ERASMUS course 2012/2013

Subject:	Advanced Finite Element Analysis	**Subject code:** (if exists)	NGM_AM002_1
Credits:	4	**Lessons per week:**	4
Teacher:	Balázs Pere, PhD	**Language:**	English
Department:	Dep. of Applied Mechanics	**Level of the course (BSc, MSc or PhD):**	MSc
Email:	balazs.pere@sze.hu	**Minimum number of students:**	1
Pre-study requirements:	Strength of materials, Elasticity	**Term: (autumn, spring, autumn/spring)**	autumn/spring
Assessment: (e.g. exam, continuous assessment, project work)	**2 homeworks, 2 practice mid-semester tests (in computer), 2 theory mid-semester tests**		
Description of the subject:	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.		
Compulsory material:	O.C.Zienkiewicz, R.L.Taylor: The Finite Element Method, The Basis, Butterworth Heinemann, Oxford, 2000		
Recommended material:	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		