AALBORG UNIVERSITET

CURRICULUM FOR MASTER'S PROGRAMME IN COMPUTER ENGINEERING, 2025, COPENHAGEN

MASTER OF SCIENCE (MSC) IN ENGINEERING
COPENHAGEN

Link to this studyline

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§ 1: PREFACE

Pursuant to consolidation Act 391 of April 10, 2024, 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) with subsequent changes and Ministerial Order no. 2271 of December 1, 2021 on University Examinations (the Examination Order) with subsequent changes. Further reference is made to Ministerial Order no. 51 of January 14, 2024 (the Admission Order) and Ministerial Order no. 1125 of July 4, 2022 (the Grading Scale Order

§ 3: CAMPUS

The programme is offered in Copenhagen.

§ 4: FACULTY AFFILIATION

The Master's programme falls under The Technical Faculty of IT and Design, Aalborg University.

§ 5: STUDY BOARD AFFILIATION

The Master's programme falls under Study Board of Electronics and IT.

§ 6: AFFILIATION TO CORPS OF EXTERNAL EXAMINERS

The Master's programme is associated with the external examiners corps on Civil engineering corps of external examiners.

§ 7: ADMISSION REQUIREMENTS

Applicants with a legal right of admission (retskrav):

Aalborg University has no programme with legal right of admission.

Applicants without a legal claim to admission:

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

- Bachelor of Science (BSc) in Engineering (Cyber and Computer Engineering) (AAU)
- Bachelor of Science (BSc) in Engineering (Computer Engineering) (AAU)
- Bachelor of Science (BSc) in Engineering (Electronic Engineering) (AAU)
- Bachelor of Engineering in Electronics (AAU)
- Bachelor of Science (BSc) in Computer Science (AAU)
- Bachelor of Science (BSc) in Engineering (Software) (AAU)
- Bachelor of Science (BSc) in Information Technology (AAU)
- Bachelor in Computer Science (AU)
- Bachelor in Data Science (AU)
- Bachelor in Computer Science (SDU)
- Bachelor in Software Engineering (SDU)
- Bachelor in Computer Engineering (KU), specialisation (General profile in Computer Science and Data Science)

- Bachelor in Software Development (ITU)
- Bachelor in Data Science (ITU)
- Bachelor of Engineering in Software Technology (DTU)

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

Admission to the master's programme in computer engineering requires that the applicant has passed a relevant qualifying bachelor's or professional bachelor's degree programme. A bachelor's or professional bachelor's degree programme is defined as relevant if the degree programme provides competencies to a minimum of ECTS within the following subject areas:

- Programming (10 ECTS)
- Mathematics (10 ECTS)
- Discrete Structures and Algorihms (5 ECTS)
- Computer Network and Distributed Systems (5 ECTS)
- Basics in Machine Learning (5 ECTS)

All applicants must, as a minimum, document English language qualifications comparable to an "English B level" in the Danish upper secondary school (gymnasium) (cf. the Admission Order).

§ 8: THE PROGRAMME TITLE IN DANISH AND ENGLISH

The Master's programme entitles the graduate to the Danish designation Cand.polyt. i computerteknologi. The English designation is: Master of Science (MSc) in Engineering (Computer 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

It is assumed that the student can read academic texts in English 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 a comprehensive base of knowledge og scientific foundations and technological principles within the field of distributed and high-performance computer systems
- Has knowledge about advanced data management and data processing techniques in the field of computer engineering
- Has knowledge about IoT and cloud security.
- Has knowledge about machine learning methods and techniques and their applicability within the field of computer engineering
- Possess knowledge in one or more subject areas thar is based on the highest international research within the field of computer engineering
- Has knowledge of theories and methods for design and implementation of complex distributed systems with the focus on cloud and edge computing, big data management and analysis

Skills:

- Excels in scientific methods, tools and general skills related to design, simulation, implementation, test, and evaluation of distributed systems within the field of computer engineering
- Can analyze the knowledge, theory, methodologies and practice related to machine learning, data management and analysis in the context of computer systems
- Can critically assess and select among scientific theories and methods - including the application of analytical, numerical and experimental methods - for analysis, design and implementation of high-performance distributed systems within the field of computer engineering
- Can analyze and critically assess methodologies and architectures applied in distributed, big-data engineering systems
- Can apply computer engineering methods to critically assess, analyze and develop ICT solutions
- Must be able to communicate orally and in writing, including using digital tools, on topics within the field of knowledge, and in particular on the application of relevant techniques, procedures and algorithms used in the solution of a given problem

Competences:

- Must be able to formulate and hypothesize problems of relevance to the performance (e.g., complexity, networking, security) of practical computer and distributed systems and critically analyze these on a system level.

- Can analyze and apply appropriate theories and methods within the field of computer engineering and evaluate the results regarding their accuracy and validity on a scientific basis
- Can develop and advance new analyses and solutions within the field of computer engineering, with the focus on distributed systems and big data engineering
- Can manage work and development situations that are complex, unpredictable and require new solutions
- Has the ability to participate in project group work, apply process models, and collaborate with industry
- Can independently initiate and implement discipline-specific and interdisciplinary cooperation and assume professional responsibility
- Can independently take responsibility for his or her own professional development and specialization, getting knowledge from different platforms, incl digital platforms
- Can communicate research-based knowledge and discuss professional and scientific problems with both peers and non-specialists using the correct terminology

§ 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 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)

• self-study

• 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).

Electives: The remaining 25 ECTS can be obtained by choosing elective courses and projects on the 3rd semester as described below. Note that elective courses might not be offered if less than 10 students sign up. Students will be offered other options if a chosen course is not offered.

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

1 SEMESTER						
Complex System Design and Development (ESNCEKK1P1)	Project	15	7-point grading scale	Internal examination	Oral exam based on a project	English
Cloud Technologies (ESNCEKK1K1)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Security in IoT and Cloud Architectures (ESNCYSK1K9)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Computer Systems Engineering (ESNCEKK1K2)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
2 SEMESTER						
High-performance Systems (ESNCEKK2P1)	Project	15	7-point grading scale	External examination	Oral exam based on a project	English
Numerical Scientific Computing (ESNAVSK2K3)	Course	5	Passed/Not Passed	Internal examination	Active participation/continuous evaluation	English
AI and Advanced Machine Learning (ESNCEKK2K1)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Big Data Management (ESNCEKK2K2)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
3 SEMESTER Option A						
Project 3rd Semester Choose 1 project	Project	20				
Data Mining and Analysis (ESNCEKK3K1)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Course 3rd Semester Choose 1 course	Course	5				
3 SEMESTER Option B						
Project-Oriented Study in an External Organisation (ESNCEKK3P3)	Project	25	Passed/Not Passed	Internal examination	Oral exam based on a project	English
Data Mining and Analysis (ESNCEKK3K1)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
4 SEMESTER						
Master's Thesis (ESNCEKK4P1)	Project	30	7-point grading scale	External examination	Master's thesis/final project	English

Project 3rd Semester Choose 1 project						
Module name	Course type	ECTS	Applied grading scale	Evaluation Method	Assessment method	Language
Big Data Engineering in Practice (ESNCEKK3P1)	Project	20	7-point grading scale	Internal examination	Oral exam based on a project	English

Sustainable ICT Solutions (ESNCEKK3P2)	Project	20	7-point grading scale	Internal examination	Oral exam based on a project	English

Course 3rd Semester Choose 1 course						
Module name	Course type	ECTS	Applied grading scale	Evaluation Method	Assessment method	Language
Quantum Technologies (ESNCEKK3K2)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Network Security (ESNCYSK1K6)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Programming Paradigms (DSNSWCK111)	Course	5	7-point grading scale	External examination	Written or oral exam	English
Web Intelligence (DSNSWCK112)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Industrial Test and Verification (DSNSWCK113)	Course	5	7-point grading scale	Internal examination	Written or 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 see Department of Electronics Systems's website.

§ 20: COMMENCEMENT AND TRANSITIONAL RULES

The curriculum is approved by the dean and enters into force as of 1 September 2025.

§ 21: AMENDMENTS TO THE CURRICULUM AND REGULATIONS