



Biotechnology Processes and Applications Biotekniska processer och applikationer

5 credits

5 högskolepoäng

Ladok Code: FRRBT03

Version: 1.0

Established by: The Research education committee in Resource Recovery 2022-03-02

Valid from: Spring 2022

Education Cycle: Third cycle

Research Subject: Resource Recovery

Prerequisites: The student has to be admitted to a PhD programme. The examiner can make exceptions to this rule. The student should have connections to the subject Resource Recovery. This must be approved by the examiner.

Grading Scale: Fail (U) or Pass (G)

Content

The course deals with the importance of biotechnology and opportunities for the development towards a more sustainable society with a focus on industrial biotechnology. The course covers various areas such as biorefineries for biofuels e.g. ethanol and biogas processes, but also the production of other products such as biopolymers, organic acids, amino acids, enzymes, biosurfactants, etc. Students also gain insight into local and global developments in biotechnology and the future labour market.

Learning Outcomes

After completing and passing the course, the student will be able to:

Knowledge and understanding

- 1.1. describe the latest developments in industrial biotechnology and describe various bioprocesses, among other things, for the production of biofuels, biomaterials, biopolymers, and fermented food and feed,
- 1.2. explain the general structure of the most important bioprocesses and explain their value chains for converting residual products into higher value ones,
- 1.3. describe how microorganisms and enzymes are used to refine various raw materials into products with higher value.

Skills and abilities

- 2.1. use literature to understand and analyse different products and processes in industrial biotechnology,
- 2.2. critically examine different bioprocesses in terms of technology and economics and assess their feasibility for given applications,
- 2.3. discuss and, both orally and in writing, present various aspects of biotechnological processes and their products.
- 2.4 describe how the content of the course relates to the PhD student's own research project.

Evaluation ability and approach

- 3.1. evaluate biotechnological products and processes based on technical, economic, and social aspects in relation to the 2030 agenda for the 17 global sustainability goals defined by the UN.

Forms of Teaching

The teaching consists of lectures, project work with supervision, and seminars. The supervision is linked to the PhD student's individual research project.

The language of instruction is English.

Forms of Examination

The course is examined through the following examination components:

- Written Individual Examination

Learning outcomes 1.1-1.3

Credits: 3.0

Grading scale: Pass/Fail

- Written assignment and oral presentation

Learning outcomes: 2.1-2.4, 3.1

Credits: 2.0

Grading scale: Pass/Fail

If the student has received a decision/recommendation regarding special pedagogical support from the University of Borås due to disability or special needs, the examiner has the right to make accommodations when it comes to examination. The examiner must, based on the objectives of the course syllabus, determine whether the examination can be adapted in accordance with the decision/recommendation.

Student rights and obligations at examination are in accordance with guidelines and rules for the University of Borås.

Literature and Other Teaching Methods

Pandey, Ashok, Höfer, Rainer, Larroche, Christian, Taherzadeh, Mohammad & Nampoothiri, K. Madhavan (Eds.) (2015). *Industrial biorefineries and white biotechnology*. Amsterdam, Netherlands: Elsevier

Additional literature and teaching materials are provided via the learning platform (max 300 pages).

Student Influence and Evaluation

The course is evaluated in accordance with current guidelines for course evaluations at the University of Borås in which students' views are to be gathered. The course evaluation report is published and returned to participating and prospective students in accordance with the above-mentioned guidelines, and will be taken into consideration in the future development of courses and education programmes. Course coordinators are responsible for ensuring that the evaluations are conducted as described above.

Miscellaneous