



Faculty of Health, Science and Technology
Chemical Engineering

Syllabus

Bioindustrial processes

Course Code:	KTAD01
Course Title:	Bioindustrial processes <i>Bioindustriella processer</i>
Credits:	15
Degree Level:	Master's level
Progressive Specialisation:	Second cycle, has only first-cycle course/s as entry requirements (A1N)

Major Field of Study:
KTA (Chemical Engineering)

Course Approval

The syllabus was approved by the Faculty of Health, Science and Technology 2017-03-06, and is valid from the Autumn semester 2017 at Karlstad University.

Prerequisites

Upper secondary level Swedish 3 or B, or Swedish as a second language 3 or B, and English 6 or A, or equivalent.

Admission to the Master of Science programme chemical engineering or industrial economy with 180 ECTS credits attended and chemistry 30 ECTS cr and chemical engineering 30 ECTS cr completed. Alternatively chemistry 60 ECTS cr with 30 ECTS cr completed and chemical engineering 90 ECTS cr attended with 45 ECTS cr completed, or equivalent.

Learning Outcomes

Upon completion of the course, students should be able to:

1. give examples of bio industrial processes used nationally and internationally,
2. give an account of sustainability aspects of bio industrial processes,
3. discuss how to choose raw material for a bio industrial process,
4. explain selected unit operations and unit processes in bio industrial processes,
5. analyse the environmental impact of bio industrial processes,
6. critically review resource handling in bio industrial processes,
7. assess how bio refineries can be developed in the future,
8. plan, conduct and give an account of laboratory work according to instructions within time limits,
9. report their own project orally and in writing, defend their own project and peer review another project orally.

Content

In this course bio industrial processes refer to how biomass can be transformed in industrial processes.

The course comprises

- Basic bio industrial processes nationally and internationally.

- Historical development of bio industrial processes.
- Sustainability aspects of bio industrial processes.
- Selected unit operations in bio industrial processes, such as evaporation, drying and extrusion.
- Selected unit processes in bio industrial processes, such as mechanical mass production, biogas production and gasification.
- The environmental impact of a factory: How does purification work? How have the environmental demands affected the development of process technology? How are energy systems and the working environment affected?
- Resource handling in bio industrial processes in the perspectives of energy, materials, economy, health, environment, technology and circular economy.
- Emphasis on the processes of a paper mill: from firewood to paper.
- Bio refineries today and in the future.

Mandatory laboratory sessions and study visits. Students carry out a project, reported orally and in writing, and serve as peer reviewers.

Reading List

See separate document.

Examination

Assessment is based on

- a written exam
- attendance at laboratory sessions and lab reports according to instructions and within time limits
- attendance at study visits
- written and oral report on their own project according to instructions
- peer reviewing according to instructions

Grades

One of the grades Distinction (VG), Pass (G), or Fail (U) is awarded in the examination of the course. Engineering students are awarded a grade on the scale Distinction (5), Some Distinction (4), Pass (3), or Fail (U).

Quality Assurance

Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course evaluation is partly based on student views and experiences obtained in accordance with current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional information

The local regulations for studies at the Bachelor and Master levels at Karlstad University stipulate the obligations and rights of students and staff.