

# Engineering Materials and Manufacturing Technology

Programme course

6 credits

Material och tillverkningssteknik

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

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

## 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