

- Predict relationships between two different properties (e.g. vapor pressure and heat of vaporization)

Classical thermodynamics *cannot*

- Describe the condition or state of individual atoms or molecules.
- Predict physical behavior of a material without some previous experimental measurements.
- By itself predict a rate or how long some change will take, because this requires describing departure from equilibrium.

Course Objectives

This class is not your first exposure to thermodynamics (and hopefully will not be your last). As students and instructor, we will be learning and relearning this material together. The main objective of this course is to develop your ability and confidence to apply the principles of thermodynamics to solve problems in three areas:

1. Changes of state, including for open systems
2. Phase equilibria
3. Chemical equilibria

A secondary objective is for you to gain experience using computational tools (e.g. Mathcad) to solve real-world engineering problems. Specific skills and knowledge are described in the list of *Student Outcomes* below.

Mastery of the material in this course means much more than being able to plug numbers into an equation. There is virtually an infinite number of problems and applications that thermodynamic analysis can address, and so you should learn to analyze problems starting from fundamental relationships. This is quite different from expecting to pull a pre-digested equation out of a book to solve every problem, and students who overcome this urge will experience less frustration and improved performance. Your goal should be to practice this kind of analysis until it becomes automatic.

Text

The required text is Smith, Van Ness, and Abbott, *Introduction to Chemical Engineering Thermodynamics*, 7th ed., McGraw-Hill, 2005.

Coursework Activities

You should spend approximately 9 hours per week on this class: 3 in the classroom and 6 on outside work. Some students will need to put in more time than this to earn the grade they desire. Coursework activities include the following:

- **Assignments.** Completing homework assignments is essential for your learning. Assignments are due at the beginning of class on the indicated due date. Late homework will not be accepted for credit unless approved by the instructor given a compelling reason, such as