Study Programme for the degree

Bachelor of Engineering in Biotechnology

PROFESSIONS-
HØJSKOLEN
ABSALON

Center for Engineering & Science,
University College Absalon

September 2019

Indhold

Preface

Dear students,

Welcome to University College Absalon – to the Bachelor of Engineering in Biotechnology and to this study programme.

The programme is provided by Center for Engineering & Science at University College Absalon; where we are particularly focused on the following areas around which the programme is structured:

- professionalism with a base in industrial application
- regional and industrial symbiosis – locally and internationally
- project-based teaching as a development tool for making good engineers
- an active international study and work environment with a short distance from students to employees

We hope that you will notice our focus areas in the form and structure of the programme, the scientific level as well as in the study and work environment on Campus Kalundborg. We will do our utmost to make it happen.

As a Bachelor of Engineering in Biotechnology, you can work with e.g. the operation, optimisation or quality of production processes within the pharmaceutical, food, energy, and environmental sectors. This will require a high degree of professional competence, technological insight and overview, and the ability to seek and process knowledge that can be put into practice. At the same time, you must be able to communicate and collaborate with different professional groups across sectors, nationally, and internationally.

In the course of the programme, you will investigative, experiment, reflect, research, and actively participate in interactions with students, lecturers, and engineering businesses. You will be required to set targets and reflect upon your expectations relative to the learning processes of the programme and relative to your future work as an engineer.

During the programme, you are offered challenging and relevant learning opportunities that will constitute frameworks for the development of your professionalism and identity as a Bachelor of Engineering in Biotechnology, comprising knowledge that is both comprehensive and specialised. You must participate actively in order to reap the maximum benefits from the programme.

In the academic setting of this programme, we collaborate on creating attractive learning environments within our campus, within the local community, and within the framework of relevant businesses. As a student, you will be co-responsible for your own and your fellow students' learning and well-being. Thus, at Absalon we expect that – through your behaviour – you will contribute to the establishment of a sound and constructive study environment.

We look forward to collaborating with you.

With kind regards

The Education Management
Center for Engineering & Science, University College Absalon

Part 1 Facts about the programme

1.1 Study programme

This study programme sets out the rules and regulations as well as the rights and obligations applicable for students enrolled on the Bachelor of Engineering in Biotechnology programme at University College Absalon.

The study programme explicates the framework and requirements, such as they are set out in the Danish Ministerial Order on Academy Profession Programmes and Professional Bachelor Programmes, and presents an overview of the structure, objectives, content, and scope of the programme. Similarly, the study programme provides a description of the different teaching forms, study activities and examination forms that are relevant for the education. At the website of the Bachelor of Engineering in Biotechnology programme descriptions of the individual courses can be found – such as e.g. set out in Part 1.2 An overview of the programme.

The objective, duration, and structure of the programme are determined in pursuance of Bekendtgørelse om uddannelserne til professionsbachelor som diplomingeniør (BEK nr. 1160 af 07/09/2016) – Ministerial Order no. 1160 of 07/09/2016 on the Professional Bachelor Programmes, Bachelor of Engineering (in Danish only).

The Ministerial Order sets out the objective of the academic degree, Bachelor of Engineering as follows:

The objective of the academic-degree programmes, bachelor of engineering, is to qualify the student to carry out commercial functions, nationally as internationally, in which he/she shall be competent to:

- *convert technological research results and scientific and technological knowledge into practical application by way of development assignments and the solution of technical problems.*
- *critically acquire new knowledge within relevant engineering areas.*
- *independently perform diverse engineering duties.*
- *plan, realise and manage technical and technological facilities and, for instance, be able to incorporate societal, economic, environmental, and occupational health and safety consequences in their solution of technical problems.*
- *at a qualified level, enter into collaborative and managerial functions and contexts together with colleagues of different educational, language and cultural backgrounds.*

In the course of the programme, Bachelor of Engineering in Biotechnology, the students will acquire qualifications targeted at enabling them to work professionally within areas such as operation, development and production – typically within the pharmaceutical, food, energy, and environmental fields. The objective is to educate engineers who will has a commercial and application oriented focus.

Having completed the programme, the graduate shall be entitled to the title: *Bachelor of Engineering* (B. Eng.) with specialisation in the branch of Biotechnology. In Danish: *Diplomingeniør med retningsbetegnelsen Bioteknologi*.

The academic-degree, Bachelor of Engineering, entitles the graduates to continue their education, which can lead to the degree Master of Science in Engineering (MSc Eng.) – pursuant to the admission requirements of the individual programmes. Further information can be obtained at our website or by contacting the Education Management at Center for Engineering & Science.

Qualifications and competences

Referencing the terminology and graduation of the Danish Qualifications Framework, the standards of the professional bachelor's degree programmes are expressed as follows:

Students obtaining a degree at this level are expected to:

- possess a basic understanding of the scientific foundation for the methodologies practiced by the profession in connection with the operation and optimisation of chemical and bio-technological production
- possess specific competences targeted at bio- and chemical technological operation and production processes based on technical installations
- possess specific competences within the operation and production of fermenters together with ensuing unit operations in terms of process engineering (downstream processing)
- possess specific competences within demand specification of technological installations and production
- be able to apply skills related to the solution of assignments within quality assurance and control
- be able to independently handle the planning, performance and management of experimental laboratory work
- possess an insight into and an understanding of the engineering profession and of the methodologies practiced in connection with problem solving in project-oriented practices

Having obtained the above competences, students with a degree at this level are expected to possess:

- the ability to handle the operation and optimisation of chemical and biotechnological production
- the ability to prepare demand specifications pertaining to processing facilities and equipment
- the ability to contribute to the development and optimisation of new products and processes
- the ability to participate in multidisciplinary collaboration within project frameworks

In the course of the programme, and in addition to discipline-specific competences, the student will further acquire profession-specific competences within project work and management, resources, communication, and scientific methodology. See Part 2.3 for more details.

1.2 An overview of the educational framework

The education, Bachelor of Engineering in Biotechnology is a 3½-year fulltime study. The programme comprises 7 semesters, each of approximately 6 months' duration and equal to 30 ECTS (European Credit Transfer System). European Credit Transfer System is a numerical expression of the standard workload related to the completion of an educational programme.
A week of studies accounts for 1.5 ECTS and equals a minimum workload of 40 hours. The workload comprises the entire study effort put in before, during, and after participation in theoretical as well as practical teaching and practice work. Study work comprises independent study, assignments, project work, examination attendance, etc.

Thus, the structure of the programme represents a collective study load of 210 ECTS.

In Fig. 1 below, the academic content and ECTS distribution of the programme's seven semesters are set out. The first five semesters of the programme comprise four project modules that collectively equal 40 ECTS. Semester 6 equals the engineering internship that lasts for approx. ½ a year and the programme finishes with a bachelor project on semester 7. Electives, taking place in semesters 5 and 7, collectively equal 20 ECTS.

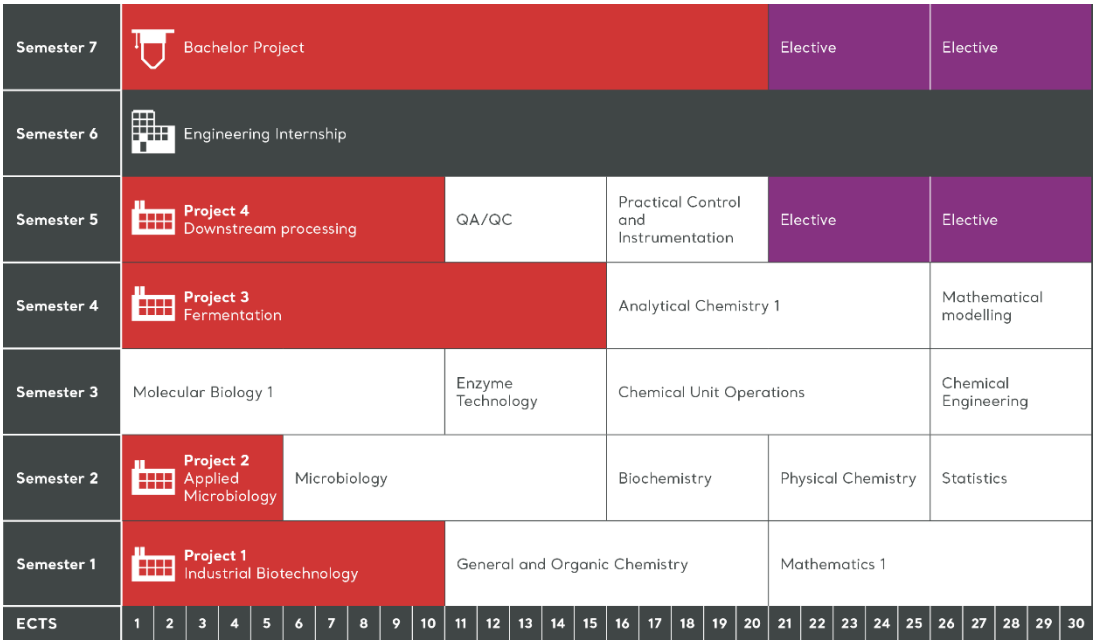

Fig. 1. The academic content and ECTS distribution of the entire programme. It should be noted, that all courses set in the same semester e.g., for semester one (Project 1, General and organic chemistry, and Mathematics 1) run in parallel and are finished in the same examination term. The best way to read the figure is as a coordinate system with progression in semesters on the Y-axis and ECTS-points along the X-axis.

Part 2 The content of the programme

2.1 The elements of the education

The Bachelor of Engineering in Biotechnology programme comprises the following elements:

- compulsory academic courses and project-based courses
- specialisation by way of electives
- engineering internship
- bachelor project

Compulsory academic courses and project-based courses

The study programme comprises compulsory academic courses and project-based courses equivalent to 140 ECTS credits. The content of compulsory academic courses and projects comprise such basic knowledge, skills, and competences as are characteristic of the engineering education.
The objective of the individual course is that the student obtain qualifications within a certain academic discipline. Elements from other academic disciplines might be included to ensure the student a broader understanding and the ability to see how different academic disciplines are integrated.

Specialisation by way of electives

The study programme provides an opportunity for individual specialisation equal to 20 ECTS. The objective of this specialisation is to provide the students with an opportunity to pursue an individual interest of relevance to their future profession.

University College Absalon provides electives that reflect our prioritised academic fields within biotechnology. Our priorities are based on the biotechnological development, clients' requirements, and on student demand.

The specific electives provided by University College Absalon represent individual specialisation that will enable students, who wish to continue their education, to qualify for admission to the next level, the degree Master of Science in Engineering (MSc Eng.).

Engineering internship

The engineering internship constitutes an integral element in the Bachelor of Engineering programme. It is a 5-month course and equals 30 ECTS credits. The engineering internship is described in Part 5 Engineering internship.

Bachelor project

The Bachelor of Engineering in Biotechnology programme is completed by a bachelor project that is equal to 20 ECTS credits.

In general, the point of departure of the project will be a given set of problems that is typical of the profession, though it can also be a discussion of a specific sub-problem pertaining to a research or development project.

The objective of a bachelor project is to provide the student with an opportunity to, independently, apply his or her acquired knowledge within the framework of a major technical-scientific project. The student must demonstrate an ability to apply engineering theory and methodology within well-defined discipline-specific boundaries and to explain the results arrived at in a logic and coherent way – in speech as well as in writing.

2.2 Teaching and working methods

The teaching is structured with a view to such academic and pedagogic progression as is reflected by the learning targets of the individual courses. For this reason, the education applies a number of different teaching and working methods, e.g. comprising group instruction, group work, case and project work, laboratory work and experiments, lectures, various types of digital learning, exercises, simulation and business and study visits. The learning-oriented activities of the programme will be structured in such a way that the teaching method will underpin the academic content that is the objective of the teaching as well as the competences to be developed by the student. The teaching methods will thus be determined by what will best serve in support of the students' learning processes – as regards variation, educational progression, collaboration, and independence.

Teaching and working methods are further set out in the study activity model (link only in Danish and see Fig. 2 below).

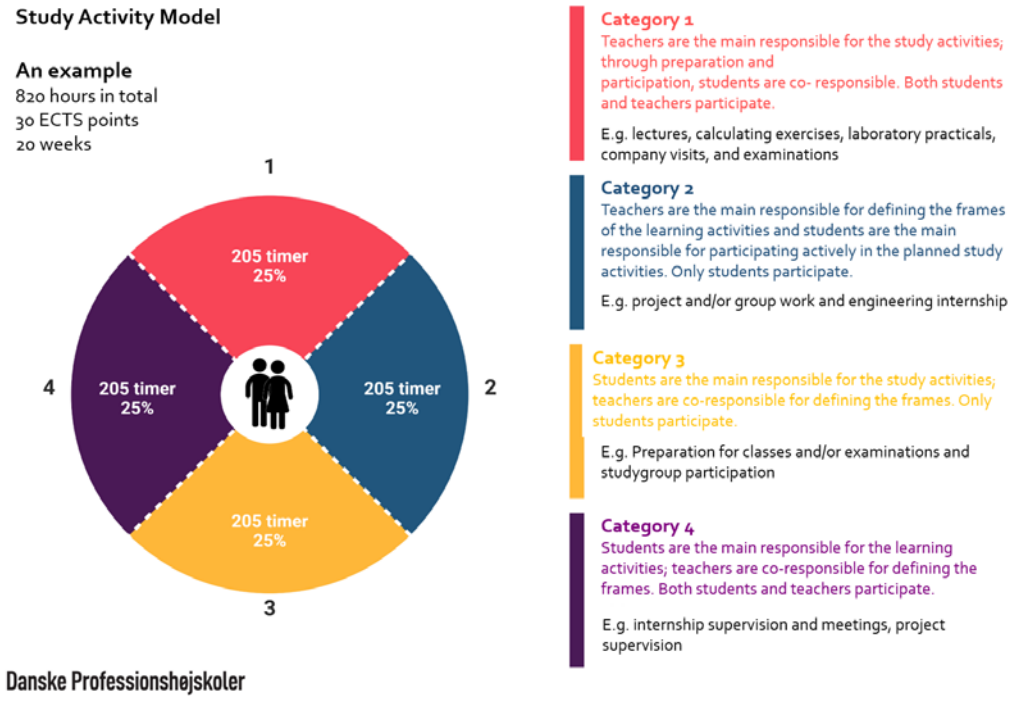

Fig. 2. The study activity model shows examples of teaching and work methods that are applied at university colleges in general.

Study activities, to be determined for every individual course taught within the bachelor-degree programme, will be set out in a plan to which the student will have access from University College Absalons learning management system prior to the commencement of the course programme. Examples of teaching and working methods related to the Bachelor programme in Engineering are:

Project work

In the four primary project courses the students work as part of a group on solving an engineering assignment. The courses include academic disciplines within engineering, introduction to project based teaching and learning as well as activities in support of learning and development of the student's personal qualities and skills within communication and cooperation. Projects continuously introduce and involve relevant scientific theory and methodology.

For project work, it is important that the students are capable of independently organising and prioritising their project work outside scheduled periods (i.e. outside teaching and supervision). Likewise, it is important that the students are independently able to find supplementary literature and references for their project based on what is presented for the class in common.

Project supervision is a key element in the project work which the students gradually must learn to use in an optimal way e.g. in relation to resources, preparation, and outcome.

Laboratory work

The objective of laboratory training is for the student to acquire a set of specific academic qualifications and the competence to perform laboratory work with a view to safety precautions and safe practise. The student will also learn how to follow a given procedure as well as to troubleshoot, when function or results are not as expected.

Company visits and collaboration

The engineering programme focuses on application and has a close collaboration with companies within biotechnology, both large and small ones. Hence, many courses will include cases and examples from relevant businesses as well as employees from these businesses taking part in the programme as lecturers or project supervisors. Furthermore, company visits are an integral part of many courses, as it is of high importance that the students see for themselves how academic disciplines and practice works in relevant organisations and businesses.

Written communication

Written assignments may vary from the treatment of well-defined problems, calculations, and designing a poster, to more comprehensive assignments like a paper or a report.
Technical records are made in connection with laboratory work and experiments and usually constitute the foundation for acceptance or admission in respect of examination for a given course.

Non-written communication

Non-written communication could be e.g. oral presentations of project work, solving calculation assignments in plenum, participation in symposiums or workshops. It can also be in the form of digital communication e.g. a video or podcast.

2.3 The CDIO Initiative

"The CDIO Initiative" is an international project that sets new standards for engineering education, and is a worldwide educational framework. Here, work is focused on providing engineering students with an opportunity to acquire specific skills within the fields of the natural and technological sciences together with the capacity for managing the development and production of new products as well as for applying and implementing new research-based knowledge to the benefit of society.

The overall goals for the CDIO initiative is to educate students who are able to:

- master a deep working knowledge of technical fundamentals
- lead in the creation and operation of new products and systems
- understand the importance and strategic impact of research and technological development on society

Recommended learning outcomes from the CDIO Initiative is given in "The CDIO Syllabus" that is divided into four main areas:

- disciplinary knowledge and reasoning ("Learning to know")
- personal and professional skills and attributes ("Learning to be")
- interpersonal skills: Teamwork and communication ("Learning to live together")

- conceiving, designing, implementing, and operating systems in the enterprise, societal, and environmental context – The innovation process ("Learning to do")

The Bachelor of Engineering in Biotechnology programme strives to be part of The CDIO Initiative and gradually implements elements from the 12 "CDIO Standards" as well as from "The CDIO Syllabus". See http://www.cdio.org and the website of the engineering programme for more information.

2.4 Study activity, compulsory attendance, and participation

Study activity

Students at the Bachelor of Engineering in Biotechnology programme are under an obligation to demonstrate active participation relative to the study programme and to participate in all activities such as they are set out in the study activity model and as specified in individual course descriptions.

Compulsory participation

Participation is not registered in general for study activities but the students are expected to take active part in their programme, which means:

- to prepare for lectures, laboratory work etc.
- to take part in study and project groups
- to hand in assignments and other tasks
- to attend the internship
- to attend tests and examinations

Compulsory attendance

For certain study activities, the compulsory participation is specified as compulsory attendance. Compulsory attendance is construed as the student's duty to attend, and actively participate in, specific activities relative to the degree programme.

At the Bachelor of Engineering in Biotechnology programme, attendance duty applies in connection with, for instance, laboratory exercises, company visits, and internship. For study activities with compulsory attendance, documentation of compliance with attendance duty is kept.

Assessment of study activity

The students study activity is assessed based on three elements: Compulsory attendance and participation as well as participation in examinations. For a student to be considered study active, he or she shall comply with the programme's requirements to participation and attendance.

Failure to meet compulsory participation and attendance

Documentation of compliance with attendance duty is an imperative prerequisite when sitting for examinations in the learning targets pertaining to the individual course.

In the event of the student's failure to meet participation and/or attendance duty, this is registered as an examination attempt. The student is then automatically signed up for the re-examination and is given the opportunity to fulfil the examination prerequisites before this. An examination attempt is not registered if the student submits documentation of illness.

If it is ascertained that a student does not fulfil his or her attendance duty (e.g. does not sit at examinations) the student is called in for a meeting with a study counsellor.

If – within a consecutive period of at least 1 year – the student fails to pass at least one examination under the study programme, the student shall be expelled from the programme, pursuant to the Admission Order (BEK no. 17 of 09/01/2020).

2.5 Assessment and development of the program

At the Bachelor of Engineering in Biotechnology programme, we would like to ensure that the programme is regularly improved and that the student's feedback and suggestions for the programme are incorporated. Hence, courses as well as teaching and work methods are assessed in both digital and oral evaluations.

The results of the assessments are presented to the programmes educational committee, where relevance of the programme with respect to the future employers is also considered. See more about this in the Policy and Strategy for Quality (Kvalitetspolitik og –strategi only in Danish) at the website of University College Absalon.

Part 3 The programme's semester plans

The following sections introduce the curriculum of each individual semester, comprising a description of the elements set out below:

- academic content and distribution of ECTS credits
- coherence and educational value
- competence goals

More detailed descriptions of the content, learning targets, and examination form of the respective courses can be found in the individual course descriptions set out on the programme website. A combined examination plan for the programme is located in part 3.8.

3.1 Semester one

Study start test (screening examination)

The study start test is an internal examination that takes place in the first weeks after the study start. It is a written test evaluated as passed/failed. See part 4.4 and University College Absalon's learning management system for more information.

Academic content and ECTS credits

- Project 1 Industrial biotechnology (10 ECTS)
- General and organic chemistry (10 ECTS)
- Mathematics 1 (10 ECTS)

Coherence and value

The semester as a whole should introduce the basic knowledge and skills within natural sciences and engineering technology that are required of an engineer. Additionally, students are shown how these are applied in a specific industrial production within biotechnology.

In the course of this semester's project, the students shall be provided with a basic introduction to the field of activity within which they, as Bachelors of Engineering, shall be capable to perform upon the completion of their education. This project will provide them with an insight into the primary elements and parameters of current industrial biotechnological manufacturing, from raw material to product. In addition, they will get an opportunity to meet representatives of businesses involved in this production method and, hence, get an idea of what engineering work actually entails.

The objective of the courses in chemistry and mathematics is to provide the students with a set of skills for problem solving in connection with their project work such as, for instance, the calculation of mass yield. Furthermore, these courses shall qualify the students for participation in the courses on the following semesters.

To ease the students' transition from being pupils to being students, an extra effort is put in during the initial semesters – by way of assistance in connection with assignment work, project work support and an introduction to good laboratory practice.

Competence goals for the semester as a whole

The student must:

Disciplinary knowledge and reasoning

- acquire basic knowledge of production processes
- demonstrate an ability to describe and calculate simple chemical and technological conditions relative to a production process
- acquire basic skills within general and organic chemistry

- acquire basic skills within laboratory work and safety
- acquire basic skills within mathematics

Personal and professional skills and attributes

- demonstrate the ability to search for relevant scientific literature and knowledge
- demonstrate the ability to record, analyse, interpret, and present data from basic laboratory experiments
- demonstrate an ability to form a general view of a major biotechnological production
- demonstrate an ability to collaborate with a project group towards the production of one finished deliverable
- demonstrate the ability to plan the progress of a project

Interpersonal skills: Teamwork and communication

- demonstrate the ability to collaborate with a project group
- demonstrate the ability to reflect upon team roles as well as strengths and weaknesses of all members in a project group
- demonstrate the ability to evaluate the progress of a project with respect to team work, development and final product
- demonstrate an ability to communicate project-work results, in speech as in writing and digital form

Conceiving, Designing, Implementing and Operating systems in the enterprise, societal and environmental context – The innovation process

- demonstrate understanding of the engineering profession (role and function) in a large biotech production
- demonstrate the ability to understand and evaluate technical , financial, and societal challenges for a given production unit

3.2 Semester two

Academic content and ECTS credits

- Project 2 Applied microbiology (5 ECTS)
- Microbiology (10 ECTS)
- Biochemistry (5 ECTS)
- Physical chemistry (5 ECTS)
- Statistics (5 ECTS)

Coherence and value

This semester shall further introduce the basic knowledge and skills within natural sciences and engineering technology that are required of an engineer. At the same time, the students are required to apply this knowledge for planning and running an independent project in the laboratory as well as analysing the outcome.

In the course of this semester's project, the students shall be provided with a basic introduction to the field of industrial application of microorganisms for e.g. the production of bioenergy or wastewater purification. CDIO as a framework is introduced and applied on a factual problem within applied microbiology. The project process is based on basic theoretical and practical competences acquired by the students in the academic subject, microbiology, which will run parallel to the project. The skills acquired within statistics will be applied e.g. in connection with the collection and analysis of data within the project framework. Meanwhile it is important that the students reflect upon the differences and challenges going from the theoretical project work in semester one to the experimental setup during semester two.

To a very large extent, the basic skills acquired by the students in the academic subjects, biochemistry and physical chemistry, involve enzyme kinetics, but are also applied as a basis for the understanding of e.g. biosynthesis, chemical equilibrium, and reactivity, which may be of significant relevance to the design and implementation of the experimental part of the project.

To ease the students' transition from being pupils to being students, an extra effort is put in during the initial semesters – by way of assistance in connection with assignment work, project work support, and an introduction to good laboratory practice.

Competence goals for the semester as a whole

The student must:

Disciplinary knowledge and reasoning

- acquire basic skills within microbiology
- acquire basic skills within biochemistry
- acquire basic skills within physical chemistry
- acquire basic skills within statistics

Personal and professional skills and attributes

- demonstrate an ability to plan, execute and assess a major experimental piece of project work
- demonstrate an ability to collect, calculate, analyse and interpret valid data from experimental work
- demonstrate the ability to reflect upon personal development in relation to the project work and the team

Interpersonal skills: Teamwork and communication

- demonstrate an ability to communicate progress and results from laboratory experiments in a technical record
- demonstrate an ability to communicate project-work results, in speech as well as in writing
- demonstrate an ability to collaborate with a project group towards the production of a shared deliverable

Conceiving, Designing, Implementing and Operating systems in the enterprise, societal and environmental context – The innovation process

- demonstrate an ability to explain, and work on the basis of the CDIO principles
- demonstrate an ability to understand and provide a perspective of the application of microorganisms with industrial frameworks, as well as be able to relate this to work on quality assurance

3.3 Semester three

Academic content and ECTS credits

- Molecular biology 1 (10 ECTS)
- Enzyme technology (5 ECTS)
- Chemical unit operations (10 ECTS)
- Chemical engineering (5 ECTS)

Coherence and value

This semester shall give the students an introduction to two significant areas within professional biotechnology: the biological and chemical basis as well as process and production technology.

This semester is characterised by not having any interdisciplinary project process and thus makes room for an increased focus on the development of the students' skills and competences within applied experimental work, ranging from molecular biology to process production plants.

The courses Molecular biology 1 and Enzyme technology primarily focus on biological products, their properties, reactions and application potential. In comparison, the disciplines Chemical engineering and Chemical unit operations focus on how the bio-products can be produced, processed, and transported. Considering the production of biotechnological products from different perspectives in this

way provides the students with an insight into multidisciplinary connections and an understanding of the complexity of such production processes.

The courses, Chemical unit operations and Chemical engineering are based on the competences acquired by the students in the course of the two initial semesters within, for instance, general and physical chemistry, mathematical methods, and process understanding.

Molecular biology 1 and Enzyme technology are based on the students' competences acquired in the disciplines of Biochemistry, Physical chemistry, and General and Organic chemistry.

Competence goals for the semester as a whole

The student must:

Disciplinary knowledge and reasoning

- acquire basic skills within molecular biology
- acquire basic skills within enzymes and enzyme technology
- acquire basic skills within chemical unit operations, comprising functional descriptions, dimensioning, and data collection
- acquire basic skills within chemical engineering, comprising how mass and energy balances are outlined and calculated
- acquire skills within process-plant description via process diagrams together with the ability to estimate e.g. yield and turn-over rate by way of calculations

Personal and professional skills and attributes

- in a safe, responsible and methodical way, demonstrate an ability to perform practical laboratory work – be this within molecular biology or within the areas of chemistry and process engineering
- demonstrate an ability to form a general idea of a biotechnological production and an understanding of how unit operations are combined into complete process plants and of their mutual interdependence
- demonstrate the ability to search for and apply scientific literature for e.g. use in the discussion and perspectives of own data

Interpersonal skills: Teamwork and communication

- demonstrate the ability to collaborate with fellow students on laboratory work and safety
- demonstrate the ability to communicate the progress and results of laboratory work in a technical record

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- demonstrate the ability to evaluate and develop a view of changes in production processes in relation to economy, society, resources etc.

3.4 Semester four

Academic content and ECTS credits

- Project 3 Fermentation (15 ECTS)
- Analytical chemistry 1 (10 ECTS)
- Mathematical modelling (5 ECTS)

Coherence and value

This semester shall give the students an introduction to the central scientific areas that are important for almost all biotechnological processing industry: fermentation technology and analytical chemistry. The students must once again apply their CDIO framework to solve a practical engineering problem in a project group, while also demonstrating the ability to relate their work to the theory of scientific methods.

In the course of this semester's project, the students shall be provided with experience in the planning and management of a larger multidisciplinary project process that comprises the execution of practical experimental work. The project is concerned with fermentation technology-based production and development. The project is based on the presentations of relevant businesses' production or on problems from development projects. Three central academic disciplines are involved in the project: fermentation, theory of scientific methods, and project work. Hence, during this semester, there is a significant focus on the students' ability to navigate within and manage the multidisciplinary aspect. Focus areas comprise project management and design of experimental project processing, natural science methods, the engineering profession and role and the communication and discussion of the project result – in writing as well as in speech.

The course Analytical chemistry 1 incorporates the students' competences from the preceding subjects, General and organic chemistry, Physical chemistry, Biochemistry, and Enzyme technology. Competences within analytical chemistry are essential to understand e.g. the work with quality assurance and control in the biotechnology-based production industry.

The course Mathematical modelling is based on the students' competences acquired in Mathematics 1 and Statistics as well as acquired competences within chemical engineering. Together with Analytical chemistry 1, this academic subject is targeted at preparing the students for Project 4 Downstream processing that incorporates the simulation of processes, as well as the characterisation and analysis of purified bio-products.

Competence goals for the semester as a whole

The student must:

Disciplinary knowledge and reasoning

- obtain basic skills within fermentation and fermentation technology
- obtain basic skills within quantitative chemical analysis, comprising sample preparation, the application of standards, selection of methods and data processing
- obtain basic skills within trial design and statistical methods with respect to the treatment of experimental data
- demonstrate an ability to understand the theoretical background of calculations and mathematical models in respect of systems within the framework of biotechnological and process-engineering systems

Personal and professional skills and attributes

- demonstrate an ability to design, plan and execute experimental trials within fermentation technology
- obtain basic knowledge about and skills within the theory of science, comprising work within the framework of the theory of science method, source criticism and application
- demonstrate an ability to prepare a project report that assesses and provides a perspective on the result of a practical process, and incorporates relevant scientific references

Interpersonal skills: Teamwork and communication

- demonstrate an ability to work on problem-oriented issues within the framework of a project group, focused on a technological problem with respect to fermentation
- demonstrate an ability to make an oral presentation and discussion whilst providing a perspective on methods and theories relative to the project

Conceiving, Designing, Implementing and Operating systems in the enterprise, societal and environmental context – The innovation process

- demonstrate the ability to solve an engineering problem by application of the CDIO tools and project progress steps
- demonstrate an ability to explicate the application of tools for project control and management
- demonstrate an ability to reflect upon the engineering professions work areas and significance

3.5 Semester five

Academic content and ECTS credits

- Project 4 Downstream processing (10 ECTS)
- QA/QC (5 ECTS)
- Practical control and instrumentation (5 ECTS)
- Electives (in total 10 ECTS)

Coherence and value

In the course of this semester, focus will be on such elements that are central to biotechnological production such as basic adjustment and control of unit operations, purification strategies (downstream processing) and quality control and assurance (QA/QC). In this semester, all academic subjects interact: the control of processes and valid process and product data collection are essential prerequisites for upholding the quality assurance system. Accordingly, no product requirement, no purification process goal – and vice versa. It is crucial that the students demonstrate an understanding of the interaction between the practical operations of the production, strategies for individual process plants, all in combination with the overall quality assurance system – in particular as preparation for the engineering internship to take place in semester 6.

The project work will provide the students with increased experience in project management – in particular with focus on collaboration with customers/stakeholders, operationalisation, quality and validation. The latter is supported by the concurrent course in QA/QC. The communication of the project results will prepare the students for the challenges of their engineering internship. Practice-oriented work will be ensured by way of relevant project cases about biotechnological production.

The course QA/QC incorporates the students' competences from the preceding courses e.g. Analytical chemistry 1 and Project 3. Competences within quality assurance and control are of outmost importance before the students begin their engineering internships.

The choice of electives will provide the student with an opportunity to specialise within one or more academic areas, perhaps as regards the desire for an internship within a particular area.

Competence goals for the semester as a whole

The student must:

Disciplinary knowledge and reasoning

- obtain competences in the preparation, discussion and execution of purification techniques pertaining to selected bio-products
- acquire basic skills within quality assurance and control of biotechnological production
- acquire skills within the management, adjustment, and control of production units

Personal and professional skills and attributes

- obtain competences in the collection and assessment of quality related data
- obtain competences in applying and taking a critical view of others' scientific work and results

Interpersonal skills: Teamwork and communication

- obtain the ability to work together with a project group as well as the potential customers/stakeholders of the project
- acquire basic skills within scientific communication

Conceiving, Designing, Implementing and Operating systems in the enterprise, societal and environmental context – The innovation process

- obtain competences in the planning, performance and provision of a perspective on project work pursuant to the CDIO framework

- obtain competences for discussing and develop a view of the choice of downstream processing steps for various bio-products
- obtain the ability to evaluate project performance and results with respect to economy, environment, and technical challenges
- demonstrate the ability to apply project management tools
- obtain the ability to work with the quality and validation of data
- acquire knowledge on quality assurance and control comprising the structuring, implementation, maintenance and organisational implementation pertaining to biotechnological production
- obtain competences in the performance of risk analysis of a given biotechnological production

3.6 Semester six

Academic content and ECTS credits

- Engineering internship (30 ECTS)

Coherence and value

This semester's academic content solely comprises engineering internship, thus stressing the central role of the internship in terms of making the education practice- and profession-oriented. The professional focus is on the practical application of such competences, as the student will have acquired in the course of the programme. The internship is intended to contribute to the enhancement of the student's conception of business principles as well as providing an insight into assignments, challenges and solutions pertaining to engineering work in practice.

Competence goals for the semester as a whole

The student must:

Personal and professional skills and attributes

- in a written report, demonstrate his/her ability to establish an overview in respect of work assignments, projects and goals for own learning

Interpersonal skills: Teamwork and communication

- obtain experience in keeping one's end up in a workplace within the engineering profession as regards collaboration with different disciplinary groups, communication, rules, and management

Conceiving, Designing, Implementing and Operating systems in the enterprise, societal and environmental context – The innovation process

- obtain an understanding of the organisational, financial, social and work-related circumstances of a business
- an ability to participate actively and professionally in the solution of engineering assignments
- obtain experience in transforming theoretical knowledge into practical projects and solutions

3.7 Semester seven

Academic content and ECTS credits

- Bachelor project (20 ECTS)
- Electives (in total 10 ECTS)

Coherence and value

The bachelor project constitutes the predominant aspect of this semester. The bachelor project must be prepared by the individual student in collaboration with a business or as parts of the educational institution's own research and development projects. The project is intended to provide the student

with an opportunity to demonstrate independence in experimental or theoretical treatment of a practical engineering-oriented problem within the field of biotechnology.

The electives will provide the student with an opportunity to specialise within one or more disciplines – perhaps rooted in a desire for the elective to provide support of the bachelor project or to constitute qualification for a job within a particular subject area.

Competence goals for the semester as a whole

The student must:

Personal and professional skills and attributes

- demonstrate an ability to involve relevant scientific methods and technical literature in the solution of a complex problem
- demonstrate an ability to develop a critical and reflecting view of the bachelor project's methods and results

Interpersonal skills: Teamwork and communication

- demonstrate an ability to communicate the knowledge content of the bachelor project in writing as well as in speech
- demonstrate an ability to collaborate with costumers and stakeholders of the project

Conceiving, Designing, Implementing and Operating systems in the enterprise, societal and environmental context – The innovation process

- demonstrate an ability to control and perform a longer project process relative to e.g. resources and time
- demonstrate an ability to define boundaries and find solution models for an engineering challenge

3.8 Combined examination plan for the programme

Semester	Academic discipline	ECTS	Marking	Grading	Scheduled
1	Study start test	-	Internal	Passed/Failed	September
	Project 1 Industrial biotechnology	10	External	The 7-point grading scale	January
	General and organic chemistry	10	Internal	The 7-point grading scale	January
	Mathematics 1	10	External	The 7-point grading scale	January
2	Project 2 Applied microbiology	5	Internal	The 7-point grading scale	May/June
	Microbiology	10	External	The 7-point grading scale	May/June
	Biochemistry	5	External	The 7-point grading scale	May/June
	Physical chemistry	5	External	The 7-point grading scale	May/June
	Statistics	5	Internal	The 7-point grading scale	May/June
3	Molecular biology 1	10	External	The 7-point grading scale	January
	Enzyme technology	5	External	The 7-point grading scale	January
	Chemical unit operations	10	External	The 7-point grading scale	January
	Chemical engineering	5	External	The 7-point grading scale	January
4	Project 3 Fermentation	15	External	The 7-point grading scale	May/June
	Analytical chemistry 1	10	External	The 7-point grading scale	May/June
	Mathematical modelling	5	External	The 7-point grading scale	May/June
5	Project 4 Downstream processing	10	External	The 7-point grading scale	January
	QA/QC	5	Internal	The 7-point grading scale	January
	Practical control and instrumentation	5	Internal	The 7-point grading scale	January
	Elective*	5	-	-	January
	Elective*	5	.	-	January
6	Engineering internship	30	Internal	Passed/Failed	August
7	Elective*	5	-	-	January
	Elective*	5	-	-	January
	Bachelor project	20	External	The 7-point grading scale	January

*For the electives, details on the examination, marking, and grading are given in the individual course descriptions on the website.

Part 4 Examinations in general

Examination relative to the degree, Bachelor of Engineering in Biotechnology, will be held in compliance with the rules set out in the Examination Order (BEK no. 18 of 09/01/2020) and such institutional examination rules as drawn up by University College Absalon.

4.1 Examination rules

University College Absalon has drawn up a set of examination rules that shall apply to all the institution's educational programmes. The examination rules are available at the University College Absalon website and learning management system.

4.2 Registration for examinations

The student's registration for a semester constitutes automatic registration for the examination(s) pertaining to the relevant semester. Deregistration is not possible.

Failure to sit for an examination or examinations within the period set out shall be considered an examination attempt. However, this shall only apply in the event that failure to sit for an examination cannot be ascribed to documented illness.

4.3 Individual examinations

The examination at all tests is always individual. However, parts of the examination can be group-based e.g. a presentation of a project or a product.

It is possible to produce the bachelor project in collaboration with one other student, similar to the process in the project-based courses where the project report is produced by a project group.

4.4 Screening examination (study start test)

The Bachelor Degree in Engineering operates with the concept of screening examination.

The objective of such a screening test is to determine whether the student has actually commenced the course programme. The screening examination is an internal written test that shall be marked as passed/failed. The student will have two attempts at passing the screening examination.

This test will take place in the first week after the student's commencement of study. In the event of the student's failure to pass the screening examination in the first attempt, re-examination will be held by University College Absalon in the following week. In the event of two failed attempts to pass the screening examination, University College Absalon will cancel the student's enrolment.

4.5 Writing and spelling skills

The students' writing and spelling skills are included in the evaluation of all written assignments such as project reports, bachelor project as well as written examinations.

4.6 Special examination terms

If the student cannot sit for examinations in compliance with the general terms and conditions, it is possible to apply for special examination terms on the grounds of decreased functionality or health- or language-related circumstances.

Health-related circumstances may involve:

- decreased physical or mental functionality
- pregnancy

Language circumstances may involve:

- dyslexia
- native language other than English

The condition for granting permission to special examination terms is that neither the examination's level nor the target fulfilment will be affected by the special examination terms, i.e. special examination terms shall solely contribute to compensate for the student's functional impairment/ health-related circumstances.

Read more about SPS (special needs support), documentation, and application at University College Absalon's website and learning management system.

4.7 Make-up examinations and re-examinations

Make-up examinations

If a student is prevented from sitting for an examination on the grounds of illness, University College Absalon shall, as soon as practically possible hold a make-up examination.

Illness must be documented by way of a medical certificate. University College Absalon must be notified on illness on the day of examination by either e-mail or telephone and subsequently receive the medical certificate no later than 5 workdays after the date of the examination. Students who are taken acutely ill during the course of an examination must subsequently submit documentation for their illness, which occurred on the day of the examination.

In the event of failure to submit documentation for illness subject to the rules above, the student shall be registered for one examination attempt.

Read more about make-up examination on the University College Absalon learning management system and website.

Re-examinations

The consequence of fail marks for the first examination attempt shall entail re-examination. The student will automatically be registered for re-examination and, hence, use of the second examination attempt. It should be noted that re-examinations will be held as soon as possible cf. the examination descriptions pertaining to the individual disciplines. Read more about this on the University College Absalon learning management system.

4.8 Cheating, plagiarism, and disruptive behaviour during an examination

Cheating and plagiarism

In connection with written examination papers, University College Absalon ensures that the student, by his or her signature, which may be digital, confirms that the examination paper has been prepared without the use of disallowed or unlawful assistance.

The student is subject to the general principles on scientific integrity and plagiarism. In the event that these principles are violated, it shall be considered to be cheating. Attempts at cheating and at aiding and abetting fellow examinees' cheating shall be considered equal to committed cheating.

It is not permitted to enlist disallowed or unlawful help by way of the use of non-permitted aids in connection with an answer paper – neither for one self nor for a fellow examinee.

Cheating at oral examinations will entail discontinued examination, and the student will be expelled from the examination. The student has thus used an examination attempt.

Cheating and/or plagiarism at written examinations or hand in of written assignments leads to rejection of the examination/assignment and the student has thus used an examination attempt. After individual assessment, the Education Management settles whether the written product shall be re-written and handed in again.

When cheating or plagiarism is ascertained, the student is called in for an interview.

In aggravated circumstances, the student may be expelled for briefer or longer periods. The student's state education grant (SU) is stopped in this period. In the event of repeated cheating and/or plagiarism, the student can be permanently expelled from University College Absalon and he or she will then be expelled from the educational programme.

Disruptive behaviour

If, during an examination, the student demonstrates disruptive behaviour, this student may be expelled from the examination while the examination is being held. An expulsion will entail that the grading, if any, of the examination in question will be annulled, and the student will thus have used an examination attempt.

4.9 Complaints and appeals with respect to examination

Complaint opportunity

The student shall be entitled to file a complaint about an examination – such complaints may concern:

- the basis of the examination
- the progress of the examination
- marking

The time limit for filing a complaint is 2 weeks from date on which the marking of the examination has been made public. The complaint must be reasoned and in writing. The complaint may be rejected if it is unreasoned and inadequate. The complaint must stipulate on which of the above items the complaint is focused. Besides this, there are no other formal requirements for the complaint. The complaint must be sent to uddannelsesjura@pha.dk.

The decision made by University College Absalon will be in writing and reasoned. The decision may entail:

- an offer of reassessment, albeit not in connection with oral examinations
- an offer of re-examination
- that the decision does not find in favour of the student

In the event that the examinee is offered reassessment or re-examination, the complaining student shall, no later than 2 weeks after his/her receipt of the decision, accept the offer of reassessment or re-examination. Otherwise, this offer shall lapse. Reassessment of re-examination may result in a lower grade.

The opportunity to make an appeal

In matters pertaining to the academic content, the student can bring University College Absalon's decision before a board of appeals, which shall be appointed by University College Absalon. Such an appeal must be reasoned and in writing and submitted no later than 2 weeks after Absalon has submitted its decision.

Read more about complaints and appeals on the University College Absalon website and learning management system.

Part 5 Engineering internship

Internship is an integral element in the Bachelor Degree in Engineering. It equals 30 ECTS credits of the programme's 210 ECTS credits. The internship, scheduled to take place in semester 6, is of a duration of approximately 5 months fulltime work. In general, this covers the period from 1 February to 30 June.

Exhaustive information as well as relevant documents relative to the internship, such as e.g. a contract, is available on University College Absalon's learning management system. A description of the academic content of the internship is set out on the website of the education.

5.1 Before the internship

As a prerequisite for commencement of the internship, the student must have passed all mandatory academic disciplines in the course of the programme's first 4 semesters. This is caused by an expectation from the education as well as the internship workplaces that the students have acquired a minimum of relevant competences before the internship is commenced.

The internship, to take place at approved internship workplaces, is scheduled as an integral part of the education as a whole. In interaction with the programme's theoretical parts, the internship is thus intended to strengthen the student's learning and contribute to compliance with the learning targets set out for the programme.

Criteria for internship workplace approval

A business shall be approved as internship host by the course manager for the engineering internship.

The approval shall take place based on a collective assessment based on the following criteria:

- The disciplinary profile of the internship business must be of relevance to the educational programme
- The internship workplace shall allocate resources for supervision and collaboration with University College Absalon. Such resources that, as a minimum, shall be allocated by the internship workplace shall be set out in the internship contract
- The internship workplace shall allocate an employee with an engineering degree as supervisor for the trainee. Where this is not possible, the supervisor must otherwise be competent within the field of the academic discipline
- The internship workplace shall provide frameworks and conditions that will ensure the trainee's opportunity to participate in the planning, performance, and solution of engineering problems whilst also providing the trainee with experience within the social, financial, and administrative aspects pertaining to a workplace
- The internship workplace must ensure that the trainee will be supported in the internship's learning targets – in particular as regards decision-making and action competence

Applying for an internship workplace

The application procedures may vary relative to the individual businesses. It should be noted that, it will be the student's responsibility to send his/her internship application to the business and, likewise, he or she shall have the primary dialogue with the workplace. Information about this procedure, the number of internship workplaces provided by the individual businesses can be administered by the education. For this reason, application for an internship workplace shall always take place subject to agreement between the student and the course manager for the engineering internship.

Internship contract
When the student and a specific business arrive at an agreement about the internship, an internship contract shall be drawn up. This contract will provide a brief description of the trainee's future duties and the resources provided by the business during the period.

Salary during the internship or SU?
The general recommendation is that the internship host provides salary for the trainee during the internship period. In relation to the internship contract it is settled whether the business offers salary or not.

If the internship host pays the student, he or she will be employed subject to the business' ordinary employment rules and, should the business desire it, the agreement can be supplemented by a definite employment contract. The Engineering Association in Denmark (IDA) recommends salary subject to applicable rates. The student is employed for 5 months, normally from 1 February to 30 June. The trainee shall not be entitled to holiday during the internship period albeit holiday pay shall accrue pursuant to ordinary rules.

In case the student does not receive salary from the internship host during the internship period, the student can apply for 5 additional months of SU (state educational grant).

General circumstances regarding the internship
The student is entitled to be off for a maximum of 3 days, to participate in examinations and study-related activities at University College Absalon.

The internship host takes out a regular occupational accident insurance for the intern.

Internship supervisor
In addition to being assigned a supervisor at the internship workplace, the student will also have a supervisor allocated by the educational institution. The supervisor is appointed by the course manager for the engineering internship.

5.2 During the internship
Content
In order to meet the overall learning targets in respect of internship, it is expected that the student, in the course of the internship, will participate in relevant work assignments at the internship workplace that are of relevance to engineering work such as e.g. project management, development, quality work or operational tasks. Preferably, the trainee will be occupied with independent assignments and supervised assignments as well as obtaining experience in being a part of a team.

Internship plan
After the passage of maximum 1 month of the internship, the trainee shall submit an internship plan to the institution's supervisor. This plan, to be prepared in collaboration with the business' supervisor, shall comprise brief descriptions of the following:

- the business and organisation of the business
- the trainee's position in the business
- the trainee's future work assignments
- selected focus areas as regards the trainee's work

Contact

Prior to the actual commencement of the internship, the course manager for the internship shall have the primary contact to the business. In the course of the internship period, the discipline supervisor appointed by the institution shall be in charge of the contact.

Unless otherwise agreed, the business' contact person will be the trainee's primary supervisor.

Internship meeting

In the course of the internship work, the student shall be responsible for organising a meeting at the workplace in which supervisors from both the business and the institution will participate. The purpose of this meeting is to verbalise for instance the trainee's work assignments, learning targets, and success. Likewise, it may be of interest to discuss future internship agreements, bachelor-project opportunity etc. It is recommended, that this meeting be held within a period of 1-2 months after internship commencement. Preferably, after the internship plan has been drawn up and sent to the supervisor.

Engineering internships abroad shall be exempt from this rule about a physical meeting at the workplace. Instead, an online-based meeting is organised between the trainee and the supervisors.

5.3 After the internship

Internship report

The internship report must be submitted in Wiseflow no later than 6 weeks after internship completion. It is recommended that the trainee in collaboration with the business' internship supervisor prepare the report. The report must contain an elaboration of the topics of the internship plan, as well as the following:

- a summary of the internship procedure
- an exhaustive scientific description of the trainee's work assignments within the focus areas
- perspectives of the trainee's work assignments relative to the competences acquired in the course of the educational programme
- a reflection of the business' handling of safety and working environment
- the trainee's assessment of the internship procedure

Internship seminar

The institution organises an internship seminar at which the internship procedures are subject to assessment and perspectives. Students are expected to participate actively at this seminar. Representatives from the internship businesses are invited, but not under an obligation, to participate at the seminar. The internship seminar is organised for the purposes of securing the students', the business' and the institution's assessments of internship procedures, output, work assignments and work load within the framework of constructive dialogue. This will further secure the continued quality development of internship procedures to the benefit of all parties.

Quality assurance of the internship work is in pursuance of University College Absalon's quality policy in respect of internship, as given on the University College Absalon website (only in Danish).

Assessment

Internship assessment is comprised of two parts:

- the internship business will submit a written assessment of the trainee's internship period to the educational programme's internship supervisor. Here, the business will state whether the trainee's internship work was satisfactory and whether the trainee complied with his/her duty to attend
- the trainee's internship report

Based on these two documents the internship is assessed by the educational programme's internship supervisor and marked as either passed or failed.

If the internship is marked as failed due to the assessment from the internship business, the student will need to attend a replacement internship of similar duration as the ordinary internship. This can take place in another business or at University College Absalon.

If the internship is marked as failed due to the trainee's internship report, this is registered as a used examination attempt. The student will then have two attempts left. A revised internship report can be handed in 7 days after the first marking has been given. If this revised report is also marked as failed, the student has once again 7 days to submit a second revision, within 7 days after the second marking is made.

Part 6 General rules

6.1 Credits

University College Absalon assigns credits for such completed educational elements – including internship – as can be compared to the corresponding educational elements.

Credit transfer for practical, compulsory, and elective educational elements are assigned subject to an academic assessment of whether such completed education, work etc. – as regards content and academic level – can be compared to one or more educational elements. As regards credit transfer for study visits abroad, please see the study programme's section on internationalisation (part 6.2).

Application for credit transfer that is not included within the rules on mandatory credits shall be submitted to the institution no later than 8 weeks prior to the commencement of the educational element for which credits are applied. Such applications must be submitted to merit@pha.dk.

An application form is available on the University College Absalon learning management system.

6.2 Internationalisation

The education Bachelor of Engineering in Biotechnology comprises international educational elements that are targeted at providing the student with an opportunity to strengthen his or her academic, international, and intercultural competences for enabling the student to act professionally within a globalised world.

International educational elements are incorporated in the teaching framework of the educational programme in which the student is given an opportunity to acquire knowledge about international tendencies and research. In addition, the student can also acquire international perspectives via activities such as project work in collaboration with international and/or Danish students attending the Danish-language version of the educational programme, study visits by students from abroad, lectures by guest lecturers and, perhaps, study visits and site visits.

In the course of the education, students attending the programme will also have an opportunity for exchange studies or internship abroad. In the event of exchange studies and/or internship abroad, the student must obtain the Education Management's prior approval of the specific study activity. Having obtained prior approval of a study visit abroad, the student shall be committed to document the completion of such pre-approved educational elements to University College Absalon at the completion of the study visit. The educational element shall be considered to be completed on the provision that it has been passed subject to applicable rules within the area.

The programme recommends that exchange studies abroad primarily take place in semester 5 of the programme and that internships abroad are scheduled for semester 6.

On an ongoing basis, the programme enters into applicable agreements and mobility programmes with educations abroad – such agreements will be published on the website. The University College Absalon website likewise features exhaustive information on internationalisation via exchange studies or internships.

In addition, the student may also complete study or practical course programmes in relation to which the student on his/her own will establish contact to an academic and/or practical course programme provided by an institution that must be approved and assessed as to credits by the Education Management.

It shall be a precondition that academic or practical visits abroad shall not prolong the period of study and that the content of such academic courses attended by the student have not already been passed.

Incoming students (international)

As a rule, incoming students apply via a special online application form, and an agreement will be entered with the Education Management for documenting that the study programme at University College Absalon shall be credited as an element in a study programme provided by the institution that sends out the student.

With respect to course programmes held in the English language, the following documentation shall be required:

- academic level (a minimum of 2 years of study at a similar programme)
- English language skills (TOEFL-test with a minimum score of 550 or similar)
- the prior approval of the institution that sends out the prospective student
- approval as to the bachelor project shall require the prior completion of a minimum of one semester taught in the English language at the Bachelor of Engineering programme provided by University College Absalon.

6.3 Requirements to written assignments and projects

Within the framework of the Bachelor of Engineering programme provided by University College Absalon, a set of rules, guidelines and formal requirements have been prepared with respect to written assignments and projects – comprising the application of a reference system. Read more about this on the University College Absalon learning management system.

In the event of any requirements in addition to the overall rules, such requirements shall be specifically set out within the framework of the individual course description.

6.4 Transfer to University College Absalon

Transfer to the degree Bachelor of Engineering in Biotechnology at University College Absalon from a similar educational programme at another Danish educational institution shall be feasible when the student has passed examinations equal to the examinations held within the first year of study at the Bachelor of Engineering in Biotechnology programme.

Such transfer shall presuppose vacant study places at the educational level of the Bachelor of Engineering in Biotechnology programme at University College Absalon on which the student will be enrolled.

In addition, passed educational elements shall equal similar educational elements at other educational institutions that provide this educational programme.

6.5 Transfer from University College Absalon

Transfer from the degree Bachelor of Engineering in Biotechnology to another Danish educational institution shall be feasible when the student has passed examinations equal to the examinations held within the first year of study at the Bachelor of Engineering in Biotechnology programme.

However, the student can be transferred earlier in case of exceptional circumstances. The education management decides whether exemption is given or not.

Such transfer shall presuppose vacant study places at the receiving institution.

6.6 Time limits

The following time limits shall apply to the completion of the Bachelor of Engineering course programme:

- prior to the end of the student's first 2 years of study, the academic disciplines of semesters 1 and 2 must be passed
- the education as such must be completed within the number of years that equal the standard time limit plus 2 years

In the event that the above time limits are not complied with, the student will be expelled from the educational programme at University College Absalon. Exemption from the requirement of completion can be given if exceptional circumstances exist. A written justified application from the student regarding exemption must be handed in to the Education Management at Center for Engineering & Science before they can make a decision on this.

6.7 Participation in lessons, lectures, and examinations

General requirements

- In general, the educational programme is planned with a view to establish coherence and progression between the individual academic disciplines and semesters; and, hence, they should be attended in the sequence stipulated in section 1.2
- In respect of academic disciplines that in particular relate to specific dependencies on other courses, such dependencies are set out as recommended essential requirements in the course descriptions of the academic disciplines

Specific requirements for individual semesters

- Engineering internship: An agreement on engineering internship cannot be entered before all compulsory courses of the programme's first 4 semesters are passed
- Bachelor project: Enrolment on the bachelor project presupposes academic disciplines equal to 180 ECTS credits, and every compulsory academic discipline must be passed. All academic disciplines, corresponding to 190 ECTS credits must be passes before the student can attend the examination for the bachelor project.

6.8 Exemption

In case of exceptional circumstances, the Education Management at Center for Engineering & Science may grant exemption from the rules set out in this present study programme. The Education Management makes decisions on this based on written justified applications for exemption.

6.9 The coming into force of the study programme

This present study programme, shall come into force on September 1, 2019.

6.10 Legal framework

The following statutory instruments and ministerial orders govern this present study programme:

- Bekendtgørelse af lov om erhvervsakademiuddannelser og professionsbacheloruddannelser nr. 1343 af 10/12/2019 (Ministerial Order no. 1343 of 10/12/2019 on Academy Profession Programmes and Professional Bachelor Programmes)
- Bekendtgørelse om erhvervsakademiuddannelser og professionsbacheloruddannelser (LEP-bekendtgørelsen) nr. 15 af 09/01/2020 (Ministerial order no. 15 of 09/01/2020 on Training Programmes for the Vocational Academy Professions and on Professional Bachelor's Degree Programmes (in Danish only))
- Bekendtgørelse om uddannelserne til professionsbachelor som diplomingeniør nr. 1160 af 07/09/2016 (Ministerial order no. 1160 of 27/01/2017 on the Academy Profession Programme Bachelor of Engineering (in Danish only)

- Bekendtgørelse om adgang til erhvervsakademiuddannelser og professionsbacheloruddannelser (adgangsbekendtgørelsen) nr. 17 af 09/01/2020 (Ministerial order no. 17 of 09/01/2020 on Admission to and Enrolment on Vocational Academy Professions and Professional Bachelor's Degree Programmes (the admission order)) – in Danish only
- Bekendtgørelse om prøver i erhvervsrettede videregående uddannelser (prøvebekendtgørelsen) nr. 18 af 09/01/2020 (Ministerial Order no. 18 of 09/01/2020 on Tests and Examinations in Professionally Oriented Higher Education Programmes (in Danish only)

Bekendtgørelse om karakterskala og anden bedømmelse ved uddannelser på Uddannelses- og Forskningsministeriets område (karakterbekendtgørelsen) nr. 114 af 03/02/2015 (Ministerial Order no. 114 of 03/02/2015 on the Marking scale and Other Forms of Assessment in Education Programmes within the framework of the Ministry of Higher Education and Science (the Marking Order)) – in Danish only.

Contact
The B. Eng.-programmes at
Center for Enginering & Science
Kalundborg@phabsalon.dk

@biotechDK

@AbsalonEngineering

phabsalon.dk/english

PROFESSIONS-
HØJSKOLEN
ABSALON