

## Course Syllabus

### Materials Selection and Design 7.5 Credits\*, Second Cycle

#### Learning Outcomes

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

- Demonstrate an understanding of the importance of selecting appropriate materials for design and construction
- Select appropriate materials on the basis of various functional properties, objectives and constraints.
- Apply this knowledge in materials selection for a design so as to increase durability, decrease energy consumption, and be economical and eco friendly
- Analyse and evaluate the role of design aspects such as the engineering dimension, product use, environment, aesthetics and emotion in the selection of materials
- Evaluate the structure, properties, processing and performance of various materials in order to choose optimum materials while keeping within realistic constraints for different cases.

#### Course Content

The course addresses various factors that influence material selection, such as production, distribution, consumption and recycling. Various engineering materials such as metals, polymers, ceramics and composites are described. A description of materials properties with a view to engineering design is included, and material property charts such as strength vs density are introduced. The materials and process selection, using case studies, is explained. As well, tools are described that are used for environmental audits of the manufacturing, usage and recycling of materials with an assessment of the environmental impact of products through the application of life-cycle analyses.

#### Assessment

Written exam (5 credits) and project (2.5 credits)

#### Forms of Study

Lectures and project work.

#### Grades

The Swedish grades U, 3, 4, 5.

Project U, G

Written examination U, 3, 4, 5

To receive a passing grade in the course, students must pass all components. The written examination determines the final grade of the course.

**Prerequisites**

Bachelor of Engineering (Mechanical, Metallurgy, Materials Science, Production Engineering) of at least 180 credits and English 6

**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 6 February 2020

Valid from 6 February 2020