

Course Syllabus

Metallic Materials 7.5 Credits*, First Cycle Level 1

Learning Outcomes

After completing the course, the student shall be able to:

- describe and draw common crystal structures of metals, and denote directions and planes in crystals
- identify and describe common microstructures of metallic materials, and explain structural and phase transformations using binary phase diagrams and TTT and CCT diagrams as well as the way in which transformations affect mechanical properties
- describe the basic heat-treatment principles in terms of metallic materials
- describe the most common metallic construction materials and the atomic structures of ceramics, polymers and composites
- demonstrate a basic understanding of the degradation of metallic materials
- perform basic material testing, sample preparation and light microscopy

Course Content

The course starts with a general description of the structure of metals. This is followed by a study of microstructure and phase transformations in metals. Furthermore, diffusion and crystal defects in metals are discussed. Binary phase diagrams, in particular the iron carbon diagram and TTT and CCT diagrams, are used to study phase transitions and heat treatments. The course also includes a general review of various metallic construction materials, both ferrous as well as non ferrous. The course also addresses the corrosion of metals.

The course includes exercises in sample preparation and light optical microscopy, hardness testing, heat treatment and corrosion.

Assessment

Written examination 5 credits

Laboratory exercises 2.5 credits

Forms of Study

Lectures and laboratory exercises

Grades

The Swedish grades U, 3, 4, 5.

Laboratory work U,G.

Prerequisites

Bachelor of Science in Engineering (Mechanical, Electrical, Energy, Engineering Physics, Industrial Engineering and Management), Civil Engineering of at least 180 credits.
Knowledge in Solid Mechanics equivalent to 5 credits.

Subject:

Materials Technology

Group of Subjects:

Materials Technology

Disciplinary Domain:

Technology, 100%

This course can be included in the following main field(s) of study:

1. Materials Technology

Progression Indicator within (each) main field of study:

1. G1E

Approved:

Approved 27 April 2017

Valid from 17 June 2017