CME 434 - FINITE ELEMENT ANALYSIS I, FALL SEMESTER, 2006
(Preliminary Draft)
Call#22721 3 U.Hours.
Call#22722 4 G.Hours.
LCD 12:00 PM - 12:50 PM MWF 1033 2ERF

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TEACHING ASSISTANT: Amirhossein Iranmanesh

COURSE DESCRIPTION
introduction to the principles of finite element methods in continuum mechanics, and its application in practical solutions of problems in solid and structural mechanmics and if time permits, other field problems. Solution of central problems using MATLAB and existing computer programs.

PREREQUISITES: Completion of undergraduate courses in strength of materials and structural analysis or mechanics of deformable solids. It is strongly suggested that by the last day for dropping CME courses you are competent in the material presented in those courses, and familiar with and progressing nicely in the use of MATLAB (the state of your knowledge at that time may be an indicator of final grade).

REQUIRED TEXTBOOK: Chandrupatla and Belegundu, Introduction to Finite Elements in Engineering (with software on CD), 2nd edition, Prentice Hall, 1997.
RECOMMENDED REFERENCE: Bathe, Finite Element Procedures, Prentice Hall, 1996.
REQUIRED SOFTWARE: MATLAB, installed in the CME computer laboratory.
REQUIRED SOFTWARE: RISA3D Demo version, program and reference manuals. Soon to be installed in the CME computer Laboratory, and also available at no charge from www.risatech.com > download a demo (on the rignt) > download a demo > http://www.risatech.com/demo_request.asp where you fill in a form.

Topics
Review of matrix arithmetic and mechanics of deformable bodies.
Matrix formulation of the fundamental equations of deformation, stress and strain, compatibility, elasticity, work and conservation of energy.
Finite element models, meshes, system equations and their solution,
Problems in one dimension.
Bars and beam elements in frames and their contribution to the system equations.
Application of boundary conditions and loads.
Solving for displacements.
Calculation of fores and stresses in elements.
Introduction to two-dimensional analysis using membranes.
Fundamentals of shape functions and isoparametric elements.
Evaluation of element matrices by numerical quadrature.
Reliability of results.

ACADEMIC INTEGRITY: You are required to be familiar with, understand, and follow the UniversityÆs policy on academic integrity. See page 46 of the UIC 2005ù2007. I recommend you to study together in groups to compare and complete your notes and to perfect your understanding by discussion. All homework and exams must be completed by each student acting alone or, when assigned to a team, by only the team members acting together.

GRADES: Final grades depend on scores for homework and exams. Class participation may be used to decide marginal scores. The undergraduate and graduate partitions of the class may be graded by separate scales.