

Course Syllabus

Materials and Surface Characterisation 7.5 Credits*, Second Cycle Level 1

Learning Outcomes

After completion of the course the students shall be able to:

- Describe the most important methods and techniques used in materials testing and characterisation.
- Show in depth theoretical and practical knowledge concerning opportunities and limitations using different material characterisation techniques.
- Motivate for the choice of analytical methods based on the capabilities of the method and the relevance of the results to address a problem in materials science and engineering.
- Apply some of these methods in practical analysis, and interpret the results and also be able to perform fundamental laboratory work in order to characterize microstructure and mechanical properties of materials.

Course Content

In the course, various mechanical testing methods, surface imaging and surface analysis methods are discussed theoretically. The mechanical testing methods included are tensile and impact testing and hardness measurement. The basics of surface-imaging techniques, such as light-optical microscopy, scanning electron microscopy (SEM), and interference profilometry, are dealt with. The surface analysis methods discussed are energy dispersive X ray analysis (EDX), electron backscattered diffraction (EBSD), auger electron spectroscopy (AES), X ray photoelectron spectroscopy (XPS), time of flight secondary ion mass spectrometry (ToF SIMS), Fourier transform infrared spectroscopy (FTIR) and X ray diffraction (XRD). The course also includes laboratory work in the characterisation of surface coatings, micro-structure and mechanical properties of metals.

Assessment

Written examination (5 credits)

Written assignment (1 credit)

Laboratory work (1.5 credits)

Forms of Study

Lectures, assignment and laboratory work.

The assignment and the laboratory work are mandatory.

Grades

The Swedish grades U, 3, 4, 5.

On laboratory work and assignment U, G

The written examination controls the final mark on the course.

Prerequisites

Bachelor of Science in Engineering (Mechanical, Electrical, Energy, Engineering Physics, Industrial Engineering and Management), Civil Engineering of at least 180 credits and Introduction to Materials Science, 7.5 credits and English 6

Other Information

Replaces MP3016.

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. A1N

Approved:

Approved 15 February 2018

Valid from 7 May 2018