



Faculty of Health, Science and Technology  
Materials Engineering

# Syllabus

## Polymer Engineering

**Course Code:**

MTAD22

**Course Title:**

Polymer Engineering  
*Polymerteknik*

**Credits:**

7.5

**Degree Level:**

Master's level

**Progressive**

Second cycle, has only first-cycle course/s as entry  
requirements (A1N)

**Major Field of Study:**

MTA (Mechanical Engineering)

### Course Approval

The syllabus was approved by the Faculty of Health, Science and Technology 2020-03-11, and is valid from the Autumn semester 2020 at Karlstad University.

### Prerequisites

75 ECTS credits completed in Mechanical Engineering, including 15 ECTS credits in Materials Engineering, Solid Mechanics (7.5 ECTS credits), and registered on Finite Element Methods: Basics (7.5 ECTS credits), plus upper secondary level Swedish 3 or Swedish as a second language 3, and English 6, or equivalent

### Learning Outcomes

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

- use knowledge of molecular structure to explain physical properties and recycling aspects of polymers, as well as fracture mechanical relations,
- analyse rubber-like elasticity and anisotropy in polymers,
- analyse areas of application for polymers,

- evaluate viscoelasticity in stress situations,
- evaluate mechanical properties of polymer composites, including fibre reinforcement and laminate structures, and
- evaluate and select forming technology for different components.

## **Content**

Instruction is in the form of lectures, teaching sessions, laboratory sessions, and hand-in assignments. The course covers the structure of plastics and composite materials, thermoplastics, elastomers, thermosetting resins, additives, crystallinity, fibre length and direction, thermal properties, mechanical properties, viscoelasticity, cracks and fractures, design, construction, and manufacturing.

## **Reading List**

See separate document.

## **Examination**

Assessment is based on a written exam, a mandatory laboratory report, and a hand-in assignment.

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 5 (Pass with Distinction), 4 (Pass with Some Distinction), 3 (Pass), U (Fail) 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.