



AALBORG UNIVERSITET

# **MASTER OF SCIENCE (MSC) IN ENGINEERING (MATERIALS TECHNOLOGY) 2016**

MASTER OF SCIENCE (MSC) IN ENGINEERING  
AALBORG

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## Master of Science (MSc) in Engineering (Materials Technology) 2016

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## TABLE OF CONTENTS

§ 1: Preface .....	4
§ 2: Basis in Ministerial orders .....	4
§ 3: Campus .....	4
§ 4: Faculty affiliation .....	4
§ 5: Study board affiliation .....	4
§ 6: Affiliation to corps of external examiners .....	4
§ 7: Admission requirements .....	4
§ 8: The programme title in Danish and English .....	4
§ 9: Programme specifications in ECTS credits .....	5
§ 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 .....	5
§ 11: Exemptions .....	5
§ 12: Rules for examinations .....	5
§ 13: Rules concerning written work, including the Master's Thesis .....	5
§ 14: Requirements regarding the reading of texts in a foreign language .....	5
§ 15: Competence profile on the diploma .....	5
§ 16: Competence profile of the programme .....	5
§ 17: Structure and Contents of the programme .....	6
§ 18: Overview of the programme .....	7
§ 19: Additional information .....	8
§ 20: Commencement and transitional rules .....	8
§ 21: Amendments to the curriculum and regulations .....	8

## § 1: PREFACE

Pursuant to Act 261 of March 18, 2015 on Universities (the University Act) with subsequent changes, the following curriculum for the Master's program in Materials Technology is stipulated. The programme also follows the Joint Programme Regulations and the Examination Policies and Procedures for the The Faculty of Engineering and Science, the Technical Faculty of IT and Design, and the Faculty of 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 right of admission (retskrav):

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

### Applicants without legal right of admission:

Applicants with the following bachelor's degree are entitled to admission:

- Bachelor of Science (BSc) in Engineering (Nanotechnology with specialisation in Physics), Aalborg University
- Bachelor of Science (BSc) in Physics, Aalborg University
- Bachelor of Science (BSc) in Chemistry, Aalborg University
- Bachelor of Engineering in Mechanical Engineering and Industry, Aalborg University
- Bachelor of Engineering in Nanotechnology, Aalborg University

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 materialeteknologi*. The English designation is: Master of Science (MSc) in Engineering (Materials 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 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**

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.

## **§ 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 and experimental techniques within the area of Materials Technology.
- Has knowledge in several subject areas based on the highest international research level, within the field of materials technology.
- Can understand and, on a scientific basis, reflect over subject area's related to materials technology and identify scientific problems within that area.
- Demonstrate an understanding of research work and be able to become a part of the research environment.
- Demonstrate insight into the implications of research work, including research ethics.

### **Skills**

- Be able to apply scientific methodology to solve a wide variety of problems within the field of specialization.
- Be able to perform scientific work in relevant topics of the field of 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 in or lead projects in materials technology, materials selection, product development, and production technology.
- Can communicate research-based knowledge and discuss professional and scientific problems with both peers and non-specialists.
- Can use advanced laboratory equipment 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 materials technology.
- Be able to analyse and evaluate the influence of material structure and processing method on the material properties.
- 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 Master's programme in Materials Technology 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 Materials Technology. The graduates have knowledge about qualified materials selection, materials behavior to external stimuli, influence of processing on material properties and material microstructure, metallurgy, issues related to polymer chemistry, various material testing methods and simulation of material behavior.

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 that 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

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	ECT S	Applied grading scale	Evaluation method	Assessment method
<b>1 SEMESTER</b>					
<a href="#">Metallic Materials</a>	Project	15	7-point grading scale	External examination	Oral exam based on a project
<a href="#">Metals and Alloys</a>	Course	5	7-point grading scale	Internal examination	Written or oral exam
<a href="#">Continuum Mechanics</a>	Course	5	7-point grading scale	Internal examination	Written or oral exam
<a href="#">Solid Mechanics with Microstructure</a>	Course	5	7-point grading scale	Internal examination	Written or oral exam
<a href="#">Fracture Mechanics and Fatigue</a>	Course	5	7-point grading scale	Internal examination	Written or oral exam
<b>2 SEMESTER</b>					
<a href="#">Polymers and Polymer Composites</a>	Project	15	7-point grading scale	External examination	Oral exam based on a project
<a href="#">Fundamental Polymer Chemistry</a>	Course	5	7-point grading scale	Internal examination	Written or oral exam
<a href="#">Polymer Chemistry</a>	Course	5	7-point grading scale	Internal examination	Written or oral exam
<a href="#">Simulation and Measuring of Materials Behavior</a>	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
<a href="#">Polymers and Composite Materials</a>	Course	5	7-point grading scale	Internal examination	Written or oral exam
<b>3 SEMESTER</b>					
<a href="#">Industrial Development</a>	Project	30	7-point grading scale	Internal examination	Oral exam based on a project
<a href="#">Industrial Development</a>	Project	15	7-point grading scale	Internal examination	Oral exam based on a project
<b>4 SEMESTER</b>					

<a href="#">Master's Thesis</a>	Project	30	7-point grading scale	External examination	Master's thesis/final project
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According to the joint programme regulations students are offered a choice of an individually planned semester comprising of a traineeship/scientific paper/overseas studies or a long dissertation, see § 17.

The students are given options in the project modules as they can select among different projects within the same general theme. Moreover, the projects on the 3rd and 4th semester can be selected freely within the field of Materials Technology, and the students have the choice of making a long master's thesis comprising both semesters. Optional choices are also given on the 2nd and 3rd semester where some course modules can be selected.

1st semester: The student must choose one of the two courses based on the students bachelor degree.

2nd semester: The student must choose one of the two courses based on the students bachelor degree.

3rd semester: The project must be equivalent to at least 15 ECTS. Course modules approved by the Study Board for Industry and Global Business Development. The specific study must supplement to a total of 30 ECTS.

## § 19: ADDITIONAL INFORMATION

The current version of the curriculum is published on the Board of Studies' 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 2013 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.