

BOROUGH OF MANHATTAN COMMUNITY COLLEGE
The City University of New York
Department of Science

Title of Course: College Chemistry II

Class Hours: 4

Course Code: CHE 202

Laboratory Hours per Week: 3

Semester: Spring 2024

Instructor Information (Phone#, Office#, email): Daniel Torres Rangel; N699E; dtorresrangel@bmcc.cuny.edu

Credits: 4

Course Description: This is a two-semester course sequence that involves the study of chemical principles including atomic and molecular theories, molecular structure, and reactivity. The laboratory will include experiments illustrating the chemical principles. CHE 201-202 two terms required. Required in A.S. (Science), A.S. (Engineering Science), A.S. (Science for Forensics), and A.S. (Biotechnology Science). Fulfills science requirement for A.A. (Liberal Arts) Prerequisite for CHE 202 is CHE 201.

Basic Skills: ACR 094, ENG 088 or ESL 054, and MAT 056

Prerequisites: CHE 201

Corequisites:

Course Student Learning Outcomes (Students will be able to?)	Measurements (means of assessment for student learning outcomes listed in first column)
1. Identify and define key terminology in chemistry.	1. Examinations will measure students' ability to define terms in stoichiometric calculations
2. Explain chemical properties	2. Examinations will measure students' ability to explain atomic spectra from energy levels
3. Apply chemical concepts to chemical properties.	3. Examinations will measure students' ability to apply chemical bonding to properties of solids.
4. Compare chemical properties based on chemical models.	4. Examinations will measure student's ability to compare types of chemical reactions
5. Categorize chemical properties based atomic and molecular structure.	5. Examinations will measure student's ability to categorize periodicity of atomic properties.
6. Evaluate the effect of changes in variables on chemical properties.	6. Examinations will measure student's ability to evaluate enthalpy calculations.

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. (Check at least one.)

General Education Learning Outcomes	Measurements (means of assessment for general education goals listed in first column)
<input checked="" type="checkbox"/> Communication Skills- Students will be able to write, read, listen and speak critically and effectively.	
<input checked="" type="checkbox"/> Quantitative Reasoning- Students will be able to use quantitative skills and the concepts and methods of mathematics to solve problems.	Examinations will assess student's ability to mathematically analyze quantitative problems in chemistry.
<input checked="" type="checkbox"/> Scientific Reasoning- Students will be able to apply the concepts and methods of the natural sciences.	Examinations will assess student's ability to interpret chemical properties based on chemical concepts and models.
<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.	
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: Flowers, P., Theopold, K., Langley, R., & Robinson, W. R. (2015). Chemistry: OpenStax. Available for free at <https://openstax.org/details/books/chemistry-2e>

Required Laboratory Manual: Wentworth, R. A. D., and Munk, Barbara H., Experiments in General Chemistry 11th Edition, Cengage Learning (2017), Boston MA. ISBN 978-1-305-94498-5

Required Laboratory Goggles Appropriate chemical-resistant protective eyewear (goggles) must be purchased for use in the laboratory. The bookstore is carrying them (\$7.00).

Other Resources Use of Technology (If Applicable)

Evaluation and Requirements of Students

Face2face quizzes: 30%

Face2Face Final examination: 20%

Laboratory: 20% (only if Face2face quizzes average ≥ 60)

HomeWork: 30% (only if Face2face quizzes average ≥ 60)

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.

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).

Gender-Inclusivity

BMCC community members have the right to use and be referred to according to their preferred name, title, and/or personal pronouns. Everyone also has the right to use all spaces according to their self-identification, including restrooms and locker rooms. To learn more about how to change your preferred name and affirm your gender identity at CUNY (including requesting a new ID card and/or email address), go here: <https://www.bmcc.cuny.edu/student-affairs/lgbtq/> Anyone who has experienced harassment related to gender or sexual identification, who needs assistance, or who wishes to file a complaint, can contact the Office of Compliance and Diversity: <https://www.bmcc.cuny.edu/about-bmcc/compliance-diversity/>.

FREE BMCC STUDENT SUPPORT SERVICES

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.

Advocacy and Resource Center (ARC) <https://www.bmcc.cuny.edu/student-affairs/arc/> room S230, 212-220-8195, arc@bmcc.cuny.edu. 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, contact the Advocacy and Resource Center (formerly Single Stop) for assistance. Please contact us at arc@bmcc.cuny.edu, call 212-220-8195, or come by the office at room S230. You may also contact the Office of Student Affairs, S350, 212-220-8130, studentaffairs@bmcc.cuny.edu, for assistance.

Counseling Center www.bmcc.cuny.edu/counseling, room S343, 212-220-8140, counselingcenter@bmcc.cuny.edu. 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 <https://www.bmcc.cuny.edu/about-bmcc/compliance-diversity>, 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, Students who need academic accommodations in connection with a disability must initiate the request with BMCC's Office of Accessibility (OA). Students need to register with the Office of Accessibility in order to officially disclose their disability status to the College and to determine eligibility for appropriate reasonable accommodations (including any prior IEPs or 504s). Please contact the OA at the start of the semester (or as soon as possible) to coordinate any accommodation request/s: www.bmcc.cuny.edu/accessibility, Room N360 (accessible entrance: 77 Harrison Street), 212-220-8180, accessibility@bmcc.cuny.edu.

Lab policies

1. You will not be allowed to carry any work in the lab unless you submit all two pages of the lab release form, back and front, via BB.
2. You will not be allowed in the lab unless you bring your safety goggles. Safety glasses will not be permitted.
3. If you are seen once without safety goggles during lab work, the instructor will invite you to leave for 15 minutes. If you are seen twice, you will have to go home.
4. You will not be allowed in the lab unless you bring a printed copy of the corresponding lab experiment to be carried out.
5. In the lab, foods or drinks are not allowed.
6. If you come to the lab with a printed lab experiment which contains missing pages you will be penalized with 5 points.
7. Pre-lab should be carried out at home and presented to the instructor at the beginning of the experiment. An empty pre-lab page will be collected with your name in case the work is not done.
8. If you are done with the lab work, the instructor will evaluate and signs your work. Lab work without a signature are non gradable.
9. Lab work will be submitted via BB as a single PDF during the lab session, never later than that. Late submissions will be penalized with 5 points a day.
10. If you finish the lab work late, after the lab ending time, you will be penalized with 5 point.
11. There are no make-ups for missed lab sessions. However, I will allow a single absence without penalty.
12. E-books are not allowed, you need a paper copy of the experiment.
13. If you miss a lab session you miss the grade of the corresponding work carried out during that session.
14. If you arrive late to the lab, after one hour, your lab will not be graded.

Name

Signature

Date

Lecture policies

1. If you signed up to class late and start the semester later than regular students, you have 5 days from when you are officially listed to class to hand out any missing HW, lab work (pre and post lab), and take any quiz. After that period you will not receive any points for missing work.
2. Lab and HW components of the grade will only be taken into account if your quiz average is above 60.
3. If you miss the final quiz your final grade will be computed using a zero for the final quiz.
4. There are no make-ups for missed quizzes or HW.
5. If you submit any HW late you will subtracted 5 points a day.
6. You need to bring a scientific calculator to class and your phone does not count as one.
7. For level 2 classes (CHEM 202) you need a graphing calculator (Casio is a good brand)
8. Class work can only be done during class, hence your attendance is critical for this grade component.
9. If you miss a class with a classwork component you miss the corresponding grade.
10. You may bring a cheat sheet on 8.5x11 paper to the exam. No more than a single sheet will be allowed under any circumstance. If you are seen in a quiz with more than a single page, the instructor has the right to reduce your quiz grade by 20 points.
11. Assignments in which you had tech issues during submission will be waived unless you reach out on the day of the deadline.

Name

Signature

Date

Topics

Ch 1 Organic and Biological Molecules (a) Alkanes: Saturated Hydrocarbons (b) Alkenes and Alkynes (c) Aromatic Hydrocarbons (d) Hydrocarbon Derivatives (e) Natural Polymers

Ch 2 Properties of Solutions:(a) Solution Composition (b) Energies of Solution Formation (c) Factors Affecting Solubility (d) Vapor Pressure of Solutions (e) Boiling Point Elevation and Freezing Point Depression (f) Osmotic Pressure (g) Colligative Properties of Electrolyte Solutions

Ch 3 Chemical Kinetics:(a) Reaction Rates (b) Rate Laws (c) Determining the Form of the Rate Law (d) Integrated Rate Laws (e) Reaction Mechanisms (f) A Model for Chemical Kinetics (g) Catalysis

Ch 4 Chemical Equilibrium:(a) The Equilibrium Condition (b) The Equilibrium Constant (c) Equilibrium Expressions Involving Pressures (d) Heterogeneous Equilibria (e) Applications of the Equilibrium Constant (f) Solving Equilibrium Problems (g) Le Chatelier's Principle

Ch 5 Acids and Bases:(a) The Nature of Acids and Bases (b) Acid Strength (c) The pH Scale (d) Calculating the pH of Strong Acid Solutions (e) Calculating the pH of Weak Acid Solutions (f) Bases (g) Polyprotic Acids (h) Acid-Base Properties of Salts (i) The Effect of Structure on Acid-Base Properties (j) Acid-Base Properties of Oxides (k) The Lewis Acid-Base Model (l) Solutions of Acids or Bases Containing a Common Ion (m) Buffered Solutions (n) Buffering Capacity (o) Titrations and pH Curves (p) Acid-Base Indicators (q) Polyprotic Acid Titrations

Ch 6 Solubility and Complex Ion Equilibria:(a) Solubility Equilibria and the Solubility Product (b) Precipitation (c) Precipitation Conditions (d) Equilibria Involving Complex Ions

Ch 7 Spontaneity, Entropy and Free Energy:(a) Spontaneous Processes and Entropy (b) Entropy and the Second Law of Thermodynamics (c) The Effect of Temperature on Spontaneity (d) Entropy Changes in Aqueous Solutions (e) Entropy Changes in Chemical Reactions (f) Free Energy (g) Free Energy and Chemical Reactions (h) The Dependence of Free Energy on Pressure (i) Free Energy and Equilibrium (j) Free Energy and Work

Ch 8 Electrochemistry:(a) Galvanic Cells (b) Standard Reduction Potentials (c) Cell Potential, Electrical Work, and Free Energy (d) Dependence of Cell Potential on Concentration (e) Corrosion (f) Electrolysis