COURSE SYLLABUS (2 Page)

Course Number: MEGR 3111
Course Name: Thermodynamics I

Credits and Contact Hours: 3

Instructor: Staff

Textbook: Moran and Shapiro, Fundamentals of Engineering Thermodynamics, 7th Edition, Wiley (Property tables to accompany the 7th Edition)

Catalog Description: First and second laws of thermodynamics. Work and heat Carnot cycle. Ideal and real gases. Non-reactive mixture of gases. Availability and irreversibility.
Most Recently Offered (Day): Spring 2016, Fall 2015, Summer 2015
Most Recently Offered (Evening): Course has not been offered in 3 years

Pre-Requisites/Co-Requisites: MATH 2171 and PHYS 2101 with grades of C or above.

Course is: Required (R)

Goals: The objective of this course is to provide the students with an understanding of the first and second laws of thermodynamics and their application to engineering systems.

After successful completion of this course, the student will be able to:

- Understand the thermodynamic properties of general working substances.
- Evaluate the properties and property changes for an ideal gas.
- Apply conservation of energy through the First Law of Thermodynamics to closed and control volume systems.
- Utilize the Second Law of Thermodynamics for cyclic devices.
- Calculate the entropy generation rate for a control and closed system.
- Analyze the operation of pumps, compressors, turbines, and nozzles.
- Realize the concepts of energy availability (exergy).

Student Outcomes Addressed:

A. an ability to apply knowledge of mathematics, science, and engineering

Course Topics:

- Conservation of Energy (1st Law of Thermodynamics)
- Application to Closed Systems
- Concepts of Internal Energy and Enthalpy
- Ideal and Real Gases

- Polytropic Processes
- Application to Control Volume Systems
- Transient Control Volume Analysis
- Second Law of Thermodynamics
- Maximum Performance of Cycles
- Carnot Cycle
- Entropy and the 2nd Law of Thermodynamics
- Entropy Balance in Internally Reversible Processes
- Entropy Balance for Closed Systems
- Entropy Balance for Control Volume Systems
- Isentropic Processes and Efficiencies
- Heat Transfer and Work in Internally Reversible Control Volume Systems
- Exergy (Availability) Analysis