Readable Version

of the examination and study regulations fort he Master's Programme in Environmental Engineering (Umweltingenieurwesen) at Technischen Universität München

as of June 2016

In accordance to article 13, subsection 1, sentence 2 in connection with article 58, subsection 1, sentence 1 as well as article 43, subsection 5 of the Bayerische Hochschulgesetz (BayHSchG), the following constitution is hereby decreed by the Technische Universität München:

PLEASE NOTE: The English version is provided merely as a convenience and is not legally binding!

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§ 34
Geltungsbereich, akademischer Grad

(1) The Examination and Study Regulations for the Master's Program in Environmental Engineering (German - FPSO) complete the General Academic and Examination Regulations for Bachelor's and Master´s Programs at Technische Universität München (German - APSO) in the following currently valid framework. APSO has priority.

(2) Upon successful completion of the Master's Examinations, the candidate will receive a "Master of Science" ("M.Sc") degree and denotation. Furthermore, the degree can also be additionally denoted with the university acronym TUM.

§ 35
Start of Studies, Prescribed Period of Study, ECTS

(1) The study period for the Master's Program in Environmental Engineering at Technische Universität München begins in the winter term as well as in the summer term. Starting at the winter term is suggested.

(2) In order to obtain the Master's Degree each candidate has to achieve 90 credits in required and elective modules over the course of three semesters. In addition, the student must achieve 30 credits with the completion of the Master's Thesis (6 months at maximum) as per § 46. Thus, in the Master's Program in Environmental Engineering the total credits to be obtained amounts to 120 Credits. The corresponding standard period of study is four semesters.

§ 36
Qualification Requirements

(1) Qualification for the Master's Program in Environmental Engineering is proved through the following:

1. A Bachelor's Degree obtained at a domestic or foreign university after at least six semesters of study in the area(s) of Environmental Engineering or equivalent,

2. Adequate knowledge of the English language; for students whose native language or language of instruction is not English, this must be demonstrated by a recognized language test such as „Test of English as a Foreign Language" (TOEFL) (min 88 points), the „International English Language Testing System" (IELTS) (min 6,5 points) or the „Cambridge Main Suite of English Examinations" or any other test to listed on the website of the enrolment office of TUM as an accepted examination; Alternatively, this can be demonstrated by good grades in English (equating to at least 10 out of 15 points) in an entrance qualification of a domestic institute of secondary education. Likewise, adequate English knowledge is also demonstrated with at least 3 credits obtained in a level C1 English language course of the Common European Framework of Reference for Languages targeted to environmental engineering, or an amount of 30 credits achieved in undergraduate courses with English as the medium of instruction and examination,
3. Successful passing of the aptitude test

(2) A Bachelor's degree qualifies as an equivalent as in (1) point 1 to an environmental engineering bachelor's degree if there are no significant differences in the competence levels between the obtained bachelor's degree and the bachelor's degree in Environmental Engineering (Umweltingnieurwesen) at TUM and those competences fulfil the requirements of the master's programme

(3) The equivalence according to (2) is verified in the first stage of the aptitude test considering the module cataloge of the bachelor's programme in Environmental Engineering at TUM. If competences are missing the obtained degree of the applicant's the admissions committee can appoint additional requirement examinations to the applicant. Applicants will be informed about the additional examination requirements after the first stage of the aptitude test.

(4) The equivalence of the obtained bachelor's degree to the bachelor's degree in Environmental Engineering (Umweltingnieurwesen) at TUM is verified by the admissions committee for Environmental Engineering at the Department of Civil Geo and Environmental Engineering.

§ 37
Modules, Module Exams, Courses, Fields of Study, Language of Instruction

(1) General regulations regarding modules and courses can be found in §§ 6 and 8 of the APSO. In the case of deviations in module definitions § 12 subsection 8 of the APSO comes into effect.

(2) The study plan including the Fields of Study, and the list of required modules can be found in Appendix 1.

(3) In the Master's programme of Environmental Engineering students choose two out of elevan Fields of Study:

- Urban Water Engineering
- Water Resources Management
- Hydraulic Engineering
- Hydrogeology, Groundwater, Pedology
- Modelling and Measurement of Flow and Transport
- Resource Efficiency in Urban Planning
- Environmental Geotechnics
- Environmental Hazards and Risk
- Sustainable Urban Mobility Planning
- Transportation Engineering and Control
- Water-Food-Energy Nexus

Each student has to choose two Fields of Study (Appendix 1) that define their individual study profile. The choice has to be done during the first semester. A mentor can advise the students upon the choice of their field of study. A change of the field of study during the course of the programme is possible after a consultation of a mentor and the stud programme co-ordinator. A mentor is a proven examiner of the Department of Civil Geo and Environmental Engineering.

(4) Student can choose up to 18 credits of elective modules freely from the entire module cataloge of TUM. The choice must be approved by a mentor in advance n ordert o be included in the curriculum. Every approved examiner from the department of Civil, Geo and Environmental Engineering can be a mentor for this approval.

(5) Students participating in an agreed 1:1 or double degree programme have to make an individual study plan in co-operation with a mentor and the study programme co-ordinator. This individual study plan can differ from the structure presented in (3).

(6) The instruction Language in the Master's Programme in Environmental Engineering is English. Students who do not have any language skills in German upon their acceptance receive the additional requirement to obtain basic language skills in German until the end of their second semester. The recognised courses are determined by the examination board and published accordingly. Voluntary, extra-curricular courses, e.g. from the TUM Language Centre are recognised.

§ 37 a

Projektstudium

(1) Each student of environmental Engineering has to complete a thematically related study project. The Study Project is based of a practical topic from the chosen field of study or a selected topic from Crosscutting Methods. The Study project has the workload of 12 credits. The topic of the project is issued and supervised by an approved examiner from the department of Civil, Geo and Environmental Engineering of Technischen Universität München.

(2) Details of the study project are to eb funfd in the “Guidelines for the Study Project” issued by the examination board for Environmental Engineering.

(3) The Study Project is successfully completed if graded with at least “sufficient” (4.0).

§ 38
Examination Deadlines, Monitoring of the Study Progress, Failure to Observe Deadlines

(1) Examination deadlines, monitoring of the study progress, and failure to observe deadlines are regulated in § 10 of the APSO.

(2) At least one of the required modules from one of the chosen Fields of Study specified in appendix 1 must be successfully completed by the end of the second semester. In case of failure to observe this time limit, § 10 subsection 5 of the APSO applies.

§ 39
Examination Board

According to § 29 of the APSO, the Master’s Examination Board for the Environmental Engineering programmes of the Faculty of Civil, Geo and Environmental Engineering is responsible for all decisions related to examinations

§ 40
Recognition of Study Periods, Academic Performance

(1) The recognition of study periods and overall academic performance are regulated in § 16 of the APSO.

(2) Exams from partner universities that are part of an approved study plan for a 1:1 or Double Degree programme do not require further recognition assessment.

§ 41
Examination Procedure, Examination Types

(1) Apart from written and oral examinations other examination types according to § 12 and § 13 of the APSO are in particular reports as well as scientific papers.

a) A written exam is a written assignment under supervision. In written exams, the student should show that he or she is able to identify problems and find approaches to solutions applying specified methods and defined resources within a time limit.

b) A scientific paper is a written record in which ambitious scientific or scientific applied problems are treated independently by the student applying the scientific methods of the respective

academic discipline. The student should prove that he or she is able to completely treat a problem corresponding to the learning results of the respective module involving analysis of the problem, concept of a draft and writing up – considering the guidelines for scientific work. Feasible types differing in their particular ambition level are e.g. discussion papers, abstracts, essays, research papers), term papers etc.

c) A report is a written review and summary of a learning process with the aim of structuring and reproducing what the student has learned as well as analyzing the results in the context of a module. In the report, the student should show that he or she recognized the most important aspects and that he or she is able to reproduce them in writing. Possible report types are e.g. excursions reports, internships reports, work reports etc. The written report can be supplemented by an oral presentation to assess the communicative competence in explaining contents in front of an audience. A scientific composition can be supplemented by an oral presentation to test the communicative competence in explaining contents in front of an audience. Details on particular requirements of the scientific composition and the related competences that are to be examined are specified in the module description.

d) An oral examination is a time limited examination talk about specific topics and with specific questions to be answered. In oral exams, the student should show that he or she has reached the qualification aims of the module descriptions, that he or she recognizes relations and connections in the specific field of examination and that he or she is able to classify specific questions in these relations. The oral examination can be held as an individual or group examination. The duration of the examination is regulated in § 13 (2) of the APSO

(2) Module exams are usually taken during the course of study. Type and length of the required elective module exams are specified in appendix 1. In case of deviations from these predefinitions § 12 subsection 8 of the APSO is to be observed. A module exam is evaluated according to § 17 of the APSO. Weighting of module exam parts corresponds to the specified weighting factors in appendix 1.

(3) If appendix 1 stipulates a written or oral exam as module examination the examiner will inform the students in an appropriate way about the binding examination type, by the lecture start at the latest.

(4) Upon request of a student and with the consent of the examiners, a German taught module exam can be taken in the English/ in a foreign language.

§ 42
Registration for and Admission to Exams

(1) Once enrolled in the Master's Program in Transportation Systems, a student is then considered as eligible to take part in the module exams of the master's degree.

(2) Registration for exams of required elective and elective modules is regulated by § 15 subsection 1 of the APSO. Registration for retakes of failed exams of a required or elective module is regulated by § 15 subsection 3 of the APSO

§ 43
Extent of the Master's Examination

(1) The Master's Examination consists of:

1. The module examinations in the corresponding modules in accordance to subsection (2),
2. The Study Project According to § 37 a
3. The Master's Thesis according to § 46.

(2) The required module exams are listed in appendix 1 Students must complete 24 credits (12 credits in each of the chosen Fields of Study) from required courses and a total of 54 credits of elective courses. The requirements for the single categories of elective courses are:

- Min. 12 credits in each of the chosen fields of study (total of min. 24 credits)
- Min. 12 credits from elective courses from the „Cross Cutting Methods" catalogue
- Max. 18 credits from elective modules chosen freely from the entire module catalogue of environmental engineering or from other study programmes at TUM. The choice of those modules has to be approved by a mentor according to § 37. subsection (4)

Fort he choice of the modules § 8 subsection. 2 of the APSO must be considered.

§ 44
Retaking, Failing Exams

(1) Retaking exams is regulated in § 24 of the APSO. Re-taking partial exams for modules that over span two semesters is regulated in § 24 Abs. 4 subsection (5) APSO.
(2) Failing exams is regulated in § 23 of the APSO.

§ 45
Degree Requirements (Pass/Fail requirements)

The master's programme of environmental Engineering has no Degree Requirements (Pass/Fail requirements) during the course of studies.

§ 45 a
Multiple Choice Regulations

A written exam can have the form of multiple choice in accordance with § 12 a APSO.

§ 46
Master's Thesis

(1) According to § 18 of the APSO every student has to write a Master's Thesis within the Master's examination. The Master's Thesis can be issued and supervised by every expert examiner ("Themensteller") of the Faculty of Civil, Geo and Environmental Engineering of the Technische Universität München. The examination board for Environmental engineering decides upon the assignment as an expert examiner.

A student is eligible to start with the Master's Thesis after completing 75 credits. The student has to submit a preliminary transcript of records to the supervisor as proof for the 75 credits.

(2) The period of time between topic determination and submission of the completed Master's Thesis must not exceed six months The Master's Thesis is deemed taken and not passed, if the student does not submit it in time unless convincing reasons are given according to § 10 subsection 7 of the APSO.

(3) The Master's Thesis should be written in the English language Completion of the Master's Thesis consists of a written part and an oral presentation of its contents.

(4) [1]Der Abschluss der Master's Thesis besteht aus einer schriftlichen Ausarbeitung und einem Vortrag über deren Inhalt. [2]Der Vortrag geht nicht in die Benotung ein.

(5) If the Master's Thesis is not graded with at least "sufficient" (4.0), it can be retaken once with a new topic. It has to be reregistered within a period of six weeks starting with the date of the notification letter about the semester examination results (Prüfungsbescheid).

§ 47
Passing and Evaluation of the Master's Program

(1) The Master's Program is considered completed once all the required exams stated in § 43 subsection 1 have been passed and a total of 120 credits has been achieved.

(2) The grades for the modules are calculated according to § 17 of the APSO. The final grade for the Master's Program is determined by a weight based calculation of the modules under § 43 subsection. 2, the study project according to § 37 a and the Master's Thesis. The weights for each individual module correspond to the module's assigned number of credits. The overall evaluation is expressed by the grading system as laid forth by § 17 of the APSO.

§ 48
Certificate, Record and Diploma Supplement

In accordance with § 25 subsection 1 und § 26 of the APSO, a certificate, record and diploma supplement with a transcript of records is issued upon successful completion of the Master's Program. The date printed on the certificate is that date on which all examination requirements have been fulfilled.

§ 49
Double Degree

The Technische Universität München has Double Degree agreements with the École Polytechnique (France), École Nationale des Ponts et Chaussées (France), Universidad Politécnica de Madrid (Spain), Kungliga Tekniska Högskolan (Sweden) und České vysoké učení technické v Praze (Czhech Republic). Following rules apply to students of the master's programme in Environmental Engineering at TUM who participate in the double degree programme:
The choice of participants in the double degree programme takes place on two stages. In a first step suitable candidates are selected among the applicants based on school and university performance, English language skills and motivation. The final choise is taken in a second step in discussion between representatives of both universities.

§ 50
Date of Effectiveness

(1) This regualtion comes into effect in October 2016.
(2) It is valid for all students commencing their studies in Environmental Engineering from the winter semester of 2016/2017 and forth at the Technische Universität München.

Appendix 1: Examination Modules

	Title	Teaching form, weekl. hours[X]	Sem.	total weekl. hours	Credits	Exam form	Exam duration	Weight of exam parts	language
Field of Study 1 – Urban Water Engineering: Required Modules									
	Water and Waste Water Treatment Engineering	3L +1E	Winter	4	6	Written exam	120’	-	English
	Advanced Water Treatment/Anaerobic Technologies	2L +2E	Summer	4	6	Written exam	120’	-	English
Field of Study 2 – Water Resources Management: Required Modules									
	Integrated Water Resources Management	3L+1E	Winter	4	6	Written exam	120’	-	English
	Flood Risk and Flood Management	2L+2E	Summer	4	6	Written exam	120’	-	English
Field of Study 3 – Hydraulic Engineering: Required Modules									
	Water Resources and Hydro Power	4L	Winter	4	6	Written exam	120’	-	English
	Hydraulic Engineering and Hydromorphology	4L	Winter	4	6	Written exam	120’	-	English
Field of Study 4 – Hydrogeology: Required Modules									
	Groundwater Hydraulics	2L+2E	Winter	4	6	Written exam	90‘	-	English
	The saturated and the unsaturated Zone: Process Understanding and Modelling	3L+1E	Summer + Winter	4	6	Written exam + Project work	60‘	1:1	English
Field of Study 5 – Modelling and Measurement of Flow and Transport: Required Modules									
	Fluid Mechanics and Transport Mechanisms	4L	Winter	4	6	Written exam	120’	-	English
	Hydrological and Environmental River Basin Modelling	2L+2E	Winter	4	6	Written exam + computer exerc. (pass/fail)	60‘	-	English
Field of Study 6 – Resource Efficiency in Urban Planning: Required Modules									
	Energy-Building-City	3L+1E	Winter	4	6	Written	120‘	-	English*
	Sustainable Architecture, Urban and Landscape Planning - Lecture	2L+2S	Winter	4	6	Written exam + Scientific report	60‘	1:1	English*

*These modules will be approximately available in English after the winter term 2017/18

Field of Study 7 – Environmental Geotechnics: Required Modules

	Geotechnical issues in environmental engineering	4L	Winter	4	6	Written exam	90‘	-	English
	Ground water handling and sustainable use of geomaterials in civil construction	4L	Summer	4	6	Written exam	90‘	-	English

Field of Study 8 – Environmental Hazards and Risk: Required Modules

	Alpine Hazards	4L	Winter	4	6	Written exam	100‘	-	English
	Risk Analysis	2L+2E	Winter	4	6	Oral exam	40‘	-	English

Field of Study 9 – Sustainable Urban Mobility Planning: Required Modules

	Modelling of Environmental Effects in Transportation	2L+2S	Winter + Summer	4	6	Written exam + Scientific report	60‘	1:1	English
	Land Use and Transportation - Interactions and Strategies	2L+2S	Winter + Summer	4	6	Written exam + Project work	60‘	1:1	English

Field of Study 10 – Transportation Engineering and Control: Required Modules

	Traffic Management	2,5L+ 1,5E	Winter	4	6	Written exam	120‘	-	English
	Intelligent Transport Systems	2,5L+ 1,5E	Summer + Winter	4	6	Written exam	120‘	-	English

Field of Study 11 – Water-Food-Energy Nexus: Required Modules

	Principles and Applications of Land Management	4L	Winter	4	6	Written exam + Project work	60‘	1:1	English
	Ethics in Science and Technology	4L	Summer	4	6	Scientific report		-	English

	Projektstudium	-	Winter or Summer	-	12	Project work	-	-	English

	Master‘s Thesis	-	Winter or Summer	-	30	Scientific report	-	-	English

Legend:
L= Lecture, E= Exercise, S=Seminar | X the exact split of weekly hours between lecture and exercise may vary from year to year

Elective Modules:

For the credit requirements of the elective modules see §43 subsection (2)

The examination board for Environmental Engineering actuates the catalogues of electives every semester and publishes them in TUMonline.

According to § 43 subsection (2) students can bring in max. 18 credits of elective modules from the entire module catalogue of TUM after an approval from a mentor.