UNIVERSITY OF SKÖVDE

TRANSLATION FROM SWEDISH

COURSE SYLLABUS

Applied FEM II G2F

6 credits

Course code: MT510G
Version number: 9
Valid from: 1 January 2026
Ratified by: Curriculum Committee for Engineering Science
Date of ratification: 22 May 2025

1. General information about the course

The course is provided by the University of Skövde and is named Applied FEM II G2F (Tillämpad FEM II G2F). It comprises 6 credits and is a first-cycle course. The level of progression is G2F.

The course is a part of the main field of study in Mechanical Engineering. The disciplinary domain of the course is Technology.

2. Entry requirements

The course has the following entry requirements: passed MT345G Strength of Materials II G1F and passed MT347G Strength of Materials III G1F and passed FY128G Thermodynamics G1N and passed MT356G Applied FEM I G1F and attended MT351G Mechanics IV G1F (or the equivalent).

3. Course content

The Finite Element Method (FEM) is a numerical technique for solving partial differential equations. By applying FEM, engineers can analyze and solve a variety of problems across different engineering domains.

Throughout the course, students will further develop their understanding of the theoretical foundations of FEM and apply them to perform finite element simulations including static structural analysis, steady-state heat conduction analysis, sequential thermomechanical analysis, linearized buckling, and free vibration analysis. The aim is to equip students with the knowledge and skills to analyze and design both mechanical and thermal systems using FEM.

The course also introduces the treatment of nonlinear problems and iterative design based on various criteria such as stiffness/deformation, allowable stress, fatigue, and mass.

4. Objectives

After completed course the student should be able to:

- derive the finite element formulation for given problems by establishing strong and weak forms,
- describe the types of elements, including shells and 3D solids,
- prepare, execute, and evaluate results from finite element analyses within the scope of the course,
- assess the quality of element meshes and conduct convergence analyses,
- plan and conduct finite element analyses in an iterative process to design components according to given criteria,
- explain the sources of nonlinearity, distinguish between linear and nonlinear problems, and demonstrate strategies for solving these problems.

5. Examination

The course is graded A (Excellent), B (Very good), C (Good), D (Satisfactory), E (Sufficient) or F (Fail).

The examinations of the course consist of the following modes of assessment:

- **Seminar assignment**
  6 credits, grades: A/B/C/D/E/F

Students with a permanent disability who have been approved for directed educational support may be offered adapted modes of assessment.

6. Types of instruction and language of instruction

The teaching is conducted in English.

7. Course literature and other educational materials

Daryl, L. (2022). *A First Course in the Finite Element Method, Enhanced Edition, SI Version* (6th ed.). Cengage Learning, INC. ISBN 9780357676431.

8. Student influence

Student influence in the course is ensured by means of course evaluation. The students are informed about the results of the evaluation and potential measures that have been taken or are planned, based on the course evaluation.

9. Additional information

Further information about the course, as well as national and local governing documents for higher education, is available on the website of the University of Skövde.