AALBORG UNIVERSITET

BACHELOR OF SCIENCE (BSC) IN ENGINEERING (ROBOTICS), 2018

BACHELOR OF SCIENCE (BSC) IN ENGINEERING AALBORG

Link to this studyline

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

Curriculum for the bachelor's programme in Robotics, 2019

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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 Bachelor'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. 110 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 Bachelor's programme falls under The Technical Faculty of IT and Design, Aalborg University.

§ 5: STUDY BOARD AFFILIATION

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

§ 6: AFFILIATION TO CORPS OF EXTERNAL EXAMINERS

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

§ 7: ADMISSION REQUIREMENTS

Admission requires an upper secondary education.

According to the Admission Order, the programme's specific entry requirements are:

- English B
- Physics B
- Mathematics A (minimum grade 4.0)

§ 8: THE PROGRAMME TITLE IN DANISH AND ENGLISH

The Bachelor's programme entitles the graduate to the designation Bachelor (BSc) i teknisk videnskab (robotteknologi). The English designation is: Bachelor of Science (BSc) in Engineering (Robotics).

§ 9: PROGRAMME SPECIFICATIONS IN ECTS CREDITS

The Bachelor's programme is a 3-year, research-based, full-time study programme. The programme is set to 180 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 Bachelor'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 BACHELOR'S PROJECT

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 Bachelor's project 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. in other European languages

§ 15: COMPETENCE PROFILE ON THE DIPLOMA

The following competence profile will appear on the diploma:

A graduate of the Bachelor's programme has competencies acquired through an educational programme that has taken place in a research environment.

A graduate of the Bachelor's programme has fundamental knowledge of and insight into his/her subject's methods and scientific foundation. These properties qualify the graduate of the Bachelor's programme for further education in a relevant Master's programme as well as for employment on the basis of the educational programme

§ 16: COMPETENCE PROFILE OF THE PROGRAMME

The graduate of the Bachelor's programme:

Knowledge

- Has knowledge of and insight into fundamental theories, methods, tools and practical subjects within the fields of Robotics
- Has a firm grasp of the mathematical and programming technical foundations of the field
- Has knowledge of the interaction between electronic and mechanical systems, including feedback mechanisms, electromechanical systems, software and manipulators
- Has knowledge of sensors and actuators relevant for the field

Skills

- Can utilise up-to-date scientific methods, tools and techniques to analyse and solve complex problems in the fields of robotics
- Can evaluate and compare theoretical and practical problems, as well as describe and select relevant solution strategies

- Is able to implement such solution strategies and evaluate their success in a systematic manner
- Is able to present problems and solution strategies within the fields of robotics, in writing as well as orally, to specialists as well as non-specialists in the fields, including external parties, users, etc.

Competencies

- Is able to handle complex situations that arise in research and/or development-related environments, such as university studies and/or engineering workplaces.
- Is able to develop and test robotics hardware and software and integrate them into a broader systems-oriented context
- Can work independently as well as in collaboration with others, both within and across technical fields, in an efficient and professional manner
- Is able to identify his/her own learning needs and structure his/her own learning in various learning environment

§ 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. The 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)
- teacher feedback
- reflection
- portfolio work

Rules concerning the progress of the Bachelor’s programme

The student must participate in all first year examinations by the end of the first year of study in the Bachelor's programme, in order to be able to continue the programme. The first year of study must be passed by the end of the second year of study, in order that the student can continue his/her Bachelor's programme. In special cases, however, there may be exemption from the above

§ 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 assessment by the supervisor only).

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

Technological Teamwork (P0)	Project	5	Passed/Not Passed	Internal examination	Oral exam based on a project
Fundament Mobile Robotics (P1)	Project	10	7-point grading scale	Internal examination	Oral exam based on a project
Robot Programming	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Problem Based Learning in Science, Technology and Society	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Linear algebra	Course	5	7-point grading scale	Internal examination	Written or oral exam
2 SEMESTER Manipulator and industrial robotics					
Manipulator and Industrial Robotics	Project	15	7-point grading scale	External examination	Oral exam based on a project
Robot Mechanics, Modelling, and Simulation	Course	5	7-point grading scale	Internal examination	Written or oral exam
Calculus	Course	5	7-point grading scale	Internal examination	Written or oral exam
Structered System and Product Development	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
3 SEMESTER Manipulating the surroundings					
Manipulating the Surroundings	Project	15	7-point grading scale	External examination	Oral exam based on a project
Actuators, Drivers and Electronic Modules	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Robot Dynamics, Biomechanics and Biological Actuators	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Robotic Control Systems	Course	5	7-point grading scale	Internal examination	Written or oral exam
4 SEMESTER Sensing the surroundings					
Sensing the Surroundings	Project	15	7-point grading scale	Internal examination	Oral exam based on a project
Robotic Sensing	Course	5	7-point grading scale	Internal examination	Written or oral exam
Robotic Perception	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Probability Theory and Statistics	Course	5	7-point grading scale	Internal examination	Written or oral exam
5 SEMESTER Robot integration					
Robot Integration	Project	15	7-point grading scale	External examination	Oral exam based on a project
Software and Automation Frameworks	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Productions Systems and Automation	Course	5	7-point grading scale	Internal examination	Written or oral exam

Robots in the Health Care System	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
6 SEMESTER BSc Robotics					
6th semester elective project module Select 1 of the 2 options	Project	15			
Motion Planning and Path Planning	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
6th semester courses (2 courses) Choose 2 courses	Course	10			

6th semester elective project module Select 1 of the 2 options					
Module name	Course type	ECTS	Applied grading scale	Evaluation Method	Assessment method
BSc Project (Robots in an Application Context)	Project	15	7-point grading scale	External examination	Oral exam based on a project
BSc Project (Robots in a Theoretical Context)	Project	15	7-point grading scale	External examination	Oral exam based on a project

6th semester courses (2 courses) Choose 2 courses					
Module name	Course type	ECTS	Applied grading scale	Evaluation Method	Assessment method
Matrix Computations and Convex Optimization	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Embedded Software Design	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Digital Design	Course	5	Passed/Not Passed	Internal examination	Written or oral exam
Biomedical Engineering in an Organizational and Corporate Perspective	Course	5	7-point grading scale	Internal examination	Written or oral exam
Digital Signal Processing	Course	5	7-point grading scale	Internal examination	Written or oral exam

Throughout the semesters students will at an increasing abstraction level be introduced to relevant theories and scientific methods. Scientific theory and scientific methods in general are included in the course Problem based learning in science, technology and society. Moreover, the students develop their skills in this area in their project work, where they will apply scientific methods in practice and reflect on their application.

1st Semester: Commencement of Studies Exam (Studiestartsprøve)

Size:
The commencement of studies exam does not yield ECTS credits and will not appear on the diploma

The purpose of the commencement of studies exam is to ascertain whether students have actually commenced their studies. The students must participate in and pass the commencement of studies exam in order to continue on their studies. If the students do not participate in or pass the commencement of studies exam or re-exam, the students' enrollment at their studies will be terminated immediately after the re-exam.

The commencement of studies exam will be held within the first weeks of the semester.

Contents:
The commencement of studies exam is based on the instruction course and contains for instance general questions about the students' expectations and motivation for their choice of studies.

Re-exam:
There will be only one commencement of studies re-exam. If the students do not participate in or do not pass the commencement of studies exam or re-exam, the students' studies will be terminated before 1 October. The Study Board can grant exemption from the rules regarding the commencement of studies exam if there are unusual circumstances.

Examination format:
Written exam

Assessment:
Internal assessment. The students receive the assessment "Approved" or "Not approved" based on their answers to the written exam. The students receive the assessment "Approved" when the written exam is answered and handed in.

Appeal:
The students can complain about the commencement of studies exam to the University. The complaint must be submitted to the University within two weeks from the result of the commencement of studies exam is announced. If the University rejects the complaint, the decision may be appealed to the Danish Agency of Science and Higher Education, if the appeal concerns legal issues.

§ 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.

§ 20: COMMENCEMENT AND TRANSITIONAL RULES

The curriculum is approved by the dean and enters into force as of September 2018.

Students who wish to complete their studies under the previous curriculum from 2014 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

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

23rd January 2019: It is required that the student has received minimum the grade 4.0 in Mathematics A to be entitled to admission from 1st September 2019.