



Faculty of Health, Science and Technology
Chemical Engineering

Syllabus

Bio-based materials and products

Course Code:	KTAD11
Course Title:	Bio-based materials and products <i>Biobaserade material och produkter</i>
Credits:	15
Degree Level:	Master's level
Progressive Specialisation:	Second cycle, has second-cycle course/s as entry requirements (A1F)

Major Field of Study:
KTA (Chemical Engineering)

Course Approval

The syllabus was approved by the Faculty of Health, Science and Technology 2020-09-01, and is valid from the Spring semester 2021 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, plus 150 ECTS credits completed in a Master of Science Engineering programme, including the course Bioindustrial Processes, 15 ECTS credits, and registered on the course Pulp and Paper Technology, 15 ECTS credits, or equivalent

Learning Outcomes

The aim of the course is for students to acquire in-depth knowledge of biobased materials and products produced from forest raw materials.

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

1. describe the value-creating processes for paper products and other products based on forest raw materials,
2. compare products made of biobased materials and non-biobased materials in terms of

properties and the three dimensions of sustainability,

3. give an account of the application areas and properties of different biobased materials,
4. use and describe test methods for some biobased materials and analyse and interpret the measured values,
5. explain and evaluate how different sub processes in manufacturing affect the properties of biobased materials and products,
6. summarise in writing the most important results and conclusions of research publications in an area relevant to the course, and
7. plan, conduct, and present a laboratory assignment independently, according to instructions, and within given time limits.

Content

The course deals with manufacturing processes, refinement, product properties, and product applications in different areas.

The course covers the following areas:

- Refinement of paper and cardboard products, including conversion
- Optical, physical, and mechanical properties of paper products
- Production and properties of cellulose-based materials such as nanofibrillated cellulose, microcrystalline cellulose, cellulose derivatives, and viscose
- Biobased packaging and packaging materials
- Biobased plastics
- Material and energy recycling, comparison of biobased and non-biobased materials

Reading List

See separate document.

Examination

Assessment is based on a written exam, participation in laboratory sessions and study visits, a written literature review, and lab reports.

If students have a decision from Karlstad University entitling them to special pedagogical support due to a documented disability, the examiner has the right to give such students an adapted examination or to examine them in a different manner.

Grades

One of the grades U (Fail), 3 (Pass), 4 (Pass with Some Distinction), or 5 (Pass with Distinction) is awarded in the examination of the course.

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.

Elective course for the Master of Science in Chemical Engineering programme.

