

This syllabus is provided as a general informational guide. Some of the information may vary depending on the specific course section and instructor. Different sections of the same course may require different textbooks. Verify the section specific textbook information in the CUNY's Academic Course Schedule Web Page. Modifications of the grading system presented here will be communicated by the instructors of the sections when they meet the class.

BOROUGH OF MANHATTAN COMMUNITY COLLEGE

The City University of New York
Department of Science

Title of Course Fundamentals of General, Organic and Biological Chemistry II **Class Hours** 3

Course Code CHE 122 **Laboratory Hours per Week** 3

Semester _____ **Credits** 4

Instructor Information (Phone#, Office#, email) _____

Course Description

This course is a two-semester course sequence that introduces principles and concepts of general, organic and biological chemistry. The laboratory will provide experimental applications of these chemical topics.

CHE 121-CHE 122 Two terms required. Liberal Arts Elective. Recommended for students intending to transfer to bachelor degree nursing and allied health science curricula.

CHE 121-CHE 122 cannot be granted credit to fulfill degree requirements for A.S. (Science) and for A.S. (Engineering Science).

CHE 121-CHE 122 does not meet science requirement for A.A. (Liberal Arts).

Basic Skills ACR 94, ENG 088 or ESL 54, and MAT 051

Prerequisites CHE 118, CHE 121 or Permission of the Science Department

Corequisites _____

Course Student Learning Outcomes (Students will be able to...)	Measurements (means of assessment for student learning outcomes listed in first column)
1. Students will be able to identify and define key terminology in chemistry.	1. Exam questions, quizzes and laboratory assignments.
2. Students will be able to explain chemical properties.	2. Exam questions, quizzes and laboratory assignments.
3. Students will be able apply chemical concepts to chemical properties.	3. Exam questions, quizzes and laboratory assignments.
4. Students will be able to compare chemical properties based on chemical models.	4. Exam questions, quizzes and laboratory assignments.
5. Students will be able to categorize chemical properties based atomic and molecular structure.	5. Exam questions, quizzes and laboratory assignments.
6. Students will be able evaluate the effect of changes in variables on chemical properties.	6. Exam questions, quizzes and laboratory assignments.

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Below are the college's general education learning outcomes, the outcomes that are checked in the left-hand column indicate goals that will be covered and assessed in this course.

	General Education Learning Outcomes	Measurements (means of assessment for general education goals listed in first column)
<input type="checkbox"/>	Communication Skills- Students will be able to write, read, listen and speak critically and effectively.	
X	Quantitative Reasoning- Students will be able to use quantitative skills and the concepts and methods of mathematics to solve problems.	To record experimental data with correct significant figures in the lab. To solve quantitative problems, e.g. density, concentrations, and conversions. To plot graphs with experimental data.
X	Scientific Reasoning- Students will be able to apply the concepts and methods of the natural sciences.	Exam questions, homework assignment, laboratory assignments and case studies.
<input type="checkbox"/>	Social and Behavioral Sciences- Students will be able to apply the concepts and methods of the social sciences.	
<input type="checkbox"/>	Arts & Humanities- Students will be able to develop knowledge and understanding of the arts and literature through critiques of works of art, music, theatre or literature.	
<input type="checkbox"/>	Information & Technology Literacy- Students will be able to collect, evaluate and interpret information and effectively use information technologies.	
<input type="checkbox"/>	Values- Students will be able to make informed choices based on an understanding of personal values, human diversity, multicultural awareness and social responsibility.	

Required Text

1. Timberlake, Karen C., General, Organic and Biological Chemistry: Structures of Life, 6th Edition. Pearson Prentice Hall (2018). ISBN-10: 0134730682. ISBN-13: 9780134730684
2. Timberlake, Karen C., Laboratory Manual for General, Organic, and Biological Chemistry, 3rd Edition. Pearson Prentice Hall (2014). ISBN-10: 0321811852| ISBN-13: 9780321811851.

Other Resources _____

Use of Technology (If Applicable) _____

Evaluation and Requirements of Students

Five Examinations 5 @ 12%	60%
Final Examination (comprehensive)	20%
Laboratory	20%

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BMCC is committed to the health and well-being of all students. It is common for everyone to seek assistance at some point in their life, and there are free and confidential services on campus that can help.

Class Participation

Participation in the academic activity of each course is a significant component of the learning process and plays a major role in determining overall student academic achievement. Academic activities may include, but are not limited to, attending class, submitting assignments, engaging in in-class or online activities, taking exams, and/or participating in group work. Each instructor has the right to establish their own class participation policy, and it is each student's responsibility to be familiar with and follow the participation policies for each course.

Single Stop www.bmcc.cuny.edu/singlestop, room S230, 212-220-8195. If you are having problems with food or housing insecurity, finances, health insurance or anything else that might get in the way of your studies at BMCC, come by the Single Stop Office for advice and assistance. Assistance is also available through the Office of Student Affairs, S350, 212-220- 8130.

Counseling Center www.bmcc.cuny.edu/counseling, room S343, 212-220-8140. Counselors assist students in addressing psychological and adjustment issues (i.e., depression, anxiety, and relationships) and can help with stress, time management and more. Counselors are available for walk-in visits.

Office of Compliance and Diversity www.bmcc.cuny.edu/aac, room S701, 212-220-1236. BMCC is committed to promoting a diverse and inclusive learning environment free of unlawful discrimination/harassment, including sexual harassment, where all students are treated fairly. For information about BMCC's policies and resources, or to request additional assistance in this area, please visit or call the office, or email olevy@bmcc.cuny.edu, or twade@bmcc.cuny.edu. If you need immediate assistance, please contact BMCC Public safety at 212-220-8080.

Office of Accessibility www.bmcc.cuny.edu/accessibility, room N360 (accessible entrance: 77 Harrison Street), 212-220-8180. This office collaborates with students who have documented disabilities, to coordinate support services, reasonable accommodations, and programs that enable equal access to education and college life. To request an accommodation due to a documented disability, please visit or call the office.

BMCC Policy on Plagiarism and Academic Integrity Statement

Plagiarism is the presentation of someone else's ideas, words or artistic, scientific, or technical work as one's own creation. Using the idea or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations, require citations to the original source. Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism. Students who are unsure how and when to provide documentation are advised to consult with their instructors. The library has guides designed to help students to appropriately identify a cited work. The full policy can be found on BMCC's Web site, www.bmcc.cuny.edu. For further information on integrity and behavior, please consult the college bulletin (also available online).

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Lecture Syllabus

Module	Topics	Pages
1	12.1 Organic Compounds 12.2 Alkanes 12.3 Alkanes with Substituents 12.4 Properties of Alkanes	444 - 447 447 - 451 451 - 457 457 - 460
2	Unsaturated Hydrocarbons 12.5 Alkenes and Alkynes 12.6 Cis-Trans Isomers 12.7 Addition Reactions 12.8 Aromatic Compounds	460 - 463 464 - 467 468 - 473 473 - 476
3	Alcohols, Phenols and Thiols 13.1 Alcohols, Phenols and Thiols 13.2 Ethers 13.3 Physical Properties of Alcohols, Phenols and Ethers 13.4 Reactions of Alcohols and Thiols	489 - 495 495 - 497 497 - 500 501 - 506
4	Aldehydes, Ketones and Chiral 14.1 Aldehydes and Ketones 14.2 Physical Properties of Aldehydes and Ketones 14.3 Oxidation and Reduction of Aldehydes and Ketones	517 - 522 523 - 524 525 - 527
4	14.4 Hemiacetals and Acetals 14.5 Chiral Molecules	527 - 530 531 - 538
5	Carbohydrates 15.1 Carbohydrates 15.2 Fischer Projection of Monosaccharides 15.3 Haworth Structures of Monosaccharides 15.4 Chemical Properties of Monosaccharides 15.5 Disaccharides 15.6 Polysaccharides	551 - 554 554 - 558 558 - 561 561 - 564 564 - 570 570 - 573
7	Carboxylic Acids and Esters 16.1 Carboxylic Acids 16.2 Properties of Carboxylic Acids 16.3 Esters 16.4 Naming Esters 16.5 Properties of Esters	581 - 585 585 - 590 590 - 593 593 - 596 596 - 600
8	Lipids 17.1 Lipids 17.2 Fatty Acids 17.3 Waxes and Triacylglycerols 17.4 Chemical Properties of Triacylglycerols 17.5 Phospholipids 17.6 Steroids 17.7 Cell Membranes	609 - 610 610 - 616 617 - 620 621 - 626 627 - 632 632 - 637 638 - 640
9	Amines and Amides 18.1 Amines 18.2 Properties of Amines 18.3 Heterocyclic Amines 18.4 Neurotransmitters	650 - 656 656 - 661 661 - 664 664 - 671

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	18.5 Amides	671 – 676
	18.6 Hydrolysis of Amides	676 - 677
10	Amino Acids and Proteins	
	19.1 Proteins and Amino Acids	689 – 694
	19.2 Amino Acids as Acids and Bases	694 – 697
	19.3 Formation of Peptides	697 – 700
	19.4 Protein Structure: Primary and Secondary Levels	701 – 706
	19.5 Protein Structure: Tertiary and Quaternary Levels	706 – 711
	19.6 Protein Hydrolysis and Denaturation	711 – 714
11	Enzymes and Vitamins	
	20.1 Enzymes and Enzyme Action	723 – 726
	20.2 Classification of Enzymes	726 – 729
	20.3 Factors Affecting Enzyme Activity	729 – 732
	20.4 Regulation of Enzyme Activity	732 – 735
11	20.5 Enzyme Inhibition	735 – 739
	20.6 Enzyme Cofactors and Vitamins	739 – 744
13	Nucleic Acids and Protein Synthesis	
	21.1 Components of Nucleic Acids	754 – 759
	21.2 Primary Structure of Nucleic Acids	759 – 761
	21.3 DNA Double Helix	761 – 763
13	21.4 DNA Replication	764 – 766
	21.5 RNA and Transcription	766 - 771
	21.6 The Genetic Code and Protein Synthesis	771 – 775
	21.7 Genetic Mutations	776 - 780
	21.8 Recombinant DNA	780 - 782
	21.9 Viruses	782 - 785

Laboratory Syllabus

Reference Experiment	Title	Page
	Course Orientation	
	Hydrocarbon Structures	
21	Functional Groups	235
22	Reactions of Hydrocarbons	251
23	Alcohols and Phenols	259
24	Aldehydes and Ketones	269
29	Types of Carbohydrates	323
30	Tests for Carbohydrates	337
25	Carboxylic Acids and Esters	279
31	Lipids	349
27	Amines and Amides	303
33	Amino Acids	373
34	Peptides and Proteins	383
35	Enzymes	395
	Nucleic Acids	