EGR 255: Thermodynamics

An introductory course in the fundamentals of classical thermodynamics covering such topics as: the First Law of Thermodynamics, Heat Engines, the Second Law of Thermodynamics, the Internal Combustion Engine, Gas Turbines, Steam Power Generation, the Rankin Cycle, and Heat Transfer. Prerequisite: PHY 102 or PHY 212 and MTH 215, or permission of the instructor. Instructional Support Fee applies.

Course Student Learning Outcomes

1. Define thermodynamics concepts including: pressure, temperature, work, heat, energy and how they apply to open (flow) and closed (non-flow) systems. 2. Define energy conversion, enthalpy and specific heat and apply them using the Energy Equation. 3. Calculate efficiency and entropy and apply them to reversible and irreversible cycles, specifically The Carnot Cycle. 4. Illustrate the concepts of phase, phase change (vaporization), quality and enthalpy and use them to determine the properties of steam using computer programs, the Steam tables and Mollier chart. 5. Analyze Carnot, Rankine and actual power generation cycles and alternative energy sources using graphical and mathematical techniques. 6. Apply the concepts of Specific heat, gas constants and partial pressure to a variety of processes using ideal gas law, the Gas tables & the Psychometric chart. 7. Analyze the Otto, diesel and Brayton cycles and the internal combustion engine using graphical and mathematical techniques. 8. Calculate Coefficient of Performance and use refrigerant tables to analyze refrigeration cycles.

Credits: 3
Program: Engineering