ERASMUS course 2012/2013

Subject:	Introduction to Finite Element Method	**Subject code:** (if exists)	NGB_AG007_1
Credits:	4	**Lessons per week:**	4
Teacher:	Zoltán Molnár, PhD	**Language:**	English
Department:	Department Of Applied Mechanics	**Level of the course (BSc, MSc or PhD):**	BSc
Email:	molnarz@sze.hu	**Minimum number of students:**	1
Pre-study requirements:	Statics, Dynamics, Strength of materials, Vibration	**Term: (autumn, spring, autumn/spring)**	autumn/spring
Assessment: (e.g. exam, continuous assessment, project work)	**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 one dimensional problems of elastic beams is introduced. Later the exact solution of these equations (which in one dimension always exists) and the approximate solution are shown. After a short introduction of the most common energy based methods (principle of virtual work, principle of minimum of potential energy) some numerical examples are shown for the so-called Ritz-method. Then solve the same problem with finite element method, which demonstrate through the solution of a truss-structure. The second part of the course deals with the finite element solution of 2D problems (plane strain, plane stress and axisymmetric problems). Beside the mentioned models some special problems will also be discussed, eg.effect of distorted elements, how to integrate numerically, dynamic analysis of one dimensional elastic beams, free vibration (eigenvalue problem), forced vibration, one and two dimensional thermal expansion and thermal stresses.		
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		