SUSTAINABLE
BIOTECHNOLOGY

3-YEAR BACHELOR’S PROGRAMME · 2-YEAR MASTER’S PROGRAMME
Would you like to develop new biotechnological solutions for tomorrow’s society? Are you interested in sustainability and renewable energy? Do you want insight into biology, biochemistry and molecular biology?

Mineral oil still constitutes the most important source of liquid fuels but it is also an important raw material for the production of plastics, chemicals, pharmaceuticals, etc. During the coming decades, we need to exploit alternative sustainable resources to compensate for the forthcoming depletion of mineral oil but also to deal with greenhouse gases and the associated climate effects.

Together with a number of other renewable resources, biomass will potentially constitute an important part of the future energy supply, but biomass will be the major substitute (and probably the only one) for oil as a feedstock for industrial processes. The conversion of biomass will take place in biorefineries corresponding to traditional oil-based refineries.

The processes will be based on microorganisms (fungi and bacteria) and microbially produced enzymes. Mineral oil will be replaced by agricultural residues, algae, industrial wastes from food production and other biomasses, which are converted into high value products such as biofuels, biochemicals for the pharmaceutical and chemical industry, and biological active compounds.

Based upon our strong background in international research in sustainability, biofuels, and the use of biomass as raw material in biorefineries, we offer state of the art Bachelor and Master programmes in Sustainable Biotechnology incorporating the newest technologies and scientific results within these rapidly expanding fields.
BACHELOR’S PROGRAMME IN SUSTAINABLE BIOTECHNOLOGY

During the programme in Sustainable Biotechnology, you will achieve skills and competencies within molecular biology, biotechnology, microbiology, biorefineries, sustainability, and other scientific and technical research areas.

The Bachelor’s programme is structured to ensure a clear technical and scientific progression in which you will obtain competences within molecular biology, biotechnology, microbiology, biorefineries, sustainability and other science and engineering research areas. Through the choice of projects you will have the opportunity to focus on either molecular biological biotechnology or process oriented sustainable biotechnology.

1ST SEMESTER

On the first semester, you will obtain an overview of current biological production (food production, pharmaceuticals, enzymes, ingredients and chemicals) and how it can be uncoupled from fossil resources.

2ND SEMESTER

On the second semester, the focus is on biochemistry and cell biology in an applied perspective. The first and the second semester establish the biological knowledge foundation of the study programme.

3RD SEMESTER

The organisms and their products are the focus of the third semester. The project deals with biofuels combining the knowledge of the organisms, their diversity and their processes.
4TH SEMESTER

On the fourth semester, you will work with the processes involved in sustainable biotechnology. Your biological skills will be expanded with genetics and molecular biology and the focus will be modification of organisms for biological production.

5TH SEMESTER

The fifth semester is devoted to the design of a sustainable biotechnological process. This is supported by courses in biotechnological process techniques, mathematical modelling of biotechnological processes, and statistics.

6TH SEMESTER

The major part of the last semester is the bachelor project, which you can carry out in collaboration with a company or as a research project in your group. In the theory of science course you will be introduced to ethical problems and to the history of biotechnology. Finally you have 10 optional ECTS points, which can be used for other AAU courses or for courses e.g. at a foreign university.

As a Bachelor in Sustainable Biotechnology you qualify for admission to the two-year Master of Science in Engineering programme in Sustainable Biotechnology.
The Master’s programme in Sustainable Biotechnology is structured to ensure a clear technical and scientific progression and to offer the opportunity to focus on either molecular biological biotechnology or process oriented sustainable biotechnology through the choice of courses and projects.

The programme consists of four semesters and is arranged to initially create a common platform for the different qualifications and competences that allow admittance to the study programme. In the subsequent semesters, this platform is expanded and varied, leaving you with the possibility for specialisation and independent problem solving, which will prepare you for your future career.

1ST SEMESTER

On the first semester, a broad biological foundation with respect to sustainable biotechnology is established.

2ND SEMESTER

On the second semester, the complexity is increased developing molecular biology, microbiology and biochemical skills, which increasingly are integrated with process technological disciplines.

3RD SEMESTER

On the third semester, this scientific and technical integration concludes in the projection of a complete biorefinery. To put this progression into perspective, sustainability and life cycle analyses are involved during the courses, and to maintain the application perspective, a business plan is prepared in connection with the design of the biorefinery.

4TH SEMESTER

Fourth semester is dedicated to the Master’s thesis, which constitutes an independent project associated to a research group or/and a company. A more comprehensive two semester project can replace the third semester project with the first part of the Master’s thesis.

Students who want to focus on the molecular biology oriented sustainable biotechnology can substantiate a progression from basic biology towards an experimental development of biological production of e.g. biomaterials or bioactive compounds. It is important to emphasise that all students follow a common frame, which ensures a cross disciplinary competence leaving the possibility for progressive specialisation.

STUDY ABROAD

Since the whole study programme is taught in English, you will have the opportunity to spend a semester abroad.

We have formalised collaborations with several universities in Europe, China and the USA, and we can help facilitate and plan a stay abroad.
CAREER OPPORTUNITIES

With an MSc in Sustainable Biotechnology your future workplace can be any company that has to do with e.g. advanced screening, pharmaceutical production and food production.

The study programme in Sustainable Biotechnology will qualify you for employment within a number of fields where the transition to sustainable technologies and resources has been initiated or will be initiated. The study programme will also qualify you for general biotechnological disciplines.

With a Master’s degree in Sustainable Biotechnology you qualify for employment in biotechnological and bioenergy companies, research institutions, consulting engineering companies and public institutions. We furthermore anticipate that the biomass-based and biological sectors will expand significantly in the coming years leading to new job opportunities.
PROBLEM BASED LEARNING

As a student at Aalborg University, you will work closely together with your fellow students by way of problem based project work. The Aalborg Model for Problem Based Learning (PBL) receives great interest both nationally and internationally, and UNESCO has placed its only Professorial Chair in PBL at Aalborg University.

Typically, you will be part of a group consisting of 4-5 students. Once you have formed a project group, you need to define a problem together that you want to examine. The problem forms the basis of your project, and you are to a great extent responsible for defining it yourselves within an often very broad theme frame. The group work ensures a great variety of approaches and perspectives, which results in a sound and thoroughly prepared project. Together, you are able to discuss the details thoroughly. At the same time, you are able to solve larger and more complex problems than if you were studying on an individual basis.

Each of you has the opportunity to shape the project because group work requires a contribution from everyone. If you have any academic questions, you may also discuss these with your friends in the group.

The project work is completed with an exam. While working on your project, you will also need to do individual exams in your subjects. Together with lectures, literature and cooperation with the corporate sector, the project work will help you gain a deeper insight into the subject you are examining than if you had been working on your own.

With group work, you will quickly realise that you might have different opinions about how to solve a problem. Group work means that you have to compromise, and you will learn a lot about how to cooperate. Group work is indispensable in the modern labour market so both you and your future workplace will benefit from the skills in cooperation you have acquired at Aalborg University.

Aalborg University is rated for excellence in the QS-ranking system.

Aalborg University has received five stars, certifying the worldclass position of the university based on cutting-edge facilities and internationally renowned research and teaching faculty.

Within Engineering and Technology, Aalborg University ranks as number 79 in the world.
STUDENT LIFE

STUDY IN COPENHAGEN

Aalborg University Copenhagen (AAU-Cph) is located near the centre of Copenhagen, just 15 minutes from the Central Station. At AAU-Cph, you will be part of a dynamic, international and inspiring research and study environment of approximately 2,300 students, 400 researchers and several innovative companies.

NEW AND MODERN FACILITIES

The new campus is designed to facilitate and optimize project-based learning, networking and interaction. All students at AAU-Cph have access to well-designed study spaces, newly furnished lecture halls and, for the experimental programmes, well-equipped laboratories.

INNOVATION AND ENTREPRENEURSHIP

Innovation and entrepreneurship are integrated into all programmes at AAU-Cph with the purpose of stimulating and developing your innovative ideas. The new campus is home to several start-ups, and AAU Innovation is represented at AAU-Cph to support students with entrepreneurial aspirations.

ACCOMMODATION IN COPENHAGEN

The housing market in Copenhagen is challenging, so please start your search early. AAU-Cph has a limited number of rooms in residence halls for international students.
APPLICATION AND REQUIREMENTS

DANISH AND SCANDINAVIAN STUDENTS

Bachelor’s programme
To be admitted to Bachelor’s programme in Sustainable Biotechnology, you must meet the following requirements:

- Upper secondary school exam (stx, eux, hf, hhx, htx, Adgangskursus, or the like).
- English B
- Mathematics A

and one of the following combinations:
- Physics B and Chemistry C
- Physics B and Biotechnology A
- Earth Sciences A and Chemistry C

Master’s programme
To be admitted to the Master’s programme in Sustainable Biotechnology you must have a Bachelor’s degree in Sustainable Biotechnology, Biotechnology, Biology, Chemical Engineering, or the like.

OTHER INTERNATIONAL STUDENTS

Bachelor’s programme
To be admitted to the Bachelor’s programme in Sustainable Biotechnology, you must meet the following requirements:

- Upper secondary school exam
- English B or an acceptable IELTS or TOEFL or Cambridge score
- Mathematics A

and one of the following combinations:
- Physics B and Chemistry C
- Physics B and Biotechnology A
- Earth Sciences A and Chemistry C

Master’s programme
To be admitted to the Master’s programme in Sustainable Biotechnology you must have a Bachelor’s degree in Sustainable Biotechnology, Biotechnology, Biology, Chemical Engineering, or the like.

OFFICIAL LANGUAGE REQUIREMENTS

The official language requirements for international students applying for a Bachelor’s degree or a Master’s degree at Aalborg University are:

- IELTS (academic test): 6.5 or ielts.org
- TOEFL (paper-based): 560 or ets.org/toefl
- TOEFL (internet-based): 88 or ets.org/toefl
- Cambridge Certificate of Proficiency (CPE) cambridgeenglish.org
- Certificate in Advanced English (CAE) cambridgeenglish.org
- Cambridge First Certificate with the grade B cambridgeenglish.org

For further information please refer to apply.aau.dk.

APPLICATION DEADLINES

Bachelor’s programme
Danish students: 5 July.
International students: 15 March, 12 noon.

Master’s programme
Danish and international students: 1 April.

Please refer to optagelse.dk and apply.aau.dk

TUITION-FREE STUDIES

Students from EU/EEA countries are not required to pay a tuition fee. However, all students must pay all other costs related to studying in Denmark: for example costs related to books, living expenses and accommodation.

With the exception of students from partner universities outside the EU/EEA, a student from a non-EU/EEA country will need to pay a tuition fee.
CONTACT INFORMATION

DANISH AND SCANDINAVIAN STUDENTS
If you have questions about how to apply, please contact

Den centrale Studievejledning
AAU Aalborg
Fredrik Bajers Vej 5, room 139
9220 Aalborg Ø.
Phone: 99 40 94 40
studievejledning@aau.dk

INTERNATIONAL STUDENTS
If you have questions about how to apply to postgraduate programmes and Guest/Exchange and Special programmes, or general questions about studying in Denmark and life at Aalborg University, please contact

International Office
Aalborg University
Fredrik Bajers Vej 5
DK-9220 Aalborg East
Denmark
Phone: (+45) 9940 9940
incoming-student@adm.aau.dk

If you have questions regarding the study programmes, please feel free to contact the student guidance service at bio.sg@ses.aau.dk