

## **Engineering Materials and Manufacturing Technology**

Material och tillverkningsteknik  
6 credits

Programme course

TMKO02

Valid from: 2023 Spring semester

<b>Determined by</b>	<b>Main field of study</b>	
Board of Studies for Mechanical Engineering and Design	Mechanical Engineering	
<b>Date determined</b>	<b>Course level</b>	<b>Progressive specialisation</b>
2022-08-31	Second cycle	A1X
<b>Revised by</b>	<b>Disciplinary domain</b>	
	Technology	
<b>Revision date</b>	<b>Subject group</b>	
	Mechanical Engineering	
<b>Offered first time</b>	<b>Offered for the last time</b>	
Autumn semester 2020		
<b>Department</b>	<b>Replaced by</b>	
Institutionen för ekonomisk och industriell utveckling		

## Course offered for

- Master of Science in Design and Product Development
- Master of Science in Mechanical Engineering
- 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 could be given in Swedish, or partly in English. Examination language is Swedish, but parts of the examination can be in English.
- If teaching language is “English”, the course as a whole is taught in English. Examination language is English.
- 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.

### 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.

The course is campus-based at the location specified for the course, unless otherwise stated under “Teaching and working methods”. Please note, in a campus-based course occasional remote sessions could be included.

If special circumstances prevail, the vice-chancellor may in a special decision specify the preconditions for temporary deviations from this course syllabus, and delegate the right to take such decisions.