AALBORG UNIVERSITET

CURRICULUM FOR THE MASTER'S PROGRAMME IN WATER AND ENVIRONMENTAL ENGINEERING, 2019

MASTER OF SCIENCE (MSC) IN ENGINEERING
AALBORG

Link to this studyline

Link(s) to other versions of the same line:

Curriculum for The Master’s Programme in Water and Environmental Engineering, 2017, version 2

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§ 1: PREFACE

Pursuant to consolidation Act 172 of February 27, 2018 on Universities (the University Act) with subsequent changes, the following curriculum is established. The programme also follows the Joint Programme Regulations and the Examination Policies and Procedures for The Faculty.

§ 2: BASIS IN MINISTERIAL ORDERS

The Master's programme is organised in accordance with the Ministry of Higher Education and Science's Order no. 1328 of November 15, 2016 on Bachelor's and Master's Programmes at Universities (the Ministerial Order of the Study Programmes) with subsequent changes and Ministerial Order no. 1062 of June 30, 2016 on University Examinations (the Examination Order) with subsequent changes. Further reference is made to Ministerial Order no. 106 of February 12, 2018 (the Admission Order) and Ministerial Order no. 114 of February 3, 2015 (the Grading Scale Order).

§ 3: CAMPUS

The Master's programme is offered in Aalborg.

§ 4: FACULTY AFFILIATION

The Master's programme falls under the The Faculty of Engineering and Science, Aalborg University.

§ 5: STUDY BOARD AFFILIATION

The Master's programme falls under the Study Board of Built Environment.

§ 6: AFFILIATION TO CORPS OF EXTERNAL EXAMINERS

The Master's programme falls under the external examiners corps on Nationwide engineering examiners/Building.

§ 7: ADMISSION REQUIREMENTS

Applicants with a legal right of admission (retskrav)
Applicants with one of the following degrees are entitled to admission:

- Bachelor of Science in Engineering (Civil Engineering with specialisation in Water and Environment), Aalborg University

Applicants without legal right of admission
Bachelor's programmes qualifying students for admission:

- Bachelor of Science in Environmental Engineering, Aalborg University
- Bachelor of Science in Environmental Science, Aalborg University
- Bachelor of Science in Environmental Engineering, Technical University of Denmark
- Bachelor of Engineering in Civil Engineering with specialisation in Water and Environment, Aalborg University
- Bachelor of Engineering in Civil Engineering, Aalborg University (campus Esbjerg)
- Bachelor of Engineering in Civil Engineering with specialisation in Environmental Engineering, VIA University College
- Bachelor of Engineering in Supply Engineering, VIA University College
- Bachelor of Engineering in Civil and Structural Engineering (with specialisation in Environmental Engineering), Aarhus University

For further information on admission, see www.en.aau.dk.

All applicants must, as a minimum, document English language qualifications comparable to an "English B level" in the Danish upper secondary school (gymnasium) (the Admission Order).

§ 8: THE PROGRAMME TITLE IN DANISH AND ENGLISH

The Master's program entitles the graduate to the designation Civilingeniør, cand.polyt. i vand og miljø. The English designation is: Master of Science (MSc) in Engineering (Water and Environmental Engineering).

§ 9: PROGRAMME SPECIFICATIONS IN ECTS CREDITS

The Master's programme is a 2-year, research-based, full-time study programme. The programme is set to 120 ECTS credits.

§ 10: RULES CONCERNING CREDIT TRANSFER (MERIT), INCLUDING THE POSSIBILITY FOR CHOICE OF MODULES THAT ARE PART OF ANOTHER PROGRAMME AT A UNIVERSITY IN DENMARK OR ABROAD

The Study Board can approve successfully completed (passed) programme elements from other Master's programmes in lieu of programme elements in this programme (credit transfer). The Study Board can also approve successfully completed (passed) programme elements from another Danish programme or a programme outside of Denmark at the same level in lieu of programme elements within this curriculum. Decisions on credit transfer are made by the Study Board based on an academic assessment. See the Joint Programme Regulations for the rules on credit transfer.

§ 11: EXEMPTIONS

In exceptional circumstances, the Study Board study can grant exemption from those parts of the curriculum that are not stipulated by law or ministerial order. Exemption regarding an examination applies to the immediate examination.

§ 12: RULES FOR EXAMINATIONS

The rules for examinations are stated in the Examination Policies and Procedures - published at this website: https://www.studieservice.aau.dk/Studielegalitet/

§ 13: RULES CONCERNING WRITTEN WORK, INCLUDING THE MASTER'S THESIS

In the assessment of all written work, regardless of the language it is written in, weight is also given to the student's formulation and spelling ability, in addition to the academic content. Orthographic and grammatical correctness as well as stylistic proficiency are taken as a basis for the evaluation of language performance. Language performance must always be included as an independent dimension of the total evaluation. However, no examination can be assessed as 'Pass' on the basis of good language performance alone; similarly, an examination normally cannot be assessed as 'Fail' on the basis of poor language performance alone.

The Study Board can grant exemption from this in special cases (e.g., dyslexia or a native language other than Danish).

The Master's Thesis must include an English summary (or another foreign language: French, Spanish or German upon approval by the Study Board). If the project is written in English, the summary must be in Danish (The Study Board can grant exemption from this). The summary must be at least 1 page and not more than 2 pages (this is not included in any fixed minimum and maximum number of pages per student). The summary is included in the evaluation of the project as a whole.

§ 14: REQUIREMENTS REGARDING THE READING OF TEXTS IN A FOREIGN LANGUAGE

At programmes taught in Danish, it is assumed that the student can read academic texts in modern Danish, Norwegian, Swedish and English and use reference works, etc., in other European languages. At programmes taught in English, it is assumed that the student can read academic text and use reference works, etc., in English.

§ 15: COMPETENCE PROFILE ON THE DIPLOMA

The following competence profile will appear on the diploma:

A Candidatus graduate has the following competency profile:

A Candidatus graduate has competencies that have been acquired via a course of study that has taken place in a research environment.

A Candidatus graduate is qualified for employment on the labour market based on his or her academic discipline as well as for further research (PhD programmes). A Candidatus graduate has, compared to a Bachelor, developed his or her

academic knowledge and independence so as to be able to apply scientific theory and method on an independent basis within both an academic and a professional context.

§ 16: COMPETENCE PROFILE OF THE PROGRAMME

Knowledge

- Knowledge on technology and applicability of in-situ physical and biological methods for remediation of contaminated soil and groundwater zones at polluted soil sites.
- Understanding of the physics of the coastal zone and estuaries including currents, waves, sediment transport.
- Basic understanding of the ecological conditions in natural waters including the effect of various types of pollution on flora and fauna.
- Shall have knowledge on how numerical methods and experiments methods complement each other and how to use experimental data to improve numerical models.
- Shall have knowledge on how urban waste and storm water runoff interacts with our cities and its surrounding environment.
- Must have knowledge on effects and consequences of urban flooding.

Skills

- To analyze, synthesize and evaluate contaminant spill situations in regard to risk for area use and soil and groundwater resources around a polluted soil site.
- To apply selected methods to measure water transport parameters, solute transport parameters, gas transport parameters, and/or biodegradation coefficients in soil and groundwater.
- Explain the environmental impact of selected compounds on aquatic environments
- Identify the hydrological, chemical and biological processes that are central for the analysis and evaluation of a coastal marine environment and evaluate toxicological effects on an aquatic ecosystem.
- Use impact assessment methods.
- Build and analyze numerical water quality models.
- Plan and carry out the measurement program for field and laboratory measurements.
- Analyze errors and uncertainties in the measurement and modeling in natural or environmental engineering systems.
- Be able to evaluate the consequences of climate change for urban drainage systems.
- Combine knowledge on hydrodynamic performance of the storm drainage system with knowledge on the consequences in the receiving waters.
- Must be able to disseminate the results obtained from the project work in a project report.
- Must be able to work jointly with the project problem field project and make a joint presentation of the project work results.

Competencies

- To handle soil and groundwater pollution in relation to the groundwater resource, indoor climate, areal use.
- To structure and produce technical documentation of complex problems, methods and results.
- To communicate problems, findings and solutions graphical as well as oral to the relevant target audience.
- To perform water quality assessment studies for different types of impacts in natural waters.
- Be able to combine experimental data and numerical methods to develop better models within the area of water & environment.
- Be able to plan the drainage structure for an entire city with respect to flooding, receiving water quality and climate change.

§ 17: STRUCTURE AND CONTENTS OF THE PROGRAMME

The programme is structured in modules and organized as a problem-based study. A module is a programme element or a group of programme elements, which aims to give students a set of professional skills within a fixed time frame specified in ECTS credits, and concluding with one or more examinations within specific exam periods. Examinations are defined in the curriculum.

The programme is based on a combination of academic, problem-oriented and interdisciplinary approaches and organized based on the following work and evaluation methods that combine skills and reflection:

- lectures
- classroom instruction
- project work
- workshops
- study groups
- exercises (individually and in groups)
- laboratory tests
- measurements and testing in the field
- teacher feedback
- reflection
- portfolio work
- independent study

The modules are evaluated either through written or oral exams as stated in the description of the modules.

For individual written exams the study board selects among the following possibilities:

- Written exam based on handed out exercises
- Multiple choice
- Ongoing evaluation of written assignments

For individual oral exams the study board selects among the following possibilities:

- Oral exam with or without preparation
- Oral exam based on project report (individually graded through group exam)
- Oral exam based on presentation seminar
- Portfolio based oral exam

Elective courses will only be offered if at least five students enrol in the elective courses.

§ 18: OVERVIEW OF THE PROGRAMME

All modules are assessed through individual grading according to the 7-point scale *or* Pass/Fail. All modules are assessed by external examination (external grading) or internal examination (internal grading or by assessment by the supervisor only).

Of a total of 120 ECTS, 95-110 ECTS are assessed by the 7-point scale and 45-75 ECTS are assessed by external examination.

The students are given options in the project modules as they can select among different projects within the same general theme. Moreover, the master's thesis on the 4th semester can be selected freely within the field of water and environment.

The study board of civil engineering can decide, that the contents of a course module on a semester is taught in the project module in the same semester, by increasing the ECTS extend of the project module by the same number of ECTS.

Offered as: 1-professional					
Module name	Course type	ECTS	Applied grading scale	Evaluation method	Assessment method
1 SEMESTER					
Soil and Groundwater Pollution	Project	15	7-point grading scale	Internal examination	Oral exam based on a project
Hydrogeology and Groundwater Modelling	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Environmental Soil Science and Geostatistics	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Experimental Hydrology	Course	5	7-point grading scale	Internal examination	Written or oral exam
2 SEMESTER					
Marine and Freshwater Pollution	Project	15	7-point grading scale	External examination	Oral exam based on a project
Hydrodynamics and Time Series Analysis of Environmental Flows	Course	5	7-point grading scale	Internal examination	Written or oral exam
Marine Pollution	Course	5	7-point grading scale	Internal examination	Written or oral exam
Limnology	Course	5	7-point grading scale	Internal examination	Written or oral exam
3 SEMESTER Version A					
Advanced Urban Drainage	Project	15	7-point grading scale	Internal examination	Oral exam based on a project
Advanced Hydrodynamic Modelling (CFD) and Visualisation	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Measurement Technology, Data Acquisition, Test and Validation	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Urban Hydroinformatics	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
3 SEMESTER Version B					
Project Oriented Study in an External Organisation	Project	30	7-point grading scale	Internal examination	Oral exam based on a project
4 SEMESTER					
Master's Thesis	Project	30	7-point grading scale	External examination	Oral exam based on a project
3-4 SEMESTER Version A					
Master's Thesis	Project	60	7-point grading scale	External examination	Oral exam based on a project
3-4 SEMESTER Version B					
Master's Thesis	Project	50	7-point grading scale	External examination	Oral exam based on a project

3. semester Electives: Courses		10			
3-4 SEMESTER Version C					
Master's Thesis	Project	45	7-point grading scale	External examination	Oral exam based on a project
3. semester Electives: Courses		15			

On the 3rd semester students can choose to study at another university. The students must send an application to the Study Board before the study is commenced, where they apply for a preapproved credit transfer of the contents of the modules at the other university.

3. semester Electives: Courses					
Module name	Course type	ECTS	Applied grading scale	Evaluation Method	Assessment method
Advanced Hydrodynamic Modelling (CFD) and Visualisation	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Measurement Technology, Data Acquisition, Test and Validation	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Urban Hydroinformatics	Course	5	Passed/Not Passed	Internal examination	Written or oral exam

§ 19: ADDITIONAL INFORMATION

All students who have not participated in Aalborg University's PBL introductory course during their Bachelor's degree must attend the introductory course "Problem-based Learning and Project Management". The introductory course must be approved before the student can participate in the project exam. For further information, please see the School of Engineering and Science's website.

§ 20: COMMENCEMENT AND TRANSITIONAL RULES

The curriculum is approved by the Dean of the Faculty of Engineering and Science and enters into force the 1. September 2019 for all new, enrolled students.

The Study Board does not offer teaching after the previous curriculum from 2017 after the summer examination/winter examination 2020.

§ 21: AMENDMENTS TO THE CURRICULUM AND REGULATIONS

Minor editorial changes have been made in connection with the digitisation of the study curriculum.

On October 1, 2019, the Pro-Dean has approved the following changes effective immidiately:

- The applied grading scale on the module "*Hydrogeneology and Ground Water Modelling*" on 1st semester changes from 7-point grading scale to passed/not passed
- The applied grading scale on the module "*Experimental Hydrology*" on 1st semester changes from passed/not passed to 7-point grading scale