

ChE 342: Chemical Engineering Thermodynamics II

Fall 2016

Instructor: Dr. Gennady Gor

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Office Hours: Mondays: 1:00 PM – 2:30 PM

Additional time slots will be available by appointment

Text: Introduction to Chemical Engineering Thermodynamics, Seventh Edition, J.M. Smith, H.C. Van Ness and M.M. Abbott, McGraw-Hill (2005). ISBN: 0-07-310445-0

Class: Thursday, 6:00-9:05 PM; Room: KUPF103

Course: This course will cover heat engines, refrigeration, thermodynamics of mixtures, phase equilibrium and chemical-reaction equilibrium.

Pre-Requisites: ChE 230, Math 211 (or Math 213), Chem 236

Homework: Homework assignments will be given; collected and graded. The assignments will be posted on Moodle. Solutions to the problems will be posted on Moodle

Exams: There will be three exams and one final exam. There will also be short quizzes (closed book) covering concepts. The quizzes will not be announced in advance, please be prepared to have a quiz during every class.

Grading

| | |
|---------------------|-----------------|
| Exams | $3 \times 20\%$ |
| Final | 25% |
| Assignments/quizzes | 10% |
| Participation | 5% |
| | 100% |

Those who attend 100% of the classes will be automatically given 5% for participation.

All exams will be open book. The NJIT Honor Code will be upheld and any violations will be brought to the immediate attention of the Dean of Students.

Withdraw Deadline: Nov. 7, 2016

Course Objectives

Students will be able to:

- Apply basic chemistry and engineering concepts to thermodynamic systems.
- Use the laws of thermodynamic to analyze basic power and refrigeration cycles
- Apply both fundamental and practical knowledge of thermodynamics to the design of basic power and cooling cycles
- Apply concepts of thermodynamic to solutions
- Determine equilibrium compositions of chemical reactions and two-phase liquid/vapor mixtures.

Schedule

| Week | Date | Topic | Reading |
|------|--------------------|--------------------------------------|------------|
| 1 | September 8 | Heat Engines | Chapter 8 |
| 2 | September 15 | Heat Engines | Chapter 8 |
| 3 | September 22 | Refrigeration Processes | Chapter 9 |
| 4 | September 29 | Refrigeration Processes | Chapter 9 |
| 5 | October 6 | Refrigeration Processes | Chapter 9 |
| 6 | October 13 | Vapor-Liquid Equilibrium | Chapter 10 |
| 7 | October 20 | Vapor-Liquid Equilibrium | Chapter 10 |
| 8 | October 27 | Solution Thermodynamics | Chapter 11 |
| 9 | November 3 | Solution Thermodynamics | Chapter 11 |
| 10 | November 10 | Solution Thermodynamics Applications | Chapter 12 |
| 11 | November 17 | Solution Thermodynamics Applications | Chapter 12 |
| 12 | November 22 | Chemical Reaction Equilibria | Chapter 13 |
| 13 | December 1 | Chemical Reaction Equilibria | Chapter 13 |
| 14 | December 8 | Chemical Reaction Equilibria | Chapter 13 |

Exams

| Week | Date | Exam |
|------|------------|------------|
| 5 | October 6 | Test 1 |
| 9 | November 3 | Test 2 |
| 13 | December 1 | Test 3 |
| | Dec. 16-22 | Final Exam |