Course: CE 37500 – Structural Analysis

Type of Course: Required for Civil Engineering Program

Catalog Description: Stress resultants (reactions and internal forces) for trusses, beams, frames, arches, and cables. Deflections of beams and frames by geometric methods (moment-area theorems & conjugate beam analogy). Analysis of statically indeterminate beams and frames using approximate methods and the slope deflection method. Influence functions and their applications.

Credits: 3

Contact Hours: 3

Prerequisite Courses: CE 25200

Corequisite Courses: None

Prerequisites by Topics: Strength of Materials


Course Objectives: To introduce the students to concept of global structural stability, theory of structural analysis, and methods in structural analysis.

Course Outcomes: Students who successfully complete this course will be able to:
1. Distinguish between stable and unstable and statically determinate and indeterminate structures. (a)
2. Apply equations of equilibrium to structures and compute the reactions. (a, e)
3. Derive the shear and bending moment equations. (a, e)
4. Draw the shearing force and bending moment diagrams. (a, e)
5. Calculate the internal forces in cable and arch type structures. (a, e)
6. Evaluate and draw the influence lines for reactions, shears, and bending moments in beams and girders due to moving
loads. (a, e)
7. Use approximate methods for analysis of statically indeterminate structures. (a, e)
8. Calculate the deflections of truss structures and beams. (a, e)
9. Apply the slope-deflection method to analyze statically indeterminate structures. (a, e)
10. Ability to model and analyze structural systems (bridge and building) with the aid of SAP2000 and ETABS softwares. (a, c, e, g, k)

Lecture Topics
1. Types of Structures and Loads
2. Analysis of Statically Determinate Structures
3. Analysis of Statically Determinate Trusses
4. Internal Loads Developed in Beams and Frames
5. Cables and Arches
6. Influence Lines for Statically Determinate Structures
7. Approximate Analysis of Statically Indeterminate Structures
8. Deflections

At the end of the 3rd Chapter, the student will be introduced to the SAP2000 software. A total of 2 lectures will be given about SAP2000.

Computer Usage
High

Laboratory Experience
None

Design Experience
Low

Coordinator
Mohammad Alhassan, Ph.D.

Date
April 1, 2011