

CE 311 – ANALYSIS AND DESIGN OF CONCRETE STRUCTURES

Type (check one): Required: X Elective: _____

2005-2006 Catalog Data: CE 311. Analysis and Design of Concrete Structures. Integrated structural analysis and design of concrete structures. Approximate methods in the analysis of indeterminate structures. Design of concrete structures and structural elements (such as beams, one-way slabs, columns, and spread footings) in accordance with the American Concrete Institute (ACI) 318 Code. Introduction to the design of pre-stressed concrete beams. Hands on laboratory experiments. Oral and written communication skills are required. Introduction to the use of commercial software, such as STAAD, in the analysis and design of concrete structures. Prerequisite: CE 213 Mechanics of Solids II. Offered in the Spring semester. *One semester; three credits.*

Prerequisites: CE 213 Mechanics of Solids II

Co-Requisites: None

Textbook: Arthur Nilson, David Darwin, and Charles Dolan, *Design of Concrete Structures*, 13th Edition, McGraw-Hill, 2004

Other Required Materials: ACI 318, *Building Code Requirements for Structural Concrete and Commentary*, ACI

Other References: None

Instructor: Dr. Siripong Malasri, Professor of Civil & Environmental Engineering

Course Objectives: The intent of this course is to give juniors and seniors in Civil Engineering the analysis and design methodology for simple concrete structural members.

Prerequisites by Topics: Basic Statics
Basic Strength of Materials

Topics:

1. Analysis of indeterminate structures (moment distribution, etc.)
2. Materials and mix design
3. Ultimate strength design concept, design codes and loads
4. Design of rectangular beams and one-way slabs
5. Bond, development lengths, and splices
6. Design of axially loaded columns
7. Design of uniaxial bending columns
8. Design of wall and square spread footings
9. Introduction to prestressed concrete

Class Schedule: Two seventy-five minute sessions weekly

Prepared by: _____ Dr. Siripong Malasri **Date:** _____ December 2005

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Professional Component:

Category (check one)	<input type="checkbox"/> Math/Basic Science <input checked="" type="checkbox"/> Engineering <input type="checkbox"/> General Education <input type="checkbox"/> Other
Design (check one)	<input checked="" type="checkbox"/> Significant <input type="checkbox"/> Some <input type="checkbox"/> None
Realistic Constraints (check all that apply)	<input checked="" type="checkbox"/> Economic <input type="checkbox"/> Environmental <input type="checkbox"/> Sustainability <input type="checkbox"/> Manufacturability <input type="checkbox"/> Ethical <input type="checkbox"/> Health & Safety <input type="checkbox"/> Social <input type="checkbox"/> Political

Relationship to Program Outcomes:

Check all that apply:

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs
- (d) an ability to function on multi-disciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
- (i) a recognition of the need for and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice