MECHANICAL ENGINEERING PROGRAM

ABET COURSE SYLLABUS

ME 302 Thermodynamics I (3 Units) Required

Course Description: (2013-15 Catalog) Properties of working fluids and fundamental relations for processes involving the transfer of energy. First and second laws of thermodynamics, irreversibility and availability. 3 lectures.

Prerequisite Courses: PHYS 132; ME 212 or CHEM 128.

Prerequisites by Topic: Physics including an introduction to energy and energy transfer.
Differential and integral calculus.
Engineering Dynamics or General Chemistry II

Textbook: (and/or other required material) Fundamentals of Engineering Thermodynamics, 7th Edition by Moran Shapiro, Boettner, and Bailey, John Wiley & Sons, 2011.

References: None

Course Coordinator/Instructor: Andrew Kean, Associate Professor of ME

Course Learning Outcomes: The overall objective of this course is to develop in the student an ability to logically define and analytically solve engineering problems involving work, heat transfer, and energy. This includes a clear understanding of the definition of a thermodynamic system, the concept of a thermodynamic state, and determination of properties for liquids, ideal and real gases, and fluids with phase changes. The student will learn how to synthesize these concepts through application of the first and second laws of thermodynamics to both closed and open systems, and develop an understanding of the limitations placed on processes and cycles by the laws of thermodynamics.

Relationship of Course to MECHANICAL ENGINEERING Program Outcomes:												
a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*	*l*	*m*
H	**L**	**L**	**L**	**H**	**L**	**M**	**M**	**M**	**L**	**L**	**H**	**M**

Topics Covered:

1. Fundamental Concepts: thermodynamic system, surroundings, energy, work, heat transfer, power, units systems.

2. Physical Properties: states, thermodynamic properties vs. non-properties, ideal gas, real gas, phase change, tabulated properties and their evaluation, graphical presentations.

	3. First Law: energy can be neither produced nor destroyed, applied to closed and open systems, applied to processes and cycles. 4. Second Law: entropy can be produced but cannot be destroyed, applied to closed and open systems, applied to processes and cycles, reversible vs. irreversible processes, Carnot cycle.	
Laboratory Projects:	None	
Class/Lab Schedule:	Three 50-minute lectures per week.	
Contribution of Course to Meeting the Professional Component:	(a) College-level mathematics and basic sciences:	0 credits
	(b) Engineering Topics:	3 credits
	Design?	no
	(c) General Education:	0 credits
	(d) Other:	0 credits
Prepared by: A. Kean	**Date:** 9/11/13	