MEEM4405 Introduction to Finite Elements

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Text: Finite Element Modeling for Stress Analysis by Robert D. Cook

Date	Reading	Topic
8/27	Chapter 1	Introduction to finite elements, stress and strain
8/29	Chapter 1	Stress, strain and stress-strain relations
9/5	Chapter 2	Principal of Minimum Total Potential
9/10	Chapter 2	Truss analysis, stiffness matrix, strain energy
9/12	Chapter 2	Truss analysis, shape functions, transformations
9/17	4.1-3,13	Truss analysis, assembly and boundary conditions
9/19	4.1-3,13	Truss analysis, boundary conditions and solution procedure
9/24	Chapter 2	Beam analysis, principal moment of inertia, shear center
9/26	Chapter 2	Beam analysis, stiffness matrix
10/1	Chapter 2	Beam analysis, releases, offsets, orientation
10/3	Chapter 3	Plane stress and plane strain, constant strain triangles
10/8		**Exam 1**
10/10	Chapter 3	Plane stress and plane strain, work equivalent loads
10/15	4.4-9	Isoparametric elements, patch test
10/17	4.12, Chapter5	Modeling considerations, symmetry, element compatibility
10/22	6.1-3	3D Solids
10/24	6.4-6	Axisymetric problems and elements
10/29	Chapter 7	Plate and thin shell elements
10/31	Chapter 7	Plate and thin shell elements
11/5	Chapter 8	Thermal stress analysis
11/7	Chapter 8	Heat transfer
11/12	Chapter 8	Heat transfer
11/14	Chapter 9	Vibrations and dynamics
11/26	Chapter 9	Vibrations and dynamics
11/28		Review for Exam 2
12/3		**Exam 2**
12/5	Chapter 10	Introduction to nonlinear analysis, gap elements and contact
12/10	Chapter 10	Buckling
12/112	Chapter 10	Review for final

Grading:		
	Exam 1	100
	Exam 2	100
	Final	200
	Labs	200
	HW	50
	Total	650

Labs

Week	Topic
1	Modeling Fundamentals Tutorials 1-8
2	Simulation Projects 1,2,6
3	Truss analysis assignment
4	Simulation Project 20
5	Frame analysis assignment
6	Simulation Projects 3-5
7	Plane stress assignment
8	Simulation Projects 7,8,16
9	Solid element assignment
10	Shell element assignment
11	Axisymmetric assignment
12	Thermal stress assignment
13	Simulation Project 30
14	Vibration assignment
15	Simulation Project 26