Credits: 3 hours lecture, 0 hours laboratory per week

Instructor: Nelson Fumo, Assistant Professor of Mechanical Engineering

Additional Material: Thermodynamics tables, instructor handouts.

Course Information

Catalog Description: First law and second law of thermodynamics for closed and open systems. Fundamental relations. Entropy generation or exergy destruction. Exergy analysis. Application of thermodynamics to engineering energy systems. Entropy generation minimization.

Prerequisites: Graduate standing.

Required, Elective, Selected: Option for the required thermal science course.

Course Goals

Instructional Outcomes: By the end of this course students will be able to:
1. Apply the first and second law of thermodynamics to closed and open systems.
2. Apply the concepts lost available work, entropy generation, and available work to common thermodynamic cycles.
3. Use exergy analysis on common energy process.
4. Analyze thermodynamic processes of energy systems.
5. Evaluate entropy generation minimization of energy systems.

Relationship to Student Outcomes: This course supports the following Mechanical Engineering Program Student Outcomes, which state that our students will:
1. be able to apply science, mathematics, and modern engineering tools and techniques to identify, formulate, and solve engineering problems

Topics Covered
- First and second law of thermodynamics for closed and open systems.
- Concepts of lost available work, entropy generation, and available work applied to thermodynamic cycles.
- Sources of entropy generation.
- Fundamental relations.
- Exergy analysis for nonflow and flow systems.
- Exergy analysis of air-conditioning applications.
• Thermodynamic analysis of processes associated to energy systems, e.g. power generation, refrigeration, and solar energy.
• Entropy generation minimization analysis of energy systems such as heat exchangers and storage systems.

Prepared By: Nelson Fumo                     Date: 2/3/2014