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

Title of Course__College Chemistry I_____ **Class Hours** _____4_____

XXX_____CHE 201_____ **Laboratory Hours per Week** ___3_____

Semester_____**Fall, 2017**_____

Credits_____4_____

Instructor Information

Name _____

Telephone: _____

Office: _____

Email _____-

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 Prerequisites: ACR 094, ENG 088 or ESL 062, and MAT 056.

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 properites.
6. evaluate the effect of changes in variables on chemical properties.	6. Examinations will measure student's ability to evaluate enthalpy calculations.

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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. (Check at least one.)

	General Education Learning Outcomes	**Measurements (means of assessment for general education goals listed in first column)**
☐	**Communication Skills-** Students will be able to write, read, listen and speak critically and effectively.	
☐	**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 mathematical analyze quantitative problems in chemistry.
☐	**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.
☐	**Social and Behavioral Sciences-** Students will be able to apply the concepts and methods of the social sciences.	
☐	**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.	
☐	**Values-** Students will be able to make informed choices based on an understanding of personal values, human diversity, multicultural awareness and social responsibility.	

1. Required Textbook

Zumdahl, Steven S., Zumdahl, Susan A., and DeCoste D. J.*Chemistry 10th Ed* Cengage Learning (2017), Boston, MA
ISBN-13: 978-1-305-95740-4

2. Required Laboratory Manual

Wentworth, R. A. D., and Munk, Barbara H., *Experiments in General Chemistry IIth Edition*, , Cengage Learning (2013),
ISBN 978-1-111-98942-2

Other Resources

Use of Technology (if applicable)

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Evaluation & Requirements of Students

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

College Attendance Policy

At BMCC, the maximum number of absences is limited to one more hour than the number of hours a class meets in one week. For example, you may be enrolled in a three-hour class. In that class, you would be allowed 4 hours of absence (not 4 days). In the case of excessive absences, the instructor has the option to lower the grade or assign anF or WU grade.

Academic Adjustments for Students with Disabilities

Students with disabilities who require reasonable accommodations or academic adjustments for this course must contact the Office of Services for Students with Disabilities. BMCC is committed to providing equal access to all programs and curricula to all students.

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 website, www.bmcc.cuny.edu. For further information on integrity and behavior, please consult the collegebulletin (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
	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

	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	Combining the 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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Laboratory Syllabus

Expt	Title	Page
	Laboratory Safety, Laboratory Rules and Check In	
1C	Measurements of Mass and Volume	31
1A	Identification of Unknown Compound	15
1B	Paper Chromatography	23
2	Isotopes and Mass Spectroscopy	41
3A	Empirical Formula of an Oxide	57
3B	Hydrates and Their Thermal Decomposition	65
4B	Ionic Reactions in Aqueous Solutions	87
4C	How Much Acetic Acid in Vinegar?	97
	Molar Mass of a Volatile Liquid	
6	Thermochemistry and Hess's Law	121
7	Absorption Spectrum of Cobalt (II) Chloride	137
9A	Identity of an Insoluble Precipitate	159
8	Solubilities Within A Family	151
	Molecular Geometry: VSEPR	
11	A Student's View of Liquids and Solids	201