MH2050 Mechanical Properties of Materials 6.0 credits

Materialens mekaniska egenskaper

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Materials Science and Engineering

Specific prerequisites

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After finished course the student should have knowledge about:

-fundamental dislocation theory and strengthening mechanisms in metals

-Fracture, fatigue and creep in metals

-how different material parameters and external factors affect the mechanical properties

-which test methods are suitable for measurement of mechanical properties

-difference in influence of static and dynamic stress

-fundamental differences and likenesses between mechanical properties of organic and inorganic materials at small deformations, plastic deformation and deformation to fracture

-influence of time and temperature on the mechanical properties of materials, "time-temperature"

Course contents

Mechanical properties of inorganic materials (metals, cerams) and organic materials (polymers, fibres) and composites (material blends, nanocomposites, filled and reinforced systems).

For inorganic materials: microstructure development during deformation, dislocation theory, hardening mechanisms, fracturei, fatigue and creep.

Mechanical testing, enthalpy elasticity, rubber elasticity, viscoelasticity, plasticity, viscoplasticity, fracture properties, deformation velocity and temperature influence. Molecular and morphological influence on the mechanical properties. External influence including moisture, solvents and oxidation.

Course literature

Del 1: Organisk del

1. Mechanical Properties of Polymers, Hedenqvist

2. Ljungberg Textbook on Paper Mechanics, Fellers

3. Mechanical Properties of Composites,Hedenqvist

4. Övningsmaterial

Del 2: Oorganisk del

1. Mechanical Properties of Metals and Dislocation Theory from an Engineer’s Perspective, Jonsson

2. Mechanical Metallurgy Handbook of Formulas, Jonsson

3. Övningsmaterial

Examination

- PRO1 - Project Work, 2.0 credits, grading scale: P, F
- TEN1 - Examination, 4.0 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.