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

As of August 8th 2011

Including:

1st amendment as of	**29.10.2012**
2nd amendment as of	**23.08.2013**
General amendment as of	**20.08.2015**
3rd amendment as of	**…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!

Table of Contents:

§ 34
Scope of the Degree

(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 then 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 Technischen 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 75 credits in required elective and elective modules and 15 credits for the Study Project according to § 43 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 another closely related engineering discipline,

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 575 points in TOEFL Paper; min 232 points in TOEFL Computer; min 90 points in TOEFL iBT), the „International English Language Testing System" (IELTS) (min 6,5 points) or the „Cambridge Main Suite of English Examinations"; 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, or an amount of 60 credits achieved in undergraduate courses with English as the medium of instruction and examination,

3. Successful passing of the aptitude test according to appendix 2.

§ 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 includint the Fields of Study, the Cross Cutting Methods, Technologies and Fundamentals and the list of required elective modules can be found in Appendix 1.

(3) The student has to choose a Field of Study (Appendix 1) thus defining his or her 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) 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.

(5) The instruction Language in the Master's Programme in Environmental Engineering is English. Single modules can be taught in German.

§ 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 elective modules 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

(1) 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. At least half of the weighted coursework of the Master's degree, measured according to ECTS, must be completed at the Technische Universität München in the Master's Program in Environmental Engineering.

(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 § 47,
3. The Master's Thesis according to § 46.

(2) The required elective module exams are listed in appendix 1. The catalogue of elective modules is actuated every semester by the examination board and is published in TUMonline. Candidates have to achieve 24 credits in required elective modules and 51 credits in elective modules. When choosing the modules, § 8 subsection 2 of the APSO is to be considered.

The credit requirements of the single categories are as following:

- min 36 credits from modules of the chosen field of study, from which a total of 24 credits comes from the list of required elective modules.
- min 21 credits elective modules from Cross Cutting Methods, Technologies and Fundamentals
- 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.

§ 44
Retaking, Failing Exams

(1) Retaking exams is regulated in § 24 of the APSO.
(2) Failing exams is regulated in § 23 of the APSO.

§ 45 a
Multiple Choice Testing

(1) 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. Expert examiners are professors and "junior fellows" of the Faculty of Civil, Geo and Environmental Engineering as well as professors of other faculties teaching in the Master's Program in Environmental Engineering.

(2) A student is eligible to start with the Master's Thesis after completing 75 credits.

(3) 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.

(4) 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.

(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 ten weeks starting with the date of the notification letter about the results.

§ 47
Study Project

(1) The Study Project should start during the first three semesters of the programme. The Study Project is based of a practical topic from the chosen field of study or a selected topic from Crosscutting Methods Technologies and Fundamentals. The work on a topic outside the chosen field of study or a selected topic from Crosscutting Methods Technologies and Fundamentals is possible after the approval by a mentor. At the end of the project students submit a written report (80% of the grade) and hold a final presentation (20 % of the grade). For the Study Project 15 credits are granted.

(2) The Study Project is successfully completed if graded with at least "sufficient" (4.0).

§ 48
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 balance 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 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.

§ 49
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.

§ 50
I Date of Effectiveness

(1) This regualtion comes into effect on October 2011.
It is valid for all students commencing their studies in Environmental Engineering from the winter semester of 2011/2012 and forth at the Technische Universität München.

Appendix 1: Study Plan and Required Elective Modules

Study Plan

Students of the Master's Programme in Environmental Engineering choose one of the following Fields of Study:

1. Urban Environments and Transportation
2. Environmental Hazards and Resources Management
3. Environmental Quality and Renewable Energy
4. Energieeffizienz und Nachhaltigkeit von Gebäuden (Energy Efficiency and Sustainability Performance of Buildings)

The general structure of the study programme is as following:

Field of Study 1: Urban Environments and Transportation	**Field of Study 2:** Environmental Hazards and Resources Management	**Field of Study 3:** Environmental Quality and Renewable Energy	**Field of Study 4:** Energieeffizienz und Nachhaltigkeit von Gebäuden	ECTS	ECTS
				≥36	75
Cross Cutting Methods, Technologies and Fundamentals				**≥21**	
Study Project				15	45
Master's Thesis				30	

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

Required Elective Modules

Nr.	Module Title	Teachning Form	Access Requirements	Semester.	Weekly hours	Credits	Exam form	Exam duration	Weighting of multiple exam elements	Language
Field of study 1: Students choosing Field of study 1 must pass 24 credits from following list:										
1	Water and Waste Water Treatment	V + Ü		WS	4	6	Klausur	120	-	EN
2	Bewirtschaftung von Kanalnetzen und Regenwassermanagement	V		SS	4	6	Klausur	120	-	DE
3	Land Management and Land Policy	V + Ü		WS	5	6	Klausur.	90	-	EN
4	Project Appraisal and Planning Processes	V		WS+SS	4	6	Klausur	120	-	EN
5	Land Use and Transport -	V		WS+SS	5	6	Klausur+ Projektarbeit	60 -	50% 50%	EN
6	Modeling of Environmental Effects in Transportation	V + Ü		WS+SS (1+2)	4	6	Klausur	90	-	EN
7	Traffic Management	V + Ü		WS	4	6	Klausur	120		EN
8	Intelligent Transport Systems	V + P		SS+WS (2+3)	4	6	Klausur	120	-	EN
9	Road and Rail Design	V + Ü		WS (3)	6	6	Klausur	120	-	EN
10	Fundamentals of Urban Climate	V + Ü		WS	4	6	Klausur	90	-	EN
11	Applied Urban	V + Ü		SS	4	6	Klausur	90	-	EN

Teachnig forms: V= lecture, Ü=exercise

Field of study 2: Students choosing Field of study 2 must pass 24 credits from following list:

1	Environmental Hydrodynamic	V + Ü		WS+SS (1+2)	4	6	Klausur	90	-	EN
2	Planning and Management of Water Reservoirs	V + Ü		WS+SS (1+2)	4	6	Klausur+ Projektarbeit	60	50% 50%	EN
3	Alpine Hazards	V		WS	4	6	Klausur	100	-	EN
4	Landslides	V		SS	4	6	Klausur	90	-	EN
5	Climate Change	V		WS+SS	4	6	Klausur+ Projektarbeit	60	50% 50%	EN
6	Numerical River Hydraulics	V		SS	4	6	Klausur + SL (Übungsleistu	60 -	-	EN
7	Risk Analysis I	V + Ü		SS (2)	4	6	mündlich	30	-	EN
8	Fluid Mechanics and Turbulence	V		WS (1)	4	6	Klausur	120	-	EN
9	Hydrological and Environmental River Basin Modelling	V + Ü		WS	4	6	Klausur + SL (Übungsleistung)	90	-	EN
10	Flood Risk and Flood Management	V + Ü		SS	4	6	Klausur	120	-	EN
11	Integrated Water Resources Management	V + Ü		WS	4	6	Klausur	120	-	EN
12	Groundwater Hydraulics, Modelling and Management	V + Ü		SS	4	6	Klausur	120	-	EN

Teachnig forms: V= lecture, Ü=exercise

Field of study 3: Students choosing Field of study 3 must pass 24 credits from following list:

1	Land Management and Land Policy	V + Ü		WS	5	6	Klausur	90	-	EN
2	Water and Waste Water Treatment	V + Ü		WS	4	6	Klausur	120		EN
3	Introduction to Soil Science and World	V + Ü		SS (2)	7	8	mündlich	30	-	EN
4	Hydrological and Environmental River Basin Modelling	V + Ü		WS	4	6	Klausur + SL (Übungsleistung)	90	-	EN
5	Energy Economics, Hydro Power and Energy Storage	V		WS	4	6	Klausur	100	-	EN
6	Geothermal, Ocean and Wind Energy	V + Ü		WS + SS	4	6	Klausur	120	-	EN
7	Groundwater Hydraulics, Modelling and Management	V + Ü		SS	4	6	Klausur	120	-	EN
8	Fluid Mechanics and Turbulence	V		WS (1)	4	6	Klausur	120	-	EN
9	Bewirtschaftung von Kanalnetzen und Regenwassermanagement	V		SS	4	6	Klausur	120	-	DE

Teachnig forms: V= lecture, Ü=exercise

Field of study 4: Students choosing Field of study 1 must pass 24 credits from following list:

1	Baukonstruktion II/ III	V		WS+SS (1,2)	6	6	Klausur + Bericht	60 -	50% 50%	DE
2	Konzepte zum energieeffizienten Bauen	V+Ü		SS	3	6	Klausur/ mündlich	60/ 30	-	DE
3	Wechselwirkungen zwischen Nachhaltigkeit und Baukultur	V + Ü		WS	4	6	Klausur + Projektarbeit	60 -	50% 50%	DE
4	Projektorganisation und Management	V		WS+SS	4	6	Klausur/ mündlich	60/ 30	-	DE
5	Nachhaltige Immobilienentwicklung	V + Ü		WS+SS	4	6	Klausur/ mündlich	90/ 30	-	DE
6	Vertiefungsmodul Bauphysik	V + Ü		SS+WS	8	12	Klausur	180		DE

Teachnig forms: V= lecture, Ü=exercise