AALBORG UNIVERSITET

BACHELOR OF SCIENCE (BSC) IN ENGINEERING (CHEMICAL ENGINEERING AND BIOTECHNOLOGY), 2018

BACHELOR OF SCIENCE (BSC) IN ENGINEERING
ESBJERG

Link to this studyline

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

Curriculum for the Bachelor's Programme in Chemical Engineering and Biotechnology, 2022
Bachelor of Science (BSc) in Engineering (Chemical Engineering and Biotechnology), 2020 (Esbjerg)

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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 of Engineering and Science, The Faculty of Medicine and The Technical Faculty of IT and Design.

§ 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 Esbjerg.

§ 4: FACULTY AFFILIATION

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

§ 5: STUDY BOARD AFFILIATION

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

§ 6: AFFILIATION TO CORPS OF EXTERNAL EXAMINERS

The Bachelor's programme is associated with the external examiners corps on: Ingeniøruddannelsernes landsdækkende censorkorps – kemi.

§ 7: ADMISSION REQUIREMENTS

Admission requires an upper secondary education.

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

- Mathematics A
- English B

And one of the following combinations:

- Physics B and Chemistry B
- Physics B and Biotechnology A
- Chemistry B, Biology A and Physics C

§ 8: THE PROGRAMME TITLE IN DANISH AND ENGLISH

The Bachelor's programme entitles the graduate to the Danish designation Bachelor (BSc) i teknisk videnskab (kemi og bioteknologi). The English designation is: Bachelor of Science (BSc) in Engineering (Chemical Engineering and Biotechnology).

§ 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 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.studieservice.aau.dk/regler-vejledninger

§ 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/regler-vejledninger

§ 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. 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 his or her native language as well as in English and use reference works etc. in other European

§ 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 Bachelor

Knowledge

- Has research-based knowledge about theory, method and practice within following natural and engineering fields: Chemistry, biology, physics, material science, mathematics and statistics
- Analytical chemistry, instrumental methods, experimental design, data collection and method validation

- Process engineering, including chemical reaction engineering, chemical unit operations, construction materials, process control, instrumentation and safety
- Can understand and reflect on theory, method and practice within the scientific fields mentioned above and put them in a social context

Skills

- Can apply the problem-based approach to analyze complex issues, identify problems and define requirements for solutions
- Can describe processes and systems using process diagrams and also draw up and solve balance equations for this
- Can perform chemical, microbiological, material related and process engineering experiments in the laboratory in accordance with the laboratory safety regulations
- Can select and apply appropriate analytical methods for qualitative or quantitative analysis of composition of different products and for the purposes of process control
- Can apply statistical tools to develop experimental designs, process data and validate analytical methods
- Can develop mathematical models for chemical and biochemical reactions and processes, and design ideal reactors and simple unit operations
- Can select appropriate process equipment, construction materials, safety regulations, and approach for regulation and instrumentation (including data acquisition equipment) for a given process
- Can evaluate theoretical and practical problems associated with development, production and analysis of chemical and biotechnological products, and also reason for relevant solutions
- Can communicate chemical, biochemical, and process-technical problems and solutions to both peers and non-specialists, including collaborative partners and users, both through discussion, as well as written and oral reports

Competencies

- Can handle complex and development-oriented situations in a study or work context
- Can independently be part of discipline-specific and interdisciplinary cooperation with a professional approach
- Can identify own learning needs and structure own learning in different learning environments

§ 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

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 exemptions 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:						
Module name	Course type	ECTS	Applied grading scale	Evaluation method	Assessment method	Language
1 SEMESTER						
Chemical and Bio Industrial Products I (K-KT-B1-12)	Project	5	Passed/Not Passed	Internal examination	Oral exam based on a project	Danish and English
Chemical and Bio Industrial Products II (K-KT-B1-11)	Project	10	7-point grading scale	Internal examination	Oral exam based on a project	Danish and English
Problem-based Learning in Science, Technology and Society (N-EN-B1-5)	Course	5	Passed/Not Passed	Internal examination	Written exam	Danish and English
General Chemistry (K-KT-B1-1)	Course	5	7-point grading scale	Internal examination	Written or oral exam	Danish and English
Calculus (F-MAT-B1-3)	Course	5	7-point grading scale	Internal examination	Written or oral exam	Danish and English
2 SEMESTER						
Chemical Reactions in Natural and Technical Systems (K-KT-D2-4)	Project	15	7-point grading scale	External examination	Oral exam based on a project	Danish and English
Fundamental Chemical Engineering and Thermodynamics (K-KT-D2-2)	Course	5	7-point grading scale	Internal examination	Written or oral exam	Danish and English
Biological Active Molecules – Introduction to Cell Biology and Biological Chemistry (K-KT-D2-1)	Course	5	Passed/Not Passed	Internal examination	Written or oral exam	Danish and English
Linear Algebra (F-MAT-B2-2)	Course	5	7-point grading scale	Internal examination	Written or oral exam	Danish and English
3 SEMESTER						
Analysis of Chemical Systems (K-KT-B3-13)	Project	15	7-point grading scale	External examination	Oral exam based on a project	Danish and English
Methods in Quantitative Chemical Analysis (K-KT-B3-2)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Inorganic and Organic Chemistry (K-KT-B3-3)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Applied Statistics (K-KT-B3-30)	Course	5	7-point grading scale	Internal examination	Written or oral exam	Danish and English
4 SEMESTER						
Electives	Project	15				
Chemical Thermodynamics and Separation Process Engineering (K-KT-B4-3)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English

Microbial Biotechnology (K-KT-B4-4)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Material Science and Material Selection (K-KT-B4-5)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
5 SEMESTER						
Electives	Project	15				
Chemical Reaction Engineering (K-KT-B5-4)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Heat Transfer and Fluid Mechanics (B-MT-D5-11)	Course	5	7-point grading scale	Internal examination	Written and oral exam	Danish and English
Mathematical Modeling and Numerical Methods (K-KT-B5-6)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
6 SEMESTER						
Design of Experiments (K-KT-B6-6)	Course	5	7-point grading scale	Internal examination	Written or oral exam	English
Process Control, Instrumentation and Safety (K-KT-B6-7)	Course	5	7-point grading scale	Internal examination	Oral exam	English
BSc Project in Chemical Engineering and Biotechnology (K-KT-B6-14)	Project	20	7-point grading scale	External examination	Oral exam based on a project	English

Electives 4th semester						
Module name	Course type	ECTS	Applied grading scale	Evaluation Method	Assessment method	Language
Material Science (K-KT-B4-13)	Project	15	7-point grading scale	External examination	Oral exam based on a project	Danish and English
Applied Microbiology (K-KT-B4-18)	Project	15	7-point grading scale	External examination	Oral exam based on a project	English
Petrochemical Separation Processes (K-KT-B4-19)	Project	15	7-point grading scale	External examination	Oral exam based on a project	English

Electives 5th semester						
Module name	Course type	ECTS	Applied grading scale	Evaluation Method	Assessment method	Language
Chemical Process Engineering (K-KT-B5-14)	Project	15	7-point grading scale	External examination	Oral exam based on a project	English
Bioprocess Engineering (K-KT-B5-15)	Project	15	7-point grading scale	External examination	Oral exam based on a project	English
Refinery Products and Processes (K-KT-B5-16)	Project	15	7-point grading scale	External examination	Oral exam based on a project	English

Knowledge and Scientific Method

Science and scientific methods are included through all projects (15 ECTS modules), as these are based on problem-based learning as a scientific method. There will be teaching about this, and other scientific tools in the courses: Problem-based learning in science, technology, society, science and entrepreneurship.

Elective Courses

The Bachelor's program provides students with freedom of choice for individual profiling of their education. This freedom is achieved by the fact that both on 4th semester and 5th semester, there is an optional choice between several project modules. Also the bachelor's project provides opportunity to work on different subjects.

Commencement of Studies Exam
Studiestartsprøve

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

Objective: 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 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 1st semester.

Content: The commencement of studies exam is based on the introduction 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 October 1st. 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 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 course description.

§ 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 2017 must conclude their education by the summer examination period 2020 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.

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