METROPOLITAN STATE COLLEGE OF DENVER
Office of Academic Affairs

REGULAR COURSE SYLLABUS

School of Professional Studies

Department: Engineering Technology Studies

Semester(s) Offered: Spring

Prefix & Course Number: MET 3310 Crosslisted With*: ___

Course Title: Thermodynamics II

Credit Hours: 3 (2+2)

Contact Hours: Lecture 30 Lab 30 Internship ___ Practicum ___

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

Repeat* (Variable topics): ___
*(Pertinent only if the course can be repeated; enter maximum number of hours that can be earned by taking this course.)

Restrictions (Variable Topics Course): NONE

Prerequisite(s): MET 3110 and MTH 2410 with grades of “C” or better

Corequisite(s): NONE

Prerequisite(s) or Corequisite(s): NONE

Banner Enforced:
  Prerequisite(s): MET 3110 and MTH 2410 with grades of “C” or better
  Corequisite(s): NONE
  Prerequisite(s) or Corequisite(s): NONE

Catalog Course Description:
This, the second course in thermodynamics, deals with the consequence of the Second Law. The Td’s equations are studied, as are entropy and efficiencies of some heat power engines. Standard gas and vapor cycles are investigated. The laboratory work includes various calorimetry, gravimetric and volumetric analyzes, nozzles and internal combustion engine tests.

Required Reading and Other Materials will be equivalent to (Title, Author, Publisher, Copyright Date):

SPECIFIC (MEASURABLE) STUDENT BEHAVIORAL LEARNING OBJECTIVES:

APPROVED:

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<tr>
<th>Department Chair/Institute Director</th>
<th>Date: 8/10/05</th>
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<td>Kathy S. Elye</td>
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<th>Dean</th>
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<td>Linda L. Lynch</td>
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<th>Associate VP, Academic Affairs</th>
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*If crosslisted, attach completed Course Crosslisting Agreement Form
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Upon completion of this course the student should be able to demonstrate:

1. Apply the 1st and 2nd Laws of Thermodynamics to problems dealing with vapor cycles, combustion, gas compression, and refrigeration systems.
2. Perform laboratory tests which provide practical understanding of cycles (auto/diesel) and energy conversion.
3. Tabulate properties and use computer/software to produce results.
4. Relate the Carnot Cycle principle to other vapor cycles and combustion processes (heat engines).
5. Analyze gas flow and compute property, changes through nozzles and turbines.
6. Perform various calorimetry, gravimetric, and volumetric analysis.

OUTLINE OF COURSE CONTENT (Major Topics and Subtopics):

I. Properties of Pure Substances
   A. Extensive
   B. Intensive

II. Tabulated Properties
    A. Steam Tables
    B. Gas Tables
    C. Generalized Compressibility
    D. Critical
    E. Heats of Formation

III. Properties of Gases and Gaseous Mixtures
     A. Gravimetric
     B. Volumetric

IV. Vapor Cycles
    A. Rankine
    B. Carnot
    C. Reheat/Regenerative
    D. Co-Generation

V. Combustion Processes
   A. First Law Analysis
   B. Stoichiometric
   C. Closed
   D. Open/Flow
   E. Exothermic
   F. Endothermic

VI. Gas Cycles
    A. Carnot
    B. Otto
    C. Diesel (Dual)
    D. Stirling

VII. Nozzles and Turbines
     A. Expansion Devices
     B. Convergent and C/D Nozzles
     C. Isentropic Processes

VIII. Gas Compression
      A. Brayton
      B. Gas Turbine
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C. Multistage/Intercooling
D. Aircraft Gas Turbines

IX. Refrigeration
A. Reversed Carnot
B. Vapor Compression
C. Cascade
D. Ph Diagrams

EVALUATION OF STUDENT PERFORMANCE:
25% Quizzes
30% Tests
15% Special Projects With Computer
30% Lab Reports (written and oral)