AA 260 COURSE DETAILS

TITLE:	Thermodynamics
CREDITS:	4
FORMAT & SCHEDULE:	Lecture, 3 hours / week Quiz, 2 hours / week
FACULTY CONTACT:	James Hermanson

COURSE DESCRIPTION (Catalog Short Form, 50 words Max):

Introduction to the basic principles of thermodynamics from a macroscopic point of view. Emphasis on the First and Second Laws and the State Principle, problem solving methodology.

COURSE OVERVIEW & LEARNING OBJECTIVES:

This course will provide an introduction to the basic principles of thermodynamics from a macroscopic point of view. Students will learn about the concepts of energy and entropy and how to apply these concepts to analyze engineering systems. At the end of this course, students should be able to:

1) Understand and determine properties of real substances, use property tables, and apply the ideal gas law.
2) Analyze open and closed systems by applying the first law of thermodynamics. Perform energy balances, determine heat and work transfers.
3) Apply the second law to analyze systems and control volumes.
4) Understand basic cycles including Otto, Rankine, and Brayton cycles.

COURSE REQUIREMENTS

PREREQUISITES: 1) minimum grade of 2.0 in either CHEM 140, CHEM 142, CHEM 144, or CHEM 145
2) minimum grade of 2.0 in either MATH 126, MATH 129, or MATH 136
3) minimum grade of 2.0 in PHYS 121

REQUIRED TEXTBOOK:
Thermodynamics, An Engineering Approach, 8th Edition, Çengel and Boles

COURSE SCHEDULE

Week & Topic	
1	Units, Systems, Processes, Cycles, State Postulate, Pressure, Energy, Heat Transfer, Work, 1st Law of Thermodynamics
2	Energy Conversion Efficiencies, Pure Substances, Phase change, P-V Diagrams, Propery Tables, Ideal Gas, Other Equations of State, Compressibility
3	Moving Boundary Work, Energy Balance, Polytropic Processes, Specific Heats, Internal Energy, Enthalpy
4	Mass Balance for Control Volumes, Flow Work, Flow Energy, Nozzles, Diffusers, Turbines, Compressors, Throttle Valves
5	2nd Law, Thermal Resevoir, Heat Engine, Refrigerator, Reversible and Irreversible Processes, Carnot Principles
6	Entropy, Entropy Changes, Isentropic Processes, Entropy Property Diagrams, T ds Relations, Entropy Change of Liquids, Solids, Ideal Gasses
7	Reversible Steady-Flow Work, Efficiency, Entropy Balance, Analysis of Power Cycles, Otto Cycle, Diesel, Sterling, Ericsson, Brayton Cycles
8	Brayton with Regeneration, Intercooling, Reheating, Ideal Jet-Propulsion Cycles, Second Law Analysis
9	Carnot and Rankine Vapor Cycles, Regenerative Rankine Cycle
10	2nd Law Analysis of Vapor Power Cycles, Cogeneration, Refrigerators and Heat Pumps, Vapor-Compression Refrigeration Cycles, Review