Computational Heat Transfer

Programme course

6 credits

Värmeöverföring

TMMV54

Valid from: 2017 Spring semester

Determined by
Board of Studies for Mechanical Engineering and Design

Date determined
2017-01-25

Main field of study
Energy and Environmental Engineering, Mechanical Engineering

Course level
Second cycle

Advancement level
A1X

Course offered for
- Design and Product Development
- Energy-Environment-Management
- Industrial Engineering and Management - International, M Sc in Engineering
- Industrial Engineering and Management, M Sc in Engineering
- 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
Numerical Methods, Algebra, Analysis, and Basic course/es in thermodunamics, fluid mechanics and heat transfer.

Intended learning outcomes

After the course the student must be able to:

- Model, calculate and apply basic heat transfer phenomena: conduction, convection and radiation
- Derive,implement and apply numerical methods for analysis of industrial heat transfer problems
- Apply first law of thermodynamics to a comprahensive analysis of industrial heat transfer problems
- Model and simulate industrial heat transfer problems on a detailed as well as on a system level
- Valuate the relevans of different solutions of industrial heat transfer problems
- Model, simulate and analyze realistic industrial heat transfer problems with commercial available software

Course content

Basic relations for heat transport in fluids and solids. Heat transport across material boundaries. Modelling techniques. Numerical computational methods in heat transfer, especially. The finite difference method. Discretization techniques. Explicit and implicit numerical methods for one- and two-dimensional problems, both steady-state and non-steady.

Teaching and working methods

Teaching is in the form of lectures and guidance for assignments and project. Assignments and project is solved in groups. The course includes a large amount of computer work.

Examination

PRA4	Project assignment	6 credits	U, 3, 4, 5

Grades

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

Other information

Supplementary courses: Computational Methods in Fluid Dynamics (CFD), Computational Methods in Fluid Dynamics (CFD) advanced course, Mechanical engineering System - project course.

Department

Institutionen för ekonomisk och industriell utveckling

Director of Studies or equivalent
Roland Gårdhagen

Examiner
Hossein Nadali Najafabadi

Course website and other links
http://www.iei.liu.se/mvs/utbildning/avancerade-kurser/tmmv54?sc=true&l=en

Education components
Preliminary scheduled hours: 92 h
Recommended self-study hours: 68 h

Course literature
Anges i kursinformationen på kurshemsidan.

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.