Engineering Materials and Manufacturing Technology

Material och tillverkningsteknik
6 credits

Programme course

TMKO02

Valid from: 2022 Spring semester

Determined by	**Main field of study**	
Board of Studies for Mechanical Engineering and Design	Mechanical Engineering	
Date determined	**Course level**	**Progressive specialisation**
2021-09-01	Second cycle	A1X
Revised by	**Disciplinary domain**	
	Technology	
Revision date	**Subject group**	
	Mechanical Engineering	
Offered first time	**Offered for the last time**	
Autumn semester 2020		
Department	**Replaced by**	
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.

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.