

Tennessee Technological University
Department of Civil & Environmental Engineering
CEE 3320 – Structural Mechanics
Required
Fall Semester 2007, Spring Semester 2008

2007 Catalog Data:	CEE 3320. Structural Mechanics. Lecture 2. Recitation 2. Credit 3. Analysis of statically determinate and indeterminate structures; influence lines; and moving loads. Classical and computer methods. Prerequisite: CEE 3110.
Textbook:	McCormac and Nelson, <i>Structural Analysis using Classical and Matrix Methods</i> , 4 th edition., 2007.
Reference:	None
Coordinator:	R. N. Tolbert, Professor of Civil Engineering
Goal:	The goal of CEE 3320 “Structural Mechanics” is to reinforce and extend the student’s knowledge in the analysis of structures encountered in the practice of Civil Engineering.

Course Learning Objectives:

1. The student is to become aware of civil engineering structures and typical loadings as described in building codes and specifications.
2. The student is to demonstrate their ability to analyze and solve structural engineering problems by applying fundamental knowledge of mathematics and engineering mechanics.
3. The student is to acquire the knowledge to solve both statically determinate and indeterminate structures using modern engineering techniques and computer based tools.

Course measurable outcomes:

Students will be expected to:

1. calculate the appropriate load case for structures using dead loads, live loads, and impact loads;
2. analyze beams, frames, and trusses for both specific static load cases and moving load cases;
3. become proficient in determining the maximum shear and moment in beams and frames (shear and moment diagrams);
4. calculate kinematic unknowns (deflections and/or rotations) of beams, frames and trusses;
5. solve for reactions and draw shear and moment diagrams for statically indeterminate structures solved by a variety of methods; and
6. conduct computer solutions of structures and interpret results.

Topics covered: (Two lecture classes per week, 55 minutes, one recitation per week, 110 minutes)

1. Introduction to structural mechanics and design of structures (1 class)
2. Classifications of structures (1 class)
3. Computation of external reactions and construction of shear and moment diagrams (4 classes)
4. Solving trusses for design (3 classes)
5. Influence lines for beams and trusses (4 classes)
6. Moving loads for design (2 classes)
7. Computer applications (2 classes)
8. Introduction to statically indeterminate structures (1 class)
9. Deflections (3 classes)
10. Consistent deformation and three-moment equation (3 classes)
11. Slope-deflection and moment-distribution (4 classes)

Contribution of the course to meeting professional component:

This course is a part of the engineering topics of the curriculum, and it includes recitation sessions.

ABET category content as estimated by faculty member who prepared this course description:

Engineering Science: 2.5 credits or 83.3%
Engineering Design: 0.5 credits or 16.7%

Relation of course to program outcomes:

- Outcome 1: The graduates will have a broad understanding of the relevant principles of mathematics, science, and engineering.
Outcome 2: The graduates will have a general comprehension of four technical areas appropriate to civil engineering.
Outcome 4: The graduates will be capable of design activities and have the ability to identify, formulate, and solve engineering problems.
Outcome 8: The graduates will have the ability to use techniques, skills, and modern engineering tools needed for engineering practice.

Relation of course to ABET Criteria:

<u>General Criteria</u>	Bloom's Level of Achievement
(3a) Knowledge of math, science, and engineering	3
(3e) Identify, formulate, and solve engineering problems	4
(3k) Techniques, skills, modern tools for engineering practice	3

<u>Program Criteria</u>	Bloom's Level of Achievement
1. Apply knowledge of math and sciences	3
2. Apply knowledge of four technical areas appropriate to civil engineering	4

Computer usage:

1. Three in-house computer programs are used by students to verify "hand" solutions to trusses, frames, and statically indeterminate structures. The programs are utilized for input data generation (available with or without graphics), structural solutions including joint kinematic values, and finally output processing including shear and moment diagrams. Students use a variety of computers to run these programs.

Laboratory projects: None

Recitations:

1. Problem solving labs appropriate to assigned homework problems (11 weeks)
2. Examinations (3 weeks)

Prepared by: R. N. Tolbert

Date: September 2007