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:

Department Chair **OR** Program Director	Date 3 Apr 08
Dean **OR** Associate Dean	Date 4/8/08
Associate VP, Academic Affairs	Date 5/19/08

*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 (7th 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