



Department of Chemistry and Biochemistry

Chemistry 1144 • Fall 2024 • Lecture Schedule

Text: "Chemistry" by Overby & Chang, 14th ed, McGraw-Hill, 2022

Dates	Chapter No.	Topics
Aug 28, Sep 4	11	Liquids; Solids; Intermolecular Forces
Sep 9, 11, 16	12	Solutions
Sep 18, 23, 25	13	Kinetics
Sep 30, Oct 7	14	Equilibrium
Oct 9		EXAMINATION # 1 , covering Chapters 11-13
Oct 15	14	Equilibrium
Oct 16, 21	15	Acids and Bases
Oct 23, 28	15/16	Acid-Base Equilibria
Oct 30, Nov 4	16	Solubility and Complex Ion Equilibria
Nov 6	17	Thermodynamics
Nov 11		EXAMINATION # 2 , covering Chapters 14-16 (no solubility)
Nov 13, 18	17	Thermodynamics
Nov 20, 25, Dec 2	18	Electrochemistry
Dec 4	23	Transition Metals and Metal Complexes
Dec 9		EXAMINATION # 3 , covering Chapters 16-18
Dec 11	23	Transition Metals and Metal Complexes

Point distribution: Hour Exams: 45%; Recitation work: 25%, including 10% for the homework (Aleks) and 15% for quizzes; Final (cumulative): 30%.

There is no make-up for any missed midterm exam.

Deadlines for the homework: 35% of pie chart must be complete by 11:59 pm on Oct 13
60% of pie chart must be complete by 11:59 pm on Nov 10
85% of pie chart must be complete by 11:59 pm on Dec 8
100% of pie chart must be complete by 11:59 pm on Dec 15

Homework website: www.aleks.com

Class Key: GYHCM-FHP43

Financial Aid Access Code for Aleks: 55BBF-8E142-B3FD8-DEE30

Lecturer: Michael V. Mirkin; Remsen Hall # 120E, phone: (718) 997-4111, mmirkin@qc.cuny.edu

Office hours: Wednesday 10:35 AM – 11:35 AM and by appointment.

A grade of C or better is required to register for the next Chemistry course.

W and WU Grade policy: The drop deadline (w or change to p/nc) has been changed from the covid-era last day of class to nov. 6, 2024. Students who do not officially withdraw by Nov. 6 (and receive a W grade) but stop attending classes and do not participate in any way after the withdrawal date will be given a WU grade.

Any participation in class (i.e. lab work, homework, taking quizzes and exams) after the withdrawal date will disqualify you from receiving the WU grade, and you will be given the appropriate letter grade.'

Queens College of the City University of New York
Department of Chemistry and Biochemistry
Basic Organic Chemistry

Chem 102.3**Lecture Schedule****Fall 2024****Course Requirements:**

102.3: C or better in Chem 101.3 and 101.1, or C or better in Chem 113.4 and 113.1

Pre or corequisite: Chem 102.1 (C or better if prerequisite)

Note: a C- in any prerequisite will not permit you to take 102.3/102.1!

You must earn a C or better in Chem 102.3 and 102.1 to take Chem 103.3 and 103.1

Note: If you are a transfer student with a CR in a prerequisite course but your earned grade was a C- or less, there is a strong likelihood that you will not pass 102.3.

You will need access to Brightspace for handouts, including this syllabus. It is your responsibility to provide a valid e-mail address that you monitor. Announcements will be made via Brightspace and e-mail.

Lecture: Mon., Wed. 3:10 - 4:25 PM, Remsen 101. I am normally available after class if you have questions.

Professor William H. Hersh

Office Hour: Wednesday 2:00 PM - 2:50 PM in Remsen 109

and by appointment if you have class or work scheduled Wednesday 2-3 PM.

e-mail: william.hersh@qc.cuny.edu - only way to contact me (college phone does not work)

LECTURE TEXT (required): *General, Organic, & Biological Chemistry*, 5th or 6th Edition, Janice Smith (McGraw Hill, ISBN for 6th edition ebook with ALEKS (see below): 9781264497003, \$123.75). This is the same book used for Chem 101 (since Sp 2023, 5th ed) and 103 going forward, so plan ahead when buying or renting—a looseleaf version is available at a discounted rate (\$47) from your ALEKS account. If you have a physical copy of the 5th edition, it is virtually the same as the 6th edition, but you still need the ALEKS electronic homework, and that includes the 6th edition textbook. **ALEKS instructions are below in the On-line homework section.**

The text contains many problems - you should do those that appear in the body of the text and at the end of each chapter. These problems will not be graded. Answers to all problems may be found at the end of each chapter, but don't look at the answers when you try to answer the problems; if you can't answer the problem, go to the relevant part in the chapter to help figure it out.

If you want to understand the lecture material, you must read the textbook chapter before class. For the vast majority of students, it is not possible to understand lecture material if you are seeing it for the first time in class! When you read the textbook and do problems in the text with the reading, read slowly - do not read it like a novel if you hope to learn the material.

Final piece of advice for how to succeed in organic: ATTEND EVERY CLASS! Attendance has been highly correlated with passing the course with a grade of C or higher.

AN ADVISORY NOTE: THE DROP DEADLINE (W OR CHANGE TO P/NC) HAS BEEN CHANGED FROM THE COVID-ERA LAST DAY OF CLASS TO NOV. 6.

WU grades will not be given after Nov. 6 unless you have not done any work or attended class after Nov. 6, and evidently forgot to submit the W request.

Recommended: Molecular model kit (available on-line, about \$20-60; the ~\$20-30 kits on Amazon look good)

On-line homework (required): Register for the course at https://www.aleks.com/sign_up using the 10-character class code for this course (Chem 102 Fall 2024), UNTFL-T3GYG. Detailed instructions can be downloaded on Brightspace (ALEKS Registration Instructions).

You can purchase the access code from the bookstore, or via ecommerce during the registration process. Students who have purchased via the bookstore will be provided with the option to enter their access code during registration, and those who would like to purchase via ecommerce can also make that selection when registering.

Try it (seems to work from the aleks website, but not on all browsers), and don't wait until the last minute.

Grading:	3 75-minute Midterm Exams	60%
	ALEKS Homework	15%
	Final Exam	25%
	Total	100%

**Exams will stress lecture material, problems in the book, and recitation problems.
Bring photo ID to exams.**

You **will** be permitted to use molecular models during exams. You will **not** be permitted to use books, notes, computers, or calculators during exams. Cell phones are strictly prohibited during exams. If you have any questions concerning the grading, contact Dr. Hersh within 10 days following the exam.

There are absolutely no regrades for exams taken in pencil. If you want to have the possibility of a regrade, you must take the exam in pen, and submit the exam for regrade within 10 days.

All re-grade requests must be made in writing and attached to the exam - simply explain what error you think was made in grading; do not *under any circumstances* write anything on the exam itself. **Exams are scanned prior to being returned.**

If you miss a midterm exam, written verification of your reason for missing the exam is required. There are no make-up exams; your midterm grade will be the average of the exams you took.

Cheating of any kind will not be tolerated. Your entire exam grade will be zero, and you will be brought up on charges of academic dishonesty to the College.

Approximate Lecture (start dates for each chapter) and Examination Schedule

Approximate Lectures (Start dates for each chapter) and Examination Schedule		
Date	Chp	Topic
Aug. 28	11	Introduction to Organic Molecules and Functional Groups
Sept. 16	12	Alkanes
Oct. 7	Exam 1 Chapters 11-12	
Oct. 9	13	Unsaturated Hydrocarbons
Oct. 21	14	Organic Compounds That Contain Oxygen, Halogen, or Sulfur
Oct. 23	15	The Three Dimensional Shape of Molecules
Nov. 6	16	Aldehydes and Ketones
Nov. 11	Exam 2 Chapters 13-15	
Nov. 20	17	Carboxylic Acids, Esters, and Amides
Dec. 4	18	Amines and Neurotransmitters
Dec. 11	Exam 3 Chapters 16-18	
Dec 16 or 18 (tentative), Final Exam: Chapters 11 – 18		

No class Oct. 2-4, Oct. 11, and Oct. 14

Tuesday October 15 is a Monday schedule

Wednesday Nov. 27 is a Friday schedule

No classes Nov. 28-29.

Course Objectives: Students will learn basic structural organic chemistry, including structures and nomenclature of hydrocarbons and compounds containing the most common functional groups including halides, alcohols, thiols and disulfides, amines, carbonyl compounds including aldehydes, ketones, carboxylic acids, esters, and amides. Stereochemistry will be introduced, and students will learn to draw structures and convey three-dimensional information about structures. Reactions of these compounds will be introduced, but mechanisms of reactions, synthesis, and spectroscopy will not be covered in this course. At the conclusion, students will have a foundation that will allow them to enter a course in basic molecular biochemistry.

Assessment: Problem solving ability will be tested using exams; while memorization of naming conventions and reactions will be required, the emphasis will be on understanding structures of organic compounds. Sample problems and answers both in the book and on the course web site will be representative of the material that will be found on exams.

GRADE KEY. This course is not graded on a curve. Everyone in the class can get an A, or everyone can get an F. There is no predetermined percentage of the class that will get any particular grade. The key for all exams is shown below, except for + and – cutoffs. For instance, while “A” is shown as 80-100, an average of 80 will be an A-, and while “B” is shown as 60-79, the cutoffs are approximately 1/3 in each range, i.e. around 60-66 B-, 67-73 B, 74-79 B+. The exact ranges will not be given out except for the C cutoff, since you need a C to go on to Chem 103.

Chem 102 exam and course grade key:

80-100 A
60-79 B
47-59 C
40-46 C-
30-39 D
0-29 F

Queens College of the City University of New York
Department of Chemistry and Biochemistry
Organic Chemistry II

Chem 251.1**Lab Schedule, Remsen Annex 351****Fall 2024****Course Requirements:**

Prerequisites for Chem 251.1: C or better in Chem 114.4 and 114.1

Pre or corequisite: Chem 251.4 (C or better if prerequisite)

LAB TEXT: *Macroscale and Microscale Organic Experiments*, Williamson and Masters, 7th ed.
 Cengage Learning, 2017, ISBN: 978-1-305-57719-0 (**NOT the newer 8th edition**).

Chem 251.1 Section Number:**Lab Instructor:****Instructor's Email:****Lab Instructor's Office Hour (on-line or in-person):**

Lab coat, safety goggles, and required glassware are provided upon check-in.

Coordinator: Prof. William H. Hersh (william.hersh@qc.cuny.edu)**[Note: Students should contact their lab instructor for all lab-related questions.]*****All experiments to be done are the Macroscale version.***

Week	Experiment	Williamson & Masters Chp (Page)
1	Check-in. No laboratory work can be done. Review of safety in the Orgo. Lab., Instructions on disposal of chemical waste, Lab. protocols, Maintenance of a laboratory note-book	Chp 1-2
2-3	I. Melting Point Determination Determination of Boiling Point via Distillation and via Micro Boiling Point Method	Chp 3 (48-55) Chp 5 (87) Chp 3 (55-60)
4	II. Isolation of Clove Oil from Cloves	Chp 6 (103), Exp 5
5	II (continued). Extraction: Isolation of Eugenol from Clove Oil. Thin Layer Chromatography of Clove Oil and of Eugenol (Instructor will cut TLC strips and provide instructions)	Continues p112-114
6	III. Crystallization i. Isolation of Crystalline Acetylsalicylic Acid from Aspirin tablets (Lab Notes) ii. Recrystallization of Benzil (Lab Notes)	Lab Notes Chp 4 (82-3)
7	IV. Preparation of Cyclohexene	Chp 19 (336)
8	V. Preparation of 1-Bromobutane	Chp 16 (313)
9	VI. Nucleophilic Substitution Reactions of Alkyl Halides	Chp 17 (320)
10	VII. Oxidation of Cyclohexanol	Chp 22 (358), Exp 4
11	VIII. Grignard Reaction: Preparation of Triphenylmethanol	Chp 38 (493), Exp 4-7
12	Complete VIII. IX. Reactions of Triphenylmethanol – Parts 1, 2, and 3	Chp 33 (447) Exp 1-3
13	Finish IX and any other unfinished experiments	
14	Check out and Lab Final Exam. No laboratory work can be done.	

It is important that you check the Chemistry 251 "Lab Notes" for details of all experiments, because there are sometimes significant changes from the procedures described in the laboratory manual.

Attendance is required. There is NO make-up for any missed laboratory experiment. A missed lab will receive no credit and will be dropped from final average calculation ONLY if your absence is excused by your lab instructor. A second missed lab, if excused by your instructor, will require completion of an alternate assignment given by your instructor in lieu of the lab experiment. Further absences are NOT excusable.

Safety glasses and lab coats are required in the laboratory at all times – even if you already wear glasses.

NO short pants, skirts, or open toe shoes are allowed; tie back long hair.

NO computer, tablet or cell phone use in the laboratory during class activities other than digital lab textbook.

Do not bring food, chewing gum, coats or backpacks into the lab – use the hall lockers.

All experiments are to be done individually – no team experiments.

Course Objectives: Students will learn basic organic lab safety, waste disposal, and techniques, and will learn how to keep an organic laboratory notebook. At the conclusion of this semester students will be prepared to do organic research if they so choose.

Assessment: You will need to keep a neat, legible laboratory notebook; a lined 100 page, 9 $\frac{3}{4}$ x 7 $\frac{1}{2}$ inch composition book is best. Your lab instructor will periodically check your notebook, so it must be up-to-date, and will announce when it will be collected for grading. Lab books will not be accepted after the last day of lab class (i.e. Check Out day).

70% - lab book (Report: 35%, Results, 35%).

15% - Performance in the Laboratory (see below).

15% - A written 1 hour lab final given on the last day of lab class (Check Out) or possibly during Finals week. The lab final will cover lab safety, and the contents that were covered during the entire semester. It will not cover lecture material. You will need a calculator (no cell phones allowed).

The criteria for Performance in the Laboratory:

1. **Safety (5%):** If you do not work safely, your instructor will deduct points at their discretion. **Eye protection and lab coat must be worn at all times in the lab**; penalty for failure to do so is a 0 (zero) for the day and/or dismissal from that day's lab with no possibility of make-up [Points will be deducted from your final grade for safety offenses at instructor's discretion]. Safety shower, eyewash, and fire extinguisher locations must be noted. Chemical waste handling protocols must be observed; if in doubt, ask! Points will be deducted for unsafe practices or violations of waste protocols; You may be ejected from lab and receive a zero (0) for that day's work.

2. **Independence (5%):** Your ability to work and think independently, as determined by your instructor.

3. **Efficiency and Effectiveness (5%):** Your ability to efficiently accomplish the goals of the experiment within the lab time frame. This also includes the quality of your results.

Queens College of the City University of New York
Department of Chemistry and Biochemistry
Organic Chemistry I

Chem 251.4**Lecture Schedule****Fall 2024****Course Requirements:**

Prerequisites for Chem 251.4: C or better in Chem 114.4 and 114.1

Pre or corequisite: Chem 251.1 (C or better if prerequisite)

*Note: a C- in any pre or corequisite will not permit you to take 251.4/251.1!**You must earn a C or better in Chem 251.4 and 251.1 to go on to Chem 252.*

You will need access to Brightspace for handouts, including this syllabus. It is your responsibility to provide a valid e-mail address that you monitor. Announcements will be made via Brightspace and e-mail.

Lecture: Tu, Thurs 2:15 - 4:05 PM, Remsen 101. There will be a 10 minute break and I am available then and normally after class if you have questions.

Professor William H. Hersh**Office Hour:****Thursday 1:00 PM - 1:50 PM****in Remsen 109 and by appointment if you have class or work scheduled Thursday 1-2 PM.****e-mail: william.hersh@qc.cuny.edu - only way to contact me (college phone does not work)**

LECTURE TEXT and on-line Achieve Homework (Required): *Organic Chemistry*, 7th Ed., Loudon and Parise (2021). ***There are many options but you must purchase Achieve alone or as a package (see below); Achieve includes the text book in electronic form (E-book).***

The Achieve Link for this course is <https://achieve.macmillanlearning.com/courses/z3sfdx>

If you are asked for the course code, it is z3sfdx

Achieve will be active on August 18. You will have access to the E-book for 4 years, and to Achieve assignments for the number of terms you buy – two terms recommended if you will take Chem 252 Spring 2024.

Your choices:

1. Many purchase options and packages are available from the Macmillan website ***BUT THIS FIRST OPTION IS STRONGLY RECOMMENDED AND CANNOT BE FOUND ON THE MACMILLAN SITE EXCEPT BY USING THIS LINK OR DOING A SEARCH WITH THE ISBN:***

<https://store.macmillanlearning.com/us/product/Organic-Chemistry/p/9781319481353>

for the 2-term Achieve+E-book AND paperback Study Guide and Solutions Manual, \$149.99

(STRONGLY RECOMMENDED)

OR

<https://store.macmillanlearning.com/us/product/Organic-Chemistry/p/9781319481339>

for the 1-term Achieve+E-book AND paperback Study Guide and Solutions Manual, \$136.99

If you already have the Study Guide and Solutions Manual for the 7th edition, there is no need to purchase - there is just one version.

Other options on the Macmillan site can be found at:

<https://store.macmillanlearning.com/us/product/Organic-Chemistry/p/1319188427>

For instance you can buy the loose-leaf version of the text+Achieve (two terms), the paperback version of the text+Achieve (two terms), and there are packages with the Study Guide/Solutions Manual as well as rentals (and if you rent, you must send the book back after the rental period, otherwise there are fees). All of these packages that include the Study Guide will be more expensive than the above \$136.99 or \$149.99 special package.

2. QC bookstore, one or two term Achieve (includes E-book) with or without the Study Guide/Solutions Manual.

The text contains many problems - you should do those that appear in the body of the text and at the end of each chapter - recommended problems are listed below in the Lecture Schedule. These problems will not be graded.

They should be done together with the required on-line problems (see below); the on-line problems are not enough by themselves to prepare you to do well in this course.

If you want to understand the lecture material, you must read the textbook chapter before class. For the vast majority of students, it is not possible to understand lecture material if you are seeing it for the first time in class! When you read the textbook and do problems in the text with the reading, plan for a pace of about 4 pages/hour. Do not read it like a novel if you hope to learn the material.

Final piece of advice for how to succeed in organic: ATTEND EVERY CLASS! Attendance has been highly correlated with passing the course with a grade of C or higher.

AN ADVISORY NOTE: THE DROP DEADLINE (W OR CHANGE TO P/NC) HAS BEEN CHANGED FROM THE COVID-ERA LAST DAY OF CLASS TO NOV. 6.

WU grades will not be given after Nov. 6 unless you have not done any work or attended class after Nov. 6, and evidently forgot to submit the W request.

REQUIRED ON-LINE PROBLEMS: You are required to purchase access to the Achieve on-line problem web site for this course. The cost includes the textbook as explained above.

The Achieve Link for this course is <https://achieve.macmillanlearning.com/courses/z3sfdx> (same as above). You can probably find it by searching for Hersh or Queens College or CUNY, but you will be using this constantly.

EACH CHAPTER'S ADAPTIVE QUIZ MUST BE COMPLETED BY THE DEADLINE POSTED, including Chapter 1 for the first class. Most of the time the deadline will be before we start that chapter in class. You must "achieve" the target score to get credit. It is 100% or 0%, all or nothing. THE PURPOSE IS TO FORCE YOU TO READ EACH CHAPTER BEFORE IT IS DISCUSSED IN CLASS. There will be no exemptions. As you do the quiz, you have the options to read (or re-read) the relevant part of the text, or for a point penalty, ask for a hint. If you get problems correct, you will move along to the target faster (hence the adaptive part). I believe you will like this part of the Achieve system, and since it is new, feel free to let me know if you find it helpful or not.

After each chapter is done in lecture, you will have an additional homework assignment in Achieve; due dates will mostly be 2-4 days after the chapter is finished in lecture, and on the day we do recitation problems for the chapter in class. There are training modules (with extra credit) that you can complete before you start on the chapter problems.

If you need help contact Macmillan tech support by clicking on the blue ? at the bottom of the Achieve left-hand panel, and select the first option.

MACMILLAN TECH SUPPORT: Students can contact tech support online at

<https://macmillan.force.com/macmillanlearning/s/>

(this is not an email but probably the same site as the blue ? noted above) or by phone at (800) 936-6899.

While studying organic with other students is recommended, you will get the maximum benefit from these problems by doing them on your own, and **not** doing them at the last minute.

Recommended: Molecular model kit (available on-line, about \$20-60; the ~\$20-30 kits on Amazon look good)

LAB TEXT (Required): *Macroscale and Microscale Organic Experiments*, Williamson and Masters, 7th ed. Cengage Learning, 2017, ISBN: 978-1-305-57719-0 (hard copy or e-book).

Do NOT get the newer 8th edition.

Grading:	3 1 hour Midterm Exams	60%
	On-line Achieve Adaptive pre-class Quizzes	10%
	On-line Achieve after-lecture homework	5%
	Final Exam	25%
	Total	100%

The midterm exams will be given at the beginning of the class, followed by a break and a 30 minute lecture (approximately) after each of the midterm exams. The final (2 hour) exam will be similar to the midterm exams.

**Exams will stress lecture material and recitation problems.
Bring photo ID to exams.**

You will be allowed to bring only to the Midterm Exams (not the Final Exam) an 8.5x11 inch "help" sheet – fill in both sides as you wish. No magnifying glass allowed. They will not be collected.

You **will** be permitted to use molecular models during exams. You will **not** be permitted to use books, notes (except for the help sheet on the midterms, but **not** the final), computers, or calculators during exams. Cell phones are strictly prohibited during exams. If you have any questions concerning the grading, contact Dr. Hersh within 10 days following the exam.

There are absolutely no regrades for exams taken in pencil. If you want to have the possibility of a regrade, you must take the exam in pen, and submit the exam for regrade within 10 days.

All re-grade requests must be made in writing and attached to the exam - simply explain what error you think was made in grading; do not *under any circumstances* write anything on the exam itself. **Exams are scanned prior to being returned.**

If you miss a midterm exam, written verification of your reason for missing the exam is required. There are no make-up exams; your midterm grade will be the average of the exams you took.

Cheating of any kind will not be tolerated. Your entire exam grade will be zero, and you will be brought up on charges of academic dishonesty to the College.

Approximate Lecture and Examination Schedule

Date	Chp	Topic	Suggested Chapter-End Problems
Aug. 29	1	Bonding and Structure	43-46, 48-50, 52-58, 64-65
Sept. 3	2	Alkanes	25, 28-36, 44-45, 54-55
Sept. 12	3	Acids and Bases, Curved Arrows	40-48, 56a, 57, 59-62, 64, 66, 68a
Sept. 24	4	Intro to Alkenes and Alkynes: Structure and Reactivity	43-51, 53-62a, 63-64, 67, 72-77, 79-84
Oct. 1	Exam 1 Chapters 1-3		
Oct. 10	5	Addition Reactions of Alkenes and Alkynes	21-33, 35, 36, 39, 40-43
Oct. 17	6	Stereochemistry	28-37, 39, 41-43, 45
Oct. 29	7	Cyclic Compounds, Reaction Stereochemistry	32-40, 42-44a, 46, 50, 52-55, 60, 67-70, 76-78, 83
Nov. 7	Exam 2 Chapters 4 – 6		
Nov. 12	8	Noncovalent Intermolecular Interactions	31, 32, 36, 39-41, 44, 45, 48, 50, 52, 55, 56, 58
Nov. 14	9	Alkyl Halides, Substitution and Elimination	35-37, 39-54, 57, 60-65, 70, 71, 77
Nov. 26	10	Free Radicals, Organometallics, Carbenes	35, 36, 39, 41, 42, 44, 47-50, 60, 68
Dec. 5	Exam 3 Chapters 7 – 10		
Dec. 5	11	Alcohols and Thiols	41, 43-52, 57-66, 68-70, 73-76, 80
Dec 17 or 19 (tentative), Final Exam: Chapters 1 – 11.			

No class Oct. 2-4, Oct. 11, and Oct. 14

Tuesday October 15 is a Monday schedule

Wednesday Nov. 27 is a Friday schedule

No classes Nov. 28-29.

Course Preparation and Advice: Understanding the basic concepts from General Chemistry is critical to understanding reactions and mechanisms in organic chemistry. While these concepts are reviewed in Organic Chemistry, it will be assumed that this is the second time you are seeing this and that you understand the concepts. A brief list from the most recent Queens College textbooks for Chem 113 and 114 is given below; if you are transferring in, try match the topics with those in your textbook. Once you start Chem 251, read the book before lecture (yes, I did say this already up above!); take seriously the fact that you really do need to know and understand every reaction we cover in class (no exceptions). Understanding mechanisms will help you remember the reactions. In most cases hiring a tutor will not help and most likely will be a hindrance because you will rely on the tutor rather than yourself.

Review Chapters from Zumdahl & Zumdahl *Chemistry*:

Chem 113

Chapter 4: Types of Chemical Reactions and Solution Stoichiometry

Chapter 8: Bonding: General Concepts

Chapter 9: Covalent Bonding: Orbitals

Chem 114

Chapter 10: Liquids and Solids (Liquids only)

Chapter 14: Acids and Bases

Chapter 17: Spontaneity, Entropy, and Free Energy

or Silberberg *Chemistry*:

Chem 113

Chapter 3: Stoichiometry

Chapter 4: Major Classes of Chemical Reactions

Chapter 6: Thermochemistry

Chapter 9: Models of Chemical Bonding

Chapter 10: Shapes of Molecules

Chapter 11: Theories of Covalent Bonding

Chem 114

Chapter 12: Liquids and Solids (Liquids only)

Chapter 18: Acid – Base Equilibria

Chapter 20: Thermodynamics: Entropy and Free Energy

Course Objectives: Students will learn structural organic chemistry, including bonding, functional groups, stereochemistry, and conformational analysis, as well as the nomenclature for labeling these compounds and structures. In the first semester of organic chemistry a limited number of functional groups, including alkanes, alkenes, alkyl halides, and alcohols, will be introduced along with their reactions. The mechanisms of those reactions and their common mechanistic features will be stressed. Understanding these mechanisms, rather than their rote memorization, is a principal objective, as only understanding of mechanisms will allow new reactions to be understood. Applications of reactions to multistep synthesis will be introduced. At the conclusion of this semester students will almost be prepared to start doing organic research if they so choose, but will need Chapter 14 on NMR (covered in the first month of Chem 252).

Assessment: Problem-solving ability will be tested using exams and on-line graded problems; while memorization of naming and drawing conventions as well as reactions will be required, the emphasis will be on understanding structures of organic compounds and their mechanisms of reaction. While the on-line homework problems will be graded, the intent is to help student learning, rather than provide significant assessment. These and additional sample problems and answers both in the book and on the course web site will be representative of the material that will be found on exams.

GRADE KEY. This course is not graded on a curve. Everyone in the class can get an A, or everyone can get an F. There is no predetermined percentage of the class that will get any particular grade. The key for all exams is shown below, except for + and – cutoffs. For instance, while “A” is shown as 80-100, an average of 80 will be an A-, and while “B” is shown as 65-79, the cutoffs are approximately 1/3 in each range, i.e. around 65-69 B-, 70-74 B, 75-79 B+. The exact ranges will not be given out except for the C cutoff, since you need a C to go on to further chemistry courses.

The ranges given will never be raised, but they have on occasion been lowered if a test was too hard.

80-100 A

65-79 B

55-64 C

50-54 C-

40-49 D

0-39 F

Chemistry 252.4 (Organic Chemistry II) – Fall 2024
(Pre-requisite: Grade of C or Higher in Chemistry 251.4 & 251.1)

Department of Chemistry & Biochemistry
Queens College – CUNY
65-30 Kissena Blvd., Flushing, NY 11367

Lecture & Recitation – Tuesday & Thursday (4:20 – 6:10 pm); RE101

Instructor: Professor Yu Chen

Email: yu.chen1@qc.cuny.edu

Office Hours: Tuesday & Thursday 6:20 pm to 6:50 pm (RE 206)

You will need access to Brightspace for handouts, including this syllabus. It is your responsibility to provide a valid e-mail address that you monitor. Announcements will be made via Brightspace and e-mail.

If you want to understand the lecture material, you must read the textbook chapter before class. For the vast majority of students, it is impossible to understand lecture material if you are seeing it for the first time in class! When you read the textbook and do problems in the text with the reading, plan for a pace of about 4 pages/hour. Do not read it like a novel if you hope to learn the material.

Textbook: Organic Chemistry, 7th Ed., Loudon and Parise, and Study Guide and Solutions Manual to Accompany Organic Chemistry, 7th Ed., Loudon and Parise, Roberts & Co./Macmillan Learning

Ancillary:

- 1) Organic Chemistry as a Second Language, by David Klein, Third Edition, John Wiley & Sons, INC.
- 2) Online homework from Macmillan Learning, [Achieve](#), newest digital product. (more details will be announced in the first lecture on Aug. 29th, 2024).

Laboratory Text: by Williamson, Organic Experiments, 9th Edition.

Examinations: There will be three **in-person** 100-point mid-term exams, and one **in-person** 100-point final exam, to be held on campus as scheduled below.

Grades: Macmillan Learning ([Achieve](#)) online assignments count for 15% of the final grade. The lowest of the three midterm exams counts for 15%, and the two higher scores count for 20% each. The final exam counts for 30% of the final grade.

****(Note: There is no make-up exam.)*** If a student is sick on a scheduled exam day and cannot take the exam, he/she should provide a medical doctor's note to Dr. Chen immediately after he/she recovers. In this case, the lower grade of the rest two mid-term exams will count for 25%; and the higher grade of the rest two mid-term exams will count for 30%.

Grading Scale: 88-100 (A); 83-87 (A-); 78-82 (B+); 73-77 (B); 68-72 (B-); 63-67 (C+); 54-62 (C); 41-53 (D); < 40 (F).

General Guidelines: You must attend all the class examinations and laboratory sessions. In case of an emergency that you are unable to attend a class examination or a laboratory session, a legal valid proof of absence must be presented. In the event that you are unable to furnish a valid proof of absence within reasonable time periods, a zero grade will be assigned for the examination. You must be able to use *Brightspace* for accessing the course materials. It is strongly recommended that you use Queens College email account for effective communication with the instructor. Any other specific information regarding the course will be provided by the instructor in the first lecture, scheduled on Aug. 29th, 2024.

Schedule of Classes and Examinations:

1. Chapter 12 – The Chemistry of Ethers, Epoxides, Glycols, and Sulfides – 8/29; 9/3
 2. Chapter 13 – Introduction to Spectroscopy. Infrared Spectroscopy and Mass Spectrometry – 9/5; 9/10
 3. Chapter 14 – Nuclear Magnetic Resonance Spectroscopy – 9/12; 9/17
 4. Chapter 15 – Dienes and Aromaticity – 9/19; 9/24
 5. Chapter 16 – Chemistry of Benzene and Its Derivatives – 9/26; 10/1
-
- First Mid-term Examination – Chapters 12-15 – 10/8
-
6. Chapter 17 – Allylic and Benzylic Reactivity – 10/10; 10/17
 7. Chapter 18 – The Chemistry of Aryl and Vinylic Halides, Phenols, and Transition Metal Catalysis – 10/22; 10/24
 8. Chapter 19 – The Chemistry of Aldehydes and Ketones – 10/29; 10/31
 9. Chapter 20 – The Chemistry of Carboxylic Acids – 11/5; 11/7
-
- Second Mid-Term Examination – Chapters 16-19 – 11/12
-
10. Chapter 21 – The Chemistry of Carboxylic Acid Derivatives – 11/14; 11/19; 11/21
 11. Chapter 22 – The Chemistry of Enolate Ions, Enols, and α,β -Unsaturated Carbonyl Compounds – 11/26; 12/3; 12/5
 12. Chapter 23 – The Chemistry of Amines – 12/10;
-
- Third Mid-Term Examination – Chapters 20-23 – 12/12
-

FINAL EXAMINATION – Chapters 12-23 – TBA

*: A thirty-minute recitation will be held in class after the lecture of each chapter.

For Macmillan Learning (Achieve) online assignments:

<https://achieve.macmillanlearning.com/start>

Course ID: 92v73d.

Chp	Topic	Suggested Chapter-End Problems
12.	Ethers, Epoxides, Glycols, and Sulfides	46-66, 76, 87
13.	Infrared Spectroscopy (IR) and Mass Spectrometry (MS)	29-37,42-45a, 46,47a,c, 48,50,51a,b, 52
14.	Nuclear Magnetic Resonance Spectroscopy (NMR) (See also Chp 11, p. 598-606)	11.57-59, 11.73; 14.37, 39, 41a-f,i, 42a-f,i,j, 43-45, 48a-d
15.	Dienes and Aromaticity	37-40, 45-58, 60-61, 64-66, 70-72, 79, 82

16. Chemistry of Benzene and Its Derivatives	38-43, 47, 52, 54, 67, 71
17. Allylic and Benzylic Reactivity	20-26, 29, 30, 32-37, 41, 45, 46, 50, 54, 55
18. Aryl & Vinylic Halides, Phenols, & Transition Metal Catalysis (skip 18.5-6, 18.10b)	46-48, 50, 53, 55, 56, 62, 76, 77, 88, 89
19. Aldehydes and Ketones	41-44, 48-55, 59, 68, 69
20. Carboxylic Acids	31, 33-36, 38, 41, 43-45, 48-50, 60, 63a-d,f-l, 71a
21. Carboxylic Acid Derivatives	32-34, 35b,f, 36-42, 44a-d, 45a-g, 58, 60
22. Enolate Ions, Enols, and α,β -Unsaturated Carbonyl Compounds	52-59, 64-66, 67a-h,k, 68, 69b, 71*, 72, 89 *typo in problem, look up mesityl oxide
23. Amines	44, 45a, 46-48, 51-54, 55a-d,g, 56a-i, 66, 67a-e, 80

Course Preparation and Advice: Understanding the basic concepts from Organic Chemistry I is critical. Attend every class and read the book before lecture; take seriously the instructions that you really do need to know and understand every reaction (no exceptions). Do problems in the text, and do the on-line problems on your own and not at the last minute – take your time and understand them. Understanding mechanisms will help you remember the reactions. In most cases hiring a tutor will not help and most likely will be a hindrance because you will rely on the tutor rather than yourself.

Most students find the on-line Achieve homework helpful. It is simply another tool to help you understand the material, but by itself will not prepare you for exams. The only way the problems can be helpful is if you do them on your own and use the book or the hints to try figure out problems that you do not get correct the first time.

Course Objectives: Students will complete their initial one-year course in organic chemistry, with topics including spectroscopy, dienes and aromatic compounds, the chemistry of the carbonyl and related functional groups, and amines. At the conclusion, students will have a solid foundation in organic chemistry that will enable them to carry out organic chemistry research and understand the molecular basis of biochemical processes.

Assessment: Contrary to its reputation, success in organic chemistry depends far more on understanding of course material than on rote memorization. Problem solving ability will be tested on exams, and representative problems will be discussed in lecture recitations and will be found in the textbook, and in graded on-line problems for each chapter. Careful reading of the textbook prior to lectures, and attendance at all lectures, is strongly recommended.

Understanding of the course material will be assessed via three midterm exams and one 2-hour final exam. Since organic chemistry is a cumulative subject, it is not possible to succeed in this course without knowing the first semester material, so any exam is in effect cumulative.

CHEM 331.3/710, Adv. Inorg. Chem, Fall 2023

I. Lecture Instructor Information

Instructor: Prof. Chen Wang **Office:** REM 120B

Email: chen.wang@qc.cuny.edu

Office Hours: Fri 10:00 AM - 12:00 PM or by appointment

II. Course Information

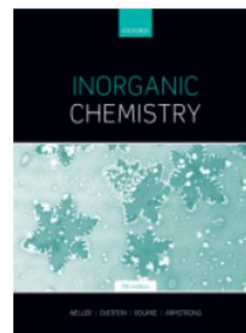
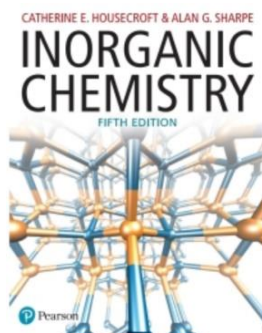
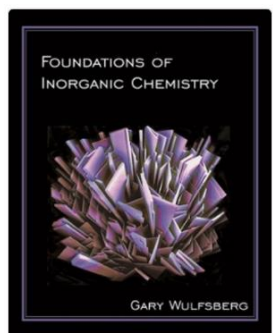
Lecture Times: Tu, F 12:15PM - 1:30PM **Classroom:** REM 105

Course Description: This course will discuss periodic trends across the entire periodic table in the category of acid-base chemistry, coordination (complex-ion) chemistry, precipitation chemistry, and oxidation-reduction chemistry. Principles that help explain these trends in chemical reactivity will also be discussed. Symmetry and molecular orbital theory will be introduced after you have developed an understanding of fundamental trends across the periodic table, which allows molecular orbital theory to be more broadly applied in subsequent chapters. This course is not only to chemistry students, but also to other professionals in other fields of science in which inorganic chemistry has become important. There is no physical chemistry prerequisite, but a background in General Chemistry, and enrollment in a Foundations of Organic Chemistry course are assumed.

III. Books and Materials

Textbook: Foundations of Inorganic Chemistry 1st Edition by Gary Wulfsberg

Other Suggested References: Inorganic Chemistry by Catherine Housecroft; Inorganic Chemistry by Mark Weller, Tina Overton, Jonathan Rourke, and Fraser Armstrong



Important Notes:

- The course materials (including the lecture slides and recorded lectures) and assignments will be posted on Brightspace.
- No material (now or in the future) obtained from this course can be distributed, sold, or purchased.
- There will be no extensions on the assignments.

IV. Grading and Evaluation

The grade is a 10-point grade scale as shown in Official Queens College Grade Scale (<https://www.qc.cuny.edu/academics/supportprograms/advising/academic-and-grading-policies/Pages/Default.aspx>).

Grades	GPA	Numerical Value / Definition
A+	97-100	4.0 (GPA in Good Academic Standing)
A	93-96	4.0
A-	90-92	3.7
B+	87-89	3.3
B	83-86	3.0
B-	80-82	2.7
C+	77-79	2.3
C	73-76	2.0
C-	70-72	1.7 (GPA in Academic Probation)
D+	67-69	1.3
D	60-66	1.0 (Grade of D is the lowest passing grade in the undergraduate division)
F	0-59	0.0

The final course grade will be calculated based on:

5% Participation	You must attend class ON TIME. Excessive absences and tardiness will affect your grade.
25% Mid-term	- One mid-term exam will cover the material for Chapter 1-6. Questions will be based on topics covered in the lecture and homework. There will be no make-up mid-term exams.
40% Final	There will be one comprehensive final exam that covers all chapters, with emphasis on the contents from Chapter 7-12 (~80%). Questions will be based on topics covered in the lecture and homework.
30% (5% × 6) Homework	- Roughly one homework will cover two chapters. - Homework will be announced in class and posted on Brightspace. - Homework will be due in one week at the beginning of the class. Late homework will not be accepted. <i>Exams may be based on the homework.</i>

V. Tentative Class Schedule

This schedule may be subject to change.

Date	Chapter #	Topic
08/30	--	Introduction to the course

09/03, 09/06	Chapter 1	Periodic Trends in Fundamental Properties of Atoms and Simple Ions
09/10, 09/13	Chapter 2	Monatomic Ions and Their Acid–Base Reactivity
09/17, 09/20	Chapter 3	Polyatomic Ions: Their Structures and Acid–Base Properties
09/24, 09/27	Chapter 4	<u>Ionic Compounds in the Solid State</u> , in Minerals, and in Solution
10/01, 10/08	Chapter 5	Trends in Coordination Equilibria
10/18, 10/22	Chapter 6	Principles of Oxidation–Reduction Reactivity
10/25	--	Review Session 1
10/29	--	Mid-term Exam
11/1, 11/5	Chapter 7	Introduction to Transition Metal Complexes
11/8, 11/12	Chapter 8	<u>Oxides and Silicates</u> as Materials
11/15, 11/19	Chapter 9	The Underlying Reasons for Periodic Trends
11/22, 11/26	Chapter 10	Symmetry
11/27, 12/03	Chapter 11	Molecular Orbital Theory
12/06, 12/10	Chapter 12	The Elements as Molecules and <u>Materials</u>
12/13	--	Review Session 2
TBD	--	Final exam

VI. College Policies and Student Services

Reasonable Accommodations for Students with Disabilities: Any student who feels that he or she may need accommodation based upon the impact of a disability should contact me privately. Please contact the office of Services for Students with Disabilities at Room 111, Frese Hall, 718-997-5870 (QC.SPSV@qc.cuny.edu) to coordinate reasonable accommodation for students with documented disabilities. See: <https://www.qc.cuny.edu/sp/>

CUNY Policy on Academic Integrity: Academic Dishonesty is prohibited in The City University of New York and is punishable by penalties, including failing grades, suspension, and expulsion as provided at <https://www.cuny.edu/about/administration/offices/legal-affairs/policies-procedures/academic-integrity-policy/>. Please read this document, paying careful attention to the sections on plagiarism and Internet plagiarism. If you are not sure how to cite work you have found on the internet, please review the APA Guidelines provided by the [Purdue OWL](https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/reference_list_electronic_sources.html) (https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/reference_list_electronic_sources.html).

Students should complete their assignments and exams independently. Plagiarism or any other forms of cheating is **NOT** tolerated. Any assignment involved will receive a grade of zero. Students plagiarizing will receive a warning for the first time. The second time that a student is caught will result in the automatic failure of the course. Other penalties, and/or referral to the Chairman and the Dean may be carried out.

Statement on student wellness: As a student, you may experience a range of challenges that can interfere with learning, such as strained relationships, increased anxiety, substance use, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may diminish your academic performance and/or reduce your ability to participate in daily activities. QC services are available free of charge. You can learn more about confidential mental health services available on campus at:

<https://www.qc.cuny.edu/StudentLife/services/counseling/counseling/>

Use of Student Work: All programs in New York State undergo periodic reviews by accreditation agencies. For these purposes, samples of student work are occasionally made available to those professionals conducting the review. Anonymity is assured under these circumstances. If you do not wish to have your work made available for these purposes, please let the professor know before the start of the second class. Your cooperation is greatly appreciated.

Biochemistry I (Chemistry 371/650) – Fall 2024

Syllabus and Tentative Schedule

Lectures: TUE, THU 12:10 -2:00pm, REMSEN 101

Instructor's Name: Professor Iva Burdett, Ph.D. (Email: iva.burdett@qc.cuny.edu)

Office Hours: Thursdays 2:15pm-3:15pm or by appointment

Course Structure:

1. **ALL LECTURES and EXAMINATIONS will be held In-Person (Remsen 101)**
2. Book: Lehninger Principles of Biochemistry by David L. Nelson and Michael M. Cox, 8th Edition, W. H. Freeman and Company;
3. Two Midterms (30% Each) and a Cumulative Final Examination (40%)

Learning Goals: Structure, properties, biosynthesis, and metabolism of major groups of compounds of biological importance: proteins, amino acids, carbohydrates, lipids, and coenzymes. The course emphasizes the relationship between the biochemical pathways and their location in the cell as well as metabolic regulation.

General Guidelines: You must appear in all three class examinations. Please note that there will be NO makeup examination, in general. In case of an emergency that you are unable to attend an examination, a legal valid proof of absence must be presented. If you are unable to furnish a valid proof of absence within a reasonable time period, a zero grade will be assigned for the examination. It is strongly recommended that you study the 'Reading Assignments' listed in Brightspace. It is anticipated that the reading assignments will help you understand the lecture material much more effectively. You must obtain a valid Queens College email id, so you can access the course materials online, posted periodically on Brightspace.

The use of cell phones is NOT permitted during exams. Use of a scientific calculator is permitted.

****Only Applicable to Chem 650 Students:** As part of this course, you are required to write a mini research review article (4-6 pages (excluding References), 1.5 spacing, font size 11), and submit it electronically via the link provided on Brightspace on or before December 19th 2024 at 11:59pm. **(NO late submission will be accepted)**. The topics will be announced in Brightspace. This report will constitute 5% of your total overall grade. **[Caution: Be very aware of plagiarism]**

Available accommodation for students with learning disabilities: Students with disabilities needing academic accommodation should register with the Special Services Office by emailing QC.SPSV@qc.cuny.edu. For more information about services available to Queens College students, visit the Office of Special Services website:

<https://www.qc.cuny.edu/studentlife/services/specialserv/Pages/default.aspx>

Counseling Services are also available to any Queens College student. This office assists students with personal concerns that can affect their enjoyment of and success in college. Services are free

and confidential. All sessions take place on Zoom or by Telephone, depending on student preference. To make an appointment, students should call 718-997-5420 and leave a message with their phone number and CUNY ID. They may also e-mail counselingservices@gc.cuny.edu

CUNY Policy on Academic Integrity: Academic dishonesty is prohibited in The City University of New York and is punishable by penalties, including failing grades, suspension, and expulsion as provided at <https://www.cuny.edu/about/administration/offices/legalaffairs/policies-procedures/academic-integrity-policy/>

W and WU Grade policy – THE DROP DEADLINE (W OR CHANGE TO P/NC) HAS BEEN CHANGED FROM THE COVID-ERA LAST DAY OF CLASS TO NOV. 6, 2024. Students who do not officially withdraw by Nov. 6 (and receive a W grade) but stop attending classes and do not participate in any way after the withdrawal date will be given a WU grade. Any participation in class (i.e., lab work, homework, taking quizzes and exams) after the withdrawal date will disqualify you from receiving the WU grade, and you will be given the appropriate letter grade.

Restrictions on Sharing of Posted Lecture Materials: Lecture materials that are posted (such as presentations, lectures, welcome video clips etc.) are shared with the class for the purpose of facilitating the learning experience and are not to be copied, downloaded or shared with anyone outside of the class.

Queens College Classroom Recording Policy: Audio or video recordings of all or parts of classes at Queens College may not be made without permission from the course instructor(s). The Office of Student Affairs and the Office of Special Services may provide for the recording of classes on behalf of a student receiving disability accommodations, missing class due to religious beliefs, or experiencing extended absence due to medical or other exigent circumstances. The Queens College Classroom Recording Policy applies to both students and visitors. Students and visitors are not authorized to copy, download, or disseminate authorized recordings to others. Students in violation of this policy are subject to disciplinary action, and visitors in violation of this policy are subject to removal from the classroom and/or campus.

Tentative Schedule of Classes and Exams (Subject to modifications, when required)

DAY	DATE	TOPIC
THU	29-Aug	Chapter 1 - Foundations of Biochemistry
TUE	3-Sep	Chapter 2 - Structure of Water
THU	5-Sep	Chapter 3 - Amino Acids, Peptides and Proteins
TUE	10-Sep	Chapter 4 - The 3-D Structure of Proteins
THU	12-Sep	Chapter 5 - Protein Function (Hemoglobin and Allosteric Regulation)
TUE	17-Sep	Chapter 5 - Protein Function (Hemoglobin and Allosteric Regulation)
THU	19-Sep	Chapter 6 - Enzyme Catalysis and Enzyme Kinetics
TUE	24-Sep	Chapter 6 - Enzyme Catalysis and Enzyme Kinetics
THU	26-Sep	Chapter 6 - Enzyme Catalysis and Enzyme Kinetics
TUE	1-Oct	Midterm Exam I (Chapter 1, 2, 3, 4, 5, 6)
THU	3-Oct	NO CLASSES SCHEDULED
TUE	8-Oct	Chapter 7 - Carbohydrates and Glycobiology
THU	10-Oct	Chapter 10 and 11 - Lipids; Biological Membrane and Transport
TUE	15-Oct	NO CLASS - MONDAY SCHEDULE
THU	17-Oct	Chapter 11 and 12 - Biological Membrane and Transport; Signal Transduction
TUE	22-Oct	Chapter 13 - Bioenergetics and Introduction to Metabolism
THU	24-Oct	Chapter 14 - Glycolysis, Gluconeogenesis, and the Pentose Phosphate Pathways
TUE	29-Oct	Chapter 14 - Glycolysis, Gluconeogenesis, and the Pentose Phosphate Pathways
THU	31-Oct	Chapter 15 – Glycogen Metabolism
TUE	5-Nov	Midterm Exam II (Chapter 7, 10, 11, 12, 13, 14, 15)
THU	7-Nov	Chapter 16 - The Citric Acid Cycle
TUE	12-Nov	Chapter 16 - The Citric Acid Cycle
THU	14-Nov	Chapter 17 - Fatty Acid Catabolism
TUE	19-Nov	Chapter 17 - Fatty Acid Catabolism
THU	21-Nov	Chapter 18 - Amino Acid Oxidation and The Production of Urea
TUE	26-Nov	Chapter 18 - Amino Acid Oxidation and The Production of Urea
THU	28-Nov	NO CLASS - THANKSGIVING BREAK
TUE	3-Dec	Chapter 19 - Oxidative Phosphorylation
THU	5-Dec	Chapter 19 - Oxidative Phosphorylation
TUE	10-Dec	Chapter 23 - Integration of Metabolism
THU	12-Dec	Chapter 23 - Integration of Metabolism; Final Thoughts and Review
THU	19-Dec	FINAL EXAM, cumulative, 11:00am-1:00pm Remsen 101

BIOCHEMISTRY LABORATORY (CHEMISTRY 376) – FALL 2024

FRIDAYS Recitation: 8:15 – 9:05 AM LAB: 9:15 AM – 1:05PM Remsen 355
Instructor: Dr. Preeni Abeyweera (tpabeyweera@gmail.com)

DATE	Laboratory Exercise
8/30 – 9/6	Bioinformatics - handout (2 Weeks) 1) Find databases and analyze a DNA sequence 2) Sequence homology, plasmids & cloning http://www.sumanasinc.com/webcontent/animations/content/plasmidcloning.html 3) Compare and identify related protein sequences; multiple sequence alignment 4) <i>Problem-based learning module: In silico analysis of DNA and protein sequences.</i> From 5 unknown sequences, determine segments having sequence homology, use BLAST to validate existence, identify putative proteins
9/13	Plasmid isolation and restriction analysis (Week 1); see Lab Manual
9/20	Plasmid restriction analysis by agarose gel electrophoresis (Week 2)
9/27	Computer-based analysis of plasmid fragments (Week 3)
10/18	The basics of primer design for PCR PCR analysis of gene expression in cells (RT-PCR); https://www.youtube.com/watch?v=QwT-Tj89VLo
10/25	Separation of proteins by chromatography Size exclusion chromatography; analysis of data
11/01	Affinity chromatography: Isolation and assay of lactate dehydrogenase ((Week 1)
11/08	Protein assay of column fractions (Week 2)
11/15	SDS-PAGE of column fractions (Week 3)
11/22	Enzyme Kinetics – Week 1 assays of glucose oxidase
11/27 (Wed)	Enzyme Kinetics – Week 2 assays of glucose oxidase; analysis of data
12/06	Introduction to Molecular Modelling -Week 1: Analysis of protein structure (pyMOL)
12/13	Introduction to Molecular Modelling - Week 2: Analysis of protein structure (pyMOL)
	REVIEW

There will be no class on October 4th, October 11th and November 29th. Wednesday November 27th observes a Friday schedule.

ASSESSMENT For each lab exercise, a formal written report or set of responses to on-line exercises will be due 1 week following the conclusion of each module. Quizzes will be given at the discretion of the instructor. The course grade will be based on: Reports (40%), Final Exam (30%), Quizzes (25%), and Participation (5%).
A final exam will be given at a date and time to be announced.

REASONABLE ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

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For more information about services available to Queens College students, visit the Office of Special Services:
<https://www.qc.cuny.edu/studentlife/services/specialserv/Pages/default.aspx>.

CUNY POLICY ON ACADEMIC INTEGRITY

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<https://www.cuny.edu/about/administration/offices/legal-affairs/policies-procedures/academic-integrity-policy/>.

COUNSELING SERVICES

Counseling Services are available to any Queens College student. This office assists students with personal concerns that can affect their enjoyment of and success in college. Services are free and confidential. All sessions take place on Zoom or by Telephone, depending on student preference. To make an appointment, students should call 718-997-5420 and leave a message with their phone number and CUNY ID. They may also e-mail counselingservices@qc.cuny.edu.

8/07/2024



Basic Organic Chemistry Laboratory Chem 102.1
Chemistry & Biochemistry
Fall 2024

Instructor Information

CHEM102.1 section number: []

Lab Instructor: [your name]

Email: [your email]

Office hour (on-line or in-person) : [time]

Lab room: Remsen 352

Coordinator: Prof. Yu Chen (yu.chen1@qc.cuny.edu)

[Note: students should contact their lab instructor for all lab-related questions.]

Course Description

Students will learn basic organic laboratory techniques including isolation and purification of organic compounds, and identification of organic compounds using chromatography and chemical tests; problem solving via understanding the use of the analytical tests is emphasized. Structural organic chemistry, which is a major focus of the lecture part of the course, will be covered in a molecular model session. Students will learn to carry out basic preparations of compounds and mixtures. At the conclusion, students will have a foundation that will allow them to carry out basic organic laboratory procedures, they will know how to keep an organic laboratory notebook, and they will know basic safety procedures including handling of hazardous waste.

Course Requirements:

PREREQ or COREQ: CHEM 1023. PRE: C or better in CHEM 1013 and 1011 (or CHEM 1134 and 1131 or CHEM 1144 and 1141

Course Goals/Objectives

To familiarize the learner with key reactions and lab techniques involving organic compounds, their derivatives.

Learning Objectives

Course Learning Objectives: (Fall 2024)

Students in Chem 102.1 lab will be able to:

1. Apply safe laboratory practices, including use of proper protective gear, proper handling of laboratory glassware, equipment, and chemical reagents
2. Identify inherent risks associated with specific reagents employed in each experiment using the MSDS Database.
3. Apply the Scientific Method to a given experimental procedure/protocol design (Appendix I: Scientific Method)
4. Write a laboratory report (Appendix II: Components of a Laboratory Report; Appendix III Assessment Rubric)
5. Calculate a limiting reagent, yield, and percent yield
6. Calculate accuracy and precision and complete an error analysis (Appendix IV: Elements of Error Analysis)



7. Identify laboratory instruments used to determine product identity, purity, and yield
8. Perform basic laboratory techniques, including recrystallization, vacuum filtration, aqueous extraction, thin layer and column chromatography.
9. Articulate classic organic chemistry mechanism(s) applied in each protocol/ procedure and identify them according to their discoverer (Appendix V: Key Mechanisms Applied in Organic Chemistry 102.1 Lab)
10. Apply learned organic chemistry mechanisms to key human physiologic/biochemical processes (Appendix VI: Key Biochemical Reactions)
11. Create connections between new information and prior knowledge** (Synthesis and Application of Learning)
12. Create a data table in Excel and perform data analysis which includes statistical (mean, median, mode) analysis and error analysis given a set of data.

The first step in becoming a good scientist is ardent observation. With observation, questions may be asked. This leads to generation of hypotheses, which may then be tested. In this class, the science and art of observation will be emphasized. Learners will be assessed in a weighted fashion according to a rubric founded in the Application of the Scientific Method, with emphasis on observation.

Observations may be divided into qualitative and quantitative measures. Qualitative measures are subjective and rely on our senses, and perception of color, light, texture, smell. These observations can be relayed to another learner through use of descriptive adjectives (i.e., aqua, translucent, viscous, fragrant liquid). Learners will become familiar with commonly used adjectives in the scientific world and will be encouraged to seek additional descriptors when reporting results. Quantitative measures are based on physical dimensions such as mass, length, diameter, circumference and are objective measures. These objective measures will be calibrated to eliminate bias in measurements taken from similar instruments (i.e., two thermometers). However, each instrument has a known percent error in measurement, which is typically indicated on the given instrument. This percent error will be included in your results analysis. The value obtained will only be reported in significant figures consistent with the given instrument's accuracy. This concept will become more apparent as we begin to explore and employ the glassware and instrumentation in lab.

Books, materials, tools, and accounts

Queens College Online Bookstore: <https://qc.textbookx.com/institutional/index.php>

Books and Materials:

Laboratory Experiments for Introduction to General, Organic and
Biochemistry, F. Bettelheim and J. Landesberg, 8th Edition, Brooks/Cole, 2013
(ISBN-10: 1133106021; ISBN-13: 978-1133106029)

Carbonless Lab Notebook (Scientific Grid Format) - 8.5" x 11", 50 Sets of Pages, 100 Sheets Total -
Duplicator [Wire-O Bound]

Required tools and accounts

Blackboard

Technical Support



If you require technical help with your Queens College email or CUNYfirst account please contact the Queens College helpdesk by emailing support@qc.cuny.edu or visiting their website: <https://www.qc.cuny.edu/Computing/helpdesk/Pages/Welcome.aspx>.

SAFETY FIRST!!!

The following safety guidelines must be always followed:

- **No cellphone, tablet, or computer allowed at any time during the lab.** You must have a calculator for calculations. You may not use a cellphone for that purpose.
- Goggles must be always worn in the lab, even if you have completed your experiment and even if you already wear glasses.
- Having and/or consuming food or drink in the laboratory is strictly prohibited.
- Masks are recommended to be worn in the lab
- **Never** leave a flame unattended.
- Tie back long hair and secure all loose clothing before conducting any experiments.
- Feet must be completely covered during lab – **no open toed shoes** (sandals, flip-flops or the like).
- If an accident occurs, notify your lab instructor immediately.
- Do not run or throw anything in the lab.
- You **must** read the lab and procedure **prior to class**, as part of safety preparation. Failure to do so will result in an F for the particular lab you are unprepared for.
- Always listen carefully to your lab instructor for safety precautions and procedure Modifications.
- **All chemical waste must be disposed of properly.** Your instructor will provide you with specific instructions at the beginning of each lab regarding how to handle the chemical waste for that experiment.
- **Failure to adhere to any of the above safety guidelines will result in points being deducted from your lab report and may result in your removal from the lab and an automatic failure for that experiment.**

Chemistry 102.1 Grading Rubric

Lab Notebook: You must obtain a carbonless organic chemistry notebook, as all your work will be recorded in this notebook and graded by its clarity and accuracy.

Assessment: Lab instructors will assess students by grading both of their online and in person assignments. In person instructors will collect lab notebooks, collecting laboratory products and assessing them for yield and purity and accuracy of reported results in the student notebook. In addition, students will be observed during lab, and assessed based on their technique and adherence to safety rules.



Grade Breakdown

Lab reports and lab notebooks	50%
6 lab quizzes	20%
Lab techniques	15%
Lab final	15%

Your notebook must include the following components for each experiment:

1. Experiment: title, date performed and Purpose of lab
 2. Introduction: In this section you should summarize the objective of the experiment in your own words. Include any chemical formulas, structures, equation, and reactions. Any relevant ideas regarding the experiment should also be written here.
 3. Procedure: You will not be allowed to use your lab book during class. Summarize the procedure in the notebook in your own words. It must be clear and detailed enough, so you can follow it and perform the experiment based on your write-up. This can be written as a step by step, or a “shopping list” type. As long as it is detailed enough for you to perform the whole experiment without any additional resources.
 4. Safety: Outline the chemicals used in this lab. their MSDS importance and safety precaution, as well as disposal of waste must be looked up and summarized. You can find the MSDS information by going to ChemWatch website at: <http://jr.chemwatch.net/chemwatch.web>.
 - Account: *queensmsds*
 - Username: *everyone*
 - Password: *eqkq+2SFEI4=*
 5. Datasheet: Create a clear data sheet in your notebook. This may be the same data sheet from the book but must be copied to the notebook and not paste on it. Be sure that any tables should be drawn using a ruler.
 6. Conclusion / Discussion: Summarize your data, explain whether you were successful in the experiment, and any errors that may have occurred.
- Note that 1-5 (Pre-lab and an empty data sheet ready to fill out in your notebook) should be done **before** you attend lab. The instructor will check your notebook prior to the beginning of the lab and initial it. Failure to complete the notebook will result in a zero for the lab, and you will not be allowed to perform the experiment that day.
 - Your notebook will be collected at the completion of every 2 labs. You will have to submit the completed labs to your instructor. These will be graded but will not be returned to you. You will get the grade from the instructor and may review it.
 - All laboratory experiments are to be performed **individually** (and evaluated by your instructor). There are **no** team experiments unless your instructor decided to do so. Each person registered for lab is to perform each laboratory experiment individually. You will be graded on your class performance, and it is 15 percent



of your lab grade. Class performance includes your lab techniques, efficiency of work, safety, independence, and cleaning of station as well as disposal of waste.

The criteria for Performance in the Laboratory:

1. Safety: If you do not work safely, your instructor will deduct points at their discretion. Eye protection and lab coat must be worn at all times in the lab; penalty for failure to do so is a 0 (zero) for the day and/or dismissal from that day's lab with no possibility of make-up [Points will be deducted from your final grade for safety offenses at instructor's discretion]. You **MUST** also cover your nose and mouth by wearing a mask during your in-person labs. Safety shower, eyewash, and fire extinguisher locations must be noted. Chemical waste handling protocols must be observed; if in doubt, ask! Points will be deducted for unsafe practices or violations of waste protocols; You may be ejected from lab and receive a zero (0) for that day's work.
 2. Independence: Your ability to work and think independently, as determined by your instructor.
 3. Efficiency and Effectiveness: Your ability to efficiently accomplish the goals of the experiment **within the lab time frame**. This also includes **the quality** of your results.
 4. Cleanness: cleaning of workbench, hood, and common chemical, balance, and waste areas & disposal of waste.
- You are scheduled to take 6 quizzes and a final exam. The quizzes are not cumulative and will include questions of the previous lab and the lab to be performed on the day of the quiz.
 - The final exam will include conceptual and procedural questions from the variety of experiments done in class, and different questions pertaining to labs. There is no option for a make - up final exam. You must attend the exam as scheduled on this syllabus, not as per CUNYFirst.

Important note on missed classes, late work

Attendance in the laboratory is mandatory.

Students must report to the lab on time.

There are no make-up labs, any missed labs (for a valid reason – illness, verified by a note from a registered physician; court appearance, verified by a note from an officer of the court; death in the family) will be excused with proper documentations. A missed lab will receive no credit and will be dropped from final average calculation **ONLY** if your absence is excused by your lab instructor with a valid reason. A second missed lab, if excused by your instructor, will require completion of an alternate assignment given by your instructor in lieu of the lab experiment. Further absences are **NOT** excusable.

Reasonable Accommodations for Students With Disabilities

Students with disabilities needing academic accommodation should register with the Special Services Office by emailing QC.SPSV@qc.cuny.edu.



For more information about services available to Queens College students, visit the Office of Special Services website: <https://www.qc.cuny.edu/studentlife/services/specialserv/Pages/default.aspx>

CUNY Policy On Academic Integrity

Academic Dishonesty is prohibited in The City University of New York and is punishable by penalties, including failing grades, suspension, and expulsion as provided at <https://www.cuny.edu/about/administration/offices/legal-affairs/policies-procedures/academic-integrity-policy/>. Please read this document, paying careful attention to the sections on plagiarism and Internet plagiarism. If you are not sure how to cite work you have found on the internet, please review the ACS Guidelines provided by the [American Chemical Society](#).

Class Schedule

This schedule is subject to change. Students will be notified in writing of such changes.

Class Schedule and lab sequence to be determined with Professor Choi and Professor [your name] and the tentative schedule appears below:

Week	Date	Experiment	Page
1		Check-in. Review of safety rules and instruction for waste disposal.	
2		Experiment 1 Isolation of pure acetylsalicylic acid from aspirin tablets	Hand out
3		Experiment 2: Molecular Models (Quiz 1)	239
4		Experiment 3: Identification of Hydrocarbons	289
5		Experiment 4: Chromatography (Quiz 2)	275
6		Experiment 5: Identification of Alcohols and Phenols	301
7		Experiment 6: Identification of Aldehydes and Ketones (Quiz 3)	313
8		Experiment 7: Carboxylic Acids and Esters	329
9		Experiment 8: Amines and Amides (Quiz 4)	341
10		Experiment 9: Preparation of Aspirin	365
11		Experiment 10: Isolation of Caffeine from Tea Leaves (Quiz 5)	377
12		Experiment 11: Carbohydrates	389
13		Experiment 12: Preparation of Hand Cream (Quiz 6)	423
14		Check-out: Final	

Chemistry and Biochemistry Department, Queens College - CUNY

CHEM 1131- General Chemistry I Laboratory (Fall 2024) Syllabus

Course Section and Code #: 11 (40978), Th 7:30 – 10:20 pm, Rem. 156

Instructor's Full Name: Mr. Henry Shum

Instructor's Email: hshum@qc.cuny.edu

Instructor's Office Hour: Thu 6:30-7:30 pm Remsen 156 or by Appt.

Textbook for the course: No charge to student and it is posted on course Brightspace.

Other required items: A lab notebook with carbonless copy pages is required for collecting your experimental data. In addition, a scientific or graphing calculator is required and can be purchased anywhere. Note that lab coat, safety goggles, and required glassware are provided upon check-in.

Pre-Requisite/Co-Requisite: CHEM 1134

Coordinator: Dr. Seogjoo J. Jang (seogjoo.jang@qc.cuny.edu)

[Note: Students should contact their lab instructor for all lab-related questions.]

I. Laboratory Course Format: In-person

A. ALL In-person lab sessions will be held on Queens College campus in Remsen at your scheduled time and day. Lateness by more than 15 min. is counted as an absence.

B. This is a laboratory class with a limited capacity in the classroom. As a result, there are NO make-up options (Excused or Unexcused) for any missed lab. YOU ARE EXPECTED TO ATTEND ALL LAB SESSIONS. If you miss a lab class due to QC approved religious reasons OR due to emergencies, inform instructor and make sure it is excused. A valid documentation for the excused absence will be required. If a doctor's note, it must be on the doctor's letterhead and signed by a physician with a different last name from the student, and a statement that the physician is not a relative of the student.

Unexcused absences are given a zero and included in the calculation of final lab score.

In case of absence(s), the following policy will be adopted:

1st Excused Absence: The missed lab will be excluded from calculating your overall lab score.

2nd Excused Absence: A quiz will be given for the missed lab OR the final lab exam score will be used to replace the missed lab score.

Any further absences will result in a zero grade for the lab irrespective of the reasons. If you are absent for 4 or more lab periods, you will NOT be allowed to take the lab final and expected to withdraw from the course. If you are not withdrawn by the deadline, you will be issued a WU grade.

INC grade: There is no INC grade for this course. If your grade is suffering due to absences in the lab, you are expected to withdraw on time and re-enroll for the next semester.

II. General Laboratory Rules

- A. Always wear safety goggles.
- B. NO short pants, skirts, open toe shoes are allowed; tie back long hair.
- C. NO food, beverages, gum, horseplay, or unauthorized experiments allowed.
- D. NO computer, tablet or cell phone use in the laboratory during class activities.

III. Laboratory Manual

A custom laboratory manual is used and is available free of charge, posted on Brightspace in the Content Section. You **must bring a printed** copy of the experiment write-up to the lab in order to complete the experiment. You will not be allowed to use electronic devices.

IV. Prelab Preparation AND Lab Reports

A. Prelab preparation is required for each experiment BEFORE you come to the lab. This includes reading the full experiment from start to finish in the lab manual and watching posted videos (if posted) on Brightspace. **The Prelab write-up should include section**

IV C (1-4)*, listed below and must be initialed by the instructor before the lab experiment begins. You should review the safety protocols for each experiment. **You should complete the prelab questions posted on Brightspace before each experiment.**

B A completed typed LAB REPORT as per specified format is ALSO required for EACH experiment. **Lab reports must be uploaded to Brightspace by the end of the day of the subsequent lab session.** Late lab reports are strongly discouraged. They will receive a severe reduction in points (see section V(B)).

C. **Format of Lab Report (*Reflect Items that should be completed in the lab notebook before each lab, i.e., the Prelab write-up).**

*1. **Title/Cover page:** Include your name, section number, experiment title, AND date of the experiment. Experiment title can be copied from the syllabus or lab book.

*2. **Objective:** It should clearly specify the aim for that day's experiment. It most often starts with "To find", "To measure", etc. Example: "To determine the heat energy released by the neutralization reaction of hydrochloric acid and sodium hydroxide."

*3. **Introduction:** Explain concisely the chemistry of the experiment in your own word. Include any equations and other scientific and mathematical explanations; i.e., the theory.

*4. **Experimental Procedure:** A concise but complete summary of the steps, materials, and apparatus of the experiment.

5. **Data:** Include your original data, signed by the instructor; i.e., the "carbon copy" of measurements or observations you directly recorded during the experiment.

6. **Calculations and Results:** Show all work; If there is a repetitive calculation, you need to show the equation and its use only once; Include any tables, graphs or diagrams that may be required.

7. **Conclusions:** Summarize your final conclusions in this section.

8. **Discussion:** State whether results were good or bad, and reasons why, what may have affected them, and any potential problems with the experiment. Be brief but complete. There may be questions you must answer, based on the lab manual. Work them into your discussion. If you know your expected value from instructor or from reference sources, be sure to list the percent error and discuss experimental errors that can account for it.

9. **References:** Include the lab experiment write-up and other references, including those from the internet.

Finally, Lab Reports do not have to be excessively long, but they do have to cover all the important ideas of the experiment.

V. Grading: (Part A) Each lab is graded for 100 points distributed as follows - 10% Prelab Questions; 10% Prelab write-up in lab notebook; 60% Lab Report; 20% Performance in the Laboratory. Part A will be weighted 85% of your lab grade.

(Part B) A written comprehensive lab final will be administered during finals week. Check cunyfirst for the date. This part will be weighted 15% of final lab grade. The lab final will cover lab safety, and the contents that were covered during the entire semester.

Further,

A. Prelab will not be accepted after the lab session is over. If material for completing prelab questions has not been covered in the lecture, utilize the office hours of the lab instructor to get help with prelab activity. No excuses will be accepted.

B. ALL lab reports are due by the end of the day on the subsequent lab session. LATE reports are strongly discouraged, and they will receive a penalty as follows - 10% reduction with each delayed week; Lab reports will NOT be accepted after two weeks or the last lab class (i.e., Check Out Day).

C. Reports will be graded for conformance to the above-described format and checked for plagiarism. Introduction, discussion, and conclusions are expected to be your original sentences.

D. If you have attended all the labs without any excused absences, your instructor will drop one of the lowest grades when calculating the lab average.

The criteria for Performance in The Laboratory Experiments are as follows:

1. **Safety:** If you do not work safely, your instructor will deduct points at their discretion. **Eye protection and lab coat must be worn at all times in the lab;** penalty for failure to do so is a 0 (zero) for the day and/or dismissal from that day's lab with no possibility of make-up [Points will be deducted from your final grade for safety offenses at instructor's discretion]. You should also cover your nose and mouth by wearing a mask during your in-person labs. Safety shower, eyewash, and fire extinguisher locations must be noted. Chemical waste handling protocols must be observed; if in doubt, ask! Points will be deducted for unsafe

practices or violations of waste protocols; You may be ejected from lab and receive a zero (0) for that day's work.

2. **Independence:** Your ability to work and think independently, as determined by your instructor.

3. **Efficiency and Effectiveness:** Your ability to efficiently accomplish the goals of the experiment within the lab time frame. This also includes the quality of your results.

There will be no extra credit provided at the end of the semester. An INC grade will not be given to a student to avoid an F or WU grade.

VI. Other Important Information

(i) If you drop the course, you must notify your lecture instructor in order to stay in the lecture. You must check-out ASAP! Otherwise, you do so at the normal time on the final check-out day. If you do not check-out, you will be charged a fine as listed in the stockroom.

(ii) On the check-in day, a combination lock will be issued to you.

(iii) You must have an approved laboratory notebook with carbonless copy pages (for example, ISBN 978-1-930882-74-4 or 978-1-617319-14-3; there are other acceptable ones), and use it to collect and document your data. You can check the availability at QC online bookstore. Do NOT take any notes on scrap paper.

(iv) Code of Conduct

A. Plagiarism- Plagiarism or any other forms of cheating is NOT tolerated and will be severely punished by point, other penalties, and/or referral to the Chairman and the Dean; Any assignment involved will receive a grade of zero. Failure to appropriately cite a source of information may also be considered plagiarism.

B. Inappropriate Behavior, e.g., horseplay or off-color language, oral or written, will NOT be tolerated and may lead to expulsion from class and a grade of zero.

(v) Available accommodation for students with learning disabilities: Students with disabilities needing academic accommodation should register with the Special Services Office by emailing QC.SPSV@qc.cuny.edu. For more information about services available to Queens College students, visit the Office of Special Services website: www.qc.cuny.edu/sp

(vi) Counseling Services are also available to any Queens College student. This office assists students with personal concerns that can affect their enjoyment of and success in college. Services are free and confidential. All sessions take place on Zoom or by Telephone, depending on student preference. To make an appointment, students should call 718-997-5420

and leave a message with their phone number and CUNY ID. They may also e-mail counselingservices@qc.cuny.edu

(vii) CUNY Policy on Academic Integrity: Academic dishonesty is prohibited in The City University of New York and is punishable by penalties, including failing grades, suspension, and expulsion as provided at <https://www.cuny.edu/about/administration/offices/legal-affairs/policies-resources/academic-integrity-policy/>

Schedule of Experiments

Week 1 **(8/29)** IN PERSON Check In, Safety Review, Discuss Syllabus, Take Safety Quiz.

A score of 80% or above on the lab safety quiz is required before working in the lab.

Safety Video Links: <https://www.youtube.com/watch?v=9o77QEeM-68>

<https://www.youtube.com/watch?v=gi3DeFY0cfw>

Week 2 (9/5) Exp. 1 Density

Week 3 (9/12) Exp. 2 Hydrate

Week 4 (9/19) Exp. 3 Precipitation

Week 5 (9/26) Exp. 4 Iron-Copper (II) Sulfate Redox

Week 6 (10/10) Exp. 5 Qualitative Study of Redox

Week 7 (10/17) Exp. 6 Copper Cycle

Week 8 (10/24) Exp. 7 Molar Mass of a Metal

Week 9 (10/31) Exp. 8 Solutions

Week 10 (11/07) Exp. 9 KHP Titration

Week 11 (11/14) Exp. 10 FAS Titration

Week 12 (11/21) Exp. 11 Calorimetry I and II

Week 13 (12/05) Exp. 12 Heat of Neutralization

Week 14 (12/12) Checkout

Week 15 (TBA) Lab Final Quiz (room TBA)

08/28/2024

QUEENS COLLEGE OF THE CITY UNIVERSITY OF NEW YORK (CUNY)
DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY
General Chemistry I – CHEM113.4 – Fall 2024

I. Lecture Instructor Information

Instructor: Prof. Iva Burdett

Email: iva.burdett@qc.cuny.edu **Important:** always use this email address for communications.

Email etiquette: Always use “CHEM113” in the subject line to ensure prompt communication.

Office hours: F 11:00 AM – 12:00 PM. Generally, held in person (RE206A). For updates, refer to Brightspace. For documented conflicts, email your instructor to set an appointment.

II. Course Information

Lecture Times [41026]: T, F 9:15 AM - 10:30 AM, RE101 (Refer to Brightspace for announcements.)

Recitation Times: 1A [41015] RA-208 Tu 11:10 -12:00 Ahmed shaila.ahmed@qc.cuny.edu
1B [41016] RE105 Tu 1:40 - 2:30 Malinoski aaron.malinoski@qc.cuny.edu

Course description: Chem 113.4 is the first semester of a two-semester science majors/pre-health professions level introductory college chemistry course. The lecture meets for **3 credit hours weekly** (two 75 min periods per week); each student will also have a **1 credit hour** (one 50 min per week) recitation session. Math 114 (or equivalent) is a pre-requisite, and the laboratory course (Chem 113.1) is a co-requisite. Chem 113.1 is administered and graded separately. A grade of C (not C-) is required to proceed to Chem 114.4. It is recommended that students have passed the New York State Regents Examinations in Chemistry or Physics with a score of 80 or higher or have a grade of C or better in Chem 101.3 and 101.1 before enrolling in this course. This course is required for more advanced study in chemistry, biochemistry, and biology. It is intended for students in the physical and life sciences, science education, pre-health professional students, and pre-engineering students and is designed to provide a thorough knowledge of facts and theory in the fundamental areas of chemistry. As appropriate, topics may be presented in terms of contemporary scientific issues such as global warming, energy production, hazardous waste, biomedical research, etc. The relationship between chemistry and society may be discussed.

Learning Objectives: Develop an understanding of basic atomic structure. Understand formation of ions and molecules. Understand measurements and the scientific method. Balance chemical reactions and solve chemical stoichiometry problems. Understand periodic trends. Master the gas laws. Understand acid-base, oxidation-reduction, and precipitation reactions. Develop an understanding of the energetics of chemical reactions. Understand quantum numbers and write electron configurations. Draw Lewis structures and determine shapes of molecules using the VSEPR theory. Understand hybridization of atomic orbitals.

III. Books and Materials

Textbook: For this course you will be required to purchase McGraw-Hill ALEKS Access for Chemistry, 15th edition by Overby and Chang. You are not required to have a print text and please be aware if you purchase a used textbook, you will still need to purchase ALEKS access. ALEKS Access Cards can be purchased in the QC Online Bookstore.

18-week Access to ALEKS ISBN 9781266454042

52-week Access to ALEKS ISBN 9781265229092

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(This is the **best deal** for students planning on completing **CHEM 114.4** in a subsequent semester)

Optional textbook: OpenStax College. (2019). *Chemistry*. OpenStax.

<https://openstax.org/details/books/chemistry-2e/>

Hardcover: ISBN-13: 978-1-947172-62-3

Paperback: ISBN-13: 978-1-59399-578-2

Digital: ISBN-13: 978-1-947172-61-6

License: by OpenStax is licensed under Creative Commons Attribution License v4.0

Other required items: You should make sure that **Brightspace** is operating appropriately on your tablet or computer. Students must make sure they login to Brightspace to check for course material and announcements and check their email that is associated with Brightspace.

Technical Support: Email Helpdesk@qc.cuny.edu, or call the Student Support Hotline (718- 9973000).

Important Notes:

- This course requires a large quantity of work in ALEKS; be prepared to spend a minimum of 5 hours a week working in ALEKS.
- Please purchase the Aleks homework as soon as possible (**within the first week**). It will take a week to deliver, and your courtesy access is only available for two weeks. If you are having difficulties purchasing the codes, please send me an email immediately; do not wait until your courtesy access expires. No student will be exempt from completing the ALEKS assignments.
- There will be no extensions on the ALEKS assignments. The date is posted and set.
- No material (now or in the future) obtained from this course can be distributed, sold, or purchased.

IV. Grading and Evaluation

The grade is a 10-point grade scale as shown in **Official Queens College Grade Scale** (it will implement official updates); there will be no curve in this class. There will be no extra credit provided at the end of the semester at student's request. An INC grade will not be given to a student to avoid an F or WU grade.

Grade	GPA	Numerical value / Definition
A+	97-100	4.0 (In Good Academic Standing)
A	93-96	4.0
A-	90-92	3.7
B+	87-89	3.3
B	83-86	3.0
B-	80-82	2.7
C+	77-79	2.3
C	73-76	2.0
C-	70-72	1.7 (GPA in Academic Probation)
D+	67-69	1.3
D	63-66	1.0
D-	60-62	0.7 (Grade of D- is the lowest passing grade in the undergraduate division)
F	0-59	0.0

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The final course grade will be calculated based on:

15% ALEKS Homework

- You should complete the homework for each chapter within one week after the chapter is covered in the lecture. If you find that a different due date is indicated in ALEKS, please ignore it (assignments are always due within one week), unless notified in writing by your instructor.
- After every few chapters, there may be a "Knowledge-Check Progress Assessment" – **Do not click "I don't know" unless you don't know. This will set you back.**

How to access Aleks:

Visit www.ALEKS.com and log in (if you've used ALEKS before) or Sign Up.

1. Enter your Class Code **RRUJN-33U4U** in the box.
2. Verify that you are registering for the correct class.
3. Enter your access code (provided on access card shipped to you after purchasing).
4. If you haven't purchased/received your access code, enter the 20-character Financial Aid Access Code:
A1600-37683-11B06-95304

Note: This code gives you **temporary** access to ALEKS for a two-week period. Once the code expires, you will be locked out of your ALEKS account until you purchase a regular Student Access Code. **It is highly recommended that you purchase the Student Access Code immediately, as it will take 7-10 business days to ship.**

5. Next you will see a page with the date your temporary access expires, click "Continue."
6. You will arrive at the **My Classes** page.
7. You can extend your access to your new class at any time by selecting "**Extend access**" from the class tile menu and enter your new access code. **You do not need to create a new ALEKS account to continue your class.**

How does Aleks work: At the start of the semester, you will be given an assessment that determines what you know and what you do not know. **During any assessment, do not hit the "I Don't Know" button unless you REALLY do not know how to work a problem.** Afterwards, your individual homework space will be populated based on the topics defined by the instructor and by what you have demonstrated that you already know.

60% Exams

- Exams will be based on topics covered in lecture and recitation.
- Exams will be given at the beginning of lecture. **There are no make-up exams.** If you know you will miss an exam, please contact your instructor well in advance.

25% American Chemical Society-style Final Exam

- The American Chemical Society examination is a 60 – 80 question multiple choice comprehensive examination (the number of questions may be different to adhere to the actual program covered in class). (Extra credit will be added to the **final exam grade** for those who attend all the Recitation sessions and perform well in Recitation.)

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Tentative class schedule. This schedule is subject to change. You will be notified in writing of such changes. For the most up to date information and activities, always refer to the course page in Brightspace.

DAY	DATE	CHAPTER	TOPIC
FRI	30-Aug	Intro	Intro
TUE	3-Sep	Chapter 1	Measurement and the Properties of Matter
FRI	6-Sep	Chapter 1	Measurement and the Properties of Matter
TUE	10-Sep	Chapter 2	Atoms, Ions and Molecules
FRI	13-Sep	Chapter 2	Atoms, Ions and Molecules
TUE	17-Sep	Chapter 3	Mass Relationships in Chemical Reactions
FRI	20-Sep	Chapter 3	Mass Relationships in Chemical Reactions
TUE	24-Sep	Chapter 3	Mass Relationships in Chemical Reactions
FRI	27-Sep	Chapter 4	Reactions in Aqueous Solutions
TUE	1-Oct	--	Exam 1 (Unit 1: Chapters 1, 2 and 3) – No Chapter 4
FRI	4-Oct	--	No classes scheduled
TUE	8-Oct	Chapter 4	Reactions in Aqueous Solutions
FRI	11-Oct	--	No classes scheduled
TUE	15-Oct	--	Monday Schedule, No Chem class
FRI	18-Oct	Chapter 4	Reactions in Aqueous Solutions
TUE	22-Oct	Chapter 5	Gases
FRI	25-Oct	Chapter 5	Gases
TUE	29-Oct	Chapter 6	Thermochemistry
FRI	1-Nov	Chapter 6	Thermochemistry
TUE	5-Nov	Chapter 6	Thermochemistry
FRI	8-Nov	--	Exam 2 (Unit 2: Chapters 4, 5 and 6)
TUE	12-Nov	Chapter 7	Quantum Theory & the Electronic Structure of Atoms
FRI	15-Nov	Chapter 7	Quantum Theory & the Electronic Structure of Atoms
TUE	19-Nov	Chapter 7	Quantum Theory & the Electronic Structure of Atoms
FRI	22-Nov	Chapter 8	Periodic Relationship among Elements
TUE	26-Nov	Chapter 8	Periodic Relationship among Elements
WED	27-Nov	Chapter 9	Compounds and Bonding
FRI	29-Nov		Thanksgiving Break
TUE	3-Dec	Chapters 9, 10	Compounds and Bonding & Structure and Bonding Theory
FRI	6-Dec	--	Exam 3 (Unit 3: Chapters 7, 8, 9 and part of 10 if covered)
TUE	10-Dec	Chapter 10	Structure and Bonding Theory
FRI	13-Dec	--	Wrap up and Review
	TBD	--	Final Exam (<u>All Chapters</u> – Date to be confirmed)

VI. Grade & College Policies and Student Services

W and WU Grade policy – THE DROP DEADLINE (W OR CHANGE TO P/NC) HAS BEEN CHANGED FROM THE COVID-ERA LAST DAY OF CLASS TO NOV. 6, 2024. Students who do not officially withdraw by Nov. 6 (and receive a W grade) but stop attending classes and do not participate in any way after the withdrawal date will be given a WU grade. Any participation in class (i.e., lab work, homework, taking quizzes and exams) after the withdrawal date will disqualify you from receiving the WU grade, and you will be given the appropriate letter grade.

Restrictions on Sharing of Posted Lecture Materials: Lecture materials that are posted (such as presentations, lectures, welcome video clips etc.) are shared with the class for the purpose of facilitating the learning experience and are not to be copied, downloaded or shared with anyone outside of the class.

Queens College Classroom Recording Policy: Audio or video recordings of all or parts of classes at Queens College may not be made without permission from the course instructor(s). The Office of Student Affairs and the Office of Special Services may provide for the recording of classes on behalf of a student receiving disability accommodations, missing class due to religious beliefs, or experiencing extended absence due to medical or other exigent circumstances. The Queens College Classroom Recording Policy applies to both students and visitors. Students and visitors are not authorized to copy, download, or disseminate authorized recordings to others. Students in violation of this policy are subject to disciplinary action, and visitors in violation of this policy are subject to removal from the classroom and/or campus.

Reasonable Accommodations for Students with Disabilities: Students with disabilities needing academic accommodation should register with the Special Services Office by emailing QC.SPSV@qc.cuny.edu. For more information about services available to Queens College students, visit the Office of Special Services website: <https://www.qc.cuny.edu/studentlife/services/specialserv/Pages/default.aspx>

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Netiquette: Please maintain a professional demeanor when posting online. You can be respectful even when you have a difference of opinion. Treat others as you'd want to be treated yourself. Don't type in all caps, as that is the online equivalent of shouting. If you need to emphasize a word or phrase, use italics.

Statement on student wellness: As a student, you may experience a range of challenges that can interfere with learning, such as strained relationships, increased anxiety, substance use, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may diminish your academic performance and/or reduce your ability to participate in daily activities. QC services are available free of charge. You can learn more about confidential mental health services available on campus at: <https://www.qc.cuny.edu/StudentLife/services/counseling/counseling/>

08/28/2024

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Course Evaluations: During the final four weeks of the semester, you will be asked to complete an evaluation for this course by filling out an online questionnaire. Please remember to participate in these course evaluations. Your comments are highly valued, and these evaluations are an important service to fellow students and to the institution, since your responses will be pooled with those of other students and made available online, at the Teaching Evaluations Data: Spring 2010 – Present (<http://ctl.gc.cuny.edu/evaluations/data/>). All responses are completely anonymous; no identifying information is retained once the evaluation has been submitted.

QUEENS COLLEGE OF THE CITY UNIVERSITY OF NEW YORK (CUNY)
DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY
General Chemistry I – CHEM113.4 – Fall 2024

I. Lecture Instructor Information

Instructor: Prof. Eleonora Gianti

Email: Eleonora.Gianti@qc.cuny.edu Important: always use this email address for communications.

Email etiquette: Always use “CHEM113” in the subject line to ensure prompt communication.

Office hours: W 11:00 AM – 12:00 PM. Generally, held in person (RE214). For updates, refer to Brightspace. For documented conflicts, email your instructor to set an appointment.

II. Course Information

Lecture Times [41025]: M, W 1:40 – 2:55 PM, RE101 (Refer to Brightspace for announcements.)

Recitation Times: 2A [41022] H. Ariel: W 10:10 – 11:00 AM, RE105 (Hannah.Ariel@qc.cuny.edu)

2B [41023] A. Abbasiazam: Th 1:40 – 2:30 PM, RE105 (aida.abbasiazam@qc.cuny.edu)

2C [41018] J. Ocando: Th 5:30 – 6:20 PM, RE105 (jocando@qc.cuny.edu)

Course description: Chem 113.4 is the first semester of a two-semester science majors/pre-health professions level introductory college chemistry course. The lecture meets for **3 credit hours weekly** (two 75 min periods per week); each student will also have a **1 credit hour** (one 50 min per week) recitation session. Math 114 (or equivalent) is a pre-requisite, and the laboratory course (Chem 113.1) is a co-requisite. Chem 113.1 is administered and graded separately. A grade of C (not C-) is required to proceed to Chem 114.4. It is recommended that students have passed the New York State Regents Examinations in Chemistry or Physics with a score of 80 or higher or have a grade of C or better in Chem 101.3 and 101.1 before enrolling in this course. This course is required for more advanced study in chemistry, biochemistry, and biology. It is intended for students in the physical and life sciences, science education, pre-health professional students, and pre-engineering students and is designed to provide a thorough knowledge of facts and theory in the fundamental areas of chemistry. As appropriate, topics may be presented in terms of contemporary scientific issues such as global warming, energy production, hazardous waste, biomedical research, etc. The relationship between chemistry and society may be discussed.

Learning Objectives: Develop an understanding of basic atomic structure. Understand formation of ions and molecules. Understand measurements and the scientific method. Balance chemical reactions and solve chemical stoichiometry problems. Understand periodic trends. Master the gas laws. Understand acid-base, oxidation-reduction, and precipitation reactions. Develop an understanding of the energetics of chemical reactions. Understand quantum numbers and write electron configurations. Draw Lewis structures and determine shapes of molecules using the VSEPR theory. Understand hybridization of atomic orbitals.

III. Books and Materials

Textbook: For this course you will be required to purchase McGraw-Hill ALEKS Access for Chemistry, 15th edition by Overby and Chang. You are not required to have a print text and please be aware if you purchase a used textbook, you will still need to purchase ALEKS access. ALEKS Access Cards can be purchased in the QC Online Bookstore. The best way to purchase it is using the “ALEKS” link in Brightspace.

18-week Access to ALEKS ISBN 9781266454042

52-week Access to ALEKS ISBN 9781265229092

(This is the **best deal** for students planning on completing **CHEM 114.4** in a subsequent semester)

Optional textbook: OpenStax College. (2019). *Chemistry*. OpenStax.

<https://openstax.org/details/books/chemistry-2e/>

Hardcover: **ISBN-13: 978-1-947172-62-3**

Paperback: **ISBN-13: 978-1-59399-578-2**

Digital: **ISBN-13: 978-1-947172-61-6**

License: by OpenStax is licensed under Creative Commons Attribution License v4.0

Other required items: You should make sure that **Brightspace** is operating appropriately on your tablet or computer. Students must make sure they login to Brightspace to check for course material and announcements and check their email that is associated with Brightspace.

Technical Support: Email Helpdesk@qc.cuny.edu, or call the Student Support Hotline (718- 9973000).

Important Notes:

- This course requires a large quantity of work in ALEKS; be prepared to spend a minimum of 5 hours a week working in ALEKS.
- Please purchase the Aleks homework as soon as possible (**within the first week**). It will take a week to deliver, and your courtesy access is only available for two weeks. If you are having difficulties purchasing the codes, please send me an email immediately; do not wait until your courtesy access expires. No student will be exempt from completing the ALEKS assignments.
- There will be no extensions on the ALEKS assignments. The date is posted and set.
- No material (now or in the future) obtained from this course can be distributed, sold, or purchased.

IV. Grading and Evaluation

The grade is a 10-point grade scale as shown in **Official Queens College Grade Scale** (it will implement official updates); there will be no curve in this class. There will be no extra credit provided at the end of the semester at student's request. An INC grade will not be given to a student to avoid an F or WU grade.

Grade	GPA	Numerical value / Definition
A+	97-100	4.0 (In Good Academic Standing)
A	93-96	4.0
A-	90-92	3.7
B+	87-89	3.3
B	83-86	3.0
B-	80-82	2.7
C+	77-79	2.3
C	73-76	2.0
C-	70-72	1.7 (GPA in Academic Probation)
D+	67-69	1.3
D	63-66	1.0
D-	60-62	0.7 (Grade of D- is the lowest passing grade in the undergraduate division)
F	0-59	0.0

The final course grade will be calculated based on:

15% ALEKS Homework

- You should complete the homework for each chapter within one week after the chapter is covered in the lecture. If you find that a different due date is indicated in ALEKS, please ignore it (assignments are always due within one week), unless notified in writing by your instructor.
- After every few chapters, there may be a "Knowledge-Check Progress Assessment" – **Do not click "I don't know" unless you don't know. This will set you back.**

How to access Aleks:

Visit www.ALEKS.com and log in (if you've used ALEKS before) or Sign Up.

1. Enter your Class Code **VE3KL-3QCXV** in the box.
2. Verify that you are registering for the correct class.
3. Enter your access code (provided on access card shipped to you after purchasing).
4. If you haven't purchased/received your access code, enter the 20-character Financial Aid Access Code:
5B821-CA6B7-2CE3C-30D9F

Note: This code gives you **temporary** access to ALEKS for a two-week period. Once the code expires, you will be locked out of your ALEKS account until you purchase a regular Student Access Code. **It is highly recommended that you purchase the Student Access Code immediately, as it will take 7-10 business days to ship.**

5. Next you will see a page with the date your temporary access expires, click "Continue."
6. You will arrive at the **My Classes** page.
7. You can extend your access to your new class at any time by selecting "**Extend access**" from the class tile menu and enter your new access code. **You do not need to create a new ALEKS account to continue your class.**

How does Aleks work: At the start of the semester, you will be given an assessment that determines what you know and what you do not know. **During any assessment, do not hit the "I Don't Know" button unless you REALLY do not know how to work a problem.** Afterwards, your individual homework space will be populated based on the topics defined by the instructor and by what you have demonstrated that you already know.

60% Exams

- Exams will be based on topics covered in lecture and recitation.
- Exams will be given at the beginning of lecture. **There are no make-up exams.** If you know you will miss an exam, please contact your instructor well in advance.

25% American Chemical Society-style Final Exam

- The American Chemical Society examination is a 60 – 80 question multiple choice comprehensive examination (the number of questions may be different to adhere to the actual program covered in class). (Extra credit will be added to the **final exam grade** for those who attend all the Recitation sessions and perform well in Recitation.)

Tentative class schedule

This schedule is subject to change. You will be notified in writing of such changes. For the most up to date information and activities, always refer to the course page in Brightspace.

Date	Book Chapter	Title of the Topic
Week 1 – 08/28 (W1)	Chapter 1	Intro & Measurement and the Properties of Matter
09/02	--	No classes scheduled - Labor Day
Week 1 – 09/04 (W2)	Chapter 1	Measurement and the Properties of Matter
Week 2 – 09/09 (M1)	Chapter 2	Atoms, Ions and Molecules
Week 2 – 09/11 (W3)	Chapter 2	Atoms, Ions and Molecules
Week 3 – 09/16 (M2)	Chapter 3	Mass Relationships in Chemical Reactions
Week 3 – 09/18 (W4)	Chapter 3	Mass Relationships in Chemical Reactions
Week 4 – 09/23 (M3)	Chapter 3	Mass Relationships in Chemical Reactions
Week 4 – 09/25 (W5)	Chapter 4	Reactions in Aqueous Solutions
Week 5 – 09/30 (M4)	--	Exam 1 (Unit 1: Chapters 1, 2 and 3) – No Chapter 4
10/02	--	No class scheduled
Week 5 – 10/07 (M5)	Chapter 4	Reactions in Aqueous Solutions
Week 6 – 10/09 (W6)	Chapter 4	Reactions in Aqueous Solutions
10/14	--	No classes scheduled - Columbus Day
Week 6 – 10/15* (M6)	Chapter 5	Gases
Week 7 – 10/16 (W7)	Chapter 5	Gases
Week 7 – 10/21 (M7)	Chapter 5	Gases
Week 8 – 10/23 (W8)	Chapter 6	Thermochemistry
Week 8 – 10/28 (M8)	Chapter 6	Thermochemistry
Week 9 – 10/30 (W9)	Chapter 6	Thermochemistry
Week 9 – 11/04 (M9)	--	Exam 2 (Unit 2: Chapters 4, 5 and 6)
Week 10 – 11/06 (W10)	Chapter 7	Quantum Theory & the Electronic Structure of Atoms
Week 10 – 11/11 (M10)	Chapter 7	Quantum Theory & the Electronic Structure of Atoms
Week 11 – 11/13 (W11)	Chapter 7	Quantum Theory & the Electronic Structure of Atoms
Week 11 – 11/18 (M11)	Chapter 8	Periodic Relationship among Elements
Week 12 – 11/20 (W12)	Chapter 8	Periodic Relationship among Elements
Week 12 – 11/25 (M12)	Chapter 9	Compounds and Bonding
11/27**	--	**Friday Schedule – Thanksgiving Week (11/28 – 11/30)
Week 13 – 12/02 (M13)	Chapters 9, 10	Compounds and Bonding & Structure and Bonding Theory
Week 13 – 12/04 (W13)	--	Exam 3 (Unit 3: Chapters 7, 8, 9 and part of 10 if covered)
Week 14 – 12/09 (M14)	Chapter 10	Structure and Bonding Theory
Week 14 – 12/11 (W14)	--	Wrap up and Review
12/18***	--	Final Exam (All Chapters – Date to be confirmed)

Schedule notes:

* 10/15 (Tuesday) follows a Monday Schedule – CHEM113.4 class scheduled

** 11/27 (Wednesday) follows a Friday Schedule – NO CHEM113.4 class scheduled

*** Refer to Brightspace for updates and announcements on Final Exam date/time/location

VI. Grade & College Policies and Student Services

W and WU Grade policy – THE DROP DEADLINE (W OR CHANGE TO P/NC) HAS BEEN CHANGED FROM THE COVID-ERA LAST DAY OF CLASS TO NOV. 6, 2024. Students who do not officially withdraw by Nov. 6 (and receive a W grade) but stop attending classes and do not participate in any way after the withdrawal date will be given a WU grade. Any participation in class (i.e., lab work, homework, taking quizzes and exams) after the withdrawal date will disqualify you from receiving the WU grade, and you will be given the appropriate letter grade.

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QUEENS COLLEGE
THE CITY UNIVERSITY OF NEW YORK
FLUSHING, NEW YORK 11367-1597

DEPARTMENT OF CHEMISTRY
AND BIOCHEMISTRY

Organic Chemistry II 252.1
Fall 2024 - Lab Schedule

Course Requirements:

Prerequisites for Chem 252.1: C or better in Chem 251.4 and 251.1

LAB TEXT: *Organic Experiments, Kenneth L. Williamson, 9th Edition, Brooks/Cole Cengage Learning, 2004, ISBN-10: 0618308423 (this book is now out of print)*

OR *Macroscopic and Microscale Organic Experiments, Williamson and Masters, 7th ed. Cengage Learning, 2017, ISBN: 978-1-305-57719-0*

For the Macroscopic and Microscale text book, all experiments to be done are the Macroscopic version.

It is important that you check the Chemistry 252 "Laboratory Notes" for details of all experiments, because there are sometimes significant changes from the procedures described in the laboratory manual.

Exp 1 Review of safety in the Organic Lab, Instructions on disposal of chemical waste, Lab protocols, Maintenance of a laboratory note-book.

(week 1)

Exp 2 Check-in. I. Reduction of a ketone with sodium borohydride

(week 2)

Exp 3 II. Preparation of the alkyne, diphenylacetylene, from stilbene.

(week 3)

Exp 4 III. Diels-Alder reaction

(week 4)

Exp 5 IV. Fischer Esterification : Preparation of methyl benzoate

(week 5)

Exp 6 V. Aldol condensation. Preparation of dibenzalacetone.

(week 6)

Exp 7 VI. Aromatic Electrophilic Substitution.
Preparation of 1,4-tert-butyl-2,5-dimethoxybenzene
Finish any uncompleted experiments from earlier weeks.

(week 7)

Exp 8 VII. Preparation of aniline
Start Organic Qualitative Analysis (see lab notes)

(week 8)

Exp 9 VIII. Nitration of methyl benzoate.
(week 9)

Exp 10 IX. Aromatic nucleophilic substitution reaction
(week 10)

Exp 11 X. Side Chain oxidation. Oxidation of para-nitrotoluene.
(week 11)

Exp 12 XI. Preparation of acetanilide
Continue Organic Qualitative Analysis.
(week 12)

Exp 13 Finish any uncompleted preps AND continue with
Organic Qualitative Analysis
(week 13)

Exp 14. Finish any uncompleted preps AND continue with
Organic Qualitative Analysis. Check-out
(week 14)

It is important that you check the Chemistry 252 "Laboratory Notes" for details of all experiments, because there are sometimes significant changes from the procedures described in the laboratory manual.

If you miss a lab due to illness or other excused reason, you must make up the lab within ONE week since reagents and compatible waste containers will not be available after that. The make-up forms are available at the stockroom, and must be signed by the instructor in whose lab you carry out the work, and by your instructor for permission.

Safety glasses and lab coats are required in the laboratory at all times – even if you already wear glasses.

Do not bring food, chewing gum, coats or backpacks into the lab – use the hall lockers.

**All experiments are to be done individually
– no team experiments.**

Course Objectives: Students will continue to learn basic organic lab safety, waste disposal, and techniques, will continue to learn how to keep an organic laboratory notebook, and through the identification of unknowns experiment, start to learn to solve lab problems on their own. At the conclusion of this semester students will be prepared to do organic research if they so choose.

Assessment: You will need to keep a neat, legible laboratory notebook; a lined 100 page, 9 $\frac{3}{4}$ x 7 $\frac{1}{2}$ inch composition book is best. Your lab instructor will periodically check your notebook, so it must be up-to-date, and will announce when it will be collected for grading.

60% - lab book (Report: 35%, results, 25%)

15% - unannounced lab quizzes (these will test lab material, not lecture material)

10% - your lab technique (including neatness, skill, attention to detail and safety)

15% - final exam (it will test lab material, not lecture material)

Seminar (Chem 381/Chem 781), Fall 2024

Dept. of Chemistry and Biochemistry, Queens College, CUNY

Research talks is an important component of scientific research, being one of the main ways scientists share their latest research with the scientific community. The Seminar course exposes students to cutting edge research by attending the Chemistry and Biochemistry departmental seminar series. These seminars include talks on selected topics from the various branches of chemistry and biochemistry. This course serves as an opportunity to integrate student's knowledge.

The course is a hybrid synchronous class. i.e. seminars will be held in person or via zoom as indicated in the seminar schedule.

Location

In person seminars: Rem105

Virtual meetings: Zoom link
(All zoom meetings will have the same zoom link unless notified otherwise. see the link below). If you have a problem connecting you can email the host of the meeting as indicated in the schedule.

Instructor Information

Instructors:

Profs. Eleonora Gianti & Uri Samuni

Emails:

Eleonora.Gianti@qc.cuny.edu

Uri.Samuni@qc.cuny.edu

Office hours: email to set a time

Time

Class meetings:

Monday 11:15 am - 12:05 pm

Evaluation and Grading

Attendance (75%) and Report (25%) on a talk of your own choice

Attendance in all seminars is mandatory. Absences will result in deduction of points. In case of emergency in which the student can not attend please notify the instructor/s (preferably before) and later once the emergency is over discuss it with the instructor.

Guidelines for writing/submitting reports

1. Each report should convey the motivation/background of the talk, provide clear and detailed summary of the major content of the talk, and discussion of the implications of the talk.
2. Write the report as a single spaced MS WORD document with maximum 2 page long, about 1000 words (Chem381), 3 pages long, about 1500 words, for graduate students (Chem781). References are not included in the paper/ word length limit (no limit in the length of references). Font size 12 pts. Each report should have a cover page with the following information: your name, student ID, course number (Chem381 or

Chem781), Date of submission, Title of seminar, name and affiliation of speaker, date of seminar. Cover page not included in the page limit.

3. Get an approval for your choice of the seminar that you want to write a report on by sending an email to both Profs. Gianti and Samuni.

4. Submit the report before December 6th, 2024, by uploading to Brightspace and also email it to both Profs. Gianti and Samuni. Write "Seminar Report and your name" in the subject line of the email (There will be reduction in credit for a late report). Email as a MS word file and also as a PDF file.

5. Reports will be screened for plagiarism. Please make sure to submit your original writing. If not, there will be no credit.

6. Use American Chemical Society style for references.

Copy and paste the following zoom link to join the meeting

Join Zoom Meeting

<https://us02web.zoom.us/j/87061715912?pwd=iQf62mnbaHNLSa7Bgg4ZyWjMbVAWzn.1>

Meeting ID: 870 6171 5912

Passcode: 815529

Textbook: This course does not have a textbook. Course material if needed is provided through Brightspace at no cost.

Brightspace: The course will utilize Brightspace system to post course material, assignments, facilitate discussions and make course announcements. Students must make sure they login to Brightspace to check for course material and announcements and check their email that is associated with Brightspace.

Technical Support: Email Helpdesk@qc.cuny.edu or call the Student Support Hotline (718-997-3000). If you are still having technical difficulties then please email the instructor to update.

Plagiarism: Students plagiarizing will receive a zero on the assignment in question and a warning. The second time that a student is caught will result in the automatic failure of the course.

Video recordings of online sessions: Some portions of online lectures/seminars may be recorded. Prior to initiation of any recording students will be informed. Students who participate in this class with their camera on or use a profile image are agreeing to have their video or image recorded solely for the purpose of creating a record for students enrolled in the class to refer to, including those enrolled students who are unable to attend live. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively

using the "chat" feature, which allows students to type questions and comments live.

Restrictions on Sharing of Posted lectures or recordings: Recordings that are posted (such as presentations, lectures, welcome video clips etc.) are shared with the class for the purpose of facilitating the learning experience and are not to be copied, downloaded or shared with anyone outside of the class.

Academic Accommodation: Any student who feels that he or she may need an accommodation based upon the impact of a disability should contact the Office of Special Services for Students with Disabilities (718-997-5870 and QC.SPSV@qc.cuny.edu) to coordinate accommodations. See: <https://www.qc.cuny.edu/sp/>. Student can also contact the instructor privately to communicate their need for accommodations.

CUNY Policy on Academic Integrity: Academic Dishonesty is prohibited in CUNY and is punishable by penalties, including failing grades, suspension, and expulsion as provided at <https://www.cuny.edu/about/administration/offices/legal-affairs/policies-procedures/academic-integrity-policy/>.

Netiquette: Please maintain a professional demeanor when posting online and on online discussions forum. You can be respectful even when you have a difference of opinion. Treat others as you would want to be treated yourself.

W and WU Grade policy – THE DROP DEADLINE (W OR CHANGE TO P/NC) HAS BEEN CHANGED FROM THE COVID-ERA LAST DAY OF CLASS TO NOV. 6, 2024. Students who do not officially withdraw by Nov. 6 (and receive a W grade) but stop attending classes and do not participate in any way after the withdrawal date will be given a WU grade. Any participation in class after the withdrawal date will disqualify you from receiving the WU grade, and you will be given the appropriate letter grade.

CHEMISTRY 3311
PHYSICAL INORGANIC LABORATORY
Fall 2023

General Information:

Queens College
Department of Chemistry and Biochemistry

Time and Location:

REM 354, Friday 1:40 PM – 5:30 PM

Instructor Information

Prof. Chen Wang
Telephone: 718-997-4194
Email: chen.wang@qc.cuny.edu
Office hour: Fri 10:00 – 12:00 am or by appointment
Office: REM 120B

Course Description:

Content: A laboratory course in physical inorganic chemistry. An introduction to the synthesis and characterization of inorganic compounds and nanomaterials. A mock study of scientific exploration in chemistry.

Textbook Information:

The instructor will provide lecture notes, slides, and lab writeups. The following textbooks are recommended as supplementary references.

Experiments in Physical Chemistry, Eighth ed., Garland, Nibler and Shoemaker. McGraw-Hill, New York

Physical Chemistry, seventh ed., Atkins, de Paula, W. H. Freeman and Company, New York 2002 (any recent editions)

Advanced Inorganic Chemistry a Comprehensive Text, Cotton, Wilkinson, Wiley-Interscience New York 1980 (any recent edition will do)

Introduction to Error Analysis, 2nd Ed. The Study of Uncertainties in Physical Measurements. John R. Taylor, University Science Books, Mill Valley, California 1996

Attendance Policy:

Attendance is mandatory. A lab can only be excused with documentation relating to an unplanned emergency (medical or legal) or religious observance. See the Evaluation section for point deduction policies. There will be **NO** make-up labs.

Discipline/Course Specific Learning Objectives:

Objectives: 1) Mastery of selected laboratory methods that illustrate synthesis of inorganic

compounds and nanomaterials.

- 2) Exposure of students to state-of-the-art instrumentations that characterize the physical properties of inorganic compounds and nanomaterials.
- 3) Transitioning the student from following lab instruction to independent research work through encouraging analytical thinking and problem-solving.
- 4) Developing written and oral presentation skills.

Academic program and General Education Outcomes:

Apply concepts and methods of physical science and lab operational principles to make informed decisions with analytical reasoning during the experiments.

Reason quantitatively as required in various fields of interest and in everyday life.

Apply information management and digital technology skills useful for academic research and lifelong learning.

Learn to work collaboratively to accomplish learning objectives.

Communicate effectively through written lab reports.

Writing statement:

This course is a Writing Intensive (W) course and fulfills one Writing Intensive requirement. W classes include a significant portion of time devoted to writing instruction. This may include things such as revision workshops, discussions of rhetorical strategies, or reflective writing about writing assignments.

Important Information

Brightspace: The course will utilize the Brightspace system to post course materials, assignments and make course announcements. Students must make sure they login to the Brightspace to check for course materials and check their e-mails that are associated with the Brightspace system for any announcements.

Safety: Lab safety is our highest priority. In the lab you must work in a safe manner and follow all lab safety guidelines. Lab safety booklets will be posted on Brightspace. Students must also read and sign the Queens College lab safety booklet prior to starting any lab work.

You must wear a lab coat and safety goggles while in the laboratory. Failure to do so will result in removal from the laboratory.

You must wear protective gloves when handling any chemicals. Proper protective attire is required in the lab: long sleeve pants, shoes that cover your toes (no shorts or short skirts, no sandals/flip flops). Backpacks and winter coats cannot be brought into the lab (can be stored in the lockers in the hallway). No food or drinks is allowed in the lab.

Laboratories: Estimated lab dates are listed in the tentative schedule. Individual students assigned lab dates and times will be emailed. The course schedule is a tentative one and is subject to change as dictated by the experimental progress. Please monitor your email in case there is a date/time change. It is the student's responsibility to follow Brightspace and your email for any schedule changes. The

grade will be determined from graded writing assignments, the instructor's evaluation of the student's laboratory techniques and understanding, lab notebook record keeping, and laboratory reports.

Instrument/ Equipment

Policies: The instruments used in the lab are research grade, which allows the students the opportunity to experience a wide range of state-of-the-art instrumentation. Thus, all instruments should be treated with care. Students are responsible for cleaning the instrument and work area at the end of each lab meeting. Failure to do so will result in grade deduction.

Required materials:

Scientific calculator, laboratory notebook, and thumb drive (memory stick) for files transfer and backup for in-person labs. Lab coats and safety goggles can be obtained from the Chemistry Department stock room.

Academic Accommodation:

Any student who feels that he or she may need accommodation based upon the impact of a disability should not contact me privately. Please contact the office of Services for Students with Disabilities at Room 111, Frese Hall, 718-997-5870 (QC.SPSV@qc.cuny.edu) to coordinate reasonable accommodation for students with documented disabilities. See: <https://www.qc.cuny.edu/sp/>

Course Activities Calendar:

Lab# Date	Class discussion	Lab Work	Assignments and Exe due by 11:59 pm the night before scheduled lab	Objectives/ Criteria Met
01 08/30	Overview of course and syllabus: Transition to working independently in the lab. How to prepare for an experiment Lab safety Intro to writing in your lab notebook.	Transition to working independently in the lab. How to prepare for an experiment Reaction reagents and glassware		
02 09/06	Discussion of the metal complex experiment	Synthesis of $\text{Fe}(\text{AcAc})_3$ Metal complex	Exe#1 Prepare all	

	Intro to writing in your lab notebook: review		experimental calculations for the synthesis of $\text{Fe}(\text{AcAc})_3$	
03 09/13	Intro to UV-vis absorption, Fluorescence How to prepare a sample for characterization: UV/Vis How to make sample dilutions	UV-vis measurement of $\text{Fe}(\text{AcAc})_3$ in different solvents Discussion of Exe#1	Exe#2 Protocol for UV/Vis sample preparation and UV/Vis measurements	
04 09/20	Introduce IR and FTIR spectroscopy. Literature searching and citation.	Discussion of Exe#2 Determine the extinction coefficient (molar absorptivity) of $\text{Fe}(\text{AcAc})_3$ FTIR and Fluorescence spectroscopy of $\text{Fe}(\text{AcAc})_3$	Exe#3 Protocol for FTIR sample preparation and measurements	One hour lecture on necessary writing skill, literature searching and how to cite in scientific writing.
05 09/27	Scientific writing outline: Overall structure Abstract Introduction Experimental Results Graphic and table Discussion	Continue FTIR and Fluorescence spectroscopy of $\text{Fe}(\text{AcAc})_3$	Exe#4 Independent literature search for metal complex experiments	1.5 hours lecture on the general structure of writing a scientific paper, and how to make a writing plan with an outline. Exe#4 asks for practicing literature search and taking reference notes for preparing writing.
06 10/18	Review Exe#4 Introduction to the semiconductor nanocrystals Quantum confinement Hot injection synthesis Introduction of NMR spectroscopy.	Synthesis of CdSe Quantum Dots Initial UV-vis and photoluminescence characterization of QD samples. Determine the sizes of QDs.	Exe#5: UV-vis Figures	Feedback provided for Exe#4. Exe#5 focuses on preparing figures and writing appropriate captions for a scientific paper.

07 10/25	Review of Exe#5 Formatting Graphic information Introduction of the surface chemistry of QDs.	Characterization of CdSe QDs with ATR-FTIR and steady state photoluminescence. Analyze the bound configuration of the surface ligand and estimate the number of bound ligands.	Writing assignment 1 (WA1) Experimental for the first lab report	1 hour instruction lecture on details for graphic presentation of data in scientific writing. Revision provided for Exe#5 to improve the figures WA1: 300-500 words writing of experimental procedure
08 11/1	Review/Discussion of 1 st writing assignment –	Photoluminescence quenching NMR	WA2: Introduction (50 pts)	Revision provided for WA1. WA2: 500 words of writing with the practice for citing while writing.
09 11/08	Review/Discussion the 2 nd writing assignment Introduction Discussion of references/citation Laser safety Introduction to exciton dynamics	Time-resolved photoluminescence NMR		Revision provided for WA2. 1 hour lecture on proposing discussion topics based on experimental data will be provided.
10 11/15	Basic of photophysics and photochemical processes Individual meeting with the instructor to discuss writing metal complex lab reports	Continue lab CdSe nanocrystal characterization PL quenching TR-PL NMR	3 rd writing assignment: Results and Discussion	WA3: 1000 words of writing with the graphic presentation of data and the practice for citing while writing.
11 11/22	Review/Discussion the 3 rd writing assignment Stern-Volmer analysis Individual meeting with the instructor to discuss	Continue lab CdSe nanocrystal characterization PL quenching		Revision is provided for WA3.

	questions of the CdSe nanocrystal experiment	TR-PL NMR		
12 11/27	Time resolved spectroscopy and laser	Continue lab CdSe nanocrystal characterization PL quenching TR-PL NMR	Metal complex laboratory reports	First lab report: 2000+ words of formal scientific writing with graphic presentation, data discussing and citations.
13 12/06	Review/discussion of Metal complex lab reports Individual meeting with the instructor to discuss questions of the CdSe nanocrystal experiment	Photocatalytic reaction setup		Revision is provided for the 1 st lab report.
14 12/13	Individual meeting with the instructor to discuss questions of the CdSe nanocrystal experiment	Reaction result analysis (HPLC)		
15	No lab – Exam week		CdSe nanocrystals lab report (400 pts)	Second lab report: 3000+ words of formal scientific writing with graphic presentation, data discussing and citations.

Course Grading: Total points possible: 1000 pts

Breakdown of points:

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|----------------------------|----------------|
| 1. Lab performance | 100 pts |
| 2. Lab notebook evaluation | 50 pts |
| 3. Exe# 1-5 | 150 pts |
| 4. Writing assignments | 700 pts |

[Preliminary written Assignments: Exp 50 pts, Intro 50 pts, Results 100 pts

Formally written Laboratory reports: 1st report 100 pts, 2nd report 400 pts]

NOTE: Lab Safety is mandatory (pass/fail). It has no point value.

≥95%	A+
90-94.9%	A
87-89.9%	A-
83-86.9%	B+
80-82.9%	B
76-79.9%	B-
73-75.9%	C+
70-72.9%	C
67-69.9%	C-
64-66.9%	D+
60-63.9%	D
<60%	F

Point deduction:

Missing each lab without an excuse will cause a deduction of **100 pts** from the final grades.

Failure to care for equipment/instruments, failure to clean the work area and working without safety glasses will cause points deduction from the lab performance.

Working in an unsafe manner will not be tolerated and could lead to dismissal from the lab.

Any assignment involved in plagiarism will receive a grade of **zero**.

Plagiarism: **CUNY Policy on Academic Integrity:** Academic Dishonesty is prohibited in The City University of New York and is punishable by penalties, including failing grades, suspension, and expulsion as provided at <https://www.cuny.edu/about/administration/offices/legal-affairs/policies-procedures/academic-integrity-policy/>. Please read this document, paying careful attention to the sections on plagiarism and Internet plagiarism. If you are not sure how to cite work you have found on the internet, please review the APA Guidelines provided by the [Purdue OWL](https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/reference_list_electronic_sources.html) (https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/reference_list_electronic_sources.html).

Students should complete their assignments and lab reports independently. Plagiarism or any other forms of cheating is **NOT** tolerated. Any assignment involved will receive a grade of zero. Students plagiarizing will receive a warning for the first time. The second time that a student is caught will result in the automatic failure of the course. Other penalties, and/or referral to the Chairman and the Dean may be carried out.