AALBORG UNIVERSITET

MASTER OF SCIENCE IN ENGINEERING (MATHEMATICAL ENGINEERING), 2017

MASTER OF SCIENCE (MSC) IN ENGINEERING AALBORG

Link to this studyline

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

Master in Mathematical Engineering, 2020

Master of Science (MSc) in Engineering (Mathematical Engineering) 2022
Master of Science in Engineering (Mathematical Engineering), 2018

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§ 1: PREFACE

Pursuant to Act 261 of March 18, 2015 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) and Ministerial Order no. 1062 of June 30, 2016 on University Examinations (the Examination Order). Further reference is made to Ministerial Order no. 258 of March 18, 2015 (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 Faculty of Engineering and Science, Aalborg University.

§ 5: STUDY BOARD AFFILIATION

The Master's programme falls under Study Board of Mathematical Sciences

§ 6: AFFILIATION TO CORPS OF EXTERNAL EXAMINERS

The Master's programme is associated with the external examiners corps on Nationwide engineering examiners/Electronics, IT and Energy (Electromagnetic direction).

The Body of External Examiners for Mathematics can also be used.

(Ingeniørernes landsdækkende censorkorps (elektronik-delen). Censorkorpset for matematik kan også anvendes.)

§ 7: ADMISSION REQUIREMENTS

Applicants with a legal right of admission (retskrav)

- Bachelor of Science (BSc) in Engineering (Mathematical Engineering), Aalborg University

Applicants without legal right of admission

- Bachelor of Science (BSc) in Engineering (Mathematical Engineering), Technical University of Denmark (DTU)

§ 8: THE PROGRAMME TITLE IN DANISH AND ENGLISH

The Master's programme entitles the graduate to the Danish designation Civilingeniør, cand.polyt. i matematik-teknologi. The English designation is: Master of Science (MSc) in Engineering (Mathematical 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.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 that are 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 knowledge in one or more of the areas applied mathematics, engineering science, and their interaction. The knowledge should, in selected areas, be based on the highest level of international research
- can understand and on a solid mathematical and engineering basis reflect over the area's knowledge base and be able to identify relevant mathematical and technological problems

Skills

- excels in the subject area's(s') scientific methods and tools and general skills related to employment within the subject area(s)

- can evaluate and select among the subject area's(s') scientific theories, methods, tools and general skills and, on a scientific basis, advance new analyses and solutions
- can communicate scientific knowledge and discuss professional and scientific problems with both peers and non-specialists

Competencies

- can manage work and development situations that are complex, unpredictable and require new solutions
- can independently initiate and implement discipline-specific and interdisciplinary cooperation and assume professional responsibility
- can independently take responsibility for own professional development and specialization

§ 17: STRUCTURE AND CONTENTS OF THE PROGRAMME

The programme is structured in modules and organised 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
- exercises (individually and in groups)
- teacher feedback
- reflection
- portfolio work

§ 18: OVERVIEW OF THE PROGRAMME

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).

General provisions concerning courses:

- Only a limited number of elective courses will be offered at each semester
- Some mandatory courses are only offered every other year
- Students can only participate once in a course with a given title. In particular, they cannot follow a course if they have previously participated in a course with the same title as part of a bachelor programme
- Courses from a bachelor programme must include extra competencies when followed on the master programme

Offered as: 1-professional Study programme:						
Module name	Course type	ECTS	Applied grading scale	Evaluation method	Assessment method	Language
1 SEMESTER						

Information Processing in Technical Systems (F-MTK-K1-1)	Project	15	7-point grading scale	Internal examination	Oral exam based on a project	Danish and English
Information and Coding Theory (F-MTK-K1-2)	Course	5	7-point grading scale	Internal examination	Written or oral exam	Danish and English
Machine Learning (N-IRS-K3-3)	Course	5	Passed/Not Passed	Internal examination	Written or oral exam	English
Array and Sensor Signal Processing (ESNSPAK3K1)	Course	5	Passed/Not Passed	Internal examination	Written or oral exam	English
2 SEMESTER						
Signal/Data Processing Systems (F-MTK-K2-1)	Project	15	7-point grading scale	External examination	Oral exam based on a project	Danish and English
Compressive Sensing (F-MTK-K2-2)	Course	5	Passed/Not Passed	Internal examination	Written or oral exam	Danish and English
Bayesian Inference and Mixed Models (F-MAT-K2-2)	Course	5	Passed/Not Passed	Internal examination	Active participation/continuous evaluation	Danish and English
Time Series and Econometrics (F-MOK-B6-3)	Course	5	7-point grading scale	Internal examination	Written or oral exam	Danish and English
3 SEMESTER						
3. semester/MATTEK9 Projects						
3-4 SEMESTER						
Long Master's Thesis, 60 ECTS (F-MTK-K3-3)	Project	60	7-point grading scale	External examination	Oral exam based on a project	Danish and English
4 SEMESTER						
Master's Thesis. 30 ECTS (F-MTK-K4-1)	Project	30	7-point grading scale	External examination	Oral exam based on a project	Danish and English

The student selects one project, 30 ECTS, on MATTEK9.

3. semester/MATTEK9 Projects						
Module name	Course type	ECTS	Applied grading scale	Evaluation Method	Assessment method	Language
Selected Advanced Topics in Mathematics and Technology with a Focus on Mathematical Problems (F-MTK-K3-1)	Project	30	7-point grading scale	Internal examination	Oral exam based on a project	Danish and English
Selected Advanced Topics in Mathematics and Technology with a Focus on Technical Problems (F-MTK-K3-2)	Project	30	7-point grading scale	Internal examination	Oral exam based on a project	Danish and English

Study abroad

On the 3'rd semester the student also has the possibility to study at another Danish or international university (study abroad). Study at another university must be approved by the Study Board.

PBL Course in Problem Based Learning and Project Management (The course is an integrated part of the project for those not acquainted to the Aalborg PBL Model)

Problem Based Learning and Project Management/Projblembaseret læring og projektledelse

Prerequisites: None

Objective: The objective is to prepare newly started Master's students from another university than AAU to enter the Problem Based Learning environment at AAU and manage study projects in close collaboration with peers.

Students who complete the module should:

Day 1

- Describe and discuss the Aalborg PBL Model based on the three key words: Group work, project work, problem orientation
- Identify an initial individual challenge when using a PBL approach

Day 2

- Develop and practice peer feedback skills
- Practice collaborative learning in a group
- Design a plan of action to deal with an initial individual PBL challenge or curiosity

Day 3

- Practice presentation skills
- Practice critical skills when giving feedback to peers
- Reflect on own and peer skills in relation to PBL practice

Type of instruction: Three□ half□ day workshops centred on the individual student working with an individual challenge or curiosity in relation to using a PBL approach. Peer learning is also a hallmark, since the students will discuss and reflect on their individual challenges or curiosities in a peer learning group.

Form of examination: Internal assessment during the course/class participation according to the rules in the Examination Policies and Procedures, Addendum to the Joint Programme Regulations of Faculty of Engineering and Science, Aalborg University. In this case the assessment is primarily based on the oral performance during the course, this means that the student has to be active during the course time and participate in discussions.
The course is an integrated part of the project for those not acquainted to the Aalborg PBL Model, and is a condition for participation in the project examination. In this way there will be no diploma for the course and it will not be visible on the academic transcripts.

Evaluation criteria: As stated in the Joint Programme Regulations.

§ 19: ADDITIONAL INFORMATION

§ 20: COMMENCEMENT AND TRANSITIONAL RULES

The curriculum is approved by the dean and enters into force as of September 2017.

Students who wish to complete their studies under the previous curriculum from 2016 must conclude their education by the summer examination period 2018 at the latest, since examinations under the previous curriculum are not offered after this time.

§ 21: AMENDMENTS TO THE CURRICULUM AND REGULATIONS