

Course-specific examination and study regulations of the master course Computational Science and Engineering at the University of Rostock

On the basis of § 2 section 1 connected to § 38 section 1 of the federal state's higher education law (*Landeshochschulgesetz*) in the edition of the announcement from January 25th, 2011 (*GVOBl. M-V p. 18*), which was most recently amended by section 6 of the law from June 22nd, 2012 (*GVOBl. M-V p. 208, 211*), and the general examination regulations for bachelor and master courses at the University of Rostock from July 9th, 2012 (*Mittl.bl. BM M-V 2013 p. 740*), which was most recently amended by the first constitution concerning the amendment of the general examination regulations for bachelor and master courses from September 29th, 2013 (bulletin of the University of Rostock no. 46 2013), the University of Rostock issued the following course-specific examination and study regulations of the master course Computational Science and Engineering as a constitution:

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I. General Provisions

§ 1 Purview

The present regulations govern aims, contents, procedures, and course-specific provisions for the degree of the research oriented master course Computational Science and Engineering at the University of Rostock based on the general examination regulations of the bachelor and master courses at the University of Rostock.

§ 2 Entrance Criteria

- (1) In line with § 3 of the general examination regulations of the bachelor and master courses, the entrance to the master course Computational Science and Engineering is bound to the proof of a first university degree qualifying for a profession and, furthermore, to the following entrance criteria:
1. Applicants whose native language is not English have to prove English language skills on level B2 according to the Common European Framework of Reference for Languages.
 2. Applicants have to prove a first university degree qualifying for a profession in the subject of Computational Science and Engineering, Electrical Engineering, Information Technology, Mechanical Engineering, or Physics with a minimum of 180 credit points, or a different but equal degree.
 3. Applicants have to prove profound knowledge in the following academic fields:
 - For studies of Computational Electrical Engineering: electromagnetic fields and waves
 - For studies of Computational Mechanical Engineering: technical mechanics
 - For studies of Computational Physics: quantum mechanics, optics, statistic physics and the common mathematical foundations underlying these academic fields.
- (2) In case there is no admission restriction, the entrance to the master course Computational Science and Engineering can only be denied if a successful graduation from the master course is not to be expected. It can be assumed that a successful graduation from the master course is not to be expected when:
1. one of the criteria in section 1 number 1 to 3 is not fulfilled, or
 2. the first university degree qualifying for a profession has not been completed with at least 75% of the CGPA (Cumulative Grade Point Average) or with a comparable grade in a different grading system
- and the applicant is not able to prove any other qualifications relevant for this master course that may lead to the prospect of a successful graduation based on overall academic progress. The examination board may decide to invite an applicant for a clarifying interview. The applicant may also be accepted on a reserved basis, in case of an admission restriction in accordance with § 4 of the university admission law (*Hochschulzulassungsgesetz*).

II. Degree course, order of studies, and organization of studies

§ 3

Study objectives

- (1) Students receive the academic degree Master of Science (M.Sc.) by successfully completing the master course Computational Science and Engineering.
- (2) The master course Computational Science and Engineering is dedicated to research. It imparts knowledge and competences to prepare students for professional work in academic and industrial occupational fields. Graduates will achieve systematically and scientifically to process issues of their area of studies based on their knowledge in mathematics, natural science and engineering and furthermore, contribute to the field of Computational Science and Engineering after the autonomous acquisition of a specific question. Graduates of the master course Computational Science and Engineering are expected to deliver a high degree of autonomous scientific work that enables them to contribute to the development of their subject and to conduct development and research work in the industry or in research institutions as well as to undertake executive functions.
- (3) Completing this master course serves as a prerequisite to acquire further scientific qualifications. Generally, the degree serves as an admission requirement for doctoral studies that include the further development and the specialization of skills in autonomous scientific work.

§ 4

Start of studies, structure of studies, and standard period of study

- (1) The studies of the master course Computational Science and Engineering may be commenced in the winter semester or in the summer semester. The Computational Physics course may only be commenced in the winter semester since the specific obligatory fundamental lecture is not available in summer semesters. In both courses, Computational Electrical Engineering and Computational Mechanical Engineering, the start of studies is recommended for the winter semester as otherwise there will be only a limited range of modules to select. Students enroll according to the deadlines annually set by the administration of the University of Rostock. For study applications, use the university website. Other websites are also available as mentioned.
- (2) The master course Computational Science and Engineering is generally provided in English language. Single modules are offered in German language according to attachment 2 of the present regulations. Details can be found in the respective module description. The course plan for the master course Computational Science and Engineering is arranged such that – with limited options – the entire course may be completed in English language.
- (3) The standard period of study is four semesters.
- (4) The following specializations are offered for the master course Computational Science and Engineering:
 - Computational Electrical Engineering
 - Computational Mechanical Engineering
 - Computational Physics

Students must select one of these specializations in their application. The mandatory indication of the chosen specialization must be given in written form in the registration for the final examination.

- (5) The master course is divided into obligatory and elective modules. In the specialization Computational Electrical Engineering, students must achieve 84 credit points in the obligatory modules and 36 credit points in the elective modules. In the specialization Computational Mechanical Engineering, students must achieve 87 credit points in the obligatory modules and 33 credit points in the elective modules. In the specialization Computational Physics, students must achieve 87 credit points in the obligatory modules and 33 credit points in the elective modules. Students must choose elective modules from the respective specialization with at least 12 credit points as well as comprehensive elective modules with a maximum of 12 credit points according to attachment 1. For all specializations, also bachelor modules may be chosen upon condition that they were not served for passing the bachelor examination. 30 credit points of the obligatory modules are reserved for the final examination. Further 12 credit points are reserved for two language modules. For passing the master examination, students must achieve at least 120 credit points.
- (6) Students with respective German language skills must achieve 12 credit points in modules from different courses offered at the University of Rostock instead of language modules and upon consulting course guidance. The examination board may decide upon the credibility of the aforementioned modules or of modules taken at other universities as equivalent achievements in pursuance of § 19 of the general examination regulations for bachelor and master courses. The examination board may decide upon the single cases before the beginning of the respective semester and on request of the student. Students may only attend such modules at the University of Rostock if they do not belong to a course with an admission restriction, except capacities for interdisciplinary student exchange have been granted and are available. The entrance criteria, examination requirements, examination dates and deadlines as well as form, duration, and extend of the module examination are valid as stated in the examination regulations of the respective course.
- (7) An appropriate guide of time structure for the modules which grants the compliance with the standard period of study can be found in attachment 1. The examination and study guidelines form the basis of the respective semester course plan, which will be provided to students as customary at the faculty of Computer Science and Electrical Engineering. The chronology and the content-related coordination of classes may grant the students' study achievements. Sufficient possibilities to individually shape the studies will be provided.
- (8) A short description of all modules (contents, aims of qualification, conditions, efforts, as well as prerequisite and examination requirements) can be found in attachment 2. Detailed module descriptions are published as customary at the faculty of Computer Science and Electrical Engineering.

§ 5

Individual part-time studies

- (1) Up until two weeks prior to the beginning of the semester, students may declare to the examination board that they are only able to spend half of the working time necessary for their studies due to a pursued professional occupation or due to domestic obligations in nurture and care. Students have to state in their application which of the scheduled modules or parts of modules they will not be able to complete and in which of the subsequent semesters they intend to complete the respectively offered modules or parts of modules. If the examination board allows the student's application, they may require the student to take modules or parts of modules different from those stated in the application, especially if this is necessary to ensure the student's regular graduation. In case of hardship, the application may also be filed at a later point in time.

- (2) The application has to be addressed to the examination board and submitted at the study administration office. If the examination board decides differently from the student's application, the student must be heard. The application may be withdrawn up until two months after the beginning of the semester.
- (3) In case of section 1, the standard period of studies will not be extended by an additional semester and remains disregarded according to the account of the deadlines stated in the general examination regulations for bachelor and master courses. During the time of the part-time studies, examinations other than the ones stated in the decision of the examination board may not be taken effectively. Taking a second course during this time is not allowed. All other rights and obligations of the students concerned remain unaffected.
- (4) Every student may utilize the regulation in section 1 maximally two times.

§ 6

Forms of teaching and learning

- (1) The studies' contents are taught in different classes. The different kinds of classes are signified by the practice of different forms of teaching and learning. Usually, classes are offered only once a year. The following kinds of classes are deployed in the master course Computational Science and Engineering:
 - *Integrated class*
An integrated class combines the lecture with more active forms of student participation (e.g. seminars or exercises). Students autonomously acquire contents of given topics based on literature and have the opportunity to present as well as discuss their results with fellow participants in class.
 - *Consultation (for the supervision of academic papers)*
Consultations are individual counseling interviews of students and instructors. Students create academic papers or final examination theses long term. Instructors require information about the status of the students' work and provide advice on a regular basis.
 - *Internship session*
An internship session is an internship at the university, which is organized – differently from an internship outside the university – as a supervised class where students are given instructions and work on their own research projects in small groups. Such a class serves as an exercise for students to apply their previously gained theoretical knowledge on specific practical issues. Students may practice scientific methods and working techniques by practically applying their knowledge. Furthermore, students may deepen the contents of the modules and improve their own organization of work.
 - *Project session*
In a project session, students create a topic for a project autonomously or in groups together with fellow students under the supervision of an instructor.
 - *Seminar*
In a seminar, students have the opportunity to orally present autonomously acquired knowledge and bring it up for discussion or present it in written form. Seminars may be held as an attendance class or online.

- *Exercise*
In an exercise, which is not mainly practical, students work on given tasks in order to deepen and apply their knowledge and gain specialist skills. An exercise offers the opportunity to ask questions, to discuss problem solutions, and to use self-check of achieved knowledge status.
 - *Lecture, review class*
In a lecture or a review class, instructors orally present relevant contents with the help of media, such as boards, slides, and scripts. A lecture or a review class may be held as an attendance class or online.
- (2) The achievement of the aims of study is dependent on the participation in classes as well as the accompanying self-study.

§ 7 Required Attendance

- (1) As regulated in the module description, the regular attendance in seminars, exercises, and internship sessions is required in order to achieve the learning objective. Regular attendance of seminars and exercises is fulfilled if a student does not miss more than 20 percent of the class without a valid excuse. Internship sessions have to be attended completely. If the requirement of regular attendance is not fulfilled, permission to the respective examination may not be granted.
- (2) Absence has to be excused and justified in advance (usually via e-mail to the instructor); if this is not possible, students have to excuse themselves immediately after the class. If the instructor cannot find a solid reason for a student's absence, the absence will not be excused.
- (3) If students can credibly and in written form explain a longer absence from classes for reasons they are not responsible for (e.g. sickness, care for a sick or otherwise needy relative, pregnancy, death of a relative), the instructor may decide whether the student's actual time of presence can be counted as regular attendance. Regarding the time of the student's absence, the instructor may demand an achievement equivalent to the regular examination. The instructor decides how such a compensatory achievement may be mannered. The amount of time the student invests for this achievement may be twice or maximum three times as much as the time of their absence from class. Missed internship sessions must be made up for. The student will be provided individual appointments for this purpose.
- (4) If a student does not fulfill the requirement of regular attendance and, furthermore, may not deliver an achievement equivalent to the regular examination, the instructor has the obligation to inform the student in written form, giving reasons for the decision and an explanation of legal remedy. The student has the option to enter an objection against the decision addressing the examination board.

§ 8 Admission to classes

The given class sizes established in the capacity regulations serve as a restriction for the admission to classes in the obligatory as well as the elective modules. Furthermore, the limited number of laboratory seats may restrict the number of class participants. If the number of registered students exceeds the capacity of a class, the examination board considers whether students may attend a different class instead or whether an additional class can be offered in order to compensate the excess. If there is no possibility

to compensate the excess, the person responsible for the class elects the class participants from the students who are enrolled in a course that involves the respective class in an obligatory or an elective module according the examination schedule, who registered in time, and who fulfill the required preconditions regulated in the module description in the following order:

1. Provided that the class is to be attended by students of different courses, they will be supplied with the given seats according to the distribution rates that result from the module description. In every course, students will be preferred who have failed the respective examination in the preceding semester and, therefore, as repeaters according to the present regulation have to attend the class again.
2. Within this scheme, the seats are distributed via a lottery system.

Deadlines for registration will be announced via notice. The examination board decides on cases of hardship.

§ 9 Studies abroad

Alternatively to the examination and study plan, the master course involves the students' opportunity to spend a maximum of one semester at a university abroad starting during their second semester. Studies abroad have to be prepared early. For this purpose, the student first chooses a thematic focus according to the research priorities of the faculties involved in the course and then contacts the departmental study advisor as well as the international students' registry of the University of Rostock (*Akademisches Auslandsamt der Universität Rostock*) not later than at the end of the first semester. The departmental study advisor puts the student into contact with their research partners and helps to organize the semester abroad. A list of research partners is being maintained. The student and the head of the examination board conclude a learning and teaching agreement in compliance with § 5 section 3 of the general examination regulations prior to the student's stay abroad.

§ 10 Organization of studies and teaching

- (1) At the beginning of the semester, a schedule for the entire semester will be provided via notice. It includes lecture periods, examination periods, semester breaks, and the commencement of the subsequent semester.

Based on the examination and study plan (attachment 1), the study administration office develops a semester curriculum for each register and each semester in cooperation with the instructors responsible for the single modules. The semester curriculum contains information on the subjects, the instructors, the time exposure of the different class structures, and the dates of classes.

- (2) Instructors may plan classes that are not involved in the schedule autonomously and in coordination with the study administrative office. If required, they are supported by the administrative organization of the Faculty of Computer Science and Electrical Engineering.
- (3) Instructors may exchange or reschedule classes in justified cases autonomously and in coordination with the study administration office.

- (4) The study administration office has to be informed in advance about all special information passed on to students from the instructor. Special information are dates and facts that differ from the study organizational regulations.

§ 11 Course Guidance

- (1) The general course guidance of the University of Rostock (*Allgemeine Studienberatung der Universität Rostock*) is responsible for advising students, prospective students as well as applicants in general matters concerning the course Computational Science and Engineering.
- (2) Within the Faculty of Computer Science and Electrical Engineering course guidance is provided by the departmental study advisor, who gives advice on concepts and contents of the course, its professional objectives, the organization of studies, in case of failed examinations, attending obligatory and elective modules, and study stays abroad. Departmental study advisors cooperate with the general course guidance.

III. Examinations

§ 12 Structure of examinations and examination requirements

- (1) The constellation of the required modules, the form of prerequisites, the form, the duration, and the scope of the module examination, the regular examination date, and the required credit points may be taken from the examination and study plan (attachment 1) and the module descriptions (attachment 2). The final examination (master thesis and colloquium) is according to § 14 part of the master examination.
- (2) Especially the following forms of examinations are required:
 - a. Forms of oral examinations
 - *Colloquium*
A proficient auditory asks questions after the students' presentation of their autonomous work.
 - *Oral examination*
Students answer questions on one or more examination topics orally.
 - *Presentation*
A presentation is a depiction of a scientific topic and involves research results and/or the results of a literary study. Supported by the reasonable use of media, fundamental contents of the consulted literature are presented, explained and discussed on the basis of pre-formulated questions. In addition to the presentation, a handout, a research paper, or a coherent text with complete contents of the presentation may be required from the student.

b. Forms of written examinations

- *Report/documentation*

A report (or documentation) is a factual depiction of an event or the structured depiction of facts. A report may be handed in as a portfolio. A portfolio is a sorted collection of written documents or own works. Examples of reports are internship documentations, protocols of work shadowing, research reports, journalist articles, and literature reports.

- *Written tests*

In a written test, students have to process given tasks in written form, with no or only a limited number of tools, and under supervision.

c. Forms of practical examinations

- *Practical examination*

Students have to prove competences in professional activities or their own practical, athletic, or artistic skills. Possible forms of practical examinations are practical examinations at schools, practical examinations of sick patients at bedside, role-playing, business games, moot courts, athletic examinations, musical examinations, internships in the laboratory, or the processing of programming tasks.

- *Project work*

The project work is an open form of examination that may be developed with a high degree of freedom. Students may work alone or in teams to accomplish a project work within the scope of one semester. The basis of the examination is the result of the project work as well as the documentation and the process of the teamwork. The results of the work may be presented as a portfolio.

- (3) Within one module, study achievements may be a prerequisite for the module examination. The prerequisites may be evaluated and graded but may not affect the final module grade. Prerequisites can be homework, exercises, presentations, regular and active participation in classes, experiments and seminars, practical tasks, obligatory tasks, programming projects, simulation projects (including defense), assignment papers, and project reports. Specific prerequisites can be referenced in the respective module descriptions as well as the examination and study plan (attachment 1).
- (4) Oral examinations may also be taken in groups, up to three students can be tested simultaneously. The group examination time is reduced by five minutes for each student compared to the examination time of a single student.
- (5) Written examinations may also be taken as group achievements with the exception of written tests. The achievement of each student in the group must be proven by providing paragraphs, page numbers, or other objective criteria that indicate the respective contribution distinctly and in an evaluable manner.

§ 13

Examinations and examination periods

- (1) Examinations taken during the studies are conducted in the determined examination period. The examination period directly succeeds the lecture period and ends with the semester.
- (2) Deviating from section 1 examinations during the studies may be taken in the form of presentations, reports, or project works during the lecture period. In this case students have to be informed about the form of the examination, the scope of the examination, and its deadline within the first week of the lecture period. In accordance between student and instructor, examinations may be taken at a different point in time respecting the deadlines and registration modalities given in the general examination regulations for bachelor and master courses.
- (3) Students have the possibility to withdraw their examination registration at the study administration office. The same is the case for the request to grade an examination as a free attempt (*Freiversuch*).
- (4) In case of a second repeat examination, the examiner may decide whether the student has to take an additional oral examination deviating from the module handbook. This decision has to be uniform for all students per semester.

§ 14

Admission to the final examination

- (1) Students who fulfill the following requirements are admitted to the final examination:
 - the achievement of at least 78 credit points in the obligatory and elective modules of this course
- (2) Students have to apply for the admission to the final examination in written form at the study administration office. The application has to be filed two weeks before the intended commencement of processing the master thesis at the latest.

§ 15

Final examination

- (1) The final examination consists of the master thesis and the colloquium as stated in the module "master thesis M.Sc. Computational Science and Engineering" (*Masterarbeit M.Sc. Computational Science and Engineering*).
- (2) Topics may be provided by researchers who are involved in the course, also in other faculties of the University of Rostock, or other scientific institutions outside the university. Furthermore, students may suggest their own topics. In any case, it is assumed that the student finds a mentor according to § 27 of the general examination regulations for bachelor and master courses.
- (3) Students develop the specific task for their master thesis together with their mentor. The mentor ensures that the task fulfills the requirements of such a thesis.
- (4) The master thesis is prepared in the fourth semester. The processing period of the master thesis is 20 weeks. In individual cases, this period may be extended by a maximum of five weeks by

application to the examination board. The master thesis has to be turned into the study administration office within the stipulated time.

- (5) The master thesis has to be prepared according to the rules of good scientific practice, avoiding scientific misconduct of the University of Rostock (*Regeln zur Sicherung guter wissenschaftlicher Praxis und zur Vermeidung wissenschaftlichen Fehlverhaltens an der Universität Rostock*).
- (6) The colloquium consists of the student's 20 minute presentation and a 20 minute discussion.
- (7) After successful completion of the module "master thesis M.Sc. Computational Science and Engineering", students receive 30 credit points. The associated amount of work consists of 900 hours whereby 860 hours should be invested for the preparation of the master thesis and 40 hours for the preparation of the colloquium.

§ 16

Evaluation of examination achievements, generation of grades

The module overview and the module descriptions (attachment 2) define which modules are graded and which are evaluated with "passed" ("*Bestanden*") or "failed" ("*Nicht Bestanden*"). All graded modules will be regarded in the generation of the overall grade according to § 13 section 5 of the general examination regulations for bachelor and master courses.

§ 17

Examination board and organization of examinations

- (1) The examination board consists of five members; three members are instructors; one member is a research associate; one member is a student. The tenure is two years for instructors and research associates and one year for students.
- (2) The organization of the examination as well as the validation of the prerequisites is undertaken by the study administration office in cooperation with the examination board. Students register online for the module examinations. On the basis of the registrations, the study administration office develops examination plans and announces them.

§ 18

Diploma Supplement

The Diploma Supplement (German and English) includes course-specific information, which can be viewed in the attachments 3 and 4.

IV. Closing provisions

§ 19

Transfer terms

- (1) The present course-specific examination and study regulations are initially valid for students who enrolled for the master course Computational Science and Engineering at the University of Rostock in the winter semester 2015/16.

- (2) For students who have enrolled for the master course Computational Engineering prior to the winter semester 2015/16, the examination and study regulations of November 10th, 2008 apply until no later than March 31st, 2018. On application, they may take examinations on the basis of the general examination regulations for bachelor and master courses and the present course-specific examination and study regulations. The application is irrevocable. Examination and study achievements the student gained prior to the application are credited according to § 19 of the general examination regulations for bachelor and master courses. After the application is filed, changes in the module descriptions apply for students who have not taken the respective examinations. Repeat examinations are treated according to the regulations that had been valid for the repeated examination.

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