Finite Element Analysis
Course: ENGR 01 410 1,2,3 (501 3) Fall 2017
410-1 MW 3:30pm to 4:45pm M ROWx 321 ROWx 319
410-3, 510-1 TR 5:00pm to 6:15pm T ROWx 321 R ROWx 107
410-4, MW 2:00pm to 3:15pm James M ROWx 321 W ROWx 319

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Course Content. Fundamental concepts for the development of finite element analysis are introduced. The element stiffness matrices are developed using shape functions defined on the elements. Aspects of global stiffness formation, consideration of boundary conditions, and nodal load calculations are presented. Mesh division and problem modeling considerations are discussed in detail. Topics of scalar field problems and natural frequency analysis are covered. Computer applications are included.

Homework assigned is due at the beginning of the class on the day announced by the instructor. Any reading assignments are to be completed by the next class meeting. Homework must be carried out on engineering paper and neatly stapled. Each student must prepare a portfolio file for the course. The course will also include other *assignments*, and a *project* that involves computer usage.

Exams: There will be two tests. The project presentations will take place during the final examination period.

Grading Policy:

Home Work and Projects	20
Test 1	30
Test 2	30
Final Project – Report & Presentation	20
Total	100

* Final Projects will be of different levels for undergraduate and graduate students. Regular attendance is required.

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T.R.Chandrupatla, P.E.

Text: T.R.CHANDRUPATLA and BELEGUNDU, A.D., *Introduction to Finite Elements in Engineering*, FOURTH EDITION, Prentice Hall, Upper Saddle River, New Jersey, 2012.

Week	**Topics**	**Chapters**
1 Sep 5,6 7	Fundamental Concepts	Ch. 1 and 2
2 Sep 11,12 13,14	Fundamental Concepts, Matrix Algebra	Ch. 1 and 2 Ch. 3
3 Sep 18,19 20,21	One Dimensional Problems	Ch. 3
4 Sep 25,26 27,28	One Dimensional Problems	Ch. 3 Ch. 4
5 Oct 2,3 4,5	Trusses Beams and Frames	Ch. 5
6 Oct 9,10 11,12	2-D Stress Analysis – Constant Strain Triangle	Ch. 6
7 Oct 16,17 18,19	Axisymmetric Stress Analysis	Ch. 7
8 Oct 23,24 25,26	Review; Term projects **TEST 1**	
9 Oct 30,31 Nov 1,2	2-D Isoparametric Elements	Ch. 8
10 Nov 6, 7 8, 9	Numerical Integration Mesh Generation	Ch. 8 Ch. 12
11 Nov 13, 14 15,16	3-D Stress Analysis	Ch. 9
12 Nov 20,21 22,x	3-D Stress Analysis Field Problems – Heat Transfer, Fluid Flow, …	Ch. 9 Ch. 10
13 Nov 27,28 29,30	Field Problems – Heat Transfer, Fluid Flow, …	Ch. 10
14 Dec 4,5 6,7	Dynamic Analysis Review	Ch. 11
15 Dec 11,12 13, 14	**TEST 2** Project discussion	
16 Dec 18-20	Final Project Presentations	