

## **NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY EGR 248 – THERMODYNAMICS FOR ENGINEERING (3 CR.)**

### **Course Description**

Studies formulation of the first and second law of thermodynamics. Presents energy conversion, concepts of energy, temperature, entropy, and enthalpy, equations of state of fluids. Covers reversibility and irreversibility in processes, closed and open systems, cyclical processes and problem solving using computers. Lecture 3 hours per week.

### **General Course Purpose**

Students will learn the fundamentals of thermodynamics and will develop knowledge of the first and second law of thermodynamics and their applications to various engineering devices involved in the energy exchanges, transmissions and transformations. Student will be able to solve problems related to these engineering devices.

### **Course Prerequisites/Corequisites**

Prerequisites: MTH 264 and PHY 241 (or PHY 231).

### **Course Objectives**

Upon completion of the course the student will be able to:

- a) Determine the liquid, vapor and ideal gas properties of substances and the associated phase diagrams.
- b) Apply the State Principle to solve thermodynamic problems.
- c) Use thermodynamic property tables.
- d) Use the first law of thermodynamics to solve work, heat transfer, or internal energy of closed systems.
- e) Apply the first law of thermodynamics to solve mass flow rate, work, heat transfer, or enthalpy of open systems.
- f) Use the second law of thermodynamics to solve work, heat transfer, or entropy of closed and open systems.
- g) Analyze the different cycles including the Otto, Diesel, Rankine, and vapor compression refrigeration cycles, and calculate specified parameters such as work, efficiency/Coefficient of Performance (COP), quality, and heat transfer.

### **Major Topics to be Included**

- a) Introduction to Thermodynamics and Basic Concepts
- b) Energy, Energy Transfer, and General Energy Analysis
- c) Properties of Pure Substances
- d) Energy Analysis of Closed Systems
- e) Mass and Energy Analysis of Control Volumes
- f) The Second Law of Thermodynamics
- g) Entropy
- h) Gas Power Cycles
- i) Vapor and Combined Power Cycles
- j) Refrigeration Cycles