MASTER COURSE OUTLINE
Prepared By: James Sauceda Date: Sep 2017

COURSE TITLE
Thermodynamics

GENERAL COURSE INFORMATION

Dept.: ENGR&	Course Num: 224	(Formerly:)
CIP Code: 14.1901	Intent Code: 11	Program Code:
Credits: 5		
Total Contact Hrs Per Qtr.: 55		
Lecture Hrs: 55	Lab Hrs: 0	Other Hrs: 0
Distribution Designation: Natural Science NS		

COURSE DESCRIPTION (as it will appear in the catalog)
Thermodynamics is the science of energy. This course introduces the basic principles of thermodynamics from a macroscopic point of view and applies them to engineering systems such as heat pumps, engines, power plants, and refrigeration. Topics include property tables, equations of state, first and second laws of thermodynamics, analysis of closed and open systems, power and refrigeration cycles.

PREREQUISITES
PHYS& 221, MATH& 152. COREQUISITE: CHEM& 162

TEXTBOOK GUIDELINES
Thermodynamics: An Engineering Approach with Connect Access, 7th Edition, Yunus A. Cengel and Michael A Boles, 2011 or similar text. Access to the internet will be required and resources will be accessed through a specified online platform.

COURSE LEARNING OUTCOMES
Upon successful completion of the course, students should be able to demonstrate the following knowledge or skills:

1. Explain the following thermodynamic concepts: systems, control volumes, properties and state of a substance, process, and cycle.
2. Apply equations of state and thermodynamic tables to evaluate the properties of a pure substance.
3. Apply the 1st law of thermodynamics to evaluate a change in the state of a thermodynamics system.
4. Apply the concept of conservation of mass and the first law as a rate equation to the analysis of a control volume.
5. Explain the second law of thermodynamics and how it relates to the concepts of reversibility and entropy.
6. Apply the concepts of reversibility and entropy change to the analysis of thermodynamic systems and control volumes.
7. Use the 1st and 2nd laws of thermodynamics in the analysis of a Rankine cycle, vapor compression refrigeration cycle, and air-standard Otto cycle.
8. Calculate changes in entropy using thermodynamic tables.
9. Calculate changes in entropy for ideal gases.

INSTITUTIONAL OUTCOMES
None

COURSE CONTENT OUTLINE

I. Basic concepts of thermodynamics
II. Properties in pure substance
III. First law of thermodynamics for closed systems
IV. First law of thermodynamics for control volumes
V. Second law of thermodynamics; Carnot Cycle; Thermodynamic temperature scale
VI. Concept and calculation of entropy
VII. Gas power cycles
VIII. Vapor and combined power cycles
IX. Refrigeration cycle

DEPARTMENTAL GUIDELINES *(optional)*
PO5 should be assessed: Students will be able to solve problems by gathering, interpreting, combining and/or applying information from multiple sources.

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DIVISION CHAIR APPROVAL **DATE**