

Tropical Hydrogeology and Environmental Engineering Master of Science (M.Sc.)

Study regulations version 2021

English translation of the study regulations

For information purposes only - the legally binding document is the German version!

1. Implementation provisions (*Ausführungsbestimmungen*)

ad § 2 (1): Academic degree

The Master of Science (M.Sc.) course "Tropical Hydrogeology and Environmental Engineering" is carried out by the Department of Materials- and Geosciences of the Technical University of Darmstadt. The Technical University of Darmstadt awards the academic degree "Master of Science" (M.Sc.) after the total of 120 credit points has been achieved in the course.

ad § 5 (2), (3): Modules, components and type of exam

In Annex I of these implementation regulations, the "Study and Examination Plan", the type (technical examination, study examination), the scope, the number and the form (oral, written or special form as well as the specification) of the examinations as well as the weighting with which they go into the calculation of the overall grade of the module are specified.

Examinations that are taken in other departments are based on the provisions of the departments offering them.

ad § 11 (4), (5): General requirements for admission - language of instruction

The language of instruction for the course is English.

ad § 12: General evidence needed to register for examination

The office of student affairs must be informed of the choice of one of the following two specializations at the latest when registering for the first examination in these areas:

- Hydrogeology
- Environmental Engineering

A change of specialization is possible once without justification. A further change can be approved by the examination board upon submission of a justification.

ad § 17a (1): Conditions for admission to master's courses

The entry requirements for the M.Sc. Tropical Hydrogeology and Environmental Engineering and in particular the prior knowledge and qualifications (entry skills) required by the applicants are specified in the following.

ad § 17a (2): Entrance competencies in consecutive master's degrees

The entry-level skills for the consecutive master's course M.Sc. Tropical Hydrogeology and Environmental Engineering result from the competence profile of the B.Sc. "Applied Geosciences", B.Sc.

"Environmental Engineering" and B.Sc. "Civil Engineering and Geodesy" from the Technical University of Darmstadt as reference courses.

Details on the entry-level competencies are set out in the competencies description in Annex II. Admission requirements for the master's course M.Sc. Tropical Hydrogeology and Environmental Engineering is a bachelor's degree in one of the reference courses of study at the Technical University of Darmstadt or a degree in a course that conveys competencies that are not significantly different from the competencies conveyed in one of the reference courses (comparable course).

ad § 17a (4) lit. a) and b): Formal entrance examination

As part of the formal entrance examination, evidence of the required entrance skills is checked on the basis of the written documents to be submitted by the applicants. The following must be submitted: the certificate of the first degree and the diploma supplement or comparable documents of the course leading to the first degree.

ad § 17a (4) Lit. c): Substantive entrance examination

If the entrance skills could not already be positively or negatively clarified in the formal entrance examination, a substantive entrance examination will be carried out afterwards. The entrance examination cannot be repeated in this application process. As part of the substantive entrance examination, either an oral examination lasting 45 minutes is carried out on the premises of the Technical University of Darmstadt or an oral examination lasting 45 minutes via internet-based video telephony (following the relevant data protection regulations), whereby the applicant's identity is confirmed by a trustee on site (this can be especially employees of cooperating universities or the DAAD). The trustee present on site also ensures that the examination is carried out lawfully.

ad § 17a (8): Conditional admission

Admission can be granted subject to conditions if, after the entrance examination, it turns out that the applicant lacks entrance skills that can be compensated for by catching up on requirements of no more than 30 CP. The modules or technical examinations required are listed in the letter of admission. The requirements must be met by the end of the second semester. The general examination regulations of the Technical University of Darmstadt apply to the conditions, with the exception of the second repeat examination according to § 31 APB and the oral supplementary examination according to § 32 APB, i.e. only two attempts are allowed per examination.

ad § 18: Requirements for admission

Any existing admission requirements for examinations or modules are set out in Annex I to these implementation regulations, the "Study and Examination Plan", and in Annex III, the "Module Handbook".

ad § 22 (2): Conducting the examinations - duration of the oral examination

The duration of the oral examinations (at least 15 min. per candidate and examination) is specified in Annex I of these implementation regulations, the "Study and Examination Plan".

ad § 22 (5): Conducting the examinations - duration of supervised written examinations

The duration of the written examinations (at least 45 min. per examination) is specified in Annex I of these implementation regulations, the "Study and Examination Plan".

ad § 23 (2): Final thesis - requirements

The topic of the thesis is only issued if at least 60 CP have been acquired in the course.

ad § 23 (3): Final thesis - topic

The topic of the thesis requires the approval of the examination board.

ad § 23 (5): Final thesis - preparation time

The thesis has a workload of 30 CP (900 hours) and must be prepared and submitted within 26 weeks.

ad § 25 (1), (3): Definition and weighing of grades

The grading system for each examination is set out in Annex I to these implementation regulations, the "Study and Examination Plan". The study and examination plan also specifies the weight with which the grades of the technical examinations and study examinations are included in the weighting of the module grade. Unless otherwise specified, the grades of the examinations within the module are included in the module grade in accordance with the credit points assigned to the examinations.

ad § 28 (3): Total rating

Annex I of these implementation regulations, the "Study and Examination Plan", specifies the weight with which the module grades are included in the overall grade. Unless otherwise specified in Annex I, the module grades are included in the overall grade according to the credit points acquired in the modules.

ad § 31 (1): Second repetition

The second repeat examination may be held orally, in agreement between examiners and candidate.

ad § 38a: Coming into effect

These implementation regulations come into force on October 1st, 2021. They are published in the Supplement to the Articles of the Technical University of Darmstadt (*Satzungsbeilage*). With the entry into force of these implementing provisions, the implementation provisions dated 04.12.2013 (*Satzungsbeilage* 2014-I) in the version dated 07.12.2016 (*Satzungsbeilage* 2017-II) expire.

Annex I Study and Examination Plan

Annex II Competencies Description

Annex III Module Handbook

Darmstadt, 18.02.2021

The Dean of the Department of Materials- and Geosciences of the Technical University of Darmstadt
signed Prof. Dr. Karsten Albe

1.1. Annex I Study and Examination Plan (*Studien- und Prüfungsplan*)

s. Study and Examination Plan in a separate file

1.2. Annex II: Competencies description (*Kompetenzbeschreibungen*)

1.2.1. Entry competencies

Entry requirements are geoscientific, environmental engineering, or civil engineering competencies, or competencies in a related subject, at least at bachelor's level, which are documented by a Bachelor of Science, Bachelor of Engineering, or a comparable degree. The relevant entry requirements are checked as part of the entrance examination. The following minimum qualifications are required for admission:

- a. Knowledge in mathematics and natural sciences, expressed by proven achievements in at least one completed module in mathematics (comparable to the module of "*Höhere Mathematik*" at TU Darmstadt), chemistry (general chemistry or inorganic chemistry), and physics (fundamentals of experimental physics). This previous knowledge cannot be compensated for by admission requirements.
- b. Basic geoscientific knowledge, expressed by proven performance in at least four completed modules in the field of geoscientific fundamentals (in particular geology, mineralogy/petrology, geochemistry) and an applied geology subject (hydrogeology, engineering geology).
- c. Basic knowledge in the field of water and the environment, expressed by proven performance in at least four completed modules from the subjects of environmental science and environmental engineering, pollutant behavior in water/soil/air, water management, water treatment, wastewater treatment, or comparable subjects.
- d. The topic of the thesis of the previous study qualifying for admission must be from the geoscientific field or from the field of water and the environment.

Newcomers to the master's course in Tropical Hydrogeology and Environmental Engineering (TropHEE) are expected to have the following specific research and practical competencies:

- They have a basic knowledge in mathematics and natural sciences that will enable them to successfully complete the teaching modules offered.
- They have a broad and integrative basic knowledge in geosciences and/or environmental engineering.
- They have geoscientific and/or environmental engineering methodological competencies which enable them to apply geoscientific and/or environmental engineering knowledge and methods in the scientific analysis and solving of practical problems.
- They are able to work on selected questions from current research or their professional environment in a supervised team, and to project and develop conceptual solutions.
- They are able to study literature with modern methods, to document their work in a scientific manner, and to represent it publicly.

1.2.2. Qualification goals

Building on a suitable bachelor's degree, the students will acquire knowledge, skills and competencies in particular in the areas of applied geology (here in particular hydrogeology), environmental geosciences, water management, as well as water and environmental engineering, in order to be able to work independently and responsibly on issues related to the future issues of water and the environment. The students will acquire sound theoretical knowledge, supplemented by methodical competencies and system expertise. After completing this course, the student is expected to

- have developed an awareness of the scientific basis of local, regional, and global water and environmental problems,

- have acquired in-depth specialist knowledge in the training focuses of the course as well as the ability to apply subject-specific methodological and analytical approaches,
- be able to recognize subject-specific problems and tasks in their complexity,
- be able to independently develop or further develop subject-specific solutions for complex geological and engineering and interdisciplinary problems and tasks in research and development,
- be able to independently familiarize himself/herself with new areas and methods of the chosen subject area and its neighboring areas,
- be able to act creatively, e.g. to develop new insights, methods, and problem solutions,
- be able to assess and take into account the subject-specific and social consequences of his/her actions, taking into account the globalization and internationalization of technical, socio-economic and socio-ecological developments, and to align them with ethical standards,
- be able to weigh different solutions and explain them objectively and understandably, and make and justify decisions,
- be able to identify future problems and developments from the scientific-technical to the geopolitical level (e.g. Millennium Development Goals) and include them in his/her work,
- be able to cooperate in an interdisciplinary and international way, beyond potential technical, administrative, and political boundaries, and
- be prepared for the assumption of managerial responsibility through the acquired professional and social skills.

The subject-specific competencies profiles of the two specializations are described as follows:

Hydrogeology: Graduates have in-depth knowledge in the field of groundwater resources and related topics, specifically in hydrogeology, sedimentary geology, hydrochemistry, environmental geochemistry, and environmental engineering, and are able to work independently on scientific, technical, and planning questions - e.g. on topics such as groundwater exploration, resource development, groundwater protection, pollutant behavior – and to project and develop conceptual solutions. They are able to use subject-specific field and laboratory methods for the investigation of water and soil as well as modeling techniques, to assess their applicability and significance, and to be able to assess the plausibility and accuracy of their results.

Environmental Engineering: Graduates have in-depth knowledge in the field of water technologies and environmental technologies and related topics and are able to work independently on environmental engineering questions – e.g. on topics such as water treatment, wastewater treatment, water resource management, pollutant behavior in soil, water and air – and to project and develop conceptual solutions. They are able to use subject-specific field and laboratory methods for the investigation of soil, water and air as well as modeling techniques, to assess their applicability and significance, and to be able to assess the plausibility and accuracy of their results.

1.3. Annex III Module Handbook

s. Module Handbook in a separate file