

ME 316: Engineering Thermodynamics II
Fall Semester Only

Type (check one): Required: Elective:

2005-2006 Catalog Data: ME 315. Engineering Thermodynamics II. Concepts of reversibility, irreversibility, and availability. Power and refrigeration systems. First Law analysis of gas-vapor mixtures. Introduction to psychrometry. Thermochemical reactions including combustion processes, fuel properties, and equilibrium composition. Prerequisite: ME 305. Offered in the Fall semester. *One semester; three credits*

Prerequisites: ME 305

Co-Requisites: None

Textbook: R. Sonntag, C. Borgnakke, and G. Van Wylen, *Fundamentals of Thermodynamics*, Sixth Edition, Wiley, 2002.

Other Required Materials: None

Other References: None

Instructor: Dr. Joseph M. Londino, Assistant Professor of Mechanical Engineering

Course Objectives:

1. Develop understanding of second law and how it limits engineering systems
2. Deepen understanding of irreversibility, and introduce availability analysis
3. Discuss power generation and refrigeration systems in detail
4. Develop understanding of non-reacting and reacting gas mixtures

Prerequisites by Topics:

1. Differential and integral calculus
2. Thermodynamics up through the second law

Topics:

1. Entropy and availability
2. Open and closed systems
3. Principle of increase of entropy
4. Mechanical and thermal efficiencies
5. Reversible and irreversible work
6. Power generation: steam cycles / air standard cycles
7. Refrigeration cycles
8. Adiabatic saturation processes
9. Psychrometrics
10. Chemical reactions: first and second law analysis
11. Heating values; adiabatic flame temperature

Class Schedule: Three 50-minute sessions per week

Prepared by: Dr. Joseph M. Londino **Date:** August 2005

**Professional Component:
ME 316 – Engineering Thermodynamics II**

Category (check one)	<input type="checkbox"/> Math/Basic Science <input checked="" type="checkbox"/> Engineering <input type="checkbox"/> General Education <input type="checkbox"/> Other
Design (check one)	<input type="checkbox"/> Significant <input type="checkbox"/> Some <input checked="" type="checkbox"/> None
Realistic Constraints (check all that apply)	<input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input type="checkbox"/> Sustainability <input type="checkbox"/> Manufacturability <input type="checkbox"/> Ethical <input type="checkbox"/> Health & Safety <input type="checkbox"/> Social <input type="checkbox"/> Political

Relationship to Program Outcomes:

Check all that apply:

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs
- (d) an ability to function on multi-disciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
- (i) a recognition of the need for and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice