AALBORG UNIVERSITET

CURRICULUM FOR THE MASTER'S PROGRAMME IN BIOENGINEERING, 2022

MASTER OF SCIENCE (MSC) IN ENGINEERING
ESBJERG

Link to this studyline

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

Master of Science (MSc) in Engineering (Bioengineering), 2020

TABLE OF CONTENTS

§ 1: PREFACE

Pursuant to consolidation Act 778 of August 7, 2019 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) and Ministerial Order no. 2271 of December 1, 2021 on University Examinations (the Examination Order). Further reference is made to Ministerial Order no. 104 of January 24, 2021 (the Admission Order) and Ministerial Order no. 114 of February 3, 2015 (the Grading Scale Order).

§ 3: CAMPUS

The programme is offered in Esbjerg.

§ 4: FACULTY AFFILIATION

The Master's programme falls under The Faculty of Engineering and Science, Aalborg University.

§ 5: STUDY BOARD AFFILIATION

The Master's programme falls under Study Board of Chemistry and Bioscience

§ 6: AFFILIATION TO CORPS OF EXTERNAL EXAMINERS

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

§ 7: ADMISSION REQUIREMENTS

Applicants without legal claim to admission:

- BSc i Chemical Engineering and Biotechnology, Aalborg University
- BSc i bioteknologi, Aalborg University
- BSc i Sustainable Biotechnology, Aalborg University
- Diplomingeniør i kemi og bioteknologi, Aalborg University
- BSc i kemi og bioteknologi, University of Southern Denmark
- BSc i bioteknologi, Århus University
- BSc i bioteknologi, Technical University of Denmark
- Diplomingeniør i bioteknologi, Århus University
- Bachelor of Engineering (B. Eng.) with specialization in the branch of biotechnology, University College Absalon, Denmark

All applicants must prove that their English language qualifications are equivalent to level B (Danish level) in English.

Admission to the master's programme in Bioengineering, cand.polyt 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:

- Mathematics and statistics (15 ECTS)
- Chemistry, including organic chemistry and physical chemistry (15 ECTS)

- Biotechnology or chemical engineering, including biochemistry, molecular biology, microbiology, cell biology and genetics, and process technology (100 ECTS)
- Experimental work in biotechnology or chemical engineering, through practice courses, projects, or other activities (20 ECTS)

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

§ 8: THE PROGRAMME TITLE IN DANISH AND ENGLISH

The Master's program entitles the graduate to the designation Civilingeniør, cand.polyt. i bioprocesteknologi. The English designation is: Master of Science (MSc) in Engineering (Bioengineering).

§ 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

A Master in Bioegineering has knowledge based on the highest international research in a number of subject areas within bioengineering

- Biological engineering
- Bioprocess engineering
- Biorefinery concepts and processes
- Bioenergy
- Process monitoring and chemometrics
- Process engineering, modelling and simulation
- Microbial fermentation platforms
- Microbial production of small molecules
- Genetic engineering
- Mass balances in bioprocesses
- Thermodynamics and kinetics of microbial metabolism
- Life science industry, sustainability and bioeconomy

Skills

A Master in Bioegineering can select, apply and develop experimental methods within the subject areas of biological engineering

A Master in Bioegineering can select, apply and develop genetic tools for enhanced production of small molecules

A Master in Bioegineering can select, apply and develop technical methods for designing optimal engineering equipment for microbial fermentation processes.

A Master in Bioegineering can select, apply and develop methods for monitoring and simulating biological processes

Competences

A Master in Bioegineering can communicate bioengineering technical and research problems and solutions to both peers and non-specialists, including collaborative partners and end-users, through discussion as well as through written reports and oral presentations.

A Master in Bioegineering can independently be part of a discipline-specific or interdisciplinary group dealing with technical or research problems within bioengineering.

A Master in Bioegineering can handle complex and development-oriented situations in a study, professional, or research context.

A Master in Bioengineering can analyze, identify and formulate problems on a scientific basis and subsequently work problem-oriented on understanding, further developing and finding solutions both individually and in collaboration with other professionals.

A Master in Bioengineering can use digital solutions for data collection and storage, statistical data analysis, data visualization, modeling and simulation, for presentation of theories, hypotheses and results in writing as well as orally, as well as for organizing and implementing collaboration in project groups and with external partners.

A Master in Bioegineering can perform digital search of relevant professional and research literature and knowledge in databases as well as assess the validity of digital sources and use digital platforms for self-study and knowledge sharing as well as for professional discussion and communication.

§ 17: STRUCTURE AND CONTENTS OF THE PROGRAMME

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. Examinations 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

AAU Micro

AAU Micro are small e-learning modules of limited, well-defined scope. AAU Micro modules are extra-curricular but may be employed to support learning in curricular course and project modules.

§ 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: 1-professional						
Module name	Course type	ECTS	Applied grading scale	Evaluation method	Assessment method	Language
1 SEMESTER						
Analysis of Macro and Molecular Biotechnology Systems (K-KT-K1-30A)	Project	15	7-point grading scale	Internal examination	Oral exam based on a project	English
Molecular Biotechnology – Recombinant DNA Technology (K-KT-K1-31)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Fermentation Technology (K-KT-K1-32)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Recovery and Purification of Chemical and Biological Products (K-KT-K1-33)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
2 SEMESTER						

Applied Bioprocess Design and Engineering (K-KT-K2-33A)	Project	15	7-point grading scale	Internal examination	Oral exam based on a project	English
Bioressources and Biorefineries (K-BT-K2-22)	Course	5	Passed/Not Passed	Internal examination	Active participation/continuous evaluation	English
Modelling and Simulation of Biological Processes (K-KT-K2-35)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Chemometrics and Process Monitoring (K-KT-K2-36)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
3 SEMESTER Option A						
Specialization in Bioengineering (K-KT-K3-33A)	Project	30	7-point grading scale	External examination	Oral exam based on a project	English
3 SEMESTER Option B						
Specialization in Bioenergy (K-KT-K3-34A)	Project	30	7-point grading scale	External examination	Oral exam based on a project	English
3-4 SEMESTER Option C						
Master's Thesis (K-KMB-K4-4A)	Project	60	7-point grading scale	External examination	Master's thesis/final project	English
4 SEMESTER						
Master's Thesis (K-KMB-K4-5A)	Project	30	7-point grading scale	External examination	Master's thesis/final project	English

Electives

On 3 - 4 semester option A, B or C is chosen

§ 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 the www.en.bio.aau.dk

§ 20: COMMENCEMENT AND TRANSITIONAL RULES

The curriculum is approved by the dean and enters into force as of September 1, 2022.

The Study Board does not offer teaching after the previous curriculum from 2020 after the summer examination 2023.

The Study Board will offer examinations after the previous curriculum, if there are students who have used examination attempts in a module without passing. The number of examination attempts follows the rules in the Examination Order.

§ 21: AMENDMENTS TO THE CURRICULUM AND REGULATIONS

The Vice-dean has on November 24, 2023, approved an addition of Micro Modules in section 17, valid from spring 2024.

The Vice dean of Education has on February 11, 2025, approved that the prerequisite for enrollment for the exam is erased in the module *Applied Bioprocess Design and Engineering*, valid from Spring 2025.