

Master Programme in Biotechnology

Programme code: TABIT

Scope: 120 credits

Cycle: Second

Approved by: Educational Programmes Board C

Validity: 2013/2014

Date of approval: 15 April 2013

In addition to the syllabus, general regulations and information for the Faculty of Engineering apply to this programme.

1 Aim and outcomes

1.1 Aim

This internationally oriented master's programme aims to provide specialised theoretical knowledge in a practical technological context in order to make students employable for advanced tasks in society and industry.

The programme aims to provide qualifications for both professional activities in society and industry and for research studies.

The programme is to provide in-depth knowledge in an area of specialisation in engineering or science;

- ability to plan, complete and assess experiments, in both the laboratory and on a large scale, and ability to use theoretical models to describe physical, biological and chemical processes as well as to assess the applicability and limitations of these models in different contexts;
- ability to select and design technical solutions for industrial production of bio-based products, with due regard to raw materials, energy, economics and sustainability in the system of industrial biotechnology;
- ability to create and develop products;
- ability to consult specialised literature.

1.2 Outcomes for a Degree of Master of Science (120 credits)

(Higher Education Ordinance 1993:100)

Knowledge and understanding

For a Degree of Master of Science (120 credits) the student shall

- demonstrate knowledge and understanding in the main field of study, including both broad knowledge of the field and a considerable degree of specialised knowledge in certain areas of the field as well as insight into current research and development work, and
- demonstrate specialised methodological knowledge in the main field of study.

Competence and skills

For a Degree of Master of Science (120 credits) the student shall

- demonstrate the ability to critically and systematically integrate knowledge and analyse, assess and deal with complex phenomena, issues and situations even with limited information
- demonstrate the ability to identify and formulate issues critically, autonomously and creatively as well as to plan and, using appropriate methods, undertake advanced tasks within predetermined time frames and so contribute to the formation of knowledge as well as the ability to evaluate this work
- demonstrate the ability in speech and writing both nationally and internationally to report clearly and discuss his or her conclusions and the knowledge and arguments on which they are based in dialogue with different audiences, and
- demonstrate the skills required for participation in research and development work or autonomous employment in some other qualified capacity.

Judgement and approach

For a Degree of Master of Science (120 credits) the student shall

- demonstrate the ability to make assessments in the main field of study informed by relevant disciplinary, social and ethical issues and also to demonstrate awareness of ethical aspects of research and development work
- demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used, and

- demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.

1.3 Specific outcomes for a Degree of Master of Science (120 credits)

Outcomes

For a Degree of Master of Science (120 credits) students must demonstrate the knowledge and skills required for working independently in research and development or in another advanced context within the area of biotechnology.

Knowledge and understanding

For a Degree of Master of Science students shall

- demonstrate specialised knowledge of the disciplinary foundations of engineering and science relevant to the field of biotechnology;
- demonstrate the ability to analyse entire systems as well as their constituent parts in industrial production aided by biological catalysts;
- demonstrate insight into current research and development work in the field.

Skills and abilities

For a Degree of Master of Science (120 credits) students shall

- demonstrate the ability to identify, formulate and deal with complex issues in the field autonomously and with a holistic approach;
- demonstrate the ability to analyse and critically assess different technical solutions in the field;
- demonstrate the ability to participate in research and development projects in biotechnology;
- demonstrate the ability to acquire new knowledge in the field and integrate this with previous knowledge;
- demonstrate the ability to autonomously plan and complete advanced tasks in the field;
- demonstrate the ability to develop and design systems and processes of industrial biotechnology while taking into account the circumstances and needs of individuals, and the targets of local and global society for sustainable development;

- demonstrate the ability to clearly report in speech and writing their knowledge and different types of project work, including background material, investigation and findings, to expert and non-expert audiences in international contexts.

Judgement and approach

For a Degree of Master of Science (120 credits) students shall

- demonstrate the ability to make assessments in the field informed by relevant disciplinary, social and ethical aspects;
- demonstrate the capacity for teamwork and collaboration with various constellations;
- demonstrate the ability to identify their need for further knowledge in the field and to continuously develop and broaden their knowledge and skills in the field.

1.4 Further studies

On completion of the second-cycle degree, students have basic eligibility for third-cycle studies.

2 Programme structure

The programme comprises 120 credits including 15 credits of compulsory courses, 60 credits of elective-compulsory courses, 15 credits of optional courses and a degree project of 30 credits. Each year, the programme is adapted to the specialisations in bioprocess technology and molecular biotechnology of the Engineering programme in Biotechnology. The range of courses offered is broadened to include relevant courses from the other specialisations.

2.1 Courses

The courses included in the programme are indicated in the timetable. In addition to these courses, students are entitled to accreditation of 7.5 credits of courses in Swedish (organised by Lund University for exchange students).

2.2 Levels

The courses on the programme are divided into levels. The level is indicated in the relevant course syllabus. The relevant levels are first cycle (G) and second cycle (A). These levels are defined in the Higher Education Act, Chapter 1 Sections 8–9. First-cycle courses at the Faculty of Engineering are further

subdivided into First cycle 1 (G1) and First cycle 2 (G2). G2 courses presuppose knowledge acquired on G1 courses. Second-cycle courses may constitute specialisations in a Master's degree.

2.3 Grades

Grades are awarded both for entire courses and for course components, when applicable. Course components are indicated in the relevant syllabus. Grades for an entire course are awarded according to a scale of four grades (Fail, 3, 4, 5) or a scale of two grades (Fail, Pass). If another scale of grades is applied, this is indicated in the course syllabus. Only entire passed courses (according to the four-grade scale) are included on the degree certificate. Grades awarded in Swedish higher education are criterion-referenced, i.e. the performances of students are assessed with reference to the relevant learning outcomes and no internal ranking of students is made.

3 Specific admission requirements

3.1 Admission requirements

To be admitted to the Master's programme in Biotechnology, students must have a Swedish Engineering degree of no less than 180 credits or a Bachelor's degree in food technology, biotechnology, medical engineering or an equivalent degree from abroad corresponding to no less than three years of higher education studies. The degree must include courses in microbiology and biochemistry. From the qualifying degree students must have knowledge of university-level mathematics and it is recommended that they have laboratory knowledge and skills. Students must also have documented proficiency in English corresponding to at least English B in Swedish upper secondary school, as specified on the programme website. Language requirements are further specified at www.studera.nu.

3.2 Selection

The applicants' grades or equivalent are the main criteria for selection. In addition, the subjects included in the applicants' first degree are considered.

4 Degree

4.1 Degree requirements

For a Degree of Master of Science (120 credits) students must successfully complete courses comprising 120 credits, including a degree project worth 30 credits. 75 credits must be second-cycle credits, including the degree project.

4.1.1 Degree project

For a Degree of Master of Science (120 credits) students must complete an independent project (degree project) of no less than 30 credits as part of the course requirements. The degree project must be completed in accordance with the valid course syllabus and must deal with a relevant subject.

4.2 Degree and degree certificate

When students have completed all the degree requirements, they are entitled to apply for a degree certificate for a Master of Science (120 credits). Main Field of Study: Biotechnology.