Course Organization for Chemistry 51

- **Prerequisite**. The prerequisite for Chemistry 51 is Chemistry 2. The prerequisite for Chemistry 52 is Chemistry 51.
- **Grading and Examination Practices**.
- **Course Objectives**
    - **Learn the fundamental reactions and properties of hydrocarbons, oxygen containing compounds, and related organic compounds**
    - **Understand and work with stereochemical problems**
    - **Understand and formulate mechanisms for simple organic reactions**
    - **Devise simple organic synthetic schemes**
    - **Master simple laboratory techniques**
    - **Understand and interpret nmr, ir and mass spectroscopy**

- **The Final Grade**. The grade will be determined as follows:

    - **Recitation Grade 25%**
    - **Laboratory Grade 25%**
    - **Lecture Examinations 25%**
    - **Final Examination 25%**

  Final letter grades for the course will be assigned by a course grading committee. It is the recitation instructor's responsibility to keep a record of all of the student's grades. To receive your grade after the course ends, either visit the Brooklyn College web site or give a stamped post card or envelope to your recitation teacher.

  Recitation Grade. This grade will be based on the student's average score on recitation quizzes and may also include the instructor's evaluation of the student's class participation. All recitations must be attended. Absence from recitation is subject to penalties.

  Laboratory Grade. The laboratory instructor is responsible for determining the laboratory grade and will include his assessment of your advance preparation, comprehension of the experiment, aptitude for laboratory work, and your compliance with safety regulations among other criteria which will be explained to you by the laboratory instructor. Penalties will be assigned for failure to attend lab and do all of the assigned experiments.

  Lecture Examinations. There will be two uniform lecture examinations given to students in all sections. Questions based on the reading assignments, the lectures, and the laboratory experiments will be included. The examinations will be held during the regular lecture hour. The dates of these examinations are shown in the lecture schedule; the location of the examination rooms will be announced by the lecturer.

  Final Examination. This examination will cover the assignments of the ENTIRE semester including the laboratory work. There are no exemptions from the final examination.

Illness During Examinations. If you become ill during any examination and feel that you are unable to complete it, notify a proctor immediately, write the words "I am sick", and hand in you paper. Your paper will not be graded and you will be considered absent from the examination. If you complete the exam, your paper will be graded and your grade will not be changed by a later claim of illness.

Absence from Examinations. No make up examinations are given to students who are absent from the lecture examinations. Students who miss one of the exams with a valid excuse, will be assigned a score for the exam missed on the basis of their performance on the other lecture exam and on the final. A grade of zero for lecture will be given if both lecture exams are missed. In the event of absence from the final exam, you will need to apply to the academic Advisement Center for permission to take the make up final examination given the following semester. If the recitation instructor has recorded an abs 50 grade or lower, permission will be denied.

Cheating. Any student found cheating on any laboratory exercise, quiz or exam will be given a failing grade for the course.

Exposure to Chemicals. During the laboratory exercises you will inevitably be exposed to a variety of chemical reagents. This may pose a hazard to some people: those who are particularly sensitive and those that are pregnant. In particular, I strongly recommend that if you are pregnant you not take the course. If you become pregnant during the course consult with me. We may be able to allow you to continue in the lecture portion of the course, receive an INC, and complete the laboratory when the pregnancy is completed.

Safety Goggles. Note that students **must** wear approved safety goggles whenever any laboratory work is being performed in the laboratory.

Sample Exams and Quizzes. Previously used testing items are available on my BC web site:: http://academic.brooklyn.cuny.edu/chem/howell/jhowell.htm

- **Required textbooks:**
  - **Organic Chemistry**, 4th Edition, W. Brown, C. S. Foote, B. L. Iverson, E. V, Anslyn, Thomson Brooks/Cole, Belmont, CA, 2009
  - **Techniques & Experiments in Organic Chemistry**, 2nd Edition, L. B. Gortler and R. C. Tripp, Avery Publishing Group, Wayne, NJ, 1977
  - **Supplement for Organic Chemistry 51 and 52**, Brooklyn College Press, 1987. (Available only at the Brooklyn College Bookstore)
- **Recommended**
  - **Molecular Model Set for Organic Chemistry**, HGS, Maruzen
  - ORGANIC CHEMISTRY: **A GUIDED INQUIRY**, A Moog/Spencer Guided Inquiry Course, with Solution Manual, Andrei Straumanis, Houghton Mifflin, 2004.*ISBN 9780618806430*

Chemistry 51 Lecture Outline

Fall 2008

	Date	Subject	Reading in BFI	Chem Activities	Suggested Problems BFIA
1	August 28	Covalent Bonding	1.1 - 1.4	1,2,11	Chap. 1: 22, 24, 25, 27-32, 34, 37, 45, 50, 51, 52, 57, 59, 60, 64-67, 71,72
2	Sept. 2	Shapes of Molecules	1.5 - 1.8	3	
3	Sept 4	Nomenclature of Functional Groups	Supplement 2-8		
4	Sept 9	Alkanes:	2.1 – 2.10	4, 5, 6	Chap. 2: 21, 23, 26, 28, 36, 39, 51, 52, 56, 62-63
5	Sept. 11	Stereochemistry	3.1 - 3.4	7	Chap. 3: 15-17, 19, 22, 24, 27, 29, 31, 32, 37, 39, 40
6	Sept. 16	Diastereomers, *meso* compounds	3.5 - 3.9		
7	Sept. 18	Acids and Bases	4.1 - 4.6	8, 9, 10	Chap. 4: 10, 11, 15, 16, 19, 20, 22, 23, 25, 28, 31, 33, 35, 37, 41, 42, 44, 45
8	Sept. 23	Alkenes	5.1 - 5.4		Chap. 5: 9, 10, 12, 14, 18, 20, 21, 30, 33, 37
9	Sept. 25	Reactions of Alkenes	6.1 - 6.7	17, 18, 21, 22	Chap. 6: 13, 14, 15, 17,20, 21, 23, 26, 34, 37, 39, 42 – 45, 47 - 51
10	Oct 2	Reactions of Alkenes			
11	Oct 7	Reactions of Alkenes			
12	Oct. 16	**First Lecture Examination**			
13	Oct 21	Alkynes	7.1 - 7.9	23	Chap. 7: 8, 11, 16, 17, 19, 20, 23, 24, 28
14	Oct. 23	Halogenation of Alkanes	8.1 - 9.8	20, 21	Chap. 8: 10 – 12, 14, 15, 18, 21, 23, 26, 28 - 31
15	Oct. 28	Substitution Reactions	9.1 - 9.5	12, 13	Chap. 9: 10 – 13, 15, - 18, 20 – 23, 25 – 29, 31 – 33, 36 – 40, 42, 43, 45, 46 – 50, 52 - 60
16	Oct. 30	Elimination	9.6 - 9.9	14, 15	

		Reactions			
17	Nov. 4	Neighboring Group Effects	9.10 - 9.11		
18	Nov. 6	Alcohols, Thiols	10.1 - 10.5		Chap. 10: 18, 20 – 22, 25, 29, 31 – 33, 35 – 39, 44, 46, 48, 54, 56
19	Nov. 11	Ethers, Sulfides, Epoxides	11.1 - 11.12		Chap. 11: 12, 13, 15, 17, 20, 24, 25, 27, 28, 33, 34, 40, 42, 44
20	Nov. 13	Organometallic Compounds	15.1 - 15.2	19	Chap. 15: 7 – 12, 16 - 19
21	Nov 18	Organometallic Compounds			
22	Nov 20	Aldehydes and Ketones	16.1 - 16.6	31	Chap. 16: 19, 20, 24, 26, 31 – 33, 37, 39, 42, 43, 45, 46, 48, 52, 54, 58, 66, 70
23	Nov.25	Aldehydes and Ketones	16.7 - 16.12	32	
24	Dec. 2	**Second Lecture Examination**			
25	Dec. 4	Nuclear Magnetic Resonance	13.1 - 13.7	16B, 16C	Chap. 13: 11, 13, 16 -18, 22, 25, 28
26	Dec. 9	Nuclear Magnetic Resonance	13.7 - 13.13		
27	Dec. 11	Infrared Spectroscopy	12.1 - 12.5	16A	Chap. 12: 5 - 11
28	Dec. 16	Mass Spectroscopy	14.1 - 14.4		Chap. 14: 6, 8, 11, 14, 16, 20, 25, 30

Chemistry 51 Laboratory Assignments

Read Chapter 1 of the Laboratory Manual before coming to the laboratory for the first time. You must be familiar with the safety precautions (Section 1.2), the rules for working in the laboratory (Section 1.3). You are expected to have approved safety goggles, a padlock, and a hardbound laboratory notebook with numbered pages. You should also bring matches, towels, soap and similar items (Section 1.8). Students are expected to have part of the laboratory notebook written in advance of performing each experiment. If a pre-lab writeup is not done the laboratory instructor may choose not to allow the student to perform the experiment.

Approved safety goggles must be worn at all times in the laboratory. Failure to do so will result in the student not being allowd to continue in the laboratory exercise.

Lab Period	Experiment	Reading
1	Check-In; Simple Distillation (2.3-1 and 2.3-2); Identification of an Unknown by Boiling Point (2.3-4)	Ch 1, Ch 2
2	Simple vs. Fractional Distillation (3.4-1); Melting Points (7.4-1); Mixed Melting Points (7.4-2)	Ch 3; 7.2
3	Recrystallization of Acetanilide 7.4-3) and Benzoin (7.4-4)	7.3-2 through 7.3-6
4	Unknown Purification by Recrystallization and Identification by Melting Point (7.3-5)	7.3-1
5	Extraction of Adipic Acid from water using ether (8.3-1, 8.3-2, 8.3-4)	8.1; 8.2
6	Separation and Identification of Unknown Acid and Neutral Compounds by Extraction (8.4-1; 8.4-2; 8.4-3)	
7	Separation of Fluorene-Fluorenone Mixture by Column Chromatography (supplement)	9.1, 9.2, 9.3-1
8	Preparation of 1-bromobutane (12.2-1)	6.1; 6.2-1; 12.1
9	Preparation of Cyclohexene (13.2) and Properties of Alkenes (13.3; 13.4)	13.1
10 - 11	Oxidation of an Unknown Alcohol and Preparation of Derivatives (supplement)	14.1
12 - 13	Preparation and Purification of Triphenylmethanol (supplement)	Ch 5; Ch 17 (omit 17.3)
14	Check-out; No Experimental Work	