

North South University
Department of Biochemistry and Microbiology
General Chemistry CHE101.06
Summer 2020



Instructor: Mainul Hossain, Ph.D. (MH1)
Office: SAC 809
Office phone: + (880) -2- 55668200 Ext. 1920
E-mail: mainul.hossain01@northsouth.edu
Google Class code: **s4ykha3**

Class Hours		
General Chemistry, CHE101.06	MW 11.20 am – 12.50 pm	Online
S (Student consultation Hours)	2.30 am – 4.10 pm	vjqkykr
M (Student consultation Hours)	1.00 pm – 2.30 pm	
Dear Students, you are always welcome to discuss any problem you have while studying the lecture. Outside the virtual office schedule if you need please shoot me email or call me anytime.		

Course description: General Chemistry (CHE101) is a one semester course designed to teach the students to the systematic treatment of fundamental chemical and physical principles and their applications to the properties and transformations of materials, including the concept of energy and its uses, gas laws, kinetic molecular theory, laws of chemical combination, atomic and molecular structure, periodic classification of the elements, chemical bonding and introductory organic chemistry. Credit 3 units.

Textbooks + Hand out	CHEMISTRY, 10 th ed. Author: Raymond Chang
	CHEMISTRY: The Molecular Nature of Matter and Change, 7 th ed. Author: Silberberg, Martin S.

Learning outcomes: After completing General Chemistry (CHE101), students will be able to:

1. Perform calculations involving chemical and physical processes, use the dimensional analysis method, record numerical answers with proper units, and attain proficiency in the proper use of scientific notation and significant figures, including the concept of uncertainty in scientific measurements.
2. Name ions and compounds, write their chemical formulas, calculate their molar masses and percent composition, and determine the empirical and molecular formulas of compounds.
3. Classify substances, reactions, and processes according to various classification schemes.
4. Complete and balance chemical equations, determine whether a reaction actually occurs based on chemical and physical properties of the reactants and products, and solve stoichiometry problems.
5. Describe and calculate the energy changes involved in chemical reactions and physical processes.
6. Describe the atomic and electronic structure of the elements.
7. Predict the relative magnitudes of physical properties of elements based on their electronic structures.
8. Determine the structures, shapes and polarity of compounds/organic compounds.
9. Describe properties of real and ideal gases using the Kinetic Molecular Theory and solve gas law problems.

Class Rules:

1. Keep the following items to every class: Notebook, Calculator, Periodic table, Textbook.
2. No make-up quiz will be taken and no incomplete grade (I) will be given.
3. Make-up Mid will be taken only for considerable reasons and must be informed earlier by e-mail or via phone.

Grading: NSU grading policy: <http://www.northsouth.edu/academic/grading-policy.html>

Methods of assessing outcomes: The expected learning outcomes will be assessed using assessment types such as quizzes, midterm and final.

Tentative Assessment Plan for Summer 2020		
This tentative assessment plan will likely to be followed but they are subject to change by the instruction of the higher authority immediately	Assessment Types	100-point total
	Quiz (3 to 4)	30%
	Midterm (one)	30%
	Final Assignment	35%
	Attendance	5%

Courtesy Student code of conduct: This is a standard size class and can get noisy at times if everybody talks at once. Please respect those who want to hear by not participating in disruptive conversation, by not allowing cell phones to ring or by making derogatory remarks to others. You will be asked to leave if others complain about your behavior. All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students must be familiar with the Student conduct Code. The Code is available for review online at: <http://www.northsouth.edu/student-code-of-conduct.html>.

Disclaimer: The instructor holds the right to make necessary changes to the syllabus and the grading policies outlined here to best accommodate the interest of the class.

Tentative Summer 2020 Recitation/Quiz/Final Assessment Schedule			
Ch #	Contents in Brief (Raymond Chang)	Page	Lecture
1	The Study of Change (Q-1) Chemistry: A Science for the Twenty-First Century, the Study of Chemistry, the Scientific Method, Classifications of Matter, The Three States of Matter, Physical and Chemical Properties of Matter, Measurement, The Importance of Units, Handling Numbers, Dimensional Analysis in Solving Problems	1-35	L1, L2 & L3
2	Atoms, Molecules, and Ions (Q-1) The Atomic Theory, the Structure of the Atom, Atomic Number, Mass Number, and Isotopes, the Periodic Table, Molecules and Ions, Chemical Formulas, Naming Compounds	36-74	
7	Quantum Theory and the Electronic Structure of Atoms (Q-2) From Classical Physics to Quantum Theory, Quantum Numbers, Atomic Orbitals, Electron Configuration, The Building-Up Principle	277-327	L4 & L5
8	Periodic Relationships among the Elements (Q-2) Development of the periodic table, rules for writing electron configurations of cations and anions, logical way to build up the periodic table, periodic trends in physical properties such as the size of atoms and ions in terms of effective nuclear charge, chemical properties like ionization energy and electron affinity	328-369	L6, L7 & L8
9	Chemical Bonding, I (M) Basic understanding of chemical bonding: Lewis Dot Symbols, The Ionic Bond, Lattice Energy of Ionic Compounds, The Covalent Bond, Electronegativity, Writing Lewis Structures, Formal Charge and Lewis Structure, The Concept of Resonance, Exceptions to the Octet Rule, Bond Enthalpy	370-413	L9 & L10
10	Chemical Bonding II (M) Molecular Geometry and Hybridization: Molecular Geometry, Dipole Moment, Valence Bond Theory, Hybridization of Atomic Orbitals, Hybridization in Molecules Containing Double and Triple Bonds, Molecular Orbital Theory, Molecular Orbital Configurations, Delocalized Molecular Orbitals	414-466	L11 & L12
5	Gases(Q-3) Ideal Gases Substances That Exist as Gases, Pressure of a Gas, The Gas Laws, The Ideal Gas Equation, Gas Stoichiometry, Dalton's Law of Partial Pressures, The Kinetic Molecular Theory of Gases	171-229	L13 & L14
3	Mass Relationship in Chemical Reactions(F) (Q-4) Atomic Mass, Avogadro's Number and Molar Mass of an Element, Molecular Mass, The Mass Spectrometer, Percent Composition of Compounds, Experimental Determination of Empirical Formulas, Chemical Reactions and Chemical Equations, Amounts of Reactants and Products, Limiting Reagents, Reaction Yield	78-119	L15 & L16
4	Reactions in Aqueous Solutions (F) General Properties of Aqueous Solutions, Precipitation Reactions, Total and Net Ionic equations, Acid-Base Reactions, Oxidation-Reduction Reactions, Concentration of Solutions, Gravimetric Analysis, Acid-Base Titrations, Redox Titrations	120-171	L17, L18, L19 & L20
6	Thermo-chemistry (F) The Nature of Energy and Types of Energy, Energy Changes in Chemical Reactions, Introduction to Thermodynamics, Enthalpy of Chemical Reactions, Calorimetry, Standard Enthalpy of Formation and Reaction, Heat of Solution and Dilution	116-169	L21 - L24