QUEENSBOROUGH COMMUNITY COLLEGE
CHEMISTRY DEPARTMENT

INTRODUCTORY ORGANIC CHEMISTRY (CH-128)

Course Syllabus

Pre-Requisite CH-120, CH-127 or CH-151

Hours 3 Lecture Hours 4 Laboratory Hours 4 ½ Credits

Textbook Fundamentals of General, Organic, and Biological Chemistry, 5th Edition, ISBN # 0-13-187748-8
by John McMurry, Mary E. Castellion and David S. Ballatine (Prentice Hall)

Lab manual Organic Chemistry Laboratory Manual (2nd Ed, ISBN-0-697-33923-8)
by P. Svoronos, E. Sarlo and R. J. Kulawiec (WCB McGraw-Hill)

Course Description

This course is intended to provide a brief, but thorough introduction to organic chemistry and biochemistry. The major functional groups such as hydrocarbons, alcohols, ethers, amines, carbonyl compounds and their derivatives are studied with some emphasis on mechanisms and stereochemistry. Several aspects of organic chemistry related to biochemistry are also stressed including topics on amino acids, proteins, enzymes, carbohydrates and lipids. The laboratory introduces the students to the various synthetic methods for organic compounds, as well as to the purification techniques such as distillation, recrystallization and extraction.

Curricula for Which the Course is Required/Recommended

This course is recommended for students in Nursing and others planning to pursue careers in Allied Health curricula such as various Medical Laboratory Technology programs. The course may not be substituted for CH-251, but may be used as a preparation for CH-251. This course is not open to students who have already completed CH-251 or its equivalent.

General Education Objectives

Integrate knowledge and skills in the major fields and across disciplines; employ concepts and methods of the natural and physical sciences to make informed judgments, use information management skills effectively for academic research and lifelong learning.

Course Objectives/Expected Student Learning Outcomes

Understand the nomenclature, structures and reactions of simple organic compounds: alkanes, alkenes, alkynes, alcohols, amines, aldehydes, ketones, amides, esters, carboxylic acids and their derivatives. Attain knowledge of basic concepts of biomolecules such as amino acids, proteins, enzymes, carbohydrates and lipids. Correlate structures and reactivity of simple organic compounds and develop scientific research abilities such as planning and performing experiments, gathering and analyzing data, drawing conclusions from qualitative analysis, communicating results orally and in scientific writing and demonstrating some basic familiarity with chemical literature.

Methods by Which Student Learning Will Be Evaluated

The general guidelines for assessing grades are as follows:

- Examinations, Assignments and Classroom Performance 50%
- Laboratory Work 25%
- Final Examination 25%

The distribution may be changed at the discretion of the individual instructor. Aside from the above the students are mandated to take the American Chemical Society (ACS) assessment test which is administered during the last (check-out) laboratory period (week 14) and 10% of that grade will be added on top of the student's final course grade.

Accommodations for Students with Disabilities

Any student who feels that he/she may need an accommodation based upon the impact of a disability should contact the office of Services for Students with Disabilities in Science Building, room 132 (718-631-6257) to discuss his/her specific needs and to coordinate reasonable accommodations for documented disabilities. Students should also contact their instructor privately to discuss their specific needs.

Academic Integrity

Academic honesty is taken extremely seriously and is expected of all students. All assignments must be the original work of the student (and partners or group, if applicable). All questions or concerns regarding ethical conduct should be brought to the course instructor. "It is the official policy of the College that all acts or attempted acts that are violations of academic integrity be reported to the Office of Student Affairs (OSA). At the faculty member's discretion and with the concurrence of the student or students involved, some cases, though reported to the OSA, may be resolved within the confines of the course and department. The instructor has the authority to adjust the offender's grades as deemed appropriate, including assigning an F to the assignment or

exercise or, in more serious cases, an F to the student for the entire course." (Taken from the QCC Academic Integrity Policy, 2/14/2005.)

Attendance/Absence Policy

Attendance will be taken at every class. The Student Handbook states that you will be considered excessively absent from a course and will receive a WU grade if you have been absent for 15% or more of the total number of contact hours for your course. If there is a laboratory component to your course, you will be considered excessively absent if you miss 15% or more of **either component.** A WU is computed as an F in your GPA.

Students who have valid excuses for missed classes should speak with their instructor and present documentation explaining the reason for the absence.

- **If your class meets twice per week:** you will receive a grade of WU if you have a **total of 7 or more** excused and/or unexcused absences**.**

- **For any lecture that meets only once per week,** you will receive a grade of WU if you have a **total of 4 or more** excused and/or unexcused absences.

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LECTURE SCHEDULE

CHAPTER	TOPIC	HOURS
12	Introduction to Organic Chemistry: Alkanes	4
13	Alkenes, Alkynes, and Aromatic Compounds	4
14	Some Compounds with Oxygen, Sulfur, or a Halogen	3
15	Amines	3
16	Aldehydes and Ketones	4
17	Carboxylic Acids and Their Derivatives	5
18	Amino Acids and Proteins	5
19	Enzymes and Vitamins	4
22	Carbohydrates	3
24	Lipids	3
	Exams	4

Note:

The instructor is responsible for making assignments and scheduling examinations. The Final Exam date is scheduled by the Registrar.

Laboratory Policy

You must earn a passing grade in the laboratory in order to pass the course. (60% or higher lab grade excluding the ACS assessment test) You will receive a grade of WU if you have a **total of 4 or more** excused and/or unexcused absences. Students who arrive to the lab after the pre-lab lecture will not be allowed to participate and will be considered absent.

A full lab report is required for each of the experiments performed and is due the next class period. Late reports are not accepted unless it is due to an absence.
There are no make-up sessions for missed labs. Missed labs that are unexcused will be assigned a grade of zero. For excused absences, the lab average will be calculated using the experiments that were completed. Additional information will be distributed by the lab instructor.

Required Attire

Students MUST wear safety goggles in the lab at all times. Failure to do so may lead to their expulsion from the lab. Sandals or open-shoes, short pants or skirts, untied long hair, and any type of food or beverage in the lab are strictly forbidden. The instructor may request from a student to leave the laboratory if these rules are not followed.

Lab Report Format

The pre-lab report (#1 - 5, up to "Experimental Procedure" section) must be completed before coming to lab, and the final report (#1-9) should be completed and submitted by the next lab period.

Prelab Report:

1. **Your Name and Partner's Name**

2. **Title:** The title of the experiment. The title should be simple and specific.
   e.g. Synthesis of Cyclohexene (not "Synthesis of Alkene" because there are many different alkenes)

3. **Objective:** (1-2 sentences) Why do you do this experiment? What is the goal of this experiment? *e.g. "to separate benzoic acid and p-dichlorobenzene from the mixture using the solvent extraction technique"*
   * Do not mention the procedure or the background information here.

4. **List of Materials and Equipments:** Include important properties of all chemicals (molecular weight, boiling and melting points, density, etc.). Do not include standard laboratory reagents. The only time the reaction apparatus is discussed in the section is when the apparatus is not a standard apparatus. Please keep in mind that beakers, Erlenmeyer flasks, funnels, graduate cylinder, test tubes, etc. are all standard laboratory glassware and they don't need to be mentioned.

5. **Experimental Procedure:** The laboratory manual is **not** permitted in the laboratory, therefore, you need to produce an accurate procedure that will permit you to complete the experiment. Use numbers or bullets for each step, and make each step simple. The purpose for having the flowchart in lab is to ensure that you have read over the procedure ahead of time. It is not safe to begin lab work without the adequate preparation. The experimental procedure should be written on the left half of the page, leaving the right half for the observations section.

(Example)

5. Procedure	6. Observations
(1) cyclohexanol (10g) is added to a 50mL round bottom flask. (2) $Na_2Cr_2O_7$ (10g) is dissolved in 10 mL water in a 125mL Erlenmeyer flask. (3) …….. (4) ……. (5) …….. (6) do simple distillation…….. (7) determine the bp and calculate the %yield	

* Instructor's Signature _____

Post lab Report:

6. **Observations:** Write down anything you observed (color change, formation of bubble, weight of compound used and/ or obtained, m.p., b.p., etc). What you write here will be used for the "Results" and/or "Discussion" sections.

(Example)

5. Procedure	6. Observations
(1) cyclohexanol (10g) is added to a 50mL round bottom flask. (2) $Na_2Cr_2O_7$ (10g) is dissolved in 10 mL water in a 125mL Erlenmeyer flask. (3) …….. (4) ……. (5) ……. (6) do simple distillation…….. (7) determine the bp and calculate the %yield	9.934g cyclohexanol added 10.1 g $Na_2Cr_2O_7$ added color changed from orange to brown The distillate was collected between 90-100°C, total about 8mL b.p. = 98°C,

7. **Results:** Summarize your results here. Record the amount of reactants and products, the appearance of your product, the melting point or boiling point, the percent yield, graph, etc. Describe how you calculated the results using the proper units. Although you write your data and results in “Observations” section, you have to re-write them here.

8. **Discussion/Conclusion:** The experimental results are always discussed in this section. Describe if and how the experimental objectives were met. If tests were performed to confirm the product, describe how you made your decision from the test results. If you have unexpected results such as low or high %yield, etc., explain and justify the results.

9. **Questions:** Answer the post laboratory questions assigned in the laboratory manual.

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LABORATORY SCHEDULE

WEEK	TOPIC	EXPERIMENT	PAGES
1	Check-in; Introductory Remarks Laboratory Safety & Equipment; The Basics	1	1- 4
2	Distillation - Simple & Fractional (p 33, #1, 2)	4.1 & 4.2	29 - 32
3	Recrystallization of a Solid (p 71, #1,2,3)	6.3	66 - 70
4	Isolation of Caffeine from Tea (p 77, #3)	6.5	75 - 77
5	Synthesis of Cyclohexene (p 126, #1, 3)	10.1	123 - 126
6	Synthesis of t-Butyl Chloride (p 153, #1)	13.1	151 - 152
7	Qualitative Tests for Alchohols (p 182, #2, 3)	14.2	180 - 182
8	Oxidation of Cyclohexanol to Cyclohexanone (p 225, #1, 3)	17.1	223 - 225
9	Equivalent Weight of Organic Acid (p 205, # 1, 2, 3)	16.1	204 - 205
10	Synthesis of Aspirin (p 215, #1, 4)	16.3	214 - 215
11	Synthesis of Acetanilide (p 257, #1, 3)	19.2	255 - 256
12	Preparation of Phenacetin (p 186-7, #1, 3, 6)	14.3	185 - 186
13	Lipids - Preparation and Properties of a Soap & The Hanus Test (p. 307, #1, 2, 3)	23.1 23.2	305 - 307 311 - 312
14	Check-out, ACS Assessment Test		

NOTE: **Questions to be answered in the lab report are in parentheses.**