METROPOLITAN STATE COLLEGE of DENVER
Office of Academic Affairs

REGULAR COURSE SYLLABUS

School of: Professional Studies

Department: Engineering Technology

Prefix & Course Number: MET 3110 Crosslisted With*: ____

Course Title: Thermodynamics

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

Credit Hours: 3 (3+0)

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

Lecture 45 Lab 0 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): MTH 1410 and PHY 2311 with grades of “C” or better, or permission of instructor

Corequisite(s): ____

Prerequisite(s) or Corequisite(s): ____

Banner Enforced:

Prerequisite(s): MTH 1410 and PHY 2311 with grades of “C” or better

Corequisite(s): ____

Prerequisite(s) or Corequisite(s): ____

Catalog Course Description:
The fundamental laws of thermodynamics are studied. Basic concepts of energy, the thermodynamic system, dimensions and units, and the ideal-gas equation of state are studied. The course also covers closed and open systems, heat engines as well as reversible and irreversible processes.

APPROVED: [Signature]

Department Chair OR Program Director [Signature] Date 3/1/2011

Dean OR Associate Dean [Signature] Date 3/8/2011

Associate VP, Academic Affairs [Signature] Date

*If crosslisted, attach completed Course Crosslisting Agreement Form
Prefix and Course Number: MET 3110:

Required Reading and Other Materials will be equivalent to:

Specific, *Measurable* Student Behavioral Learning Objectives:
Upon completion of this course the student should be able to:
1. Interpret and apply the basic laws of thermodynamics.
2. Apply the First Law to closed systems.
3. Develop work and heat expressions and P-V. and T-S diagrams.
4. Apply the first and second laws of thermodynamics to closed and open systems.
5. Analyze flow processes and apply the continuity relationship to steady and unsteady flow systems.
6. Analyze a transient problems.
7. Apply the second law to the Carnot cycle.
8. Calculate entropy change for processes, systems, and the universe.

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

I. Introduction to Thermodynamics
   A. Energy and Work
   B. Systems
   C. Properties
   D. S.I. and English Units

II. Work
    A. Definition
    B. Applications-Closed and Open Systems

III. Temperature and Heat
    A. Temperature Equilibrium/Reservoirs
    B. Measurement/Absolute
    C. Specific and Latent Heats

IV. Properties of Systems
    A. Intensive

B. Extensive

V. First Law of Thermodynamics
   A. Processes
   B. Cycles

VI. Flow Processes
    A. Steady and Unsteady Flow Energy Equations
    B. Continuity Relationship

VII. Second Law of Thermodynamics
    A. Carnot Cycle
    B. Reversibility/Reversibility
    C. Modification of the Perfect Gas Relationship
    D. Applications

**Evaluation of Student Performance:**
1. Homework
2. Tests
3. Computer Project
4. Final Examination