COURSE SYLLABUS

Applied Finite Element Analysis, 6 credits

Tillämpad FEM med dimensionering, 6 högskolepoäng

Course Code:	TFDK15	Education Cycle:	First-cycle level
Confirmed by:	Dean Feb 9, 2015	Disciplinary domain:	Technology (95%) and social sciences (5%)
Valid From:	Aug 1, 2015	Subject group:	MT1
Version:	1	Specialised in:	G1F
Reg number:	JTH 2015/738-313	Main field of study:	Mechanical Engineering

Intended Learning Outcomes (ILO)

On completion of the course, the student should

Knowledge and understanding

-know the basic principles of how finite elements methods are constructed

-be able to explain different types of finite element and their usefulness and appropriateness in different

Skills and abilities

-show ability to idealize, implement, and solve realistic engineering problems in a commercial FE code and interpret the results

-be able to describe the workflow in a solid mechanics design process

Judgement and approach

-show ability to make assessments of different theoretical models and their limitations from a solid mechanics perspective

Contents

The course contains the basic concepts needed for the implementation of FEM such as numerical integration, assembly, and the concepts of weak and strong form of a differential equation. From solid mechanics, elementary differential equation models are derived, such as Navier's elasticity equations and the Euler beam equation.

The course covers the following topics:

-Basic FEM: Partial integration in one and several dimensions; strong and weak form of heat conduction in one and two dimensions; Galerkin's method; shape functions; numerical integration; isoparametric elements

-Theory of elasticityi: Three dimensional elasticity, plane stress and plane strain; finite elements for elasticity

-Beam elements: The Eluler-Bernoulli beam; strong and weak form; approximations with continuous derivatives

Type of instruction

Lectures and computer assignments.

The teaching is conducted in English.

Prerequisites

General entry requirements and completed course Solid Mechanics 6 credits (or the equivalent).

Examination and grades

The course is graded 5,4,3 or Fail.

Registration of examination:

Name of the Test	Value	Grading
Examination[1]	2 credits	5/4/3/U
Laboratory work	4 credits	U/G

[1] Determines the final grade of the course, which is issued only when all course units have been passed.

Course literature

The literature is preliminary until one month before the course starts.

Title: Engineering Analysis with SolidWorks Simulation 2014

Author: P. Kurowski

Publisher: SDC Publications

ISBN: 9781585038589

Lecture notes, distributed electronically.