

Tennessee Technological University
Department of Civil & Environmental Engineering
CEE 4700 (5700) – Masonry Design
Elective
Spring Semester 2008

2007 Catalog Data: CEE 4700 (5700): Masonry Design - Lecture 2. Recitation 2. Credit 3.
Masonry materials and construction. Design of masonry beams, walls and columns.
Seismic design of masonry structures. Prerequisite: CEE 3030 and CEE 4320 or consent
of instructor.

Textbook: ACI 530 – Building Code Requirements for Masonry Structures

Reference: Taly, *Design of Reinforced Masonry Structures, McGraw-Hill, 2001.*

Coordinator: R.C. Henderson, Associate Professor of Civil Engineering

Goal: The goal of CEE 4700 (5700) Masonry Design is to introduce students to masonry
analysis, design, and construction.

Course learning objectives:

1. The student is to develop an understanding of and conversance regarding masonry terminology and code principles.
2. The student is to develop an ability to apply the fundamental principles of masonry behavior in conjunction with masonry building codes so as to analyze and design masonry structures and sub-assemblies.

Course measurable outcomes:

Students will be expected to:

1. Understand test methods for masonry components;
2. Understand masonry terminology and be able to converse in written and oral format about testing, analysis, design, and construction;
3. Understand the principles of masonry construction and typical configurations of masonry buildings and sub-assemblies; and
4. Analyze and design typical masonry elements including columns, beams, lintels, and walls to resist structural forces.

Topics covered: (Two lecture classes per week, 55 minutes each, One recitation class per week, 110 minutes)

1. Masonry materials and ACI code (3 classes)
2. Masonry construction (3 classes)
3. Flexural behavior and design of beams (5 classes)
4. Shear behavior and design of beams (3 classes)
5. Flexural and axial design of load bearing walls (3 classes)
6. Design of shear and infill walls (3 classes)
7. Design of masonry columns and pilasters (3 classes)
8. Seismic design of masonry buildings (5 classes)

Contribution of the course to meeting professional component:

This is a part of engineering topics of the curriculum. It is a design elective with a significant design content.

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

Engineering Science: 1 credit or 33%
Engineering Design: 2 credits or 67%

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 civil 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:

General Criteria

Bloom's Level of Achievement

- | | | |
|------|---|---|
| (3a) | Knowledge of math, science, engineering | 3 |
| (3c) | Design a system, component of process | 5 |
| (3e) | Identify, formulate and solve engineering problems | 4 |
| (3k) | Techniques, skills, modern tools for engineering practice | 4 |

Program Criteria

- | | | |
|----|---|---|
| 1. | Apply knowledge of math and sciences | 3 |
| 2. | Apply knowledge of four technical areas appropriate to civil engineering | 4 |
| 3. | Design a system, component, or process in more than one civil engineering context | 5 |

Computer usage:

Significant use of spreadsheets (Excel) and mathematical solvers (MathCad) for design problems

Recitations:

1. Solutions to various masonry design problems and projects (11 weeks)
2. Tests (3 weeks)

Laboratory projects: None

Prepared by: R.C. Henderson

Date: January 2008