Tárgytematika / Course Description

Advanced Finite Element Analysis

NGM_AM102_1

Tárgyfelelős neve / Teacher's name: dr. Pere Balázs

Félév / Semester: 2015/16/2

Beszámolási forma / Assesment: Folyamatos számonkérés

Tárgy heti óraszáma / Teaching hours(week): 2/2/0

Tárgy féléves óraszáma / Teaching hours(sem.): 0/0/0

OKTATÁS CÉLJA / AIM OF THE COURSE

TANTÁRGY TARTALMA / DESCRIPTION

In the first part of the course an overview of the basic equations of the three dimensional problems of elastic bodies is introduced. The solution of the equations is generally not known, hence only an approximated solution can be computed. After a short introduction of the most common energy based methods (principle of virtual work, principle of minimum potential energy) some numerical examples are shown for the so-called Ritz-method.
The second part of the course deals with the finite element solution of different mechanical models, such as 3D problems, beam structures (Bernoulli and Timoshenko beam theory), 2D problems (plane strain, plane stress and axisymmetric problems) and shell theories (membrane, Kirchhoff-Love and Reissner-Mindlin theory). Beside the mentioned models some special problems will also be discussed, eg. how to treat special boundary conditions (elastic embedding, kinematic loading), and how to integrate numerically.

SZÁMONKÉRÉSI ÉS ÉRTÉKELÉSI RENDSZERE / ASSESMENT'S METHOD

2 homeworks, 2 practice mid-semester tests (in computer), 2 theory mid-semester tests

KÖTELEZŐ IRODALOM / OBLIGATORY MATERIAL

O.C.Zienkiewicz, R.L.Taylor: The Finite Element Method, The Basis, Butterworth Heinemann, Oxford, 2000

Darrell W. Pepper, Juan C. Heinrich: The finite element method: Basic concepts and applications, Taylor & Francis, New York, 2006
K. J. Bathe:Finite Element Procedures, Prentice Hall, New Jersey, 1996