

SYLLABUS

Material Science II mechanical properties 7.5 credits B0015T

Materiallära II mekaniska egenskaper

Course syllabus admitted: Spring 2018 Sp 3 - Spring 2020 Sp 4

**DECISION DATE
2017-01-17**

Material Science II mechanical properties 7.5 credits B0015T

Materiallära II mekaniska egenskaper

First cycle, B0015T

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Materialteknik	Materials Technology

Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and Course B0014T Basic Material Science

Selection

The selection is based on 1-165 credits.

Examiner

Esa Vuorinen

Course Aim

After completed this course the student shall:

- Have knowledge about how the most common heat treatment methods affects the microstructure of the steel
- Know the phases and other microconstituents that can be found in carbon steel, low alloyed- and high alloyed- steels
- Be able to in detail show how the mechanical properties of steels depend on their microstructure
- Know how tensile testing, impact testing and hardness measurement is performed and how the results of the measurements are evaluated
- Have basic knowledge about how mechanical testing is performed in a statistically sound way
- Be able to performed traditional fracture analysis by the use of light optical and scanning electron microscopes

Contents

The course comprises of heat treatment of steel with focus on soft annealing, hardening and tempering. The student is given the understanding of how the different microstructures, that is the result of the heat treatments already mentioned, such as martensite, bainite and retained austenite affects the mechanical properties of the steel. Furthermore, the course gives knowledge of how tensile testing, impact testing and hardness measurement is performed in a statistically sound manner, and how the results of the tests are evaluated. Also the limitations with these mentioned test methods will be discoursed. Traditional fracture analysis will be performed within the framework of the course.

Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

Classes, exercises, laboratory work and study visit.

Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided.

Written exam and laboratory work.

Literature. Valid from Autumn 2016 Sp 1

E. Troell et al. Stål och Värmebehandling, ISBN 978-91-86401-17-7

L. Bohlin (2011) Materialprovning, Kompendium.

L. Bohlin (2009) Metallens plastiska egenskaper, Kompendium.

Course offered by

Department of Engineering Sciences and Mathematics

Items/credits

Number	Type	Credits	Grade
0001	Written exam	5.5	G U 3 4 5
0002	Laboratory work	2	U G#

Last revised

by HUL Mats Näsström 2017-01-17

Syllabus established

by Mats Näsström 2016-02-15