

## Chem 13 Course Syllabus

**Chem 13**  
**Section 22169**  
**M-F 9:00 - 12:00, Kenna 102**

**Summer 2015**  
**General Chemistry III**  
**Santa Clara University**

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**Office Hours:** M,T,W, R 12:00-1:00 (in DS 101)

### ***Textbook and Needed Materials from bookstore:***

- Chemistry, The Central Science, 13<sup>th</sup> ed, Brown, ....., and Woodward.  
Note: text is in shrink-wrapped package with the “red” solutions manual.
- For laboratory section you will need a composition notebook labcoat and safety goggles (must be splash type).
- Scientific calculator capable of logarithms, and scientific notation (\$10-20).
- Iclicker – If you already have one bring it. If not don't buy one...
- Camino: <http://camino.instructure.com/>. For all notes and assignments.

### ***Course Content and Objective:***

This course is the third and final part of the General Chemistry sequence. There is a substantial emphasis on the laboratory portion of the class (**it is 35% of your grade**). Lab will focus on the development of precise and accurate chemical analysis techniques. Chemical equilibria concepts presented in Chem 12 will be further developed before moving into chemical thermodynamics and electrochemistry. If time allows we will discuss the chemistry of the environment. **Students are expected to bring the skills taught in Chemistry 12 into this course.** It is a goal of this course to not only present chemical facts and theory but help each student continue to develop his/her problem solving and critical thinking skills. For specific topics to be covered in this course, please refer to the lecture schedule at the end of this syllabus.

### ***Prerequisites for Chem 13 and performance standard for Organic Chemistry:***

You should have a **working** knowledge of topics covered in Chemistry 12 as well as basic algebra; you will be using logs very frequently this quarter so make sure to review the use of common and natural logs. *If you received a C- to a C in Chem 12 you will have to work extra hard to keep up.* Students historically find the material in Chem 13 very challenging. You must achieve a C- or greater in Chem 13 to go on to Organic Chemistry (Chem 31) next year.

**Disability Accommodation Policy:** To request academic accommodations for a disability, students must be registered with Disabilities Resources, located in Benson, room 216. If you would like to register with Disabilities Resources, please visit their office or call at (408) 554-4109. ***You will need to register and provide professional documentation of a disability prior to receiving academic accommodations.***

**Grades!: Performance Assessment based on 1000 points total broken down below:**

1) Final Exam	= 200 points
2) Exams I and II (2 x 150 points)	= 300 points
3) Problem Sets/Attendance	= 50 points
4) Homework	= 50 points
5) Quizzes (5 x 10 points)	= 50 points
6) Laboratory Experiments 5 X 60	= 300 points
7) Lab Homework 4 X 5	= 20 points
8) Lab Notebook/Proposal (15/15)	= 30 points

**\*\*\* Final Grade is 35% Lab and 65% Lecture\*\*\***

**Problem Sets** will be handed out and completed in class or completed at home. They will be given at appropriate times to reinforce key concepts.

**Exams:**

There are absolutely no make-up exams due to the rigorous nature of the class. Three exams will be given – Exams I, II and a cumulative final exam. Each exam will test your knowledge of principles taught in the preceding period of instruction. Details will be announced before each exam. See the Tentative Course Outline for the dates. Exams I and II and problem sets provide me an opportunity to gauge your performance weekly and to gauge my expectation of your work.

**Homework:** Homework will be assigned from the end of chapter problems (Chapter 17, Chapter 19 and Chapter 20). Assignments will be announced and will be due weekly at the beginning of class on every Friday. ***Make photocopies of your homework before class so you have it to study from during the weekend.***

**Camino and Email:**

This course will heavily depend on Camino (<http://camino.instructure.com/>) to distribute notes, outlines, problem sets and handouts. Additional announcements may be circulated via your campus Email address so be sure to check it regularly.

**Attendance** is absolutely required in this course and poor attendance will adversely affect your grade. Participation in the classroom is also mandatory. Problem sets are used to provide an objective component to class participation and attendance.

**Student Athletes:** I urge you to see me immediately with any schedule conflicts. I will try to be very flexible if you use adequate planning. If you wait until the last minute to talk to me and resolve scheduling conflicts you may lose the ability to reschedule.

**Academic Integrity:** Giving or receiving unauthorized aid during a test (sometimes called cheating) is forbidden and will result in a failing grade.

Notes on How to Study Chemistry (and in general!)

- 1) Skim over the chapter or notes before it is covered in class. This helps with familiarity.
- 2) Take good notes, ask questions and pay attention in class.
- 3) Read associated material after each lecture.
- 4) Do assigned chapter problems to engage in active learning.

- 5) Go to office hours with any questions ASAP.
- 6) Study for exams. I will generally tell you what to focus on.

Use the above suggestions to improve your performance in chemistry. Many of the suggestions are just good general study habits too. I will be able to get a handle on your performance through your homework assignments on [www.masteringchemistry.com](http://www.masteringchemistry.com), problem sets and exams.

Learning Objectives:

1) Goal: Examine the complexities of aqueous systems and understand the variables in predicting their behavior.

Objectives:

- a) Understand the common-ion effect (quantitatively and qualitatively).
- b) Understand calculations in buffer systems and how buffers function.
- c) Understand titrations: both strong acid and strong base as well as those involving weak acids or weak bases.
- d) Understand solubility and calculations that described the solubility of different species.

2) Goal: Gain a deeper understanding of chemical thermodynamics and the energetics of chemical reactions.

Objectives:

- a) Understand entropy and its effect on chemical systems.
- b) Understand Gibbs free energy both qualitatively and quantitatively.

3) Gain a complete understanding of electrochemistry.

Objectives:

- a) Understand redox reactions and balancing the reactions
- b) Understand a voltaic cell and the components of the cell.
- c) Understand electromotive force and calculations involving this concept.
- d) Understand the relationship between electromotive force and Gibbs free energy.

### **Some Important Dates:**

**Tuesday July 28<sup>th</sup>: Last day to withdraw from class with a full refund.**

**Wednesday July 29<sup>th</sup>: Last day to withdraw from class with a 50% refund.**

**Friday July 31<sup>st</sup>: Last day to withdraw from class without a W.**

**Friday August 7<sup>th</sup>: Last day to withdraw from class with a W.**

**Friday August 14<sup>th</sup>: Final Exam.**

### Tentative Course Outline

<i>Day</i>	<i>Date</i>	<i>Chapter/Source</i>	<i>Topics</i>
M	July 27	15 & 16	Quick Review of basic concepts you already know from Chem12.
T	July 28	17.1-17.2	Common-Ion Effect and Buffered Solutions.
W	July 29	17.3-17.5	Acid-Base Titrations, Solubility Equilibria and Factors That Affect Solubility.
R	July 30	17.5-17.6 and overheads	Factors That Affect Solubility and Precipitation and Separation of Ions. <i>Errors in Chemical Analysis?</i>
F	July 31		Catch up/ problem solving. Chapter 17 homework due.
<b>M</b>	<b>August 3</b>	<b>Exam I</b> 19.1-19.2	TBA – Lecture to follow. Spontaneous Processes and Entropy and the Second Law of Thermodynamics.
T	August 4	19.3-19.5	The Molecular Interpretation of Entropy, Entropy Changes in Chemical Reactions and Gibbs Free Energy.
W	August 5	19.6-19.7	Free Energy and Temperature and Free Energy and the Equilibrium Constant.
R	August 6	Overheads	Spectroscopy.
F	August 7		Catch up/ problem solving. Chapter 19 homework due.
<b>M</b>	<b>August 10</b>	<b>Exam II</b> 20.1-20.2	TBA – Lecture to follow. Oxidation States and Oxidation-Reduction Reactions and Balancing Oxidation-Reduction Equations.
T	August 11	20.3-20.5	Voltaic Cells, Cell EMF Under Standard Conditions and Free Energy and REDOX Reactions.
W	August 12	20.6	Cell EMF Under Nonstandard Conditions.
R	August 13	Chap. 19	Catch up/ problem solving.
<b>F</b>	<b>August 14</b>	<b>Final Exam</b>	Cumulative – TBA.