Engineering Materials and Manufacturing Technology

Programme course

6 credits

Material och tillverkningsteknik

TMKO02

Valid from: 2021 Spring semester

Determined by
Board of Studies for Mechanical Engineering and Design

Date determined
2020-09-29

Main field of study
Mechanical Engineering

Course level
Second cycle

Advancement level
A1X

Course offered for
- Master of Science in Mechanical Engineering
- Master of Science in Design and Product Development
- Master's Programme in Mechanical Engineering

Prerequisites
Basic courses in Engineering materials and Solid mechanics.

Intended learning outcomes
The intended learning outcomes of the course is to familiarise the student with the material aspects of manufacturing technology. After completed course the student should:

- Understand the basic physical metallurgy of Steels, Aluminium alloys, Titanium alloys and Nickel-base superalloys.
- Understand the interaction between processing, microstructure and properties of metallic materials.
- Understand the possibilities and challenges of different manufacturing techniques from a materials perspective.
- Be able to select suitable manufacturing method for a specific material.
- Be able to select suitable material for a specific manufacturing method.
- Be able to applied this knowledge when communicating and solving industrial problems.

Course content

- Material aspects on industrial manufacturing processes, like casting, welding, metal forming, forging, metal cutting, and additive manufacturing.
- Phase diagrams and alloy theory
- Solidification and diffusion
- Work-hardening and annealing
- Steel transformations
- Precipitation hardening
- Microstructure and properties of the most common groups of metallic materials; Steel, Cast iron, Aluminium, Titan- and Nickel-based alloys
- Heat treatments and surface treatments

Teaching and working methods

The course consist of lectures, tutorials, laboratory work and home assignments.

Examination

TEN1	Written examination	4 credits	U, 3, 4, 5
LAB1	Laboration course	1 credits	U, G
UPG1	Seminar	1 credits	U, G

Grades

Four-grade scale, LiU, U, 3, 4, 5

Other information

About teaching and examination language

The teaching language is presented in the Overview tab for each course. The examination language relates to the teaching language as follows:

- If teaching language is Swedish, the course as a whole or in large parts, is taught in Swedish. Please note that although teaching language is Swedish, parts of the course could be given in English. Examination language is Swedish.
- If teaching language is Swedish/English, the course as a whole will be taught in English if students without prior knowledge of the Swedish language participate. Examination language is Swedish or English (depending on teaching language).
- If teaching language is English, the course as a whole is taught in English. Examination language is English.

Other

The course is conducted in a manner where both men's and women's experience and knowledge are made visible and developed.

The planning and implementation of a course should correspond to the course syllabus. The course evaluation should therefore be conducted with the course syllabus as a starting point.

Department

Institutionen för ekonomisk och industriell utveckling

Director of Studies or equivalent

Viktor Norman

Examiner

Johan Moverare

Education components

Preliminary scheduled hours: 46 h
Recommended self-study hours: 114 h

Course literature

Other

Will be presented on the course LISAM page