AALBORG UNIVERSITET

CURRICULUM FOR THE MASTER'S PROGRAMME IN STRUCTURAL AND CIVIL ENGINEERING, 2022

MASTER OF SCIENCE (MSC) IN ENGINEERING
AALBORG

Link to this studyline

TABLE OF CONTENTS

§ 1: PREFACE

Pursuant to consolidation Act 778 of August 7, 2019 on Universities (the University Act), the following is established.

The programme also follows the Examination Policies and Procedures incl. the Joint Programme Regulations for Aalborg University.

§ 2: BASIS IN MINISTERIAL ORDERS

The Master's programme is organised in accordance with the Ministry of Higher Education and Science's Order no. 2285 of December 1, 2021 on Full-time University Programmes (the University Programme Order) and Ministerial Order no. 2271 of December 1, 2021 on University Examinations (the Examination Order). Further reference is made to Ministerial Order no. 104 of January 24, 2021 (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 (BSc) in Engineering (Civil Engineering; Structural and Civil Engineering), Aalborg University

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

- Bachelor of Science in Civil Engineering, Aalborg University (Campus Esbjerg)
- Bachelor of Engineering in Civil Engineering with specialisation in Structural and Civil Engineering, Aalborg University (Campus Aalborg)
- Bachelor of Engineering in Civil Engineering, Aalborg University (Campus Esbjerg)
- Bachelor of Science in Civil Engineering (Construction Engineering), Technical University of Denmark
- Bachelor of Engineering in Civil Engineering (Construction Engineering), Technical University of Denmark
- Bachelor of Engineering in Civil and Structural Engineering, Aarhus University – School of Engineering
- Bachelor of Engineering in Civil Engineering, University of Southern Denmark
- Bachelor of Engineering in Civil Engineering, VIA University College

All applicants without a legal claim must prove that their English language qualifications is equivalent to level B (Danish level) in English.

Admission to the master's programme in Civil and Structural Engineering requires that the applicant has passed a relevant qualifying bachelor's or professional bachelor's degree programme. In order for a bachelor education to be considered relevant, it should include ECTS points within the following topics:

- Statics / structural Analysis, construction materials including steel and concrete, solid mechanics / continuum mechanics (minimum 30 ECTS in total)
- Geotechnics / soil mechanics, foundations (minimum 5 ECTS in total)
- Fluid mechanics / hydraulics (minimum 5 ECTS in total)
- Linear algebra, differential equations, statistics and probability (minimum 10 ECTS in total)

As a prerequisite for admission to the master's programme, students must have completed a bachelor programme in technical sciences, a bachelor of engineering programme or a bachelor in natural science.

§ 8: THE PROGRAMME TITLE IN DANISH AND ENGLISH

The Master's program entitles the graduate to the designation Civilingeniør, cand.polyt. i bygge- og anlægskonstruktion. The English designation is: Master of Science (MSc) in Engineering (Structural and Civil 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 that passed programme elements from other educational programmes at the same level replaces programme elements within this programme (credit transfer).

Furthermore, the Study Board can, upon application, approve that parts of this programme is completed at another university or a further education institution in Denmark or abroad (pre-approval of credit transfer).

The Study Board's decisions regarding credit transfer are based on an academic assessment.

§ 11: EXEMPTIONS

The Study Board's possibilities to grant exemption, including exemption to further examination attempts and special examination conditions, are stated in the Examination Policies and Procedures published at this website: https://www.studyservice.aau.dk/rules

§ 12: RULES FOR EXAMINATIONS

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

§ 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. If the project is written in English, the summary can be in Danish. 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 English, it is assumed that the student can read academic text and use reference works, etc., in English and other European languages.

§ 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

- Has scientifically based knowledge about the structural behavior of civil engineering structures regarding the static as well as the dynamic response.
- Has an understanding of geotechnical engineering and hydraulics as well as structure-soil and structure-fluid interaction based on scientific methods.
- Must understand analytical, numerical and experimental methods for analysis and design of engineering structures.
- Has knowledge about construction materials and soil regarding their mechanical behavior and modeling.
- Has knowledge about loads, especially environmental loads like wind and wave loads, and methods for their evaluation.
- Has knowledge about risk and reliability in engineering including uncertainties of loads, geometry, material properties, structural response and computational models.
- Has knowledge in one or more subject areas that is based on the highest international research within the fields of civil and structural engineering.

Skills

- Excels in the scientific methods and tools as well as general skills related to employment within civil and structural engineering.
- Can communicate research-based knowledge and discuss professional and scientific problems with peers as well as non-specialists, using the correct terminology in civil engineering.
- Can apply appropriate methods of analysis for investigating civil engineering structures and construction materials
- Can assess loads on civil engineering structures, including environmental loading from wind and waves.
- Can assess the uncertainty connected with structural analysis, and judge the quality of the results.
- Can select and apply appropriate computational and experimental methods to investigate the static and dynamic response of civil engineering structures.
- Can apply experimental tests for obtaining material properties, calibrating computational models and assess uncertainties within the fields of structural and geotechnical engineering.
- Can utilize and create digital solutions for data collection and storage, statistical data analysis, data visualization, modeling and simulation, for presentation of theories, hypotheses and results in writing as well as orally, as well as for organizing and implementing the collaboration internally in project groups as well as with external partners.

Competencies

- Can select and apply appropriate methods for solving a given problem within civil engineering and judge the results regarding their accuracy and validity.
- Can identify scientific problems within civil and structural engineering and select and apply proper scientific theories, methods and tools for their solution.
- Can develop and advance new analyses and solutions within civil and structural engineering.
- Can manage work-related situations that are complex and unpredictable, and which require new solutions.
- Can initiate and implement discipline-specific as well as interdisciplinary cooperation and assume professional responsibility.
- Can take responsibility for own professional development and specialization.

- Must be able to assess and relate the content of the project to those of the UN World Goals that are relevant
- Has competencies within and can participate in the development of digitization of the built environment and can digitally and effectively collaborate, communicate and exchange information, data and results with adjacent disciplines

§ 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

The elective courses are only 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, 120 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 can be selected freely within the field of structural and civil engineering.

Offered as: 1-professional Study programme: Structural and Civil Engineering						
Module name	Course type	ECTS	Applied grading scale	Evaluation method	Assessment method	Language
1 SEMESTER						
Stiffness Analysis of Load-Bearing Structures (B-BK-K1A-6)	Project	10	7-point grading scale	Internal examination	Oral exam based on a project	English
Introduction to Problem Based Learning within Structural and Civil Engineering (B-BK-K1A-1)	Project	5	7-point grading scale	Internal examination	Oral exam based on a project	English
Structural Mechanics and Dynamics (B-BK-K1A-3)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Material Modelling in Civil Engineering (B-BK-K1A-4)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Fluid and Water Wave Dynamics (B-BK-K1A-5)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
2 SEMESTER						
The Excitation and Foundation of Marine Structures (B-BK-K2A-11)	Project	15	7-point grading scale	External examination	Oral exam based on a project	English
Coastal, Offshore and Port Engineering (B-BK-K2A-7)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Risk and Reliability in Engineering (B-BK-K2A-9)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Advanced Soil Mechanics and Structures (B-BK-K2A-8)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
3 SEMESTER Option 1						
Project-oriented Study in an External Organisation (B-BK-K3A-17)	Project	30	7-point grading scale	Internal examination	Oral exam based on a project	English
3 SEMESTER Option 2						
Analysis and Solution of an Advanced Civil and/or Structural Engineering Problem (B-BK-K3A-11)	Project	15	7-point grading scale	Internal examination	Oral exam based on a project	English
3. semester Electives: Courses		15				
3-4 SEMESTER Option 3						

Master's Thesis (B-BK-K3A-19)	Project	45	7-point grading scale	External examination	Master's thesis/final project	English
3. semester Electives: Courses		15				
4 SEMESTER						
Master's Thesis (B-BK-K4A-20)	Project	30	7-point grading scale	External examination	Master's thesis/final project	English

The study board must approve on the content of **the project-oriented study** before it is commenced.

3. semester Electives: Courses						
Module name	Course type	ECTS	Applied grading scale	Evaluation Method	Assessment method	Language
Renewable Energy Structures: Wind Turbines and Wave Energy Devices (B-BK-K3A-12)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Wind Loads on Structures (B-BK-K3A-13)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Nonlinear and Dynamic Analysis of Civil Engineering Structures (B-BK-K3A-14A)	Course	5	7-point grading scale	Internal examination	Oral exam	English
Fracture Mechanics and Fatigue (M-DMS-K1-4)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Advanced Structural Analysis and Design of Civil Engineering Structures (B-BK-K3A-20)	Course	5	7-point grading scale	Internal examination	Oral exam	English

§ 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 visit this website.

§ 20: COMMENCEMENT AND TRANSITIONAL RULES

The curriculum is approved by the dean and enters into force as of September 1, 2022.

The Study Board does not offer teaching after the previous curriculum from 2020 after the summer examination 2023.

The Study Board will offer examinations after the previous curriculum, if there are students who have used examination attempts in a module without passing. The number of examination attempts follows the rules in the Examination Order.

§ 21: AMENDMENTS TO THE CURRICULUM AND REGULATIONS

The Vice dean of Education has on February 11, 2025, approved that the prerequisite for enrollment for the exam is erased in the module *The Excitation and Foundation of Marine Structures*, valid from Spring 2025.