

CHEMISTRY S117**SYLLABUS**
Principles of Chemistry and Biochemistry I, Honors**FALL 2011****INSTRUCTORS:**

Prof. Romualdo deSouza
C230 Chemistry Bldg. 855-3767 E-mail: rdesouza@indiana.edu

Prof. Benjamin Burlingham
A206 Chemistry Bldg. 856-7782 E-mail: bburling@indiana.edu

PREREQUISITES: Appropriate performance on the chemistry placement exam.

TEXTS: Steven S. Zumdahl, Chemical Principles, 6th edition, (Houghton Mifflin Company).
A student solutions manual is shrink-wrapped with the textbook and the two should be purchased as a package.

LECTURES MWF: 9:05-9:55 AM in CH033: Prof. deSouza will teach the first half of the course and Prof. Burlingham will teach the second half. Prof. Burlingham will teach the first half of the lab part of the course and Prof. deSouza will teach the second half. Experience has shown that students who regularly attend lectures and discussion sections do much better on the exams. Demonstrations will be performed that will complement other lecture and textbook material.

ONCOURSE WEBSITE: <http://courses.chem.indiana.edu/s117/>

SOURCES OF HELP:

Associate Instructor: David Kiefer: djkiefer@indiana.edu

AI office hours: TBA on course website

1. **ASSOCIATE INSTRUCTORS' OFFICE HOURS:** The **AI's will have scheduled office hours in the General Chemistry Resource Center, C046 (see above)**. These hours will be announced at the end of the first week of classes. This room also contains some computers with programs designed to aid students in learning general chemistry. You should try these programs.
2. **PROFESSORS' OFFICE HOURS:** Professor deSouza is available in his office (C230) from 10-11 am on Monday and 1:30-2:30 p.m. on Wednesday. Office hours for Professor Burlingham are Tuesday 10-11 am and Thursday 11 am – noon, in his office (A206). Both professors are also available by prior appointment at other times. Make arrangements after lecture.
3. A list of qualified tutors can be obtained from the Undergraduate Office web site (<http://chem.indiana.edu/ugrad/>). These are usually graduate students majoring in chemistry who can be hired on an hourly basis. On Sunday through Wednesday from 7-10 pm in C046 and C006 an advanced student will be available to offer tutoring assistance to general and organic chemistry students.
4. Undergraduate Office, C021. This office is a source for help with record keeping and administrative questions, general advising, handouts, etc. They will not know answers to specific questions about this course.
5. Friends and comrades in arms. They can often be of more help than all of the above.

HOMEWORK: Problems will be assigned from each textbook chapter. Students have access to a solutions manual for some of the text book questions. Some homework problems may also be assigned within the CALM system (<http://calm.indiana.edu>).

DISCUSSION SECTIONS:

Sect 1790: **4:40-5:30** PM Mon. in BH 103
Sect 1791: **5:45-6:35** PM Tues in BH 240

**Please note starting
time of discussion
sections**

Your AI will be glad to help you during discussion periods and office hours with any questions about the homework, text reading or lectures. During each discussion session homework problems will be treated in depth. Some are likely to appear on the exams.

EXAMS: Four evening exams and a comprehensive final exam will be given in this course. Dates and times are listed on the IU website and are repeated here for your reference. **You should not be enrolled in classes that conflict with this schedule.**

<u>Exam</u>	<u>Time</u>	<u>Date</u>	<u>Room</u>
EXAM 1	7:15 – 9:15 PM	Tuesday	Sept. 20 C033
EXAM 2	7:15 – 9:15 PM	Tuesday	Oct. 11 C033
EXAM 3	7:15 – 9:15 PM	Tuesday	Nov. 1 C033
EXAM 4	7:15 – 9:15 PM	Tuesday	Nov. 29 C033
FINAL Exam	8:00 -10:00 AM	Wednesday	Dec. 14 TBA

All examinations will be closed-book. Use of calculators is encouraged. Use of laptop computers is not allowed. All examinations will be proctored.

Grading:

Lecture:	4 hourly exams @10%	40%
	Final exam	20%
	Homework	10%
	Discussion	5%
Lab		25%

WITHDRAWAL: The last day for withdrawal with an automatic grade of W is WEDNESDAY, October 26. After this date, a student must be passing the course to qualify for the grade of W. If the student is failing on the date of withdrawal the grade will be an F.

Students can find policies regarding drop/adds, incompletes, drop dates, and student etiquette at the [Policies for Students](#) link on the course homepage.

STUDY HINTS

Examinations will cover:

- (a) knowledge of chemical facts and concepts
- (b) qualitative predictions based on general trends
- (c) quantitative predictions based on chemical arithmetic
- (d) definitions of chemical terms

The final will consist of questions appropriate for a one hour exam over material not covered on the first four exams, plus questions appropriate for a comprehensive one hour exam over the entire course.

At the end of each chapter is a little section called "Discussion Questions". It will help your understanding of the key ideas if you discuss these in small groups.

Also at the end of each chapter, there is a long list of Exercises and Problems. The author has provided problems illustrating each kind of operational skill and organized by the chapter section involved.

One recommended pattern for studying chemistry is the following:

- (a) Read the text before lecture.
- (b) Attend lecture. Make notes on any new material introduced and on material stressed. Some exam questions may deal with material from lecture that is not in the text!
- (c) Reread the text. This time, work through all the examples as you go. Make notes of all the key concepts. Make notes about the chemical facts discussed.
- (d) ORGANIZE your lecture notes and reading by making an outline or a topics list that gives you a personal study guide.
- (e) Work the recommended problems. Remember, some exam problems will be similar to problems in the text. Refer to the text only if necessary. Answers can be checked with the solution manual or in the back of the text.
- (f) Make a list of the names, formulas, and structures for new compounds introduced in each chapter. Learn these!
- (g) Go to discussion sections prepared to ask specific questions about material you do not understand. Some exam problems will be similar to problems that are worked out in discussion sections.
- (h) Before the exam, review the text and notes. Work the practice exams. Do this under test conditions. Can you really work the problems without reference to the text?

Chemistry S117: Tentative Lecture Outline

<u>Part I: Nanoscale (Atoms and Molecules)</u>			
<u>Chapter</u>	<u>Subject</u>	<u>Approximate Dates</u>	<u>Exams</u>
1	Chemists and Chemistry	Aug. 29	
2	Atoms, Molecules, and Ions	Aug. 31, Sept. 2	
12	Quantum Mechanics and Atomic Theory	Sept. 7, 9, 12, 14, 16, 19	#1- Sept. 20
3,4 (parts)	Stoichiometry Types of Chemical Reactions and Solution Stoichiometry	Sept. 21, 23	
13	Bonding: General Concepts	Sept. 26, 28, 30, Oct. 3, 5, 7	
14	Covalent Bonding: Orbitals	Oct. 10, 12, 14, 17, 19	#2- Oct. 11
16	Liquids and Solids (Ionic solids, Intermolecular forces)	Oct. 21, 24,26	
<u>Part II: Macroscale (Reactions)</u>			
5	Gases	Oct. 28, 31, Nov. 2	#3- Nov. 1
16	Liquids and Solids	Nov. 4, 7, 9, 11	
6	Chemical Equilibrium	Nov. 14, 16, 18	
9	Energy , Enthalpy and Thermochemistry	Nov. 21, 28, 30	#4- Nov. 29
15	Chemical Kinetics	Dec. 2, 5, Dec. 7	
10	Spontaneity, Entropy and Free Energy	Dec. 9	
			Final – Dec. 14, 2011 8:00 AM – 10:00 AM

S117: Principles of Chemistry and Biochemistry I, Honors

LABORATORY Fall 2011

Instructors:1st Half of Semester**Prof. Benjamin Burlingham**Email: bburling@indiana.edu

Phone: 855-7782

Office Hours in A206:

10-11 am Tues; 11 am – noon Thurs.

(or by appt.)

2nd Half of Semester**Professor Romualdo deSouza**Email: rdesouza@indiana.edu

Phone: 855-3767

Office Hours in C230:

10-11 Mon and 1:30-2:30 Wed

(or by appt.)

Course Website: <http://courses.chem.indiana.edu/s117>**Associate Instructors:****Mallory Mueller:** malmuell@indiana.edu**Hyuna Lim:** limhy@indiana.edu**Office Hours:****TBA****Class Meetings:** Tuesday 9:05 – 9:55 AM in CH 033**Laboratories:** Section 1792 2:15-5:15 PM Thursday in CH 047

Section 1793 5:30-8:30 PM Wednesday in CH047

Section 1794 5:30-8:30 PM Thursday in CH047

Required Materials:1) Laboratory Manual for S117 “Principles of Chemistry and Biochemistry I”,
6th edition, by Reck, Stone, Robinson, Arnold

- Handouts will also be provided for certain experiments that are not in the lab manual.

2) Permanently bound lab notebook.

3) Safety goggles

Scope: We will cover analytical measurements, statistical treatment of data, distillation, mass spectrometry, redox titrations, bioanalytical spectroscopy, separations, thermochemistry, and qualitative analysis.

Grading: The grade in the laboratory portion of S117 will count towards 25% of the overall grade in S117. Your grade in the laboratory portion of the course is divided as follows:

10 Experiments at 100 points each.....	1000 pts.
10 Pre-lab assignments or quizzes at 10 pts/each	100 pts.
Lab Notebook.....	<u>100 pts.</u>
Total	1200 pts.

Due Dates:

Laboratory reports are due at the **beginning** of the lab period the week following the completion of the experiment. 20 points will be deducted for each day the report is late. The format for writing lab reports will be distributed and each week experiment guidelines will be posted on the course website to provide specific instructions about writing the lab report.

Academic Misconduct:

You are advised to read the *Code of Student Rights, Responsibilities and Conduct*. This a publication put out by the Student Ethics Office located at 705 E. 7th Street. Essentially, it is the instructor's decision, based on evidence and student interviews, whether misconduct has occurred. The sanctions made against a student committing academic misconduct may range anywhere from deduction of points to awarding of a failing grade for the entire class. In this class, a zero (which cannot be dropped) will be given for plagiarism on a laboratory report, fabricating data for a lab, or cheating on an exam. Any "repeat performance" of such behavior will result in the maximum penalty being enforced. All cases of academic misconduct will be immediately reported to the Dean of Students as well as the dean or director of the student's school.

Laboratory Rules:

1. Attire

- * Safety goggles must be worn at all times in the laboratory. You will receive a 10 point deduction from your laboratory report score each time your AI sees you without your goggles on during the lab. If you forget your goggles, go back and get them or buy a new pair. The stockroom does not loan goggles.
- * Contact lenses should not be worn in the laboratory.
- * Long pants and closed toed shoes must be worn in the laboratory. No miniskirts or bare midriffs are allowed.
- * Tie back long hair.

2. Tardiness

If you are more than 10 minutes late to lab, 10 pts. will be deducted from your lab report. It is important to be on time because the AI outlines lab procedures and safety measures.

Schedule of Laboratory Experiments

Week of	Experiment	(Page numbers are from the S117 Lab Manual)
8/29	Safety and Percent Volume of Alcohol in Wine	page 1, 7-1
9/5	Atomic Spectra	page 3-1
9/12	Mass spectrometry	page 17-1
9/19	Applications of Bioanalytical Spectroscopy Measuring Protein Concentration	page 16-1
9/26	Affinity Chromatography for LDH	page 14-1
10/3	Quantum Dot Research	(Handout)
10/10	Quantum Dot Research	(Handout)
10/17	Quantum Dot Research	(Handout)
10/24	Molecular Modeling	page 19-1
10/31	Redox Determination of Iron in Ore	(Handout)
11/7	Redox Determination of Iron in Ore	
11/14	Heat Storage	page 9-1
11/21	No labs- Thanksgiving	
11/28	Qualitative Analysis	page 18-1
12/5	Qualitative Analysis	