

Introduction to Chemistry (CHEM101)

Syllabus for Intensive Summer

University of Louisville



Instructor: Dr. Elba Michelena de Baez

Class Schedule: Monday to Friday from 5:00 PM to 9:00 PM.

Required Textbook: A Molecular Approach, 2nd Ed by Nivaldo Tro. Pearson Education ISBN: 0321809246

Course Description and Organization

General Chemistry course for many students interested in science, engineering, preprofessional and other majors. This course also fulfills a General Education credit in Natural Sciences. Chem101 covers topics such as matter, measurement, problem solving, atoms, elements, molecules, compounds, chemical equations, chemical quantities, aqueous reactions, gases, thermochemistry, the quantum-mechanical model of the atom, periodic properties of the elements, chemical bonding, Lewis theory, molecular shapes, valence bond theory, and molecular orbital theory.

The material for this semester will be taken from Chapters 01 to 10, but not everything in those Chapters will be covered. At the end, the student will get a more deep understanding of how the general principles of chemistry find application in a wide broad spectrum of engineering and applied sciences.

The educational strategy to be followed in this class will be centered on the students active engagement with blackboard supported interactive assignments (video clips, on-line tutorials, on-line quizzes, discussion questions, virtual chemlab activities in the classroom, and demonstrations) combined with short multi-media lecture sessions consisting of power-point supported interactive presentations.

Course Objectives: At the end the student will be able to understand the relationships between matter, atoms and molecules, physical and chemical changes, modern atomic theory and the laws that led to it, the structure of the atom, the chemical bonds, chemical formulas, the stoichiometry of a reaction, solution concentration, acid-base and gas evolution reactions, oxidation and reduction reactions, gases and the simple gas laws and the ideal gas law. In addition the student will be prepared to solve basic problems associated with the above mentioned general chemistry topics with a more deep understanding of how the general principles of chemistry find application in a wide broad spectrum of disciplines like medicine, engineering and applied sciences.

Attendance Policy

Students are responsible for attending at least 80% of the scheduled classes in order to have the right to receive a grade. The professor has the right to make an exception to the 80% attendance policy based on the student's situation and only if the student has requested the exception in writing.

Academic Integrity

Academic dishonesty is prohibited at the University of Louisville-Panama. It is a serious offense because it diminishes the quality of scholarship, makes accurate evaluation of student progress impossible, and defrauds those in society who must ultimately depend upon the knowledge and integrity of the institution and its students and faculty. Academic dishonesty includes, but is not limited to: cheating, falsification, plagiarism, multiple submission, fabrication, complicity in academic dishonesty, and multiple submission.

Penalizations for engaging in academic dishonesty may include: an F on the assignment, an F on the course, a permanent letter placed in the student's file, suspension, and expulsion. The extent of the penalization will be decided by the professor with due support from the university's academic authorities.

Disability Policy

The University of Louisville-Panama is committed to providing access to programs and services for qualified students with disabilities. If you are a student with a disability and require accommodation to participate in and complete requirements for this class, contact the Academic Dean of UofLP-QLU, Mariana León, for verification of eligibility and determination of specific accommodations.” Please speak to me about any concerns you may have.

UNIVERSITY OF LOUISVILLE GRADING SYSTEM

Grade	GRADE POINT PER UNIT	
A+	4.0	97 – 100
A	4.0	94 - 96
A-	3.7	90 - 93
B+	3.3	86 - 89
B	3.0	83 - 85
B-	2.7	80 - 82
C+	2.3	76 - 79
C	2.0	73 - 75
C-	1.7	70 - 72
D+	1.2	66 - 69
D	1.0	63 - 65
D-	0.7	60 - 62
F	0.0	59 and lower

Grading Policies: There will be one scheduled Partial Tests of one hour on Friday at the end of the first week and another on Friday at the end of the second week (100 pts each one) . There will be daily quizzes from Monday to Thursday each week (100 pts). Total of 300 pts.

Calculations: Electronic calculators are necessary for homework and examinations. A calculator capable of standard math functions and scientific notation is required for this course. Bring the calculator to every exam and to every recitation meeting, and be certain it has a charge on it. Be certain you know how to use your calculator.

Attendance: Attendance has a direct contribution to grading. Phones, pagers and other devices must have audible signals turned off during lectures and exams. Furthermore, all communication devices must be out of view.

CHEM101 Tentative Lecture Schedule

Textbook: A Molecular Approach, 2nd Ed. Nivaldo Jose Tro

Class	Chap	Topic	Pages
I	1 & 2	<p>Chapter 1. Matter, Measurement, and Problem Solving: Atoms and Molecules. The classification of Matter. Physical and Chemical Changes and Physical and Chemical Properties. The Units of Measurement. The Reliability of a Measurement.</p> <p>Chapter 2. Atoms and Elements: Imaging and Moving Individual Atoms. Early Ideas about the Building Blocks of Matter. Modern Atomic Theory and the Laws That Led to It. The Discovery of the Electron. The Structure of the Atoms. Subatomic Particles: Protons, Neutrons, and Electrons in Atoms. The Periodic law and the Periodic Table. Atomic Mass. Molar Mass.</p>	1 - 77
II	3	<p>Chapter 3: Molecular, Compound, and Chemical Equations: Hydrogen, Oxygen, and Water. Chemical Bonds. Ionic and, Covalent Bonds. Representing Compounds: Chemical Formulas and Molecular Models. Ionic Compounds: Formulas and Names. Molecular Compounds: Formulas and Names. Formula Mass and the Mole Concept for Compounds. Composition of Compounds. Writing and Balancing Chemical Equations.</p>	78- 125
III	4	<p>Chapter 4: Chemical Quantities and Aqueous Reactions: Reaction Stoichiometry. Limiting Reactant, Theoretical Yield, and Percent Yield. Solution Concentrations Types of Aqueous Solutions and Solubility.</p>	126-177
IV	5	<p>Chapter 5: Gases: The Simple Gas Laws: Boyle's Law, Charles's Law, and Avogadro's Law. The ideal Gas Law. Applications of the Ideal Gas Law: Molar Volume, Density, and Molar Mass of a Gas. Mixture of Gases and Partial Pressures.</p>	178 - 229
V		General Review and Mid - Term I	
VI	6	<p>Chapter 6. Thermochemistry: Nature of Energy, Classification of energy, Some forms of Energy, Conservation of Energy. System and Surroundings. Units of Energy. Energy of Use. The first Law of Thermodynamics: Law of Conservation of Energy, Energy Exchange. Enthalpy. Endothermic and Exothermic Reactions.</p>	230 - 310
VII	7	<p>Chapter 7. The Quantum-Mechanical Model of the Atom: The Beginnings of Quantum Mechanics. The Nature of Light. Rutherford's Nuclear Model. The Bohr Model of the Atom. Quantum Numbers. Energy Levels and Sublevels. The Shapes of Atomic Orbitals.</p>	311 -370
VIII	8	<p>Chapter 8: Periodic Properties of the Element: Mendeleev. Electron Configurations. Electron Spin. Quantum Numbers. Orbital Diagrams. Pauli Exclusion Principle. Filling the Orbitals with Electrons. Valence Electrons. Electron Configuration and the Periodic Table. Electron Configuration of Anions and Cations. Trends in Atomic Radius, Ionization Energy, and Electron Affinity.</p>	371 - 450

IX	9	Chapter 9: Chemical Bonding I: The Lewis Model. Chemical Bonding. Bonding Theories. Lewis Bonding Theory. Types of Bonds: Ionic, Covalent, and Metallic. Lewis Structure of Atoms. Octet Rule. Polar Covalent Bonding. Bond Polarity. Electronegativity. Dipole Moments. Formal Charge	451 - 520
IX	10	Chapter 10: Chemical Bonding II: Molecular Shapes. Valence Bond Theory, and Molecular Orbital Theory. Polarity of Molecules. Valence Bond Theory. Hybridization: sp^3 , sp^2 , sp . Types of Bonds: sigma and pi. LCAO. Molecular Orbital Theory. Bonding and Antibonding Orbitals.	521 - 610
X		General Review and Mid - Term II	