Mechanics of Light Structures

Programme course

6 credits

Hållfasthetslära: Lätta konstruktioner

TMHL03

Valid from: 2017 Spring semester

Determined by
Board of Studies for Mechanical Engineering and Design

Date determined
2017-01-25

Main field of study
Mechanical Engineering

Course level
Second cycle

Advancement level
A1X

Course offered for
- Mechanical Engineering, M Sc in Engineering
- Applied Physics and Electrical Engineering - International, M Sc in Engineering
- Applied Physics and Electrical Engineering, M Sc in Engineering
- Mechanical Engineering, Master's programme

Entry requirements
Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites
Multi-variable calculus, basic Solid Mechanics including multi-axial stress states

Intended learning outcomes
The course is to give the student a basic knowledge about the relations needed in order to analyze thin walled structures (plates and shells) with respect to stresses and deformations, and the ability to independently apply this knowledge to concrete problems. At the end of the course, the student shall be able to

- give an account of basic aspects of the classical plate and shell theory
- solve problems regarding the stress- and deformation states in loaded thin-walled structures
- identify unrealistic results

The course is also a preparation for further studies in Solid Mechanics.

Course content
Basic relations of Solid Mechanics, classical theory for in plane loaded plates including the Airy stress function, the Kirchhoff plate theory with applications to strip plates, symmetrically loaded circular plates and simply supported rectangular plates, buckling analysis of simply supported rectangular plates, membrane theory for shells of revolution, bending theory for symmetrically loaded cylindrical shells with applications to tanks and pressure vessels

Teaching and working methods
Lectures, teaching classes, laboratory work

Examination

LABA	Laboratory Work	1 credits	U, G
TENA	Written examination	5 credits	U, 3, 4, 5

Grades
Four-grade scale, LiU, U, 3, 4, 5

Other information
Supplementary courses: Damage Mechanics and Life Analysis, Continuum Mechanics, Mechanics of Materials, Project course in Solid Mechanics/Engineering Materials, The Finite Element Method- FEM, Mechanical vibrations and fatigue

Department
Institutionen för ekonomisk och industriell utveckling

Director of Studies or equivalent
Peter Schmidt

Examiner
Bo Torstenfelt

Course website and other links
http://www.solid.iei.liu.se/Education

Education components

Preliminary scheduled hours: 48 h
Recommended self-study hours: 112 h

Course literature

Ugural A.C., Stresses in beams, plates and shells, third edition CRC Press
Sundström B.(red), Handbok och formelsamling i Hållfasthetslära, Institutionen för Hållfasthetslära, KTH Utdelat material

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.