

FEM modelling I

Code: MFVEM31SS4-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Year, Semester: 3rd year/2nd semester

Number of teaching hours/week:

Lecture: 0

Practice: 4

Prerequisites: Steel structures II: MFACS32SS3-EN, Reinforced Concrete Structures II: MFVBS32SS3-EN, Theory of Girders I: MFTST31SS3-EN.

Topics:

Short introduction of a FEM method. Introduction of a FEM program. Modelling of beams with the use of different elements. Modelling of frame structures. Modelling of trusses. Modelling of structural joints. Modelling of concrete slabs. Modelling of concrete pools. Modelling of timber structures.

Literature:

BOJTÁR I., GÁSPÁR Zs.: The finite element method for engineers. Terc, Budapest 2003.

ZIENKIEWICZ O.C., TAYLOR R.L.: The finite element method I. ISBN 0 7506 6320 0, Butterworth-Heinemann, Oxford, 2000.

BELYTSSCHKO T., LIU W.K., MORAN B.: Nonlinear finite elements for continua and structures. ISBN 0 471 98774 3, John Wiley, Chichester, 2000.

Guide of the AXIS-VM program <http://www.axisvm.co.uk/up-demo-docs/English/Documents/manual11.pdf>

Schedule

<p>1st week: The FEM method.</p> <p>2nd week: Presentation of the features of an applied FEM software.</p> <p>3rd week: Modeling simple structures as a beam, cantilever.</p> <p>4th week: Modeling a truss girder in plane.</p> <p>5th week: Modeling a steel frame in plane.</p> <p>6th week: Modeling a steel hall building in 3D – first order structures.</p> <p>7th week: Modeling a steel hall building in 3D – second order structures.</p> <p>8th week: Modeling of timber roof structures in 2D.</p>	<p>9th week: Modeling of complex timber roof structures in 3D.</p> <p>10th week: Modeling of a simple concrete slab.</p> <p>11th week: Modeling of a concrete slab, supported with beams and columns.</p> <p>12th week: Modeling of a concrete staircase with elevator shaft. Modeling of a concrete pool.</p> <p>13th week: Modeling of structures with dynamic loads.</p> <p>14th week: Special features of the program.</p> <p>15th week: retaking of tasks</p>
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Requirements

A, for a signature:

Participation at **practice** classes is compulsory. Students must attend the practice classes and may not miss more than three times during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students can't make up a practice with another group. Attendance at practice will be recorded by the practice leader. Being late is counted as an absence. In case of further absences, a medical certificate needs to be presented. Students are required to bring a calculator to each practice. Active participation is evaluated by the teacher in every class. If a student's behavior or conduct doesn't meet the requirements of active participation, the teacher may evaluate her/his participation as an absence due to the lack of active participation in class.

Students have to upload models on the online education surface every week from the third week. Five chosen models will be rated at the end of the semester.

If the score of any model is below 10 from 20, the student can repeat modeling that structure in the last week of the semester.

B, for a grade:

The course ends in a **mid-term grade (AW5)**, based on the points of the tasks.

Based on points earned during the semester, the grade is given according to the following table:

Score	Grade
0-59	fail (1)
60-69	pass (2)
70-79	satisfactory (3)
80-89	good (4)
90-100	excellent (5)