

**Course of Study-Specific Examination Regulations
for the Master's Course of Study
Engineering Geohazards
of RWTH Aachen University**

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Please note: This publication is an English translation. Only the German original of these regulations as published in the Official Announcements of RWTH Aachen University (“Amtliche Bekanntmachungen”) is legally binding.

Based on § 2 (4) and § 64 of the law governing the Universities of the Federal State of North Rhine-Westphalia (Higher Education Act – HG) in the version of the announcement of September 16, 2014 (GV. NRW p. 547), last amended by Article 1 of the Act of the Membership of University Hospitals in the Employers' Association of the State of June 30, 2022 (GV. NRW p. 780b), RWTH Aachen University (RWTH) has issued the following regulations:

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I. General

§ 1

Scope of Application and Academic Degree

- (1) These examination regulations apply to the Engineering Geohazards Master's course of study at RWTH Aachen University. They only apply in conjunction with the currently valid version of the General Examination Regulations (GER) in the relevant applicable version, supplementing it with an additional set of course-specific regulations. In cases of doubt, the provisions of the General Examination Regulations take priority.
- (2) Upon successful completion of the Master's course, the academic degree of Master of Science RWTH Aachen University (M. Sc. RWTH) is awarded by the Faculty of Georesources and Materials Engineering.

§ 2

Objectives of the Course of Study and Language of Instruction

- (1) This is a Master's degree program according to § 2 (3) GER.
- (2) The overall educational objectives are set out in § 2 (1) (3) (4) GER. For further information and provisions on the objectives of the Master's course of study, please refer to the
 - examination regulations description at the beginning of the module handbook.
 - Appendix 1 of the present examination regulations.
- (3) The course of study is taught in English. In case individual modules are taught in another language, this is to be indicated in the module handbook.
- (4) Examinations may be taken in German or English, in agreement with the examiner in question.

§ 3

Admission Requirements

- (1) A recognized first university degree according to § 3 (4) GER from the fields of geosciences, geography, environmental sciences, environmental engineering, or civil engineering is required to embark on the course of study.
- (2) To meet the educational prerequisites and successfully complete the Engineering Geohazards Master's course of study, the student applicant must prove competency in the following areas:
 - A total of 20 CP in mathematical, chemical, and physical modules in the following areas:
 - Fundamentals of Mathematics (min. 5 CP)
 - Fundamentals of Chemistry (min. 5 CP)
 - Fundamentals of Physics (min. 5 CP)
 - Earth Sciences modules totaling at least 45 CP in the following areas:
 - Fundamentals of
 - Geology (at least 10 CP)
 - Geophysics (at least 5 CP)

- Inorganic Geochemistry (at least 5 CP)
- Organic Geochemistry (at least 5 CP)
- GIS/Remote sensing (at least 5 CP)

Complemented by courses in the following areas:

- Geodynamics
 - Engineering Geology and Hydrogeology
 - Sedimentology and Structural Geology.
- A total of at least 5 CP in geoscience field work in the following areas:
 - Geological mapping
 - Field courses/excursions/field labs/field tutorials

The credit points must have been gained from assessments for modules/courses comparable to that of the Bachelor's degree programs in Georesources Management or Applied Geosciences at RWTH.

- (3) For admission conditional on the completion of prerequisites, § 3 (6) GER applies. If prerequisites corresponding to more than 20 credit points are imposed, admission to the Master's course of study will be denied.
- (4) For this Master's course of study, sufficient knowledge of the English language must be proven according to § 3 (9) GER.
- (5) § 3 (12) GER applies for determining whether the admission requirements are met.
- (6) General regulations for the recognition of assessments taken are stipulated in § 13 GER.

§ 4

Standard Period of Study, Course Structure, Credit Points, and Scope of Study

- (1) The standard period of study is four semesters (two years) full-time, including preparation of the Master's thesis. Students can only start their studies in the winter semester.

The course of study consists of a mandatory section and a core elective section. For successful completion of the degree program, a total of 120 credit points must be earned. The Master's examination is comprised of the following components:

| | |
|--|--------|
| Mandatory modules | 66 CP |
| Core elective sections 1 to 4, 6 CP each | 24 CP |
| Master's thesis | 30 CP |
| Total | 120 CP |

- (2) The degree course, including the Master's thesis module, comprises 18 modules. All modules are specified in the module handbook. The weighting of the examinations with credit points to be taken in the individual modules is carried out according to § 4 (4) GER.

§ 5 Obligatory Attendance in Classes

- (1) According to § 5 (2) GER, obligatory attendance can only be stipulated in courses of the following type:
 1. Tutorials
 2. (Project) seminars, main seminars (“Hauptseminare”), and introductory seminars (“Proseminare”)
 3. Colloquia
 4. Lab courses and tutorials
 5. Excursions, field trips, mapping courses, and field seminars.
- (2) Classes, for which attendance is required in accordance with paragraph 1, shall be identified as such in the module handbook.

§ 6 Examinations and Examination Deadlines

- (1) General regulations on exams and exam periods are stipulated in § 6 GER.
- (2) Provided successful participation in modules or exams or passing of module components according to § 5 (4) GER is stipulated as a precondition for participation in other exams, this is indicated accordingly in the module handbook.

§ 7 Types of Examinations

- (1) General regulations on types of examination are stipulated in § 7 GER.
- (2) The following other forms of examination are stipulated according to § 7 (1) GER:

An oral presentation on a predefined topic is an assessment in the form of a talk or an explanatory graphic presentation in front of the class. The grade of the oral presentation is announced to the candidate and clearly documented in an examiner’s report. The duration of the oral presentation is as follows:

- If up to 5 CP are being awarded: 15 to 90 minutes,
 - if 6 or 7 CP are being awarded: 90 to 120 minutes,
 - if 8 or more CP are being awarded: 120 to 240 minutes.
- (3) The duration of a written exam is as follows:
 - If up to 5 CP are being awarded: 45 to 90 minutes,
 - if 6 or 7 CP are being awarded: 90 to 120 minutes,
 - if 8 or more CP are being awarded: 120 and more minutes.
 - (4) The duration of an oral exam is as follows:
 - If up to 3 CP are being awarded, at least 15 and at most 30 minutes,
 - if more than 3 CP are being awarded, at least 15 and at most 45 minutes.An oral exam may be carried out as a group exam with up to four candidates.

- (5) The length of a written term paper is a minimum of 5 and a maximum of 30 pages. The writing-up time of a term paper is a minimum of one and a maximum of 8 weeks.
- (6) The following applies to project work in particular: The length of a report is a minimum of 5 and a maximum of 30 pages. The processing time is a minimum of one and a maximum of 8 weeks.
- (7) The written version of the oral presentation shall range from 5 to 20 pages. The duration of the presentation shall be a minimum 10 minutes and a maximum 30 minutes.
- (8) The following applies to colloquia in particular: The specific requirements as well as the colloquium dates will be given to students at the beginning of the course associated with the exam. The duration of the colloquium shall be least 15 minutes and a maximum of 60 minutes.
- (9) The examiner specifies the duration and, if applicable, other forms of assessment at the start of the course.
- (10) Admission to module exams may be conditional on the successful completion of module components as examination requirements in accordance with § 7 (15) GER. For the relevant modules, this is outlined in the module handbook. At the start of the specific semester, or by the time of the first course session, the lecturer shall provide precise criteria in the CMS regarding possible improvement of grades through the completion of module components, particularly the number and type of exercises that can be taken for extra credit as well as the mode of correction and assessment.

§ 8

Assessment and Grading

- (1) General regulations for assessing the exams and the formation of grades are stipulated in § 10 GER.
- (2) If an examination consists of several partial exams, each partial exam must be passed, i.e. be completed with the grade of at least "sufficient" (4.0).
- (3) A module has been passed if all associated partial exams have been passed with a grade of at least "sufficient" (4.0), and all other credit points or module components have been achieved according to the relevant course of study-specific examination regulations.
- (4) The overall grade is formed taking into account all module grades and the grade of the Master's thesis according to § 10 (10) GER.
- (5) In the case that all module examinations of the Master's course of study have been completed within the standard period of study, one weighted module grade corresponding to 15 credit points may be omitted according to § 10 (13) GER.

§ 9 Examination Board

The responsible examination board according to § 11 GER is the Engineering Geohazards Master's Examination Board of the Faculty of Georesources and Materials Engineering.

§ 10 Repeating Examinations or the Master's Thesis, Loss of the Right to Take an Exam

- (1) General regulations governing retaking exams or the Master's thesis, and the loss of the right to take exams are stipulated in § 14 GER.
- (2) Elective modules within a core elective section of this Master's course can be replaced, provided that this is permitted according to the module handbook. It is not possible to replace mandatory modules.

§ 11 Deregistration, Non-Attendance, Withdrawal, Cheating Attempts, Non-Compliance

- (1) General provisions on deregistration, non-attendance, withdrawal, cheating attempts, or non-compliance are included in § 15 GER.
- (2) Deregistration from courses with capacity restrictions, especially seminars, lab courses, and tutorials, is possible without giving reasons, prior to 7 days before the first day of the course. In the case of field seminars, field tutorials, and mapping courses, due to the high coordination effort, deregistration must be made no later than 7 days after receiving registration confirmation.

II. Master's Examination and Master's Thesis

§ 12 Type and Scope of the Master's Examination

- (1) The Master's examination consists of
 1. exams that are to be completed based on the structure of the course of study according to § 4 (2) and detailed in the module handbook, as well as
 2. the Master's thesis.
- (2) The order of courses is based on the curriculum (Appendix 3). The Master's thesis can only be issued once the student has attained 50 credit points.

§ 13 Master's Thesis

- (1) General provisions for the Master's thesis are stipulated in § 17 GER.
- (2) The Master's thesis is to be written in the English language.
- (3) The writing time for the Master's thesis is at maximum six months alongside studies. In justified exceptional cases, the writing time can be extended by a maximum of up to six weeks upon application to the relevant examination board in accordance with § 17 (7) GER. The number of pages of the thesis should not exceed 80, excluding appendices.
- (4) The workload required for preparing and writing the Master's thesis shall correspond to 30 credit points.

§ 14 Acceptance and Assessment of the Master's Thesis

- (1) General provisions on the acceptance and assessment of the Master's thesis are stipulated in § 18 GER.
- (2) Three copies of the Master's thesis are to be submitted on time, printed and bound, to the Central Examination Office.

III. Final Provisions

§ 15 Inspection of Examination Records

Inspection of exam documents is carried out in accordance with § 22 GER.

§ 16 Entry into Force, Publication, and Transitional Provisions

- (1) These regulations shall be published in the official announcements of RWTH Aachen University ("Amtliche Bekanntmachungen") and shall enter into force as of winter semester 2022/2023.
- (2) These examination regulations apply to all students who enrolled in the Engineering Geohazards Master's course of study at RWTH for the first time in or after winter semester 2020/2021.

Issued based on the resolutions of the Faculty Council of the Faculty of Georesources and Materials Engineering dated May 13, 2020, and May 18, 2022.

It is pointed out that, in accordance with § 12 (5) NRW HG, any claims regarding a violation of procedural or formal requirements of the regulatory or other autonomous rights of the University may no longer be asserted after one year has elapsed since the official publication of this announcement unless:

- 1) the announcement has not been properly published,
- 2) the Rectorate has objected, prior to publication to the decision of the committee adopting the regulations,
- 3) the University has been previously notified about the defect of form or of procedure in a complaint, specifying the infringed legal provision and the fact which gives rise to the defect, or
- 4) the legal consequence of the exclusion of complaints was not pointed out in the public announcement.

The Rector
of RWTH
Aachen University

Aachen, dated January 2023

sgd. Rüdiger
Univ.-Prof. Dr. rer. nat. Dr. h. c. mult. Rüdiger

Appendix 1: Description of Study Content and Objectives

Societies worldwide repeatedly find themselves the victim of destructive natural forces due to extreme natural events. High economic losses, the loss of human life, and the endangerment of social structures are challenges that have to be overcome on a regular basis. Predicting the effects of these forces in terms of their extent, space, time, and intensity and minimizing their consequences is a central, interdisciplinary challenge at a local, national, and global level. The intensities of extreme exogenous natural events (storms, storm surges, heavy rainfall) are increasing, but endogenous natural events (earthquakes, volcanic eruptions) also regularly occur, causing varying degrees of damage. Complex chains and cascading catastrophes that follow an initial extreme natural event are often of equal intensity (tsunamis, mass movements) and cumulative in their extent.

The Engineering Geohazards (EGH) Master's degree program is interdisciplinary in character, integrating the contents and principles of the natural sciences, engineering, and economics. In four semesters, students are taught a comprehensive geoscientific basis to understand the complex impact of natural hazards and assess their consequences for society. Ultimately, in order to protect lives from the consequences of natural disasters, the responsible development and design of engineering protection measures is an essential part of this degree program. Furthermore, the course of study imparts skills for sustainable preparation and rehabilitation of the habitat in the area of conflict between disaster prevention, national and business economics and ecology, since coping with disasters is associated with high costs. The long-term goal is for graduates to contribute to better control and to develop a sustainable design of our living space. Practical experience and the option of an applied Master's thesis at partner companies as part of a research module are an integral part of the curriculum. This period is thus also intended as a fixed time when students may study or conduct research outside the University.

Appendix 2: Guidelines for Practical Work Experience

§1

Practical Work Experience/Internship

- (1) As part of the Master's examination, proof of practical work experience completed outside the University for at least 4 weeks (equivalent to 20 full-time working days) must be submitted by the end of the Master's program. Splitting the duration of the internship is not possible.
- (2) The goal of this internship is for students to gain insight into activities in the professional field of engineering geohazards outside of academia.
- (3) Internship activities must be closely related to the qualification profile of the Master's program in Engineering Geohazards and can be completed in the following areas, both in Germany and abroad:
 - a) National and international institutions (e.g. Federal Office for Disaster Management, EU, UN, ASEAN),
 - b) Globally active (development) aid organizations,
 - c) Companies in the (re)insurance industry, construction industry, environmental consultancies, engineering firms,
 - d) administration, or
 - e) research institutions.
- (4) 6 CP are awarded for completing the internship, which will be graded based on the internship report.

§ 2

Recognition of the Practical Work Experience/Internship

- (1) For the internship to be recognized, an internship report as well as proof of the internship providing organization must be submitted to the supervising university professor no later than three months after completion of the internship.
- (2) The student must submit a written internship report, which should be 2 to 4 pages long and, in addition to a description of the activities performed, should include a personal evaluation of the internship experience as preparation for their professional career.
- (3) A certificate of practical work experience issued by the internship providing organization must be submitted as an appendix to the internship report. This should include the period of the internship and an assessment of the intern's performance.

Appendix 3: Curriculum

| Semester | CP | Module nr. | Module title | Module CP | CP | Lecture title | Lecture type | Mandatory/ Elective | Contact hours | Self-Study | Exam type | Capacity Restriction | Compulsory Attendance | POC | |
|--|---|---|--|--|---|---|----------------------------------|---------------------|---------------|------------|-----------|----------------------|-----------------------|-----------------|-----------------|
| 1 | 28 | Mandatory modules | | | | | | | | | | | | | |
| | | 1 | Geological Hazard and Risk Analysis | 6 | 3 | Hazards and Risk Analysis | L | M | 2 | 60 | HA | No | | Reicherter | |
| | | 2 | Neotectonics and Geohazards | 6 | 3 | GIS (intensive course) | E | M | 2 | 60 | HA | 30 | | Reicherter | |
| | | 3 | Sustainability Strategies in Politics and Companies | 4 | 2 | Neotectonics and Earthquake Geology | L/E | M | 2 | 60 | HA | No | | Reicherter | |
| | | 4 | Climatology | 3 | 3 | Multi-method field survey "Understanding processes" | SE | M | 2 | 60 | PA | 25 | | Reicherter | |
| | 5 | Plate Tectonics | 3 | 3 | Sustainability Strategies in Politics and Companies | L | M | 2 | 60 | KL | No | | Traverso | | |
| | 6 | Option 1: Inorganic Environmental Geochemistry | 6 | 3 | Seminar Sustainability Strategies in Politics and Companies | SE | M | 2 | 60 | MP | No | | Traverso | | |
| | 6 | Option 2: Organic Environmental Geochemistry | 6 | 3 | Climatology | L/E | M | 2 | 60 | HA | No | | Petzold | | |
| | Elective module | | | | | | | | | | | | | | |
| | <i>One out of two options has to be taken to complete the module (6 CP)</i> | | | | | | | | | | | | | | |
| | 6 | Option 1: Inorganic Environmental Geochemistry | 6 | 3 | Inorganic Environmental Geochemistry (Lecture) | L | E | 2 | 60 | HA | No | | Yes | Sindern | |
| 6 | Option 2: Organic Environmental Geochemistry | 6 | 3 | Inorganic Environmental Geochemistry (Lab Course) | LA | E | 2 | 60 | HA | 10 | | | Sindern | | |
| 6 | Option 2: Organic Environmental Geochemistry | 6 | 3 | Analytical Methods and Data Evaluation in Organic Geochemistry | L/E | E | 2 | 60 | HA | No | | | Schwarzbauer | | |
| 6 | Option 2: Organic Environmental Geochemistry | 6 | 3 | Practical Course - Analytical Approaches in Organic Environmental Geochemistry | PR | E | 2 | 60 | HA | 12 | | Yes | Schwarzbauer | | |
| 2 | 29 | Mandatory modules | | | | | | | | | | | | | |
| | | 7 | Flood Protection and Coastal Engineering | 9 | 6 | Flood Protection | L | M | 2 | 60 | KL | No | | Schüttrumpf | |
| | | 8 | Introduction to Natural Hazards | 3 | 3 | Coastal Engineering | L | M | 2 | 150 | KL | No | | Schüttrumpf | |
| | | 9 | Sustainability Assessment - Methods and Tools | 4 | 2 | Introduction to Natural Hazards | L | M | 2 | 60 | HA | No | | Reicherter | |
| | | 10 | Research Project: From Maps to Geohazard Models | 7 | 7 | Sustainability Assessment - Methods and Tools | L | M | 2 | 60 | KL | No | | Traverso | |
| | 11 | Option 1: Geostatistical Modeling | 6 | 3 | Seminar Sustainability Assessment - Methods and Tools | SE | M | 2 | 60 | MP | No | | Traverso | | |
| | 11 | Option 2: Landslides and Rock Slope Analysis | 6 | 6 | Geohazards II - From maps to models (research project) | PT | M | 4 | 120 | ALT | 10 | | | Reicherter | |
| | 11 | Option 3: Groundwater and Flood Risk Management | 6 | 3 | Geostatistical Theories, Data and Models | L | E | 2 | 60 | KL | 30 | | | Wellmann | |
| | 11 | Option 4: Engineering Hydrology | 6 | 6 | Geostatistical Modeling | E | E | 2 | 60 | HA | 30 | | | Wellmann | |
| | 11 | Option 5: Sociology of Natural Risks and social catastrophes | 6 | 3 | Landslides and Rock Slope Analysis | L/E | E | 4 | 120 | KL | 30 | | | Amann | |
| | Elective module | | | | | | | | | | | | | | |
| <i>One out of five options has to be taken to complete the module (6 CP)</i> | | | | | | | | | | | | | | | |
| 11 | Option 3: Groundwater and Flood Risk Management | 6 | 3 | Groundwater Management | L/E | E | 2 | 60 | KL | 20 | | | Rüde | | |
| 11 | Option 4: Engineering Hydrology | 6 | 6 | Second part of the module is offered in third semester | L/E | E | 4 | 120 | KL | No | | | Nacken | | |
| 11 | Option 5: Sociology of Natural Risks and social catastrophes | 6 | 3 | Sociology of Natural Risks and social catastrophes | L | E | 2 | 60 | KL | No | | | Gonser | | |
| 11 | Option 5: Sociology of Natural Risks and social catastrophes | 6 | 3 | Sociology of Natural Risks and social catastrophes -Seminar | SE | E | 2 | 60 | HA | No | | Yes | Gonser | | |
| 3 | 21 | Mandatory modules | | | | | | | | | | | | | |
| | | 12 | Advanced Methods in Remote Sensing | 6 | 3 | Remote Sensing of Sedimentary Basins | L/E | M | 2 | 60 | KL | 25 | | Reicherter | |
| | | 13 | Geohazard Risk Management and Project Management | 6 | 3 | Geological map interpretation | E | M | 2 | 60 | PR+MP | 25 | | Reicherter | |
| | | 14 | Economics of Technological Diffusion | 3 | 3 | Project Management | L | M | 2 | 60 | HA | 25 | | Reicherter | |
| | 15 | Option 1: Dams and Hydropower | 3 | 3 | Portfolio management and prospect evaluation | L/E | M | 2 | 60 | KL | No | | | Kukla | |
| | 15 | Option 2: Structural Control and Health Monitoring | 6 | 3 | Economics of Technological Diffusion | L | M | 2 | 60 | KL | No | | | Madlener | |
| | 15 | Option 3: Engineering Geology: Site Investigation | 3 | 3 | Site Investigation | L | E | 2 | 60 | KL | 20 | | | Amann | |
| | 15 | Option 1: Dams and Hydropower | 3 | 3 | Dams and Hydropower | L | E | 2 | 60 | KL | No | | | Schüttrumpf | |
| | 15 | Option 2: Structural Control and Health Monitoring | 6 | 3 | Structural Control and Health Monitoring | L | E | 2 | 60 | KL | No | | | Altay | |
| | 15 | Option 3: Engineering Geology: Site Investigation | 3 | 3 | Structural Dynamics | SE | E | 2 | 60 | HA | No | | | Altay | |
| | 3 | 6 | 16 | Internship | 6 | 6 | Internship (company or research) | PR | M | 4 | 120 | HA | No | | All/ Reicherter |
| 1-3 | 6 | Elective module | | | | | | | | | | | | | |
| | | <i>One out of three options has to be taken to complete the module (6 CP)</i> | | | | | | | | | | | | | |
| | | 17 | Option 1: Engineering Geological Site Investigations | 6 | 6 | Engineering Geological Site Investigations | FT | E | 4 | 120 | ALT | No | Yes | All/ Reicherter | |
| 17 | Option 2: Mobility module | 6 | 6 | Mobility module | Lecture typ, exam type, language, contact hours, attendance requirements and CP will be determined according to the regulations by the respective university. A maximum of 6 CP can be awarded for the respective module. | | | | | | | | | | |
| 17 | Option 3: ABC/J module | 6 | 6 | ABC/J module | Lecture typ, exam type, language, contact hours, attendance requirements and CP will be determined according to the regulations by the respective university. A maximum of 6 CP can be awarded for the respective module. | | | | | | | | | | |
| 4 | 30 | 18 | Master Thesis | 30 | 30 | Master Thesis | MSc | M | | 0 | 900 | MSc | No | | All |
| Notes: | | | | | | | | | | | | | | | |
| ABC/J Geoverbund Aachen-Bonn-Cologne/Jülich L/E Lecture/Exercise | | | | | | | | | | | | | | | |
| ALT Alternative exam type LA Lab course | | | | | | | | | | | | | | | |
| CP Credit Points MP Oral exam | | | | | | | | | | | | | | | |
| E Exercise M.Sc. Master of Science | | | | | | | | | | | | | | | |
| FT Field Trip PA Project work | | | | | | | | | | | | | | | |
| GRM Georesourcenmanagement POC Point of Contact | | | | | | | | | | | | | | | |
| HA Homework PR Practical course | | | | | | | | | | | | | | | |
| KL Written exam PT Project | | | | | | | | | | | | | | | |
| L Lecture SE Seminar | | | | | | | | | | | | | | | |