

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 College Chemistry 1 **Class Hours** 4/week
Course Code CHE201 **Laboratory Hours per Week** 3/week
Semester _____
Instructor Information (Phone#, Office#, email) _____
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. (Biotechnology Science), A.S. (Engineering Science), A.S. (Science), A.S. (Science for Forensics), and 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 _____

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 learn the concepts and principles of chemistry.	1. Examinations, Homework Assignments and Laboratory Experiments
2. Students will be able to recognize the importance of and develop a skill in problem solving.	2. Examinations, Homework Assignments and Laboratory Experiments
3. Students will be able to relate chemistry to other areas of science.	3. Examinations, Homework Assignments and Laboratory Experiments
4. Students will be able to unify the diverse topics of chemistry.	4. Examinations, Homework Assignments and Laboratory Experiments

Use of Technology (If Applicable) Scientific Calculator

Evaluation and Requirements of Students

5 examinations	60%
Final exam	20%
Laboratory	20%

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Your overall letter grade is based on BMCC's grading system

Grade	Description	Pts
A	93-100%	4.00
A-	90-92%	3.70
B+	87-89%	3.30
B	83-86%	3.00
B-	80-82%	2.70
C+	77-79%	2.30
C	73-76%	2.00
C-	70-72%	1.70
D+	67-69%	1.30
D	63-66%	1.00
D-	60-62%	0.70
F	Failure	0.00

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 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.

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 via 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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Week	Ch/Sec	Topic	Page(s)
		Chemical Foundations	
1	1.1	Chemistry: An Overview	3 - 5
	1.2	The Scientific Method	5 - 8
	1.3	Units of Measurement	8 - 11
	1.4	Uncertainty in Measurement	11 - 14
	1.5	Significant Figures and Calculations	14 - 18
	1.6	Learning to Solve Problems Systematically	18 - 18
	1.7	Dimensional Analysis	18 - 22
	1.8	Temperature	22 - 26
	1.9	Density	26 - 27
	1.10	Classification of Matter	27 - 31
		Atoms, Molecules and Ions	
2	2.1	Early History of Chemistry	43 - 44
	2.2	Fundamental Chemical Laws	44 - 47
	2.3	Dalton's Atomic Theory	47 - 50
	2.4	Early Experiments to Characterize the Atom	50 - 53
	2.5	Modern View of Atomic Structure	54 - 55
	2.6	Molecules and Ions	55 - 57
	2.7	Introduction to the Periodic Table	57 - 60
	2.8	Naming Simple Compounds	60 - 70
		Stoichiometry	
3	3.1	Counting by Weighing	82 - 83
	3.2	Atomic Masses	83 - 85
	3.3	The Mole	85 - 90
	3.4	Molar Mass	90 - 92
	3.6	Percent Composition of Compounds	94 - 96
	3.7	Determining the Formula of a Compound	96 - 103
4	3.8	Chemical Equations	103 - 105
	3.9	Balancing Chemical Equations	105 - 108
	3.10	Stoichiometric Calculations	108 - 114
	3.11	Concept of Limiting Reagent	114 - 123
		Types of Chemical Reactions and Solution Stoichiometry	
5	4.1	Water, the Common Solvent	139 - 141
	4.2	Strong and Weak Electrolytes	141 - 145
	4.3	The Composition of Solutions	145 - 153

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	4.4	Types of Chemical Reactions	153 - 153
	4.5	Precipitation Reactions	153 - 158
6	4.6	Reactions in Solution	158 - 160
	4.7	Stoichiometry of Precipitation Reactions	160 - 162
	4.8	Acid-Base Reactions	163 - 170
	4.9	Oxidation-Reduction Reactions	170 - 175
	4.10	Balancing Oxidation-Reduction Reactions	175 - 177
		Gases	
7	5.1	Pressure	190 - 192
	5.2	Gas Laws of Boyle, Charles and Avogadro	192 - 198
	5.3	Ideal Gas Law	198 - 203
	5.4	Gas Stoichiometry	203 - 208
	5.5	Dalton's Law of Partial Pressures	208 - 214
	5.6	Kinetic Molecular Theory of Gases	214 - 222
	5.7	Effusion and Diffusion	222 - 224
	5.8	Real Gases	224 - 226
		Thermochemistry	
8	6.1	The Nature of Energy	246 - 252
	6.2	Enthalpy and Calorimetry	252 - 260
	6.3	Hess's Law	260 - 264
	6.4	Standard Enthalpies of Formation	264 - 271
		Atomic Structure and Periodicity	
9	7.1	Electromagnetic Radiation	296 - 298
	7.2	The Nature of Matter	298 - 304
	7.3	The Atomic Spectrum of Hydrogen	305 - 306
	7.4	The Bohr Model	306 - 310
	7.5	The Quantum Mechanical Model of the Atom	310 - 313
10	7.6	Quantum Numbers	313 - 314
	7.7	Orbital Shapes and Energies	314 - 318
	7.8	Electron Spin and the Pauli Principle	318 - 318
	7.9	Polyelectronic Atoms	318 - 320
	7.10	The History of the Periodic Table	320 - 322
	7.11	The Aufbau Principle and the Periodic Table	322 - 329
	7.12	Periodic Trends in Atomic Properties	329 - 334
	7.13	The Alkali Metals	335 - 338

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Types of Chemical Bonds

11	8.1	Types of Chemical Bonds	352 - 356
	8.2	Electronegativity	356 - 358
	8.3	Bond Polarity and Dipole Moments	358 - 361
	8.4	Ions: Electron Configurations and Sizes	361 - 365
	8.5	Energy Effects in Binary Ionic Compounds	365 - 369
	8.6	Partial Ionic Character of Covalent Bonds	369 - 370
12	8.7	The Covalent Chemical Bond	370 - 373
	8.8	Covalent Bond Energies and Chemical Reactions	373 - 376
	8.9	The Localized Electron Bonding Model	376 - 376
	8.10	Lewis Structures	376 - 380
	8.11	Exceptions to the Octet Rule	380 - 384
	8.12	Resonance	384 - 389
	8.13	Molecular Structure: The VSEPR Model	389 - 402

Covalent Bonding: Orbitals

13	9.1	Hybridization and the Localized Electron Model	416 - 423
	9.2	The Molecular Orbital Model	428 - 431
	9.3	Bonding in Homo Nuclear Diatomic Molecules	421 - 437
	9.4	Bonding in Hetero Nuclear Diatomic Molecules	438 - 439
	9.5	Localized Electron and Molecular Orbital Models	439 - 441

Liquids and Solids

14	10.1	Intermolecular Forces	455 - 458
	10.2	The Liquid State	458 - 459
	10.3	Introduction to Structure and Types of Solids	459 - 465
	10.4	Structure and Bonding in Metals	465 - 471
	10.5	Network Atomic Solids	471 - 478
	10.6	Molecular Solids	479 - 480
	10.7	Ionic Solids	480 - 483
	10.8	Vapor Pressure and Changes of State	483 - 491
	10.9	Phase Diagrams	491 - 496
15		Examination Week	

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SAMPLE LAB SCHEDULE

Exp.	Title	Date
	Laboratory Safety, Laboratory Rules and Check In	
1C	Measurements of Mass and Volume	
1A	Identification of Unknown Compound	
1B	Paper Chromatography	
2	Isotopes and Mass Spectroscopy	
3A	Empirical Formula of an Oxide	
3B	Hydrates and Their Thermal Decomposition	
4B	Ionic Reactions in Aqueous Solutions	
4C	How Much Acetic Acid in Vinegar	
Handout	Molar Mass of a Volatile Liquid	
6	Thermochemistry and Hess's Law	
7	Absorption Spectrum of Cobalt(II) Chloride	
9A	Identity of Insoluble Precipitate	
Handout	Molecular Geometry VSEPR	
11	Liquids and Solids	