Goal
The goal of this course is to introduce the basic concepts of Statistical Mechanics and to consider its applications to atomic and molecular systems, as they are encountered in chemistry. The course starts with a brief review of quantum and classical mechanics, thermodynamics, and statistics, considers in detail the canonical ensemble, and moves onto other ensembles and a variety of simple applications. Several deeper and more complex topics and applications of statistical mechanics in chemistry will be covered towards the end of the class.

Topics:

I. Chapters 1-5 of McQuarrie, including Introduction & Review; Canonical, Grand-canonical, Micro-canonical Ensembles and Fluctuations; Ideal Monoatomic Gas.

The first half of the class will be followed by the Midterm Exam.

II. Chapters 6-9, 10.5, 11 of McQuarrie, including Diatomic and Many-atomic Ideal Gases, Crystals, Chemical Equilibrium, Black-body Radiation and Classical Statistical Mechanics.

The second half of the class will be followed by the Final Exam.

Assessment
Homework (one problem set per week, due Tuesday before class) 40%
1st Exam, take home 30%
2nd Exam, take home, aka Final (to include 2nd half of class only) 30%