

**CYL100 General Chemistry
I Semester 2014-2015**

Date: July 11, 2014

1 Administrative Trivia

This is a two-section class. Both sections meet on Tuesday, Wednesday, and Friday at 8 am in the morning and 3 pm in the afternoon. Prof. Sameer Sapra, Prof. Ravi Shankar and Prof. Nidhi Jain in that order, will lecture on the Physical, Inorganic, and Organic Chemistry portions of the course. Nidhi Jain, the course coordinator, will handle all the administrative matters. The coordinates of the instructors are given below.

Sameer Sapra
Ravi Shankar
Nidhi Jain

Office: Room # MS 631
Office: Room # MS 707
Office: Room # MS 708

2 Office Hours

All the professors will be available in their respective offices on Mondays and Thursdays between 4:30 pm and 5:30 pm for course-related discussions including asking for extra help, seeking clarification of material presented in class and following up on aspects of the class. There will be three problem solving sessions on three Saturdays, each falling just before minor 1, minor 2 and major.

3 References

There is no single book for this course. Here is a recommended list.

1. P. W. Atkins and J. de Paula, Physical Chemistry, Oxford
2. D. A. McQuarrie and J. D. Simon, Physical Chemistry, Viva
3. R. T. Morrison and R. N. Boyd, Organic Chemistry, Pearson
4. D. G. Morris, Stereochemistry, Oxford
5. J. E. Huheey, E. L. Keiter, and R. L. Keiter, Inorganic Chemistry, Harper Collins, 1993
6. B. D. Gupta and A. J. Elias, Basic Organometallic Chemistry, Universities Press, 2013

There are numerous copies of these books (and others with similar sounding titles and content) in the central library.

4 Attendance policy

If your attendance is less than 75%, you will be awarded 1 grade less than the actual grade that you earn.

5 Exams

Two minor exams (2 X 20 %) and a final exam (50 %) make up 90 % of the overall grade. Re-take the exams is permitted only for medical reasons and when supported by a medical certificate.

6 Homework

There will be 10 homeworks during the semester which will contribute 10% to the overall grade. The homework assignment will be available for download from the course website on Monday (excluding exam weeks and mid-semester break). The completed work is due on the Friday of the same week and you will drop of your homework (handwritten on sheets of paper that are securely fastened) in the CYL100 homework drop box which will be kept outside the lecture hall.

The homework will be checked for completeness and effort and skimmed for accuracy of the solutions. It will be given a grade- 0, 1, or 2. You are awarded 2 if you do everything and a serious effort is made to do it all right, 1 if you do most of the problem set right and have made a serious effort, and 0 if you do not turn in anything. Late homework is equivalent to not turning it in.

7 Course contents

- **Driving force in physical and chemical transformation** Entropy and free energy changes (5 lectures)
- **Physical transformation of substances** Phase and chemical equilibria (5 lectures)
- **Structure and dynamics of microscopic systems** Application of quantum theory to chemical systems (6 lectures)
- **Physical basis of atomic and molecular structure** (4 lectures)
- **Three dimensional arrangement of atoms in molecules** Stereochemistry (5 lectures)
- **Structural effects on reactivity** Acidity, basicity, nucleophilicity as variables, kinetic vs thermodynamic control of reactions (3 lectures)
- **Molecular synthesis and reaction mechanism** of carbon based compounds (3 lectures)
- **Organometallic compounds** Structure and catalytic applications (3 lectures)
- **Coordination compounds** Electronic spectra, magnetic properties, and distortions from a crystal field perspective (3 lectures)
- **Metal ions in biological systems** Hemoglobin, myoglobin and carbonic anhydrase (3 lectures)
- **Silicon based compounds** Synthesis, structure and applications of silicones and zeolites (2 lectures)