AALBORG UNIVERSITET

MASTER OF SCIENCE (MSC) IN ENGINEERING (DESIGN OF MECHANICAL SYSTEMS) 2019

MASTER OF SCIENCE (MSC) IN ENGINEERING
AALBORG

Link to this studyline

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

Master of Science (MSc) in Engineering (Design of Mechanical Systems) 2017

TABLE OF CONTENTS

§ 1: PREFACE

Pursuant to consolidation Act 172 of February 27, 2018 on Universities (the University Act) with subsequent changes, the following curriculum for the Master's program in Design of Mechanical Systems is stipulated. The programme also follows the Joint Programme Regulations and the Examination Policies and Procedures for the The Faculty of Engineering and Science.

§ 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 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 Mechanical Engineering and Physics.

§ 6: AFFILIATION TO CORPS OF EXTERNAL EXAMINERS

The Master's programme is associated with the external examiners corps on Nationwide engineering examiners/Machine.

§ 7: ADMISSION REQUIREMENTS

Applicants with a legal claim to admission (retskrav):

- Bachelor of Science in Mechanical Engineering and Manufacturing

Applicants with one of the following degrees are entitled to admission:

- Bachelor of Science in Civil Engineering
- Bachelor of Science in Structural and Civil Engineering
- Bachelor of Science in Civil Engineering
- Bachelor of Science in Mechanical Engineering and Manufacturing
- Bachelor of Science in Mechanical Design
- Bachelor of Science in Mechanical Engineering

§ 8: THE PROGRAMME TITLE IN DANISH AND ENGLISH

The Master's programme entitles the graduate to the Danish designation Civilingeniør, cand.polyt. i design af mekaniske systemer. The English designation is: Master of Science (MSc) in Engineering (Design of Mechanical Systems).

§ 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.studieservice.aau.dk/regler-vejledninger

§ 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/regler-vejledninger

§ 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 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

The graduate of the Master's programme:

Knowledge

- Has attained thorough understanding of a broad range of theoretical, numerical and experimental techniques within the area of design of mechanical systems.

- Has knowledge in one or more subject areas that, in selected areas within mechanical engineering, is based on the highest international research in a subject area.
- Can understand and, on a scientific basis, reflect over subject area's related to mechanical engineering and identify scientific problems within that area.
- Demonstrate an understanding of research work and be able to become a part of a research environment.
- Demonstrate insight into the implications of research work, including research ethics.

Skills

- Be able to apply scientific methodology to the solving of a wide variety of problems within the field of specialization.
- Be able to perform scientific work in relevant topics of the field of the specialization.
- Be able to apply a wide range of engineering methods in research and development projects in the field of specialization.
- Be able to participate or lead projects in mechanical system design, product development, modeling and analysis of mechanical systems, materials technology, production technology, structural mechanics and design of lightweight structures.
- Can communicate research-based knowledge and discuss professional and scientific problems with both peers and non-specialists.
- Can use advanced laboratory test set ups and data collection methods.

Competencies

- Be able to work independently with a project on a specific problem within their field of interest on the highest possible level within their specialization.
- Be able to take part in technical development and research.
- Can manage work and development situations that are complex, unpredictable and require new solutions within the area of mechanical engineering.
- Can independently initiate and implement discipline-specific and interdisciplinary cooperation and assume professional responsibility.
- Be able to direct the technical management of development projects within the industry.
- Be competent to solve new and complicated technical problems by the use of advanced mathematics, scientific and technological knowledge.
- Can independently take responsibility for own professional development and specialization.

§ 17: STRUCTURE AND CONTENTS OF THE PROGRAMME

The M.Sc. program in Design of Mechanical Systems aims at educating graduates, who are qualified to take part in technical development and research and who are able to direct the technical management of development projects within the industry.

The graduates are expected to have gained a broad knowledge within the areas of mechanical system design, product development, modelling and analysis of mechanical systems, materials technology, production technology, structural mechanics and design of lightweight structures. Also, the graduates are expected to be competent to solve new and complicated technical problems by the use of advanced mathematics, scientific and technological knowledge.

The program is structured in modules and organized as a problem-based study. A module is a program element or a group of program 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 that are defined in the curriculum.

The program 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

- exercises (individually and in groups)
- teacher feedback
- reflection
- portfolio work

§ 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).

Offered as: 1-professional						
Module name	Course type	ECTS	Applied grading scale	Evaluation method	Assessment method	Language
1 SEMESTER						
Stress and Deformation Analyses of Load Carrying Structural Element	Project	15	7-point grading scale	Internal examination	Oral exam based on a project	English
Solid Mechanics with Microstructure	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Fracture Mechanics and Fatigue	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Finite Element Methods	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
2 SEMESTER						
Engineering Design of Mechanical Systems	Project	15	7-point grading scale	External examination	Oral exam based on a project	English
Engineering Optimization – Concepts, Methods and Applications	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Mechanics of Composite Materials and Structures	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Energy and Variational Methods with Applications	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
3 SEMESTER Project - Option A						
Industrial Development	Project	20	7-point grading scale	Internal examination	Oral exam based on a project	English
Elective courses Recommended elective courses	Course	10				
3 SEMESTER Project - Option B						
Industrial Development	Project	25	7-point grading scale	Internal examination	Oral exam based on a project	English
Elective courses Recommended elective courses	Course	5				
3 SEMESTER Project - Option C						

Industrial Development	Project	30	7-point grading scale	Internal examination	Oral exam based on a project	English
3 SEMESTER Project Oriented Study in an External Organisation - Option A						
Project Oriented Study in an External Organisation	Project	20	7-point grading scale	Internal examination	Oral exam based on a project	English
Elective courses Recommended elective courses	Course	10				
3 SEMESTER Project Oriented Study in an External Organisation - Option B						
Project Oriented Study in an External Organisation	Project	25	7-point grading scale	Internal examination	Oral exam based on a project	English
Elective courses Recommended elective courses	Course	5				
3 SEMESTER Project Oriented Study in an External Organisation - Option C						
Project Oriented Study in an External Organisation	Project	30	7-point grading scale	Internal examination	Oral exam based on a project	English
3-4 SEMESTER Option A						
50 ECTS Long Master's Thesis	Project	50	7-point grading scale	External examination	Master's thesis/final project	English
Elective courses Recommended elective courses	Course	10				
3-4 SEMESTER Option B						
Long Master's Thesis	Project	60	7-point grading scale	External examination	Master's thesis/final project	English
4 SEMESTER						
Master's Thesis	Project	30	7-point grading scale	External examination	Master's thesis/final project	English

The third semester offers different ways of organisation – depending on the student's choice of content; project work at Aalborg University, study visit at an educational institution in Denmark or abroad, Project Oriented Study in an External Organisation in Denmark or abroad, or a semester programme that comprises cross-disciplinary programme elements composed by the student. The total work load of the semester has to be equivalent to 30 ECTS. The project may be finalized with a project report or in the form of a scientific paper, or, if the project is continued at the 4th semester, with a midterm evaluation. For further information about the organisation of the module please see the Joint Programme Regulations.

Courses on 3rd semester are elective and the student can choose up to 10 ECTS course credits. The two courses listed are often followed by students from Design in Mechanical Systems.

At the 4th semester, the master thesis is completed. The master thesis can be combined with the 3rd semester in an extended master thesis.

Elective courses

Elective courses
Recommended elective courses

Module name	Course type	ECTS	Applied grading scale	Evaluation Method	Assessment method	Language
Computational Fluid Dynamics (CFD) and Multiphase Flow	Course	5	7-point grading scale	Internal examination	Oral exam	English
Test and Validation	Course	5	Passed/Not Passed	Internal examination	Written and oral exam	English

§ 19: ADDITIONAL INFORMATION

The current version of the curriculum is published on the study board's website, including more detailed information about the programme, including exams.

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. Further information about the introductory course can be found at the homepage of the study board of materials and production https://www.mp.aau.dk/study-board.

§ 20: COMMENCEMENT AND TRANSITIONAL RULES

The curriculum is approved by the Dean of the Faculty of Engineering and Science and enters into force as of September 2019.

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

§ 21: AMENDMENTS TO THE CURRICULUM AND REGULATIONS

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