies. All modules can be found in the accompanying course guide and the module handbook in the currently valid version.

(4) The study and examination performance delivered in the individual modules are assessed in accordance with § 9 and/or §21.

(5) CPs correspond with the credits of the "European Credit Transfer and Accumulation System" (ECTS). The number of CPs that can be obtained through a module results from the student workload, which results from the student's time expenditure dedicated to the study and examination performance, including the preparation and subsequent study (independent study) and sitting the examinations. A CP corresponds with an estimated time expenditure of approximately 30 hours. A semester comprises 30 CPs, the Master degree course thus comprises a total of 120 CPs.

(6) The following types of teaching sessions are offered within the framework of the modularised programmes:

- Lectures
- Exercises
- Preparatory exercises
- Seminars
- Colloquium

- Project
- Practical training

(7) In lectures, the subject matter is presented by way of example and systematically. They provide an overview of the correlation of different issues.

(8) Exercises are intended to consolidate subject knowledge and aid the acquisition of subject-specific skills and abilities on the basis of example topics.

(9) Preparatory exercises impart fundamental knowledge in particular subjects such as materials science of theoretical physics, scientific programming or similar. The aim of the exercises is to prepare for the degree course modules. The preparatory exercises will be differentiated depending on prior knowledge.

(10) Seminars are intended to provide academic consolidation and can be offered on any topics relating to the subject area. They impart academic working skills within the topical focus of the seminar. They are marked by a high level of interactivity between teachers and students.

(11) Colloquia are used for in-depth discussion of selected academic issues.

(12) The project is a module that aims to develop and present a defined research topic under instruction inside and outside the university using scientific methods.

(13) A practical training is an event in which participants carry out their own experiments on given topics and are evaluated. The experiment can be carried out in groups.

(14) Regular attendance may be compulsory for teaching sessions with a learning objective that cannot be achieved without active student participation. Compulsory attendance must be indicated in the module description in the module handbook.

§ 5 Semesters abroad or practical semesters

There is no obligatory semester abroad or practical semester, a voluntary semester abroad will however be supported. If studies abroad are undertaken in agreement with the teaching unit, the examination committee may permit replacement of prescribed modules with comparable ones.

§ 6 Examinations, examination performance and types of assessments

(1) Examination performance consists of graded or ungraded module examinations set alongside the relevant lectures in accordance with the course guide which is attached to the examination regulations as appendix, as well as the graded written Master thesis. It should be possible to complete these within the regular course length. In order to sit an examination, the students must be registered. If it corresponds with the particular teaching form, a module examinations may in justified exceptional cases be offered as partial module examinations.

(2) Examination performance can be provided in the form of a written examination, an oral examination, a contribution to a seminar, a report or presentation, an essay, a project, a practical examination or a colloquium lecture. Where there are alternative options, the final form of the examination performance and the resources permitted are announced at the start of the semester during which the module takes place. Upon request, the examination committee can allow additional, alternative examination formats.

(3) In a **written examination**, evidence should be provided that tasks from the area covered by the teaching sessions can be handled appropriately and that suitable solutions can be found during a limited time and with limited resources. Written examinations can be

taken in electronic form and in electronic communication. There is no entitlement to this. The duration of a written examination is dependent on the subject-specific content under consideration of the CP intended for the module. It is determined by the examiner and amounts to between one and four hours. The duration of the assessment process may not exceed six weeks. Within the framework of written examinations, multiple-choice questions may also be set. Multiple-choice is a format used in examinations where an answer to a question can be selected from several pre-formulated answers. The assessment criteria must be announced on the examination sheet as well as 14 days before the examination.

(4) In an **oral examination**, the candidate should provide evidence that he or she has sufficient knowledge in the examined field, recognises correlations and is able to integrate specific questions into these correlations. Oral examinations are generally conducted by at least two examiners or one examiner in the presence of a knowledgeable invigilator. Oral examinations are taken as group examinations or individual examinations. The oral examination should take from 15 minutes up to a maximum of 45 minutes per candidate. They can be taken in electronic form. The fundamental aspects and results of the examination shall be recorded in a protocol. Prior to setting the grade, the examiners discuss the grade. The invigilator must be consulted prior to setting the grade. The candidate shall be told the examination grade immediately after the examination and contextual reasoning must be provided.

(5) **Seminar contributions** are contributions made on a prescribed framework topic by a participant in the form of a lecture and, where applicable, an exemplifying graphical presentation before the group of seminar participants in addition to, where applicable, a supplementary written piece of work and that are assessed by the seminar leader. The scope is dependent on the subject-specific content under consideration of the CP intended for the module. The examination performance has been achieved when the student has held their own lecture and participated in the previously stipulated number of appointments for the discussion of the seminar contributions. The examination performance has not been achieved if the student has failed to present the lecture and, where applicable, has failed to submit the supplementary written piece of work by the due date and has failed to participate in the previously stipulated number of appointments and has not used the opportunity to catch up on the missed appointments or has not used this opportunity successfully.

(6) A **report** is a lecture taking at least 15 minutes and a maximum of 45 minutes on the basis of a written piece of work. Here the students should show that they are able to elaborate academically on a topic under consideration of the correlations of the subject and can present the results orally.

(7) Within the framework of a **written essay**, a task from the subject area covered by the module's teaching sessions under inclusion of the pertinent literature and, where applicable, further suitable resources is handled appropriately and suitable solutions are indicated. The resources are announced together with the task. The scope is dependent on the subject-specific content under consideration of the CP intended for the module.

(8) A **project** presents the independent handling of a set topic. The leader of the teaching session is also able to allow group performances if the individual assessment of the contribution of each group member is possible. The performance to be provided shall be defined by the leader of the teaching session at the start of the teaching session and shall be assessed individually at the end of the teaching session.

(9) A **practical examination** generally consists of a series of practical exercises, experiments or programming tasks with written reports.

(10) **Colloquium lectures** are performances where the students present the content and the most important results of a specialist academic piece of work (e.g. their thesis) to an expert audience.

(11) **A practical training** usually consists of a series of practical tasks, experiments or programming tasks, each with an initial test colloquium and written reports on the test results

(12) The software-supported plagiarism check of written examinations is carried out as a rule if there is suspicion of plagiarism, and in principle for master's theses. For this purpose, master's theses must be submitted in verifiable electronic form in accordance with Section 19 Paragraph 1. Further written examination papers (essays, term papers, etc.) must also be submitted in verifiable electronic form upon request of the examiner

(13) The software-supported plagiarism check is carried out by the examiner. Plagiarism is determined by the examination board. Students will only be informed about the software-supported examination of the written work if plagiarism is suspected if plagiarism is detected.

(14) A plagiarism check of written coursework (essays, term papers, etc.) is carried out in accordance with paragraphs 12-13.

(15) The requirements of a course achievement are significantly below the requirements of a module examination or partial achievement in terms of form and content. If the form in which coursework is to be completed for a module is not defined in the module descriptions in the module manual, it will be announced by the lecturer at the beginning of the course.

§ 7 Additional assessments

Students can apply to be assessed in additional modules. The results are disregarded when calculating the overall grade. They will be listed in the transcript of records (see § 22).

§ 8 Registration and entry to modules and module examinations

(1) Participation in a module including the module examination is restricted to individuals who are enrolled in the degree course Materials Science and Simulation and who have neither lost the examination entitlement in the degree course Materials Science and Simulation nor have lost it in a degree course recognised to be equivalent nor have passed the examination already.
In the Master degree course, the students are automatically registered for all examinations for the compulsory modules (modules 1 to 5) and the practical training (module 11) in the first two subject semesters in accordance with the course schedule (see appendix). The registration for all other modules is made independently by the students.

(2) Registration for the examination of a fundamental and advanced option module must be made at the latest three semesters after attending the corresponding event. Should the student fail to register by this point in time for reasons that are their own responsibility, or should the student fail to provide evidence that this delay is not their fault, the entitlement to take the examination expires.
This period is extended
1. for raising minors pursuant to Section 25(5) of the Bundesausbildungsförderungsgesetz [Federal Training Assistance Act] by three semesters per child,
2. for the participation as an elected representative in bodies belonging to the university, the students' association, the students' associations of faculties or the student union up to a total of four semesters.
3. for exercising the position of equal opportunities officer up to a total of four semesters,
4. by the time that the effects of a disability or a serious illness prolong the period of study and
5. by up to three semesters for the time during which students assume responsibility for close family members requiring care and support.

(3) Participation in module 12 (Master thesis) requires successful completion of module 11 (project).

(4) Withdrawal from automatically registered-for module examinations (modules 1 to 5) is only possible in the case of the respective first and second compulsory registration following a consultation meeting up to two weeks before the examination date. The period for attending the consultation meeting is determined and published by the examination committee. A withdrawal from independently registered-for examinations is possible respectively up to 1 week before the examination date.

(5) The examination dates are generally determined by the examination committee and announced by the examination office at the latest four weeks before the first examination date. In the case of lecture-accompanying examinations, the examinations committee permits the leader of the teaching session to set the date. The leader of the teaching session announces the examination type and the examination date during the first lesson of the event.

§ 9 Assessment of modules and grade formation

(1) Assessment of examination performance is made in accordance with the percentage points system.

Percentage value	in words	
99 - 100 points	exzellent (excellent)	0.7
95 - 98 points	sehr gut (very good)	1.0
90 - 94 points	sehr gut minus (very good)	1.3
85 - 89 points	gut plus (good)	1.7
80 - 84 points	gut (good)	2.0
75 - 79 points	gut minus (good)	2.3
70 - 74 points	befriedigend plus (satisfactory)	2.7
65 - 69 points	befriedigend (satisfactory)	3.0
60 - 64 points	befriedigend minus (satisfactory)	3.3
55 - 59 points	ausreichend plus (sufficient)	3.7
50 - 54 points	ausreichend (sufficient)	4.0
0 - 49 points	nicht ausreichend (fail)	5.0

This points scale is used for all modules that are taught at the Interdisciplinary Centre for Advanced Materials Simulation (ICAMS). An examination has been passed if it has been assessed with at least 50 points. Ungraded performances receive the grade "passed", or, where applicable, "fail". The above table can be used as a basis for the conversion of course certificates according to the decimal system (for courses taught for students enrolled at other faculties). Intermediate values (e.g.: 89.4 points) are always rounded up. For courses offered by other faculties (non-topical modules/elective modules), the grades are converted according to the following scale:

1.0	very good	an outstanding performance	98 points
2.0	good	a performance that is considerably above average requirements	84 points
3.0	satisfactory	a performance that corresponds with average requirements	69 points
4.0	sufficient	a performance that still corresponds with requirements despite some shortcomings	54 points

5.0	fail	a performance that fails to meet the requirements due to serious shortcomings	0 points

Intermediate values can be created by increasing or decreasing the individual grades by 0.3 to allow differentiation. The grades 4.3, 4.7 and 5.3 are in this case precluded.
The number of points achieved increases or decreases by respectively 5 points if intermediate values are created. Exceptions are the grades 0.7 for which 100 points are given, and 1.3 for which 94 points are given. The final Master grade is given both in percentage points and as a decimal value. When creating the overall grade, only the first decimal place after the decimal point is considered; all other decimal places are disregarded without rounding. A conversion table is printed in the diploma supplement.

(2) An examination consisting exclusively of multiple-choice questions is considered to have been passed if
b) at least 60% of the questions asked have been answered correctly or if at least 60% of the total points achievable have been obtained
or if on the basis of the regulation under a) only 20% of the examination participants pass the test with at least 4.0,
b) the number of the correctly answered questions and/or the points achieved does not fall below more than 22% of the average examination performance of the candidates.
Awarding negative points is not permitted.
If the candidate has correctly answered the minimum number of questions required and thus passed the examination, the grade will be as follows:

- "very good" (1.0) if he or she has answered at least 85%,
- "very good" (1.3) if he or she has answered at least 75% but less than 85%,
- "good" (1.7) if he or she has answered at least 67% but less than 75%,
- "good" (2.0) if he or she has answered at least 59% but less than 67%,
- "good" (2.3) if he or she has answered at least 50% but less than 59%,
- "satisfactory" (2.7) if he or she has answered at least 42% but less than 50%,
- "satisfactory" (3.0) if he or she has answered at least 34% but less than 42%,
- "satisfactory" (3.3) if he or she has answered at least 25% but less than 34%,
- "sufficient" (3.7) if he or she has answered at least 12% but less than 25%,
- "sufficient" (4.0) if he or she has answered none or less than 12%

of the questions over and above those required for the minimum pass rate correctly or has achieved the corresponding points over and above the minimum pass rate. If he or she fails to achieve the required number of points, the grade is "fail" (5.0). If a written examination consists of multiple-choice questions as well as other tasks, the multiple-choice questions are assessed according to section 2. The remaining questions will be graded in accordance with the normally applicable process. The grade is calculated on the basis of the weighted results of both sections. The weighting is determined dependent on the proportion of the types of questions in the examination.

(3) If the examination performance is to be assessed by several examiners, the grade is calculated on the basis of the arithmetic mean of the individual examination assessments. If the assessments deviate by at least 30 points or, as applicable, by at least two grade levels or if one of the assessments is "fail", the other however "sufficient" or better, the examination board will appoint a third examiner to assess the examination performance.

(4) It is possible to achieve extra points for the module examinations (bonus points) with additional performances. The proportion of bonus points must not exceed 20% of the points that can be regularly awarded per module. Full points can be achieved even without bonus points. The module handbook in its current version regulates the awarding of bonus points for the individual modules.

§ 10 Passing and retaking module examinations

(1) A module has been passed when the associated module examination has been passed. Failed module examinations or those that are deemed to have been failed can be retaken two times (3 examination attempts). The retake examination must be undertaken at the latest within the framework of the examination dates of the following semester. Should the student fail to register by this point in time for reasons that are their own responsibility, or should the student fail to provide evidence that this delay is not their fault, the entitlement to take the examination expires.

(2) An examination has been conclusively failed if all examination attempts have been assessed as "insufficient" or "fail" or the candidate can no longer be admitted to an examination. If the examination is compulsory, the student is de-registered.

(3) Retakes of written or oral examinations for which, if failed, there are no compensatory measures, shall be assessed by at least two examiners. Oral examination retakes shall be assessed by two examiners or one examiner in the presence of a knowledgeable invigilator.

(4) Retaking a passed module examination is generally not permitted. On application, the examination committee may grant students one single attempt to improve the grades of a single examination during the regular course duration. This application may only be submitted once in the entire course duration.

(5) If a written repeat exam is failed, an oral supplementary examination in the form of an examination interview in accordance with Section 6 Paragraph 4 can be offered. This only applies to the third attempt at the exam and only if a result of at least 35% was achieved in the written re-examination. If the oral supplementary examination is passed, an overall grade of "sufficient" (4.0) will be awarded for the corresponding examination attempt. The examination board decides whether to offer supplementary oral examinations. Supplementary examinations can be taken a maximum of three times during the entire period of study.

§ 11 Compensation for disadvantages and statutory periods of protection

(1) The statutory maternity leave periods and regulations, the parental leave periods and the absences for the care and upbringing of children pursuant to Section 25(5) Bundesausbildungsförderungsgesetz [German Federal Training and Assistance Act] and for caring for a spouse, a registered partner or a direct relative or first degree relative by marriage shall be observed.

(2) If the candidate is unable to complete the examination in the intended duration due to pregnancy, appropriate compensation can be granted upon written request, in particular through the granting of breaks, provided that this does not impair equal opportunities in the examination process. As proof, a medical certificate must be presented stating that the examination cannot be completed in the intended duration.

(3) Where the candidate provides evidence by way of a medical certificate to show that he or she is unable to take an examination in full or in part in the intended manner as a result of a long-term or permanent physical or mental disability or chronic illness, the chair of the examination committee must permit the candidate to provide equivalent examination performances in a different manner.

§ 12 Absence, withdrawal, deceit, infringement of regulations

(1) An examination performance is considered to be assessed as "fail" (5.0) if the candidate is absent on an examination date without good reason or if he or she withdraws from the examination after the start of the examination without good reason. The same applies if a written examination performance is not provided within the allotted working time period.

(2) The examination board must be notified immediately and in writing of the reasons given for the withdrawal or the absence and these must be substantiated. In the case of illness of the candidate, submission of a medical certificate and, where in doubt, a certificate issued by the public health officer of RUB, will be demanded. The illness of a child largely cared for solely by the candidate is equivalent to illness of the candidate themselves. If the examination board accepts the reasons for the absence, the examination in question will not be counted towards the maximum number of examination resits.

(3) In case of an exmatriculation, examinations registered before exmatriculation must be taken unless the registration has been revoked in accordance with paragraph 2 or a justified withdrawal or default recognized by the examination committee has occurred, otherwise the examinations are deemed to have been "failed" (grade 5.0).

(4) In the case of written examinations – excluding invigilated examinations - the candidate must affirm in lieu of oath that the examination performance was achieved by him or her without unauthorised outside assistance.

(5) If the candidate attempts to influence the result of an examination or study performance through deceit or use of unauthorised resources, the examination or study performance shall be assessed as "fail" (5.0). The assessment is recorded by the respective examiner or by the person responsible for supervision. The assessment is carried out by the Examination Board. A fine of up to €50,000 may be imposed. In the event of multiple or other serious attempts to cheat, the candidate may be excluded from participation in further examinations or exmatriculated. The provision of unauthorized aids during the examination is also considered an attempt to cheat. Permitted and non-permitted aids will be announced by the lecturer before the respective examination.

(6) A candidate who disrupts the proper conduct of the examination may be excluded from continuing the examination by the respective examiner or supervisor, usually after a warning. In this case, the examination in question is deemed to have been assessed as "insufficient" (5.0). The reasons for the exclusion must be recorded.

(7) The candidate shall be informed immediately and in writing of negative decisions, which shall be substantiated and information on legal remedies shall be included.

§ 13 Credit for periods of study, study performance and examination performances, transfer into higher semesters

(1) Examination achievements that have been completed in degree programmes at state or state-recognized universities, at state or state-recognized vocational academies, in degree programmes at foreign state or state-recognized universities or in another degree programme at the same university shall be recognized upon application, provided that there is no significant difference between the acquired competences and the achievements that are being replaced; an assessment of equivalence shall not take place. Recognition within the meaning of sentence 1 serves the continuation of studies and the taking of examinations.

(2) Fundamental differences exist in particular if the competences achieved do not correspond with the requirements of the Master degree course Materials Science and Simulation. The comparison should not be schematic but should instead consist of an overall review and assessment. The recognition or credit of study periods, study performances

and examination performances that have been achieved outside the territory of the German constitution shall be in accordance with the equivalency agreements approved by the conference of education ministers of the German federal states as well as the agreements made within the framework of university partnerships. If any doubts remain, the International Office of Ruhr-Universität as well as the Central Office for Foreign Education can be consulted.

(3) Upon application, other knowledge and qualifications acquired outside the university may be recognized up to a maximum of 50% of the credit points provided for this degree course if this knowledge and qualifications are equivalent in terms of content and level to the examinations they are intended to replace.

(4) The examination committee is responsible for credit and recognition in accordance with sections 1 and 2. Prior to determining whether considerable differences exist, a subject representative should generally be heard. The student must submit the documentation required for the credit. On submission of the complete documentation, a notice will be issued together with information on legal remedies, generally within 6 weeks. If the recognition sought on the basis of an application pursuant to section 1 is denied, the applicant may apply for a review of the decision by the Rectorate without prejudice to the time limits under procedural or litigation law.

(5) Where study and examination performances are credited, the grades – if the grading systems are comparable – shall be accepted and included in the calculation of the overall grade. In the case of incomparable grading systems, the qualifier "pass" shall be included. This credit shall be marked in the certificate and diploma supplement.

(6) Where the prerequisites of sections 1 and 2 have been met, a legal entitlement to credit and/or recognition exists. As a rule, the Master's thesis and a further 25 ECTS should be completed at Ruhr-Universität Bochum. ECTS gained during semesters abroad can be credited regardless of this.

(7) On the basis of the recognition according to paragraph 1, and at the request of the student, the university must classify the student into a semester, the number of which is calculated from the number of CP acquired through the recognition in relation to the total number of 120 CP that can be acquired in the respective degree program. If the decimal place is less than five, the number is rounded down to whole semesters, otherwise it is rounded up.

§ 14 Examination committee

(1) The Interdisciplinary Centre for Advanced Materials Simulation (ICAMS) establishes an examination committee to organise examinations and to handle duties allocated by these examination regulations. The examination committee consists of the chair, their deputy and a further five members entitled to vote. The ICAMS head office is a consulting member of the examination committee. The chair, the deputy and two further members are elected from the group of professors, one member is elected from the group of research associates and two members are elected from the group of students. Deputies are elected for the members of the examination committee. The tenure of the members elected from the group of professors and the group of research associates is three years, the tenure of the student members is one year. Re-election is permitted.

(2) The examination committee is a statutory body in the sense of the Verwaltungsverfahrensrecht and the Verwaltungsprozessrecht [German Administrative Procedural Acts].

(3) The examination committee ensures that the stipulations of the examination regulations are complied with and that the examinations are executed in an orderly fashion. It is in particular responsible for the decision on appeals against decisions made in examination

processes and for the compliance with set time periods. Further, the examination board must report to the executive board regularly, at least annually, on the development of the examinations and the study periods. This report shall be published in a suitable format. It provides suggestions for reform of the examination regulations and the study plan and details the distribution of the grades and the overall grades. The examination committee can transfer the handling of its obligations for all regular cases to the chair. This does not apply to decisions on appeals and the report to the executive board.

(4) The examination committee is quorate if, in addition to the chair or his or her deputy, at least two further professors entitled to vote or their deputies and at least two other further members entitled to vote or their deputies are present. It acts by simple majority. The chair's vote shall be decisive in the case of a draw. The student members of the examination committee do not participate in the crediting of study periods and examination performances, the setting of examination questions and the appointment of examiners and invigilators.

(5) The members of the examination committee have the right to attend the examinations taking place.

(6) The meetings of the examination committee are not public. The members of the examination committee and the deputies are subject to official secrecy. Unless they are in public service they shall be sworn to secrecy by the head of the examination committee. A result protocol is kept on the examination committee meetings.

(7) The examination committee may use the administrative assistance of the examinations office when exercising its responsibilities.

§ 15 Examiners and invigilators

(1) The examination committee appoints the examiners from the circle of individuals entitled to act as examiners, as well as the invigilators. Appointment as examiner or invigilator is limited to individuals who have achieved a subject-specific qualification at least corresponding with the respective examination object.

(2) The examiners are independent in their function as examiners.

(3) The candidate may suggest the examiner for their Master thesis. The candidate's suggestions should be considered where possible. The suggestions do not however constitute an entitlement.

(4) The chair of the examination committee ensures that the names of the two examiners are made known to the candidates in good time, at least two weeks before the date of the respective examination. An announcement through posting on a noticeboard is sufficient. Here the fundamentals of data protection shall be followed.

(5) § 14 section 6 sentences 2 and 3 apply accordingly for the examiners and invigilators.

II. Master Examination and Master Thesis

§ 16 Type and scope of the Master examination

The Master examination consists of the cumulative assessment of all examinations undertaken successfully in the allocated modules. There shall be no separate final examination.

In accordance with the Master course guide, the Master examination comprises in detail:

- the examinations for all modules of the compulsory modules,
- the examinations for the fundamental option modules and the advanced option modules, the general option module, as well as the project work, and the practical training,
- the examinations for the non-technical elective module
- the Master thesis.

§ 17 Admission to the Master thesis

(1) Admission to the Master thesis is limited to individuals who
- are matriculated at the RUB for the Master degree course Materials Science and Simulation or are admitted as visiting students,
- have registered for the Master thesis,
- are not currently in similar examination proceedings at another university and have not ultimately passed or failed a similar examination and
- can show evidence of having successfully completed modules comprising at least 80 CPs, including all basic and core modules according to the Master course guide (see appendix) and
- have passed the project in accordance with the Master course guide (see appendix, module 12).

(2) The application for admission shall be submitted in writing to the chair of the examination committee together with the evidence required in accordance with section 1.

(3) If the prerequisites in section 1 and 2 are not fulfilled, admission to the Master thesis is prohibited.

(4) The examination committee shall decide on justified exceptions for admission.

§ 18 Master thesis

(1) The Master thesis is a written examination. It should show that the candidate is able to work on a demanding problem within a set period independently using scientific methods. By passing the Master thesis, 30 CP are gained.

(2) The Master thesis can be issued and supervised by each university lecturer, each honorary professor and each assistant professor, if these are members or associates of the Interdisciplinary Centre for Advanced Materials Simulation (ICAMS), the Faculty of Mechanical Engineering, the Faculty of Physics and Astronomy, the Department of Civil and Environmental Engineering, the Faculty of Chemistry or the Faculty of Mathematics of Ruhr-Universität Bochum. On justified written application by the candidate, the examination committee may agree to supervision of the Master thesis by an examiner from another faculty. Undertaking the Master thesis at an institution outside the university requires the approval of the examination committee.

(3) The student has the right to suggest the subject area and the supervisor of the Master thesis. The right to suggest a subject does not give rise to a legal entitlement.

(4) On application, the chair of the examination committee ensures that the candidate receives a topic for the Master thesis in good time.

(5) The task is issued through the chair of the examination committee. The date of issue shall be kept on file. A Master's thesis topic approved by the examination committee and communicated to the student by the examination office may not be changed in individual words or in the arrangement of words by either the student or the thesis supervisor.

(6) The topic, task and scope of the Master thesis shall be limited in such a way that the Master thesis can be completed with a time requirement of approx. 900 working hours. The time period between the topic being issued and the Master thesis being handed in is at least four months and a maximum of six months after the topic has been issued.

(7) The task can only be rejected once and only within the first four weeks of the completion time. If the Master thesis is retaken, the topic can only be rejected if the candidate did not exercise this option on the first attempt. The topic can only be returned after a mandatory consultation. In individual cases and on duly justified request by the candidate, the examination committee may exceptionally grant an extension period of the completion time of up to four weeks. In the case of sickness, the period until handing in can be extended by a maximum of four weeks. This requires submission of a medical certificate, where in doubt a certificate by the public health officer. The extension period corresponds with the sickness duration. If the sickness duration exceeds four weeks, the candidate will be set a new topic. In justified exceptions, the examination committee may grant a further extension period. The Master thesis can be written in German or English.

(8) The results of the Master's thesis are presented by the candidate in a graded presentation. The presentation should be held at the earliest six weeks and at the latest two weeks before the Master's thesis is submitted. The date is agreed between the candidate and the examiners when the topic is issued. If the presentation is assessed as insufficient (0-49%), a repeat attempt is possible. The date must be agreed with the examiners and should take place in the same semester, at the latest four weeks after submission of the written work.

§ 19 Acceptance and assessment of the Master thesis

(1) The Master thesis shall be submitted to the examination office in a verifiable electronic pdf(A) format. The submission date shall be kept on file. On submission of the Master thesis, the candidate must confirm in writing that he or she has created their work independently and used no sources or resources other than those specified and has identified all quotes. If the Master thesis is not submitted within the time period stipulated, it shall be considered to be graded as "fail" (5.0).

(2) The Master thesis shall be assessed by two examiners independently of each other. One of the examiners should be the individual responsible for setting the task and the supervision of the Master thesis. The second individual entitled to act as examiner is appointed by the chair of the examination committee. Every examiner awards an assessment pursuant to § 9 and justifies it in writing. The overall assessment of the Master thesis is based on the arithmetic mean of the individual assessments. In the case of a difference of at least 30 or if one of the assessments is "fail", the other however "sufficient" or better, the examination board shall appoint a third person from the group of individuals entitled to act as examiners. In this case, the examination committee shall decide on the assessment of the Master thesis on the basis of all three opinions.

(3) The assessment process may only exceed a period of four weeks in justified exceptions.

§ 20 Retaking the Master thesis

(1) The Master thesis may be retaken once.

(2) The repeated Master's thesis must be registered at the latest in the semester following the failed attempt of the first thesis, taking into account § 8 para. 2 sentence 3. If the candidate misses this period, he or she loses his or her entitlement to the examination, unless he or she is not responsible for the lapse. The Master thesis has been

conclusively failed if the thesis is assessed as "fail" (less than 50 points/5.0) on the final attempt or is considered to have been assessed as "fail" (less than 50 points/5.0).

§ 21 Passing the Master examination

(1) The Master examination has been passed when all required modules have been successfully completed, the Master thesis is at least "sufficient" (50 points/4.0) and 120 CP have been achieved.

(2) On passing the Master examination, the Master course has been completed.

(3) The overall grade of the Master examination is calculated on the basis of the arithmetic mean weighted by CP/arithmetic mean of all graded module examinations including the Master thesis.

(4) Instead of the overall grade "very good", the overall assessment "passed with distinction" is awarded if the Master thesis is assessed with at least 94 points (1.3) and the performance point average of all module grades is better than 94 points (1.3).

(5) A grade according to the ECTS grading scale is limited to the overall grade and only included in the diploma supplement.

(6) The Master examination has been conclusively failed if compulsory modules have been conclusively failed or if the Master thesis is assessed as "fail" (less than 50 points/5.0) on the second attempt or is considered to have been assessed as "fail" (less than 50 points/5.0). A notice will be issued on the failed Master examination which shall be accompanied by information on legal remedies.

III. Final Clauses

§ 22 Diploma, certificate, diploma supplement and attestations

(1) Following the provision of the final examination performance, the graduate receives a diploma for the successfully completed Master examination in a German as well as an English version. The overall grade and the sum of the performance points are included in the diploma. The basis of the overall assessment and the overall grade of the Master examination are detailed in § 21(3) and/or (4). The diploma is to be signed by the Managing Director of ICAMS or, alternatively, by the Chair of the Examination Board and sealed with the corresponding seals of the Interdisciplinary Centre for Advanced Materials Simulation (ICAMS) at Ruhr-Universität Bochum. The diploma date indicated shall be the date on which the last examination performance was provided. In the case of the thesis, this is the date of submission.

(2) Together with the diploma for the Master examination, the graduate receives the Master certificate in a German as well as an English version with the date of the diploma. This certifies the awarding of the Master degree pursuant to § 2. The certificate is to be signed by the Managing Director of ICAMS or, alternatively, by the Chair of the Examination Board and sealed with the corresponding seals of the Interdisciplinary Cen-tre for Advanced Materials Simulation (ICAMS) at Ruhr-Universität Bochum.

(3) With the diploma the graduate also receives a diploma supplement including a transcript of records in both German and English versions. The diploma supplement provides information on the individual academic profile of the completed degree course. The diploma supplement also provides an ECTS grade for the final grade.

(4) Students leaving the university without a degree will receive a document on the total study and examination performance achieved (transcript of records).

§ 23 Invalidity of the Master examination, withdrawal of the academic degree

(1) If the candidate practised deceit during an examination and if this fact only came to light after the certificate was issued, the examination committee may retroactively correspondingly correct the grades for those examinations in which the candidate practised deceit and declare the examination as failed in whole or in part.

(2) If the prerequisites for admission to an examination were not fulfilled without the candidate intending to deceive regarding the fulfilment of these prerequisites and if this fact only becomes known after the diplomas have been handed out, this defect is corrected by passing the examination. If the candidate intentionally wrongfully obtained the admission, the examination committee will decide the legal consequences under consideration of the Administrative Procedure Act of the state of North Rhine-Westphalia.

(3) Prior to a decision, the affected individual must be given the opportunity to comment.

(4) The incorrect examination diploma shall be withdrawn and, where applicable, a new one shall be issued. A decision pursuant to section 1 and section 2 sentence 2 is only permitted within five years from the point in time of the degree being awarded. The period between the commencement and the end of administrative proceedings for the assessment of a withdrawal of an academic degree is not included in the five-year period pursuant to sentence 2.

(5) If the examination has been generally declared as failed, the academic degree shall be revoked by the Interdisciplinary Centre for Advanced Materials Simulation (ICAMS) and the certificate shall be withdrawn.

§ 24 Access to the examination files

(1) The candidate shall be given the opportunity to view the examination documentation for up to one year following completion of the examination process. This does not affect deadlines within the framework of appeal proceedings.

(2) The application shall be made to the chair of the examination committee. The chair agrees the time and place of the viewing with the candidate. § Section 32 of the Administrative Procedure Act for the State of North Rhine-Westphalia on restitutio in integrum (Verwaltungsverfahrensgesetze für das Land Nordrhein-Westfalen über die Wiedereinsetzung in den vorigen Stand) applies accordingly.

§ 25 Interim regulations

(1) These examination regulations apply to all students who have registered for the first time for the degree course Materials Science and Simulation at the RUB from the winter semester 2024/25 onwards.

(2) These examination regulations apply to students who enrolled for the degree course Materials Science and Simulation prior to the winter semester 2024/25 on application. The application to apply these examination regulations is irrevocable.

(3) The final opportunity to sit a Master examination in accordance with the examination regulations for the Master degree course Materials Science and Simulation dated 26 August 2016, Amtliche Bekanntmachungen der Ruhr-Universität Bochum [official bulletin of the RUB] is at the end of the winter semester 2026/27. From the summer semester

2027 onwards, examinations can only be taken in accordance with these examination regulations.

§ 26 Entry into force and publication

These examination regulations come into force the day after their publication in the official bulletin of the RUB.

ssued on the basis of the resolution of the Faculty Council of the Faculty of Mechanical Engineering dated 03.07.2024.

Bochum, 23 Septrmber 2024

The Rector
of the Ruhr-Universität Bochum

University professor Prof. Dr. h.c. Martin Paul

Note that only the German version is legally binding!

English translation of the „Prüfungsordnung für den Masterstudiengang Materials Science and Simulation" (only German version is legally binding)

Course of studies

Module	Module description	Semester					
		SWS	CP	1. Sem. V Ü	2. Sem. V Ü	3. Sem. V Ü	4. Sem. V Ü
	Compulsory modulese	**18**	**27**	**14**	**4**	**0**	**0**
1	Fundamental Materials Physics	4	5	3 1			
2	Thermodynamics and Statistical Mechanics	3	4	2 1			
3	Elements of Microstructure	4	6	2 2			
4	Programming Concepts in Materials Science	4	6	2 2			
5	Numerical Methods in Materials Science	4	6		2 2		
6	**Fundamental option modules**	**12**	**18**	**0**	**8**	**4**	**0**
	Wahlpflichtmodul 1	4	6		3 1		
	Wahlpflichtmodul 1	4	6		3 1		
	Wahlpflichtmodul 1	4	6			3 1	
7	**Advanced option module**	**12**	**18**	**0**	**4**	**8**	**0**
	Profilmodul 1	4	6		3 1		
	Profilmodul 2	4	6			3 1	
	Profilmodul 3	4	6			3 1	
	General option module	**4**	**6**	**0**	**0**	**4**	**0**
8	Allgemeines Wahlfach	4	6			3 1	
	Non-technical modules	**6**	**9**	**2**	**4**	**0**	**0**
9a	Documenting and Communicating Science 1	2	3	x			
9b	Documenting and Communicating Science 2	2	3		x		
10	Non-Technical module/language course	2	3		x		
	Practical training	**4**	**6**	**6**	**0**	**0**	**0**
11	Materials Modelling Lab	4	6	x			
	Specialist academic pieces of work	**24**	**36**			**4**	**20**
12	Projektarbeit (180 h)		6			x	
13	Masterarbeit (900 h)		30				x

	Sum semester weekly hours	**81**		**21**	**20**	**20**	**20**
	Sum workload	**3600**		**900**	**900**	**900**	**900**
	Sum of credit points		**120**	**30**	**30**	**30**	**30**

Note:. The associated SWS and CP are summed up in bold in the title of the module.

Appendix: ECTS grade conversion table

Grade conversion table
which corresponds with the specifications of the European Course Credit Transfer System (ECTS)

	0-49 % points	**50-59 % points**	**60-74 % points**	**75-89 % points**	**90-98 % points**	**99-100 % points**
	Mangelhaft (fail)	**Ausreichend (sufficient)**	**Befriedigend (satisfactory)**	**Gut (good)**	**Sehr gut (very good)**	**(Exzellent) (excellent)**
Belgium	0 − 9	10	11, 12, 13	14, 15, 16	17 − 18	19 − 20
Denmark	0 − 5	6	7	8, 9	10, 11	12, 13
Finland		1	1½	2	2, 2½	3
France	echéc (7,8,9)	passable (10)	assez bien (12)	bien (14)	très bien (16)	
Greece	1,2,3,4	5	6	7	8, 9	10
Great Britain	fail	third pass	lower 2nd	upper 2nd	1	
Italy	0 − 17	18 − 24	25, 26	27, 28, 29	30	30 lode
Ireland	fail	pass	3rd	2nd/II	2nd/I	I
Netherlands	1 − 5	6	6½, 7	7½, 8	8½	9, 10
Norway	4,01 − 6,0 (immaturus)	3,26 − 4,0 (non contemnendus)	2,51 − 3,25 (haud illaudabilis)	1,51 − 2,5 (laudabilis)	1,0 − 1,5 (prae ceteris)	
Austria	5	4	3	2	1	
Portugal	1 − 9	10, 11	12, 13	14, 15, 16	17, 18	19, 20
Sweden	underkant	godkant	godkant	val godkant	val godkant	
Switzerland	4 −	4	4½	5	5½	6