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 3135 **Crosslisted With*:** _____

Course Title: Mechanics of Materials with Laboratory

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

Required for Concentration: _____ Elective: _____ Service Course: X

Credit Hours: 4 (3+2)

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

Lecture 45 Lab 30 Internship 0 Practicum 0 Other (please specify type and hours):_____

Schedule Type(s): B **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 2150 and COM 2610 both with grades of "C" or better, or permission of instructor.
Corequisite(s): MTH 2410, or permission of instructor

Prerequisite(s) or Corequisite(s):

Banner Enforced:
Prerequisite(s): CET 2150 and COM 2610
Corequisite(s): MTH 2410
Prerequisite(s) or Corequisite(s): _____

Catalog Course Description:
This course introduces the theory of strength of materials, stresses and strains in members subjected to tension, compression, torsion, and shear. Flexural and shearing stresses in beams, principal stresses, and deflection of beams, column analysis, and indeterminate structures are also introduced. The laboratory component of the course is structured to give students experience in the use of laboratory equipment for conducting axial loading, shear and bending tests on various materials.

APPROVED: 2/18/2010 Richard P. Pazz — 2/18/2010
Department Chair **OR** Program Director — Date

Cathy Doyle — 3/1/10
Dean **OR** Associate Dean — Date

Sheila A Thompson — 5/4/10
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:

Beer, Ferdinand P., Johnston, Russel E., Jr., DeWolf, John T. (2009). *Mechanics of Materials*, McGraw-Hill

Harris, David W.(2005). *CE 3141 Workbook for Engineering Materials Laboratory*. Auraria Co.

Specific, *Measurable* Student Behavioral Learning Objectives:

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

1. Apply classical methods of calculus, principles of statics and materials properties to solve statically indeterminate mechanics problems.
2. Apply theory of indeterminate mechanics to axial, torsional and transversal loaded elements of machines and structures in stress calculations.
3. Calculate deformation and internal stresses in externally loaded structural and machine elements.
4. Operate laboratory equipment to determine stress and strain relationships for structural members loaded axially and transversally.
5. Conduct civil engineering experiments in a team setting.
6. Analyze and interpret the resulting data of the experiments.
7. Create a complete formal laboratory report describing the particular experiment, summarizing the results and analyzing the implications of the test.

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

I. Concept of Stress
   - A. Normal Stress
   - B. Shear Stress

II. Concept of Strain

III. Stress-Strain Relationships
   - A. Principal Stresses
   - B. Mohr's Circle
   - C. Combined Stresses
   - D. Generalized Hooke's Law

IV. Axial Loading

V. Torsional Loading

VI. Flexural Loading

VII. Combined Loading

VIII. Beam Deflections

IX. Columns

X. Energy Methods

XI. Precise Tension Test of Steel
   - A. Proportional Limit
   - B. Yield Point
   - C. Principal Stress
   - D. Tensile Strength
   - E. Modulus of Elasticity
   - F. Modulus of Toughness
   - G. Max Shearing Stress

XII. Beam Deflection Test
   - A. The Elastic Curve
   - B. Shear Force Diagram
   - C. Bending Moment Diagram
   - D. Theoretical vs. Measured Deflection

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XIII. Concrete Test
    A. Aggregate Properties and Mix Design
    B. Concrete Mix and Specimens
    C. Cylinder and Beam Testing
XIV. Additional Tests
XV. Writing Laboratory Reports

Evaluation of Student Performance:
1. Examinations
2. Oral presentation
3. Homework assignments
4. Laboratory performance
5. Formal reports of experiments