FEM Modelling

Code: MK3CAD2S5SB17-EN

ECTS Credit Points: 5

Evaluation: mid-semester grade

Year, Semester: 4th year, 7th semester

Its prerequisite: Theory of Girders, Steel Structures, RC Structures

Further courses are built on it: No

Number of teaching hours/week (lecture + practice): 0+4

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:

Compulsory:

- HUEBNER K.H., DEWHIRST D.L., SMITH D.E., BYROM T.G.: The finit element method for engineers. ISBN 0 471 37078 9, John Wiley and Sons, Inc 2001.
- Guide of the AXIS-VM13 PROGRAM
  http://ftp2.myaxisvm.com/downloads.axisvm/manual/axisvm_manual13_en.pdf

Recommended:

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

Schedule

1st week Registration week	
2nd week: Practice: The FEM method.	**3rd week:** Practice: Presentation of the features of the applied FEM software (AXIS)
4th week: Practice: Modelling simple structures as beam, cantilever.	**5th week:** Practice: Modelling truss girder in plane.
6th week: Practice: Modelling steel frame in plane.	**7th week:** Practice: Trip.
8th week: 1st drawing week	
9th week: Practice: Modelling steel hall building in 3D	**10th week:** Practice: Modelling of complex timber roof structures. 3D
11th week: Practice: Modelling of concrete slab, supported with beams and columns	**12th week:** Practice: Modelling of structures with dynamic loads

13th week:	14th week:
Practice: Special features of the program	Practice: End-term test

15th week: 2nd drawing week

Requirements

A, for a signature:

Participation at **practice** is compulsory. Students must attend the practices and may not miss more than three practice classes 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 class. Active participation is evaluated by the teacher in every class. If a student's behaviour or conduct doesn't meet the requirements of active participation, the teacher may evaluate his/her participation as an absence due to the lack of active participation in class.

During the semester the students have to make FEM models, and they have to send all of them to the leader of the practice at the end of every lesson. If they are correct the student can get signature.

B, for a grade:

The course ends with a **mid-semester grade**. Based on the points of the tasks and on the **end-term test** which is written in the **14th week**.

The grade is given according to the following table:

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