

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 4135 Crosslisted With*: _____

Course Title: Foundation and Geotechnical Engineering

Check All That Apply: Required for Major: Required for Minor: _____ Specified Elective: _____
Required for Concentration: _____ Elective: _____ Service Course: _____

Credit Hours: 3 (3+0)

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

Lecture 45 Lab _____ Internship _____ Practicum _____ 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 4130 with grade of "C" or better

Corequisite(s):

Prerequisite(s) or Corequisite(s): _____

Banner Enforced:

Prerequisite(s): _____

Corequisite(s): _____

Prerequisite(s) or Corequisite(s): _____

Catalog Course Description: The course applies engineering mechanics and soil mechanics principles to the provision of safe designs for foundations of bridges, buildings, towers and other structures. This course covers the analysis and design of shallow foundations, spread footings, mats, deep foundations, earth retaining structures and site exploration and characterization. It is a practical design course in foundation and geotechnical engineering.

APPROVED:		<u>3 Apr 08</u>
Department Chair OR Program Director		Date
		<u>4/8/08</u>
Dean OR Associate Dean		Date
		<u>5/19/08</u>
Associate VP, Academic Affairs		Date

*If crosslisted, attach completed Course Crosslisting Agreement Form

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Required Reading and Other Materials will be equivalent to:

Braja M. Das (2007). Principles of Foundation Engineering. Cengage Learning (6th or current edition)

Specific, Measurable Student Behavioral Learning Objectives:

Upon completion of this course the student should be able to (format: 1, a, i, ii, etc.):

1. Evaluate soil properties and characteristics with respect to various foundation structures selecting appropriate properties for foundation structure design.
2. Apply the engineering mechanics and soil mechanics principles to analyze and design vary foundation engineering problems.
3. Perform the geotechnical and structural engineering design for: shallow and deep foundations under vertical and lateral loads, retaining walls and basic excavation support systems.

Detailed Outline of Course Content (Major Topics and Subtopics) or Outline of Field Experience/Internship (experience, responsibilities and supervision) (format: I, A, 1, a, etc.):

- I. Types of Foundations in Civil Engineering
 - A. Structural support (buildings)
 - B. Earth structures (dams, highways)
 - C. Retaining structures (walls)
 - D. Soil Mechanics
 - E. Site Exploration and Characterization
- II. Loads on Foundations
 - A. Structure loads
 - B. Lateral loads
 - C. Traffic loads
 - D. Water loads
 - E. Seismic loads
 - F. Building Code loads
- III. Shallow Foundations
 - A. Bearing Capacity
 - B. Spread footings – Vertical and lateral loads
 - C. Mats
- IV. Pile Foundations
 - A. Pile types – Vertical and lateral loads
 - B. Pile driving formulae (steel, concrete)
 - C. Skin friction
 - D. Pile groups
- V. Drilled-Shaft and Caisson Foundations
 - A. Bearing capacity
 - B. Settlement
- VI. Retaining Structures
 - A. Lateral earth pressure
 - B. Drainage
 - C. Surcharges
 - D. Settlement and rotation
 - E. Anchors
 - F. Specialized retaining structures (slurry walls, MSE walls, Soil Nail walls)
- VII. Soil Improvements and Ground Modification
 - A. Foundations on Weak and Compressible Soils
 - B. Foundations on Expansive Soil
 - C. Foundations on Collapsible Soil

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Evaluation of Student Performance (format: 1, a, i, ii, etc.):

1. Written examinations
2. Assigned homework problems
3. Research/team report
4. Oral presentations on faculty-assigned topic