AALBORG UNIVERSITET

MASTER OF SCIENCE (MSC) IN ENGINEERING (MANUFACTURING TECHNOLOGY) 2016

MASTER OF SCIENCE (MSC) IN ENGINEERING
AALBORG

Link to this studyline

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Master of Science (MSc) in Engineering (Manufacturing Technology) 2017

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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 for the Master programme in Manufacturing Technology is stipulated. The programme also follows the Joint programme regulations and the Examination Policies and Procedures for the Faculties of Engineering and Science and Medicine.

§ 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. 111 of January 30, 2017 (the Admission Order) and Ministerial Order no. 114 of February 3, 2015 (the Grading Scale Order) with subsequent changes.

§ 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):

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

- Bachelor of Science in Mechanical Engineering and Manufacturing, Aalborg University

Applicants without legal claim to admission:

Students with another Bachelor degree may, upon application to the Board of Studies, be admitted following a specific academic assessment if the applicant is considered as having comparable educational prerequisites. The University can stipulate requirements concerning conducting additional exams prior to the start of study.

§ 8: THE PROGRAMME TITLE IN DANISH AND ENGLISH

The Master's programme entitles the graduate to the Danish designation Civilingeniør, cand.polyt. i virksomhedsteknologi. The English designation is: Master of Science (MSc) in Engineering (Manufacturing Technology).

§ 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 by the faculty on their website.

§ 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

It is assumed that the student is able to read academic texts in modern Danish, Norwegian, Swedish and English and use reference works, etc., in 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

The graduate of the Master's programme:

Knowledge

- Has an understanding of the basic elements and concepts involved in industrial manufacturing
- Has an understanding of how the elements interact locally as well as globally
- Has a deep understanding of the interface and structure of a limited manufacturing system
- Has attained an understanding for methods of analysing a manufacturing system
- Has attained an understanding of how to identify relevant actions as well as sketch and verify solutions

- Understands the fundamental principles of product design and development
- Has an understanding of the relationship between product design and manufacturing (design for manufacturing)
- Understands the use of modelling and simulation tools with regards to planning and implementing new manufacturing systems
- Understands the assumptions and limitations of the modelling and simulation tools used in the projects
- Is able to understand and use innovation models which speed up the innovation process, reduce the risk of failure and/or improve the business or societal value
- Has an in-depth knowledge of a selected manufacturing technology
- Is able to acquire new knowledge required to solve an industrial or scientific problem within manufacturing engineering and technology.

Skills

- Is able to identify and map causal relations between items such as the manufacturing equipment, the flexibility of the production facility, organisation, economy, the working environment, sustainability and the likes
- Is able to analyse technical issues with relation to manufacturing processes and production in a production facility
- Is able to formulate operational objectives for the performance of a production facility
- Is able to develop solutions for improving a production facility based on the analysis
- Is able to perform a sensitivity analysis of solutions in relation to the defined operational objectives
- Is able to develop a requirements specification for a manufacturing system through an analysis of customer needs
- Is able to develop solution concepts that satisfy the requirements specification
- Is able to identify critical elements of proposed solution concepts
- Is able to use appropriate modelling and simulation tools for development of solutions
- Is able to formulate a plan for the project's continuation. Is able to use innovation models in solution of an industrial problem
- Is able to perform an assessment of different options to solve a problem
- Is able to explain commercial relevance of a proposed solution
- Is able to assess limitations of the concepts, theories and methodologies applied in solution of a problem
- Is able to scout for new products, materials or manufacturing technologies
- Is able to demonstrate engineering and/or scientific skills within the line of specialisation and to perform engineering and/or scientific work.

Competencies

- Is able to analyse any given manufacturing system and prescribe measures to improve the efficiency of the facility
- Is able to interact and communicate with the participants involved in the design, development and operation of manufacturing systems
- Has the foundation to analyse and improve large scale manufacturing systems
- Is able to professionally participate in development of new products and manufacturing systems, focusing on evaluation, selection and implementation of relevant technologies
- Is able to establish the foundation for applying advanced and relevant simulation tools to future research and development activities
- Is able to participate in technological innovation activities
- Is able to work independently with a project on a specific problem within his/her field of interest at the highest possible level within his/her specialisation.

§ 17: STRUCTURE AND CONTENTS OF THE PROGRAMME

The MSc programme in Manufacturing Technology aims at providing graduates with competences to solve complex production-related problems and is designed to develop both theoretical understanding and practical experience. The

programme focuses on design, development and implementation of products, manufacturing and control systems; primarily in relation to development, planning and implementation of industrial production.

The programme is structured giving the graduate the opportunity to specialise within specific areas; e.g. virtual product- and process development, material- and process technology and operation and robot technology. The specialisation is carried out through the project work.

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 aim 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 defined in the curriculum.

The programme is based on a combination of academic, problem-oriented and interdisciplinary approaches and organised 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:					
Module name	Course type	ECTS	Applied grading scale	Evaluation method	Assessment method
1 SEMESTER					
Production Analysis and Efficiency Improvement	Project	15	7-point grading scale	Internal examination	Oral exam based on a project
Non-linear Finite Element - Applied on Materials Processing	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Production Modelling and Monitoring	Course	5	7-point grading scale	Internal examination	Written or oral exam
Production Planning and Control	Course	5	7-point grading scale	Internal examination	Written or oral exam
2 SEMESTER					
Development of Manufacturing Systems	Project	15	7-point grading scale	External examination	Oral exam based on a project
Intelligent Manufacturing	Course	5	7-point grading scale	Internal examination	Written or oral exam
Engineering Optimization – Concepts, Methods and Applications	Course	5	7-point grading scale	Internal examination	Written or oral exam

Product Development and Modelling	Course	5	7-point grading scale	Internal examination	Written or oral exam
3 SEMESTER					
Academic Internship	Project	30	7-point grading scale	Internal examination	Oral exam based on a project
Technological Innovation	Project	30	7-point grading scale	Internal examination	Oral exam based on a project
Scientific paper	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	Master's thesis/final project

The 3rd semester offers different ways of organisation – depending on the student's choice of content; traditional project work at Aalborg University, study visit at an educational institution in Denmark or abroad, voluntary traineeship with project work at a company 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 must be equivalent to 30 ECTS, of which up to 15 ECTS may be elective courses. The project may be finalised with a project report or in the form of a scientific paper, or, if the project is continued on the 4th semester, with a midterm evaluation. For further information about the organisation of the module, please see the Joint programme regulations, chapter 2.3, and the study guide for the MSc programme in Manufacturing Technology.

The project must be equivalent to at least 15 ECTS. Course modules approved by the Study Board for the specific study must supplement to a total of 30 ECTS.

By agreement with the Study Board of Industry and Global Business Development, the project may be reduced to allow for participation in course activities. However, the project must encompass at least 15 ECTS. Proposed course activity is evaluated and tested in accordance with the curriculum in which the course module is described.

Scientific paper writing must be equivalent to at least 15 ECTS. Course modules approved by the Study Board for the specific study must supplement to a total of 30 ECTS.

By agreement with the Study Board of Industry and Global Business Development, scientific paper writing may be reduced to allow for participation in course activities. However, the scientific paper must encompass at least 15 ECTS. Proposed course activity is evaluated and tested in accordance with the curriculum in which the course module is described.

On the 4th semester, the Master's Thesis is completed. The Master's Thesis may be combined with the 3rd semester in an extended Master's Thesis.

§ 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.

§ 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 2016.

Students who wish to complete their studies under the previous curriculum from 2010 must conclude their education by the summer examination period 2017 at the latest, since examinations under the previous curriculum are not offered after this time.

§ 21: AMENDMENTS TO THE CURRICULUM AND REGULATIONS

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