CHE 351

CHEMICAL ENGINEERING THERMODYNAMICS

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Course Description: Thermodynamics and its applications to chemical engineering operations.

Class Schedule: Monday and Wednesday 1:50 PM – 3:05 PM


Reference Book: "Thermodynamics and an Introduction toThermostatics” by Herbert B. Callen, 2nd ed., John Wiley and Sons.

(Course materials, homework assignments, etc. will be posted on the blackboard)
Grade Determination

(Based on 2 Tests, final exam, quizzes, and homework)

2 Tests 30 (15 points each)
Final exam 40
5 Quizzes 20
Homework 10

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TOTAL (100)

Homework Policy: Due date - full credit
After due date - No credit

Exams and quizzes:
Quiz: Closed book and notes
Exam: Open book and handouts only
Closed notes and other study material

Exam Dates

Mid-terms: October 3, 2012 and October 31, 2012
Final Exam: Friday, December 7, 2012 (2 PM to 4 PM)

NO RETAKES OF THE TESTS OR FINAL WILL BE ALLOWED. MAKE-UP TEST/ FINAL MAY BE ALLOWED FOR PERSONAL EMERGENCY ONLY AND WITH THE PROOF OF SUCH EMERGENCY (EXAMPLE: DOCTOR’S NOTE, ETC.)
Course Outline for CHE351

1. Introduction

2. First law of thermodynamics

3. Volumetric properties of pure liquids

4. Heat effects

5. The second law of thermodynamics

6. Thermodynamic properties of fluids

7. Production of power from heat

8. Refrigeration and liquefaction

9. Other applications of thermodynamics
CHE 351 Chemical Engineering Thermodynamics

Course Goals

1. To introduce students to the scope and domain of thermodynamics and an understanding of the 1\textsuperscript{st} law and 2\textsuperscript{nd} law of thermodynamics.

2. To provide students the knowledge of P-V-T relationship and thermodynamic properties.

3. To provide students the knowledge to calculate work, heat, and changes in the energy of a system in a process.

4. To provide students the knowledge to analyze power and refrigeration cycles.
Student Learning Objectives

Upon completion of this course, students will be able to:

1. Understand the scope and domain of thermodynamics and cite important definitions and concepts of thermodynamics.
2. Understand internal energy, heat, and work and the First Law of Thermodynamics.
4. Identify thermodynamically consistent equations of state.
5. Define generalized thermodynamic potentials, such as enthalpy, the Gibbs free energy, and the Helmholtz potential and interconvert between these potentials, internal energy and entropy. Use Thermodynamic potentials to solve problems of non-isolated systems, and to place thermodynamic restrictions on measurable material properties.
6. Derive and manipulate Maxwell Relations and use these and other relations to derive a relationship between any thermodynamic quantity and a small set of measurable thermodynamic quantities using a set of systematic thermodynamic manipulations.
7. Predict pure-component Vapor-Liquid equilibrium using any acceptable equation of state.
8. Analyze and design power cycles.
9. Analyze and design refrigeration cycles.
10. Apply the concepts of thermodynamics to non-process areas such as stretching DNA strands, adsorption on surfaces, and fuel cells.