



## **MSc in Resource Recovery - Industrial Biotechnology** **Masterutbildning i energi- och materialåtervinning - industriell bioteknik**

120 credits

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**Ladok Code:** KMAKB

**Version:** 8.0

**Level:** Second cycle

**Approved by:** Research and Education Board 2012-01-19

**Valid from:** Autumn 2012

**Valid for:**

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### **General Objectives**

Second level education shall essentially build on the knowledge that students acquire in first level education or corresponding knowledge. Second level education shall involve a deepening of knowledge, skills and abilities relative to first level education and, in addition to what applies to first level education, shall

- further develop the students' ability to independently integrate and use knowledge,
- develop the students' ability to deal with complex phenomena, issues and situations, and
- develop the students' potential for professional activities that demand considerable independence or for research and development work.

(The Higher Education Act, Chapter 1, Section 9)

### **Objectives**

The education is intended to give the student knowledge and skills to be able to introduce systems and technology favourable to a sustainable development. The central focus of the programme is biotechnical methods. The education is also intended to prepare the student for PhD studies.

Upon graduation, the student is expected to:

- be well prepared for PhD studies,
- have adequate knowledge in materials issues with regard to a sustainable development,
- have adequate knowledge in production and development of renewable fuels such as bioethanol and biogas
- have acquired experience and knowledge about planning of biotechnical facilities and have obtained knowledge in shaping a biotechnical process from a desired microbial product,
- have adequate knowledge about biological techniques to solve problems concerning waste,
- have an in-depth ability to apply molecular biotechnology in practice within traditional areas of business but also within areas of business where biotechnology isn't the primary choice of technology,
- have acquired experience of working in projects,
- orally and in writing be able to present projects and investigations in English.

### **Content**

The courses that the programme comprises are listed below.

A course comprises 7.5 ECTS credits unless otherwise stated.

### **Study year 1. For students *with* pre-requisites equivalent to Industrial Microbiology, 7,5 ECTS and Applied Molecular biology, 7,5 ECTS**

- Resource Recovery
- Protein Science and Technology
- Biofuels and Biological Treatments of Wastes
- Life Cycle Assessment
- Molecular Biotechnology, 15 ECTS
- Bioprocess Design, 15 ECTS *or* Biotechnology for Waste Treatment, 15 ECTS

**Study year 1. For students *without* pre-requisites equivalent to Industrial Microbiology, 7,5 ECTS and Applied Molecular Biology, 7,5 ECTS**

- Resource Recovery
- Industrial Microbiology
- Biofuels and Biological Treatments of Wastes
- Applied Molecular Biology
- Molecular Biotechnology
- Bioprocess Design, 15 ECTS *or* Biotechnology for Waste Treatment, 15 ECTS

**Study year 2**

- Degree Thesis, 60 ECTS. The degree thesis, 60 ECTS, includes a series of seminars in theory of science and scientific methods comprehending 4 ECTS.

*Or*

- Degree Thesis, 30 ECTS, course in Scientific Method, 7.5 ECTS, and elective courses within the area Resource Recovery comprehending 22,5 ECTS.

**Admission Requirements**

- Bachelor's degree in Engineering with a specialisation in Chemical Engineering or a Bachelor's Degree in Chemistry, 180 credits, or equivalent.
- Verified knowledge of English corresponding to the course *English B* in the Swedish Upper Secondary School *or* a Bachelor's degree from a university in Sweden, Denmark, Norway, Finland or Iceland.

For further information about English language proficiency, please view: [www.hb.se/wps/portal/engtest](http://www.hb.se/wps/portal/engtest)

**Degree**

Degree of Master of Science (Two Years) with a major in Energy and Material Recovery - specialisation Industrial Biotechnology.

Degree certificates are issued upon application on a special form. More information is available at [www.hb.se](http://www.hb.se).

**Student Influence and Evaluation**

Every course in the programme is evaluated (see to the university policy on course evaluation). The head of the programme is responsible for regularly and in a systematic fashion collecting the student's opinions on the education. The head of the programme, along with the prefect, is also responsible for evaluating the whole programme on a yearly basis. The evaluation is carried out in cooperation with the programme's teacher, the students and professional representatives. The evaluation is documented in writing and brought back to the students.

**Miscellaneous**

Study language: English.

The language of instruction is English.