

Bergen Community College
Division of Mathematics, Science and Technology
Department of Physical Sciences

Master Course Syllabus
CHM 260 Organic Chemistry I

Semester and year:

Course Number:

Meeting Times and Locations:

Instructor:

Office Location:

Phone:

Office Hours:

Email Address:

COURSE DESCRIPTION: Organic Chemistry I is a study of the fundamental classes of organic compounds, with emphasis on the relationship of structure and reactivity. Electronic theory, energy relationships, stereochemistry, and reaction mechanisms are used to explain reactivity. Molecular modeling is emphasized, particularly with respect to electrostatic potential maps. Practical applications, including syntheses, are studied and carried out in the laboratory. Instrumentation such as IR, NMR, and GC/MS are routinely used as qualitative and quantitative tools.

CREDITS/HOURS: 4 credits/ 6 hours

PREREQUISITES: CHM-240 and CHM-241

GENERAL EDUCATION COURSE: No

TEXTBOOK: Organic Chemistry, 3rd Edition; D. Klein; John Wiley & Sons, New Jersey, 2017.

LABORATORY MANUAL: Laboratory Manual for Organic Chemistry I, CHM 260 BCC, Signature Series, Cengage Learning, ISBN is 13: 9781285223339 or ISBN 10: 1285223330

MOLECULAR MODEL SET: Darling Molecular Model Set, or other similar model set for Organic chemistry

COURSE CONTENT (Lecture):

1. A Review of General Chemistry: Electrons, Bonds, and Molecular Properties.
2. Molecular Representations.
3. Acids and Bases.
4. Alkanes and cycloalkanes.
5. Stereoisomerism.
6. Chemical reactivity and Mechanisms
7. Alkyl halides: Nucleophilic Substitution and Elimination Reactions
8. Addition Reactions of Alkenes
9. Alkynes
10. Radical Reactions
11. Synthesis
12. Alcohols and Phenols
13. Ethers and Epoxides; Thiols and Sulfides
14. Infrared Spectroscopy and Mass Spectrometry

COURSE CONTENT (Laboratory):

Chemistry laboratory safety

Chemistry laboratory small scale techniques

Use of a variety of sophisticated instrumentation (IR, GC/MS, refractometer)

Experiments that emphasize the topics contained in the lecture. A detailed list of experiments is found on the last page of this syllabus

Laboratory report writing

Molecular modeling

SAMPLE LECTURE AND EXAMINATION SCHEDULE:*

Class	Lecture Time Slot
1.	Chapter 1
2.	Chapter 1
3.	Chapter 2
4.	Chapter 2-3
5.	Chapter 3-4
6.	Chapter 4
7.	Unit Exam 1 on Chapters 1-4
8.	Chapter 5
9.	Chapter 5
10.	Chapter 6
11.	Chapter 6
12.	Chapter 7
13.	Chapter 7
14.	Unit Exam 2 on Chapters 5-7
15.	Chapter 8
16.	Chapter 8
17.	Chapter 9
18.	Chapter 9
19.	Chapter 10
20.	Chapter 10
21.	Chapter 10
22.	Unit Exam 3 on Chapters 8-10
23.	Chapter 11
24.	Chapter 11-12
25.	Chapter 12
26.	Chapter 12-13
27.	Chapter 13-14
28.	Chapter 14
29.	Unit Exam 4 on Chapters 11-14
30.	Final Exam (Comprehensive)

*A three or four exam schedule may be adopted at the discretion of the instructor.

SAMPLE LABORATORY SCHEDULE:*

Class	Lab Time Slot	Title	Duration
1.	Misc 0213	Chemical Literature	1 Week
2.	Tech 0701	Measuring Melting Points of Compounds & Mixtures	1 Week
3.	Tech 0703	Purifying Acetanilide by Recrystallization	1 Week
4.	Tech 0704	Separating by Distillation	1 Week
5.	Modl 2003	Introduction to Molecular Modeling	1 Week
6.	Reac 0714	Studying Nucleophilic Substitution reactions	½ Weeks
7.	Synt 0740	Preparing Ethanol by Fermentation	1½ Weeks
8.	Tech 2096	Isolation of Caffeine	2 Weeks
9.	Synt 0746	Acetaminophen	2 Weeks
10.	Reac 0712	Dehydrating Cyclohexanol	1 Week
11.	Tech 2157	Isopentyl Acetate	2 Weeks
12.	Synt 0745	Synthesizing Aspirin	1 Week

* Faculty should schedule no fewer than 14 weeks of laboratory work from the list of laboratory experiments above.

SAMPLE GRADING POLICY:*

Option A**

Unit Examinations (all 4)	57.1%
Final Examinations (Comprehensive)	14.3%
Laboratory Assignments	28.6%

Option B***

Unit Examinations (Best 3 out of 4)	42.8%
Final Examinations (Comprehensive)	28.6%
Laboratory Assignments	28.6%

*A three or four exam schedule may be adopted at the discretion of the instructor.

**Grade Option A is used when the Final Examination is the lowest grade and all four Unit Examination are taken.

***Grade Option B is used when a student fails to take a Unit Examination for any reason or if a Unit Examination is the lowest grade. Then that Unit Examination is then dropped from the final grade. THERE ARE NO MAKE UP EXAMINATIONS.

Laboratory Experiment Grade:

11 Labs Session @ 18 Points each	198
On time Assignments	002
Total	200

THERE ARE NO MAKEUP LABORATORIES.

Lab or Examination Score	Point Value	Letter Grade
100 – 90	4.0	A (90 is always an A)
90 – 85	3.5	B+ (85 is always a B+)
85 – 80	3.0	B (80 is always a B)
80 – 75	2.5	C+ (75 is always a C+)
75 – 70	2.0	C (70 is always a C)
70 – 60	1.0	D (60 is always a D)
60 – 0	0.0	F

1. There will be no make-up exams or labs. Any labs or exams missed will be assigned a grade of zero.
2. Any student caught cheating (including using unauthorized formula sheets of any kind) will receive a grade of zero on that particular examination or lab. That zero cannot be replaced by any other examination grade or extra work. Students should read the Bergen Community College Statement on Academic Integrity as found in the college catalog
3. Written lab reports are required. The specific format to follow will be determined by the individual instructor. Students will be required to keep a lab notebook. Laboratory reports in format discussed in the lab are due one week after the completion of the experiment. Late lab reports (up to one week only) will only receive a grade of 50% of the earned score.
4. In order to receive a passing grade in CHM-260 a student **must** obtain a passing grade in both the lecture and laboratory parts of this course.
5. Instructors may make small modifications to the grading policy and/or grading scheme.

STUDENT LEARNING OBJECTIVES & ASSESSMENT MEASURES:

OBJECTIVES: Upon successful completion, the student will be able to:	MEANS OF ASSESSMENT: This outcome will be measured by one or more of the following:
1. Assess the reactivity of molecules using structure, bonding, and stereochemistry.	1. Assessment will be based on appropriate exam and quiz questions, explanation of the results of laboratory experiments, molecular modeling, and homework questions from the text and from the instructor's problem sheets.
2. Explain the outcome of a reaction using reaction mechanisms.	2. Assessment will be based on appropriate exam and quiz questions, explanation of the results of laboratory experiments, molecular modeling, and homework questions from the text and from the instructor's problem sheets.
3. Describe the reactions of alkanes, alkenes, and alkynes.	3. Assessment will be based on appropriate exam and quiz questions, explanation of the results of laboratory experiments, and homework questions from the text and from the instructor's problem sheets.
4. Use spectroscopy to determine the structure of organic molecules.	4. Assessment will be based on appropriate exam and quiz questions, and explanation of the results of laboratory experiments. Compounds synthesized in the laboratory will be routinely characterized by the student using IR spectroscopy and GC/MS.
5. Use important laboratory techniques to purify and characterize organic compounds.	5. Students will be evaluated by instructor observation of how well the student performs distillation, crystallization, and other laboratory techniques in the laboratory.

6. Employ molecular modeling to study energy relationships between molecules of similar structure.	6. Students will be evaluated by the instructor in their use of molecular modeling (Spartan) software and by their explanation of results in lab reports.
7. Use electrostatic potential maps to emphasize the electrophilic/nucleophilic character of functional groups.	7. Students will be evaluated by the instructor in their use of molecular modeling (Spartan) software and by their explanation of results in lab reports.
8. Demonstrate proficiency in using available instrumentation in laboratory experiments. Students will be evaluated by the instructor in the laboratory in their use of TLC, GC/MS, UV and IR instrumentation.	8. Students will also be evaluated through the grading of their laboratory reports.
9. Write laboratory reports that conform to accepted technical writing protocols.	9. Students will be evaluated by the quality of their laboratory reports.
10. Students will learn to practice critical thinking skills and apply them to both material presented in lecture and the analysis of data generated in the lab.	10. Students will be evaluated by observation in the laboratory and analysis of experimental results. Assessment will also be based upon performance on exam questions.

At the discretion of the instructor, assessment measures may be somewhat modified.

SUPPLEMENTARY READINGS / MATERIALS:

1. Organic Chemistry, Structure and Function; K. Peter C. Vollhart and Neil Schore; 6th Edition; W.H. Freeman & Company; New York, 2016.
2. A Microscale Approach to Organic Laboratory Techniques 5th Edition; Donald L. Pavia, Gary M. Lampman, George S. Kriz, Randall G. Engel; Brooks/Cole, CA, 2013
3. Macroscale and Microscale Organic Experiments, 7th Edition; Kenneth L. Williamson, Robert Minard and Katherine M. Masters; Houghton Mifflin Company; New York, 2017 (expected).
4. Spectrometric Identification of Organic Compounds, 8th edition, Robert M. Silverstein, Francis X. Webster, David Kiemle; David L. Bryce; John Wiley and Sons; New York, 2015.
5. Organic Chemistry, 9th edition; Leroy Wade; Jan Williams Simek; Pearson, IL, 2017
6. Organic Chemistry 9th edition; John McMurry; Cengage Learning; Boston, 2016
7. Organic Chemistry 8th edition; Paula Yurkanis Bruice; Pearson NJ; 2016

OTHER REQUIREMENTS:

- A scientific calculator is required. Cell phones cannot be used for calculations during examinations.
- Safety glasses or goggles are available in the laboratory and must be worn at all times in lab. A student is free to purchase their own pair of safety glasses or goggles for personal use.

ATTENDANCE/LATENESS POLICY:

All students are expected to attend punctually every scheduled meeting of each course in which they are registered. If a student is absent, s/he is responsible for learning the material covered, including homework assignments and any handouts. Small study groups to review lecture and homework material are usually found to be helpful. Attendance and lateness policies and sanctions are to be determined by the instructor for each section of each course. These will be established in writing on the individual course outline. Attendance will be kept by the instructor for administrative and counseling purposes.

OTHER POLICIES:

Electronic Devices: The use of portable electronic devices such as pagers and cell phones is not permitted while class is in session. Please silence these devices before entering class.

STUDENT AND FACULTY SUPPORT SERVICES:

1. Students experiencing difficulty with the arithmetic or problem solving aspects of this course should acquaint themselves with the services of the Tutoring Center and Smarthinking.
2. The BCC Library provides extensive support services for student research.
3. Faculty office hours may be a productive vehicle for assistance in understanding the course material.
4. Bergen Community College aims to create inclusive learning environments where all students have maximum opportunities for success. Any student who feels he or she may need an accommodation based on the impact of a disability should contact the Office of Specialized Services at 201-612-5269 or via email at ossinfo@bergen.edu for assistance.

FACULTY ABSENCE PROCEDURE:

A daily listing of cancelled classes will appear in a glass case near the main corridor on the first floor. Another such listing will appear in a glass case in Ender Hall. Students can consult these cases before going to class. If students find a class cancelled which has not been listed, they should report this to the Divisional Dean's Office, A304, or the Evening Office C107. A listing of a faculty member's absence is available on line.

BCC Gen Ed Goals		Student Learning Objective
Gen Ed Goals	CHM 260 Organic Chemistry I	
1. Scientific Knowledge & Reasoning		1,2,3, 10
2. Society & Human Behavior		
3. Humanistic Prospective		
4. Historical Prospective		
5. Quantitative Knowledge and Skills		6,7,10
6. Written & Oral Communications		9
7. Technological Competency		4,5,8
8. Information Literacy		9
9. Global & Cultural Awareness		9
10. Ethical Prospective		

CHM 260 LAB TENTATIVE SCHEDULE				
WEEK	NUMBER	EXPERIMENT	Techniques	STUDENT LEARNING OBJECTIVES
1.	Misc 0213	Chemical Literature	Research Techniques Writing lab reports	5 9
2.	Tech 0701	Measuring the Melting Points of Compounds & Mixtures	Use of Mp Apparatus	5
3.	Tech 0703	Purification of Acetanilide by Recrystallization Use Small Scale	Solubility Decolorization Gravity Filtration Recrystallization Vacuum Filtration Use of Mp Apparatus	5
4.	Tech 0704	Separation Cyclohexane & Toluene by Distillation Use 1/2 of Macroscale	Simple Distillation Fractional Distillation	5
5.	Modl 2003	An Introduction to Molecular Modeling	Conformations of n-Butane Substituted on alkenes Cis & trans relative energies	1,6,7
6.	Reac 0714 Synt 0740	Sn1 & Sn2 Reaction Preparing Ethanol from Fermentation Use Semimicro	(Rate Study Only) Setup Fermentation	1,2,3
7.	Synt 0740	Preparing Ethanol from Fermentation Use Semimicro	Vacuum Filtration Simple Distillation	5

			Fractional Distillation Density measurement	
8.	Tech 2096	Caffeine Isolation of an Alkaloid Use Small Scale	Hot Water Extraction Vacuum Filtration Extraction	5
9.	Tech 2096	Caffeine Isolation of an Alkaloid Use Small Scale	Evaporation of solvent Sublimation % Yield	5
10.	Synt 0746	Acetaminophen Use Semimicro x2	Reflux Vacuum Filtration Recrystallization	5
11.	Synt 0746	Acetaminophen Use Semimicro x2	Mp TLC IR Spectroscopy	4, 8
Thanksgiving Break				
12.	Reac 0712	Dehydrating Cyclohexanol Use 2 x Semimicro	Distillation Drying Agents Wet Tests IR Refractometer	4, 5, 8
13.	Tech 2157	Isopentyl Acetate (Synthesis of Banana Oil) Use 2 x Semimicro	Mix & Reflux Extraction Dry	5
14.	Tech 2157	Isopentyl Acetate (Synthesis of Banana Oil) Use 2 x Semimicro	Distillation IR Bp	4, 5, 8
15.		Make Ups / Check out		
Hold	Synt 0705	Synthesis of Aspirin Use 2 x Semimicro	Reflux Vacuum Filtration MP FeCl ₃ Test	5

All BCC students enrolled in credit courses are entitled to a WebAdvisor account. With WebAdvisor, you may register online, pay your bill, check your schedule, room assignments, GPA, and find out what courses you need to take. To find out more about WebAdvisor or to sign up online, visit <http://go.bergen.edu>! While there, please make sure you give us your preferred email address. You'll find directions how to do this at <http://go.bergen.edu/email>.