



## Polymer Material and Environment

### Polymers material och miljön

15 credits

15 högskolepoäng

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**Ladok Code:** 42RP15

**Version:** 6.1

**Established by:** Committee for Education in Technology 2021-03-12

**Valid from:** Spring 2021

**Education Cycle:** Second cycle

**Main Field of Study (Progressive Specialisation):** Polymeric Technology (A1F)

**Disciplinary Domain:** Technology

**Prerequisites:** Meet the requirements for admission to the Masters programme in Resource Recovery.

Pre-requisites for this course are successful completion of the courses Introduction to polymeric materials and Polymer technology (or equivalent knowledge).

**Subject Area:** Materials Technology

**Grading Scale:** Seven-degree grading scale (A-F)

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### Content

- Production volumes and recycling rates for different polymeric materials.
- Collection and handling of polymeric residue (production waste, industrial and government agency waste, post-consumer waste).
- Mechanical recycling of polymeric materials.
- Chemical recycling of polymeric materials (pyrolysis, supercritical fluids, hydrolysis).
- Mechanisms for biological degradation of polymeric materials.
- Additives, fillers and residual monomer environmental risks due to migration.
- Polymers' environmental impact in terms of sustainability.

### Learning Outcomes

After completing this course, the student is to:

#### *1 Knowledge and understanding*

- 1.1 describe the most common technical methods for recycling of polymeric materials (plastics and composites)
- 1.2 describe how the most common polymer materials can be recycled in an environmentally sustainable way,
- 1.3 outline the environmental risks that the use of polymeric products may present,

#### *2. Skills and abilities*

- 2.1 analyzing polymeric structures regarding biodegradability,
- 2.2 assessing how a polymer product, with regard to the polymer composition, properties, use affects the environment

#### *3. Judgement and approach*

- 3.1 to compare different polymer materials and determine which materials can best be used in a final product with respect to the product's environmental requirements,
- 3.2 evaluate how the use of different polymers can affect the environment.

### Forms of Teaching

Teaching consists of lectures, project work and study visits.

The language of instruction is English.

**Forms of Examination**

The module exam determines the final grade which is issued when all components of the course are approved.

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 Materials**

Lecture materials distributed by the lecturer.

**Student Influence and Evaluation**

The course is evaluated in accordance with the current guidelines for course evaluations at the University of Borås, where the students' views should be obtained. Course evaluation report is published, reviewed with the participation and prospective students in accordance with the above guidelines, and is the basis for the future development of courses and programs. The teacher is responsible for evaluation as described above is implemented.

**Miscellaneous**

The course is primarily intended for students at Masters programme in Resource Recovery.