ADVANCED STRUCTURAL ANALYSIS

C E 445 Spring 2009

INSTRUCTOR: **Dr. S. Mackertich**
W-255B Olmsted Building
Office (717) 948 6131
E-mail-oct@psu.edu

OFFICE HOURS: MWF 8:00am – 9:00am
MW 10:00 am – 11:00am
MWF 2:00 pm – 3:00pm

TEXTBOOK: **Structural Analysis, 6th Edition, by R.D. Hibbeler**

COURSE DESCRIPTION: Analysis of trusses frames using matrix computer methods, analysis of indeterminate beams, trusses and frames using classical methods.
Prerequisites: CET 430

GOALS: To introduce students to the theory and application of structural analysis using matrix and classical methods as it applies to trusses, beams and frames.

TOPIC	READING ASSIGNMENTS
Matrix Algebra for Structural Analysis • Matrix Operations • Determinants • Inverse of a Matrix • Solving Simultaneous Equations	Appendix A.1-5
Truss Analysis Using the Stiffness Method • Fundamentals of the Stiffness Method • Truss-Member Stiffness Matrix • Member Global Stiffness Matrix • Structure Stiffness Matrix • Application of the Stiffness Method • Space Truss Analysis	Ch 14.1-9
Beam and Plane Frame Analysis Using the Stiffness Method • Frame-Member Stiffness Matrix • Frame-Member Global Stiffness Matrix • Beam-Member Global Stiffness Matrix • Application of the Stiffness Method for Beam and Frame Analysis	Ch 15 and Ch 16

Deflections Ch 9.1- 9

- Virtual Work Method
- Castigliano's Method

Analysis of Statically Indeterminate Structures by the Force Method Ch 10.1-11 (omit 9.9)

- Statically Indeterminate Structures
- Force Method of Analysis: General Procedures
- Force Method of Analysis: Beams
- Force Method of Analysis: Frames
- Force Method of Analysis: Trusses
- Influence Lines for Statically Indeterminate Beams and Frames

Analysis of Statically Indeterminate Structures by Displacement Method Ch 12.1-5

- General Principles and Definitions
- Moment Distribution for Frames: No Sidesway
- Moment Distribution for Frames: Sidesway
- Moment Distribution for multistory Frames

GRADES

Class work	10%
3 Exams	60%
Final Exam	30%

CLASS WORK: There will be project assignments during the semester. The students are expected to use SAP 2000 Structural Analysis computer program to do the analysis for their projects.

For your information the following guidelines have been developed by the University:

- 95 and above --- A
- 90 – 94.5 --- A-minus
- 87.7 – 89.9 ---- B-plus
- 83.33 – 87.6 ---- B
- 80 - 83.32 ----- B-minus
- 75 - 79.9 ----- C-plus
- 70 – 74.9 ------ C
- 60 – 69.9 ------- D
- 60 and below --- F