



Course syllabus

Faculty of Technology

Department of Mechanical Engineering

2MT031 Hållfasthetslära, fortsättningskurs, 7,5 högskolepoäng
2MT031 Solid Mechanics, Advanced course, 7.5 credits

Main field of study

Mechanical Engineering

Subject Group

Mechanical Engineering

Level of classification

First Level

Progression

G2F

Date of Ratification

Approved 2018-05-07

Revised 2022-06-13 by Faculty of Technology. Examination and literature list is revised.

The course syllabus is valid from spring semester 2023

Prerequisites

60 credits within the programme which 1MT003 Solid Mechanics, 7,5 credits or similar must be included.

Objectives

After completing the course the student shall be able to:

- describe different types of stress vs. strain relations and yield criteria
- describe the different deformation and fracture mechanisms of engineering materials
- describe different material models and to what extent they can be applied to different engineering materials
- apply different material models in simple calculation examples
- predict the temperature- and rate-dependence of materials.

Content

The course comprises the following elements:

- Different types of constitutive behavior of materials

- Criteria for plastic yielding
- Dislocation theory
- Plastic deformation and hardening mechanisms
- Rate-dependence of materials
- Creep
- Fracture mechanics and fatigue

Type of Instruction

The teaching consists of lectures, laboratory exercises, and tutorials. Participation in the laboratories is mandatory and these are documented in a report.

Examination

The course is assessed with the grades U, 3, 4 or 5.

The examination consists of two Solid Mechanics calculation reports and a laboratory report. The laboratory report (1.5 credits) is assessed as failed or passed. The written reports (3.0 + 3.0 credits) are assessed with the grades U, 3, 4 or 5.

Both parts must be approved before the course is passed and the grades on the two Solid Mechanics calculation reports determine the final grade.

Course Evaluation

During the course or in close connection to the course, a course evaluation is to be carried out. The result and analysis of the course evaluation are to be communicated to the students who have taken the course and to the students who are to participate in the course the next time it is offered. The course evaluation is carried out anonymously. The compiled report will be filed.

Required Reading and Additional Study Material

Required reading

William F. Hosford, Mechanical behaviour of materials, 2012, Nelson Engineering. ISBN: 9781111577742, Latest edition. 420 pp.

Stefan Björklund, Göran Gustafsson, Lennart Hågeryd, Bengt Rundqvist, 2015, Karlebo Handbok, Lieber förlag, latest edition

Sundstöm B (ed.): Handbok och Formelsamling i Hållfasthetslära, Institutionen för Hållfasthetslära, KTH, Stockholm, latest edition

Technical calculator with accompanying instruction book: Texas Ti-84 Plus CE or similar

Other teaching material

Ruler

Protractor

Compasses