AALBORG UNIVERSITET

MASTER OF SCIENCE (MSC) IN ENGINEERING (VISION, GRAPHICS AND INTERACTIVE SYSTEMS), 2018 (DISP)

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 (Vision, Graphics and Interactive Systems) 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 for the Master's programme in Vision, Graphics and Interactive Systems is stipulated. The programme also follows the Joint Programme Regulations and the Examination Policies and Procedures for The Technical Faculty of IT and Design.

§ 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 Technical Faculty of IT and Design, Aalborg University.

§ 5: STUDY BOARD AFFILIATION

The Master's programme falls under the Board of Studies for Electronics and IT.

§ 6: AFFILIATION TO CORPS OF EXTERNAL EXAMINERS

The programme is affiliated with the body of external examiners for engineering educations: electro (In Danish: censorkorps for Ingeniøruddannelsernes landsdækkende censorkorps; elektro).

§ 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 Engineering (Electronic Engineering and IT with specialisation in Informatics), Aalborg University
- Bachelor of Science in Engineering (Internet Technologies and computer Engineering with specialisation in Informatics), Aalborg University

Applicants without legal claim to admission:

Bachelor's programmes qualifying students for admission:

- Bachelor of Science (BSc) in Engineering (Electronic Engineering and IT with specialisation in Communication Systems) (AAU)
- Bachelor of Science (BSc) in Engineering (Electronic Engineering and IT with specialisation in Signal Processing) (AAU)
- Bachelor of Science in Engineering (Electronic Engineering and IT with specialisation in Control Engineering), Aalborg University
- Bachelor of Science (BSc) in Engineering (Internet Technologies and Computer Engineering with specialization in Communication Systems) (AAU)
- Bachelor of Science (BSc) in Engineering (Internet Technologies and Computer Engineering with specialization in Signal Processing) (AAU)
- Bachelor of Science (BSc) in Engineering (Internet Technologies and computer Engineering with specialisation in Control Engineering), Aalborg University
- Bachelor of Science in Engineering (Robotics); Aalborg University

All students applying must document English language qualifications comparable to an 'English B level' in the Danish upper secondary school (minimum average grade 02).

§ 8: THE PROGRAMME TITLE IN DANISH AND ENGLISH

The Master's programme entitles the graduate to the designation civilingeniør, cand.polyt. (candidatus/candidata polytechnices) i vision, grafik og interaktive systemer. The English designation is: Master of Science (MSc) in Engineering (Vision, Graphics and Interactive 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 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 can read academic texts in his or her native language as well as in English and use reference works etc.

§ 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 knowledge on an advanced level in computer vision, computer graphics and interactive systems based on the highest international research in these areas
- Can understand and, on a scientific basis, reflect over the aforementioned subject area's key knowledge and can identify scientific problems and propose solutions within these
- Has a comprehensive knowledge of the core subjects for computer vision, such as image recognition, visual scene analysis, object tracking, etc.
- Has knowledge about methods for computer graphics, augmented reality, 3D rendering, etc.
- Has knowledge about interactive systems design, in particular multi modal user interaction and user experience design.
- Has knowledge about machine learning methods and techniques and pattern recognition
- Has knowledge of the theories and methods for realizing complex software systems for vision, graphic and interactive systems

Skills:

- Excels in scientific methods, tools and general skills related to design, simulation, real-time implementation, test, evaluation, and documentation of systems within the fields of computer vision, graphics and user interaction
- can evaluate and select among the scientific theories, methods, tools and general skills within the fields of computer vision, graphics and user interaction and, on a scientific basis, advance new analyses and solutions
- can communicate research-based knowledge and discuss professional and scientific problems with both peers and non-specialists
- Can apply methods and tools for solving complex problems within the aforementioned domains
- Can analyze and apply state-of-the-art methods in Computer Vision
- Can analyze and apply state-of-the-art methods in Computer Graphics
- Can apply user cantered design methods to design, implement and test multimodal user interaction strategies

Competences:

- 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
- Can analyze and apply appropriate theories and methods for computer vision problems within e.g. surveillance, robotics, etc.
- Can select and apply appropriate methods for solving a given problem within computer vision, graphics and interactive systems and evaluate the results regarding their accuracy and validity
- Can identify scientific problems within control and auto computer vision, graphics and interactive systems and select and apply proper scientific theories, methods and tools for their solution
- Can develop and advance new analyses and solutions within computer vision, graphics and interactive systems
- Can take responsibility for own professional development and specialization.
- Work according to a scientific method and present results in the form of a scientific article and at a seminar/scientific conference
- Formulate and explain scientific hypotheses and results achieved through scientific work
- Analyze results and draw conclusions on a scientific basis

§ 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

Offered as: 1-professional Study programme: MSc Vision, Graphics and Interactive Systems					
Module name	Course type	ECTS	Applied grading scale	Evaluation method	Assessment method
1 SEMESTER Computer Graphics					
Computer Graphics	Project	15	7-point grading scale	Internal examination	Oral exam based on a project
Computer Graphics Programming	Course	5	7-point grading scale	Internal examination	Written or oral exam
Machine Learning	Course	5	7-point grading scale	Internal examination	Written or oral exam
User Experience Design for Multi Modal Interaction	Course	5	7-point grading scale	Internal examination	Written or oral exam
2 SEMESTER Computer Vision					
Computer Vision	Project	15	7-point grading scale	External examination	Oral exam based on a project
Image Processing and Computer Vision	Course	5	7-point grading scale	Internal examination	Written or oral exam
2nd Semester VGIS Elective courses (2 courses) Choose 2 courses	Course	10			
3 SEMESTER Interactive Systems					
2nd Semester VGIS Elective courses (2 courses) Choose 2 courses					

2nd Semester VGIS Elective courses (2 courses) Choose 2 courses					
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2nd Semester VGIS Elective courses (2 courses) Choose 2 courses					
3-4 SEMESTER Long Master's Thesis					
3rd and 4th Semester Vision, Graphics and Interactive Systems, Option C 50 ECTS long thesis + 10 ECTS courses	Project	50			
4 SEMESTER Master's Thesis					
Master's Thesis	Project	30	7-point grading scale	External examination	Oral exam based on a project
Computer Graphics Programming	Course	5	7-point grading scale	Internal examination	Written or oral exam

2nd Semester VGIS Elective courses (2 courses)
Choose 2 courses

Module name	Course type	ECTS	Applied grading scale	Evaluation Method	Assessment method
Algorithms, Data Structures and Software Engineering for Media Technology	Course	5	7-point grading scale	Internal examination	Written or oral exam
Numerical Scientific Computing	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Robot Vision	Course	5	Passed/Not Passed	Internal examination	Written or oral exam

3rd Semester Vision, Graphics and Interactive Systems, Option A
20 ECTS project unit + 10 ECTS courses

Module name	Course type	ECTS	Applied grading scale	Evaluation Method	Assessment method
Interactive Systems	Project	20	7-point grading scale	Internal examination	Oral exam based on a project
Platforms and Methods for Multi Modal Systems	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Research in Vision, Graphics and Interactive Systems	Course	5	Passed/Not Passed	Internal examination	Written or oral exam

3rd Semester Vision, Graphics and Interactive Systems: Option B1
20 ECTS Academic Internship + 10 ECTS courses

Module name	Course type	ECTS	Applied grading scale	Evaluation Method	Assessment method
Academic Internship	Project	20	Passed/Not Passed	Internal examination	Oral exam based on a project
Platforms and Methods for Multi Modal Systems	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Research in Vision, Graphics and Interactive Systems	Course	5	Passed/Not Passed	Internal examination	Written or oral exam

3rd Semester Vision, Graphics and Interactive Systems: Option B2
25 ECTS Academic Internship + 5 ECTS courses

Module name	Course type	ECTS	Applied grading scale	Evaluation Method	Assessment method
Academic Internship	Project	25	Passed/Not Passed	Internal examination	Oral exam based on a project
2nd Semester VGIS Elective courses (2 courses) Choose 2 courses	Course	5			

3rd Semester Vision, Graphics and Interactive Systems: Option B3
30 ECTS Academic Internship

Module name	Course type	ECTS	Applied grading scale	Evaluation Method	Assessment method
Academic Internship	Project	30	Passed/Not Passed	Internal examination	Oral exam based on a project

3rd and 4th Semester Vision, Graphics and Interactive Systems, Option C
50 ECTS long thesis + 10 ECTS courses

Module name	Course type	ECTS	Applied grading scale	Evaluation Method	Assessment method
Master's Thesis	Project	50	7-point grading scale	External examination	Oral exam based on a project
Platforms and Methods for Multi Modal Systems	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Research in Vision, Graphics and Interactive Systems	Course	5	Passed/Not Passed	Internal examination	Written or oral exam

3rd Semester Vision, Graphics and Interactive Systems Elective courses (1 course)
Choose 1 course

Module name	Course type	ECTS	Applied grading scale	Evaluation Method	Assessment method
Platforms and Methods for Multi Modal Systems	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Research in Vision, Graphics and Interactive Systems	Course	5	Passed/Not Passed	Internal examination	Written or oral exam

§ 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. For further information, please see the Schools website.

§ 20: COMMENCEMENT AND TRANSITIONAL RULES

The curriculum is approved by the Dean of the Technical Faculty of IT and Design and enters into force as of September 2018.

Students who wish to complete their studies under the previous curriculum from 2017 must conclude their education by the summer examination period 2019 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 the digitisation of the study curriculum.