

METROPOLITAN STATE COLLEGE of DENVER  
Office of Academic Affairs

**REGULAR COURSE SYLLABUS**

School of: Professional Studies

Department: Engineering Technology

CIP Code: 15.0201

Prefix & Course Number: CET 4120

Crosslisted With\*: \_\_\_\_\_

Course Title: Concrete Design I

Check All That Apply: Required for Major: \_\_\_\_\_ Required for Minor: \_\_\_\_\_ Specified Elective: X

Required for Concentration: X Elective: X Service Course: \_\_\_\_\_

Credit Hours: 3 (3+0)

Total Contact Hours per semester (assuming 15-16 week semester):

Lecture 45 Lab 0 Internship 0 Practicum 0 Other (please specify type and hours): \_\_\_\_\_

Schedule Type(s): L Grading Mode(s): L

Variable Topics Courses (list restrictions, including the maximum number of hours that can be earned\*\*):

**\*\* NOTE: This information must be included in the course description.**

Restrictions (Variable Topics Course): \_\_\_\_\_

Prerequisite(s): CET 3170 with a grade of "C" or better; or permission of instructor

Corequisite(s): None

Prerequisite(s) or Corequisite(s): \_\_\_\_\_

Banner Enforced:

Prerequisite(s): \_\_\_\_\_

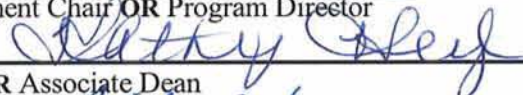
Corequisite(s): \_\_\_\_\_

Prerequisite(s) or Corequisite(s): \_\_\_\_\_


APPROVED:

ZB. 

Department Chair OR Program Director



Dean OR Associate Dean



Associate VP, Academic Affairs

3 Apr 08

Date

4/8/08

Date

5/19/08

Date

\*If crosslisted, attach completed Course Crosslisting Agreement Form

Prefix and Course Number: CET 4120

**Catalog Course Description:**

This course is a basic introduction to the fundamental principles of reinforced concrete design according to current ACI Code. The course covers flexural analysis and design of beams and one-way slabs, serviceability, bond and development lengths, and shear and diagonal tension.

**Required Reading and Other Materials will be equivalent to:**

1. McCormac, Jack C. (2006), *Design of Reinforced Concrete (7<sup>th</sup> Edition ACI 318-05 Code Edition)*. John Wiley
2. *ACI 318-05 Code-optional (recommended)* American Concrete Institute.

**Specific, Measurable Student Behavioral Learning Objectives:**

Upon completion of this course the student should be able to:

1. Examine properties and mechanical behaviors of concrete and reinforcing steel.
2. Compare fundamental principles of ultimate strength method to analyze and design beams and one-way slabs.
3. Analyze reinforced concrete structures for serviceability.
4. Design reinforced concrete members/structures.

**Detailed Outline of Course Content (Major Topics and Subtopics) or Outline of Field Experience/Internship (experience, responsibilities and supervision):**

- I. Introduction to Material Properties of Reinforced Concrete and References to the American Concrete Institute Code
  - A. Cement, aggregates and proportioning and mixing of concrete
  - B. Properties of concrete in compression and tension
  - C. Reinforcing steels for concrete
- II. Flexural Analysis and Design of Beams
  - A. Bending of homogeneous beams
  - B. Reinforced concrete beam behavior
  - C. Design of tension-reinforced rectangular beams
  - D. Rectangular beams with tension and compression reinforcement
  - E. Design and analysis of T-beams
- III. Shear and Diagonal Tension in Beams
  - A. Diagonal tension in homogeneous elastic beams
  - B. Reinforced concrete beams with web reinforcement
  - C. ACI code provisions for shear design
- IV. Bond, Anchorage and Development Length
  - A. Fundamentals of flexural bond
  - B. Ultimate bond strength and development length
  - C. American Concrete Institute (ACI) code provisions for development of tension remodeling
  - D. Anchorage of tension bars by hooks
  - E. Development of bars in compression
- V. Crack Control and Deflections
  - A. Cracking in flexural members
  - B. American Concrete Institute (ACI) code provision for crack control
  - C. Deflections due to long-and-short-term loads
  - D. American Concrete Institute (ACI) code provisions for control of deflections

**Evaluation of Student Performance:**

1. Assigned homework problems
2. Written examinations