

# Chemistry 410B: Physical Chemistry

# Course Syllabus

Spring 2019, Mon, Wed, & Fri 12:00 to 12:50 , GMCS-307

**Instructor** Dr. David Pullman, CSL-301, 619-594-5573, dpullman@sdsu.edu

**Office Hours** Mon, Tues, and Wed from 1:30-2:30 in CSL-301

**Textbook** *Physical Chemistry, 10<sup>th</sup> Ed.*, P.W. Atkins and J. de Paula

**Prerequisites** Chemistry 232, 232L, 251, 410A

**Catalog Description** Theoretical principles of chemistry with emphasis on mathematical relations. Theory and practice in acquisition and statistical analysis of physical measurements on chemical systems.

**Course Overview** The focus of Chem 410B is on Thermodynamics, Chemical Kinetics, and Statistical Thermodynamics. Since we did not cover Nuclear Magnetic Resonance (NMR) Spectroscopy in 410A, we will spend about one week on this topic before beginning our study of Thermodynamics, Chemical Kinetics, and Statistical Thermodynamics. In each of these areas, we will first discuss the underlying principles on which they are founded and then use these principles to guide us in calculating properties of physical and chemical systems.

**Topics** The main topics in Chem 410B are:

Thermodynamics Chapters 1-6

Kinetics Chapters 19-21

Statistical Thermodynamics Chapter 15

As noted above, the first topic will be Nuclear Magnetic Resonance (Chap 14)

**Course Structure** Chem 410B consists of three hour-long lectures each week. The lectures will roughly follow the text, with additional material occasionally added.

**Quiz & Exams**

NMR Exam Chapter 14

Exam 1 Tentatively Chapters 1-3

Exam 2 Tentatively Chapters 4-6

Exam 3 Tentatively Chapters 19-21

Final Tentatively Chapter 15 and cumulative Wed May 15, 10:30-12:30

- No makeup exams will be given.
- Dedicated calculators may be used during exams; cell phones and other electronic gadgets, such as ipods and ipads, must be turned off before the start of exams.

**Grading** NMR Exam 10% 3 Exams 20% each Final 30%

+/- grading and a curved scale will be used

**Student Learning Outcomes** Upon completing Chem 410B, students will be able to:

1. Articulate and understand the basic principles of Thermodynamics
2. Calculate thermodynamic properties of chemical samples and chemical reactions
3. Articulate and understand the basic principles of Chemical Kinetics
4. Calculate kinetic properties of physical processes and of chemical reactions
5. Describe the difference between Thermodynamics and Kinetics
6. Use the mathematical constructs of Statistical Thermodynamics to calculate macroscopic properties of chemical systems,

- Blackboard** Blackboard will be used to post announcements and course documents (problem sets, solution keys to problem sets and exams, etc.).
- Problem Sets** There will be one or two problem sets per chapter. Problem sets will ***not*** be graded; you do not need to hand them in. You can download them from the Blackboard website for Chem 410B. **Doing the problem sets is of the utmost importance to learning the material and doing well on quizzes and exams.**
- The **BAD**, but easy, way to do a problem is to look at the solution while you think about the problem. Nearly as bad is to think about a problem for five minutes, give up, and then look at the solution key. You are doing yourself a substantial disservice if you approach the problem sets in this fashion.
- The **GOOD**, but more difficult, way is to focus your energy on a problem for a sustained period (say 30 minutes). If you can't answer the problem, go on to another problem— but do not look at the answer key if it is already available. Later on, after you have done other problems, things may gel in your mind, and you may see how you should approach the problem. **Real learning involves, among other things, recognizing patterns in problems and comes only after a significant effort on the part of your brain.**
- Add/Drop Procedure** The add/drop deadline is Tuesday Feb. 5, 2019 at 11:59 PM. For details, see [http://arweb.sdsu.edu/es/registrar/schedule\\_adjustment.html](http://arweb.sdsu.edu/es/registrar/schedule_adjustment.html)
- Students with Disabilities** If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Disability Services at [\(619\) 594-6473](tel:6195946473). To avoid any delay in the receipt of your accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive, and that accommodations based upon disability cannot be provided until you have presented your instructor with an accommodation letter from Student Disability Services. Your cooperation is appreciated.