The University of Jordan
Department of Chemistry
General Chemistry 1 (0303101)
Course Syllabus. First Semester 2021/2022

I) TEXTBOOK:

General Chemistry, D. Ebbing and S Gammon, 11th edition, Cengage Learning, 2017.

II) EVALUATION SCHEME, GRADING SYSTEM & EXAM DATES:

Quiz	20%	Date and time: To Be Announced
Midterm exam	30%	Date and time: To Be Announced
Final exam	50%	Date and time: To Be Announced
Total	100%	

The letter grade scale is adopted at The University of Jordan.

III) COURSE OUTLINE:

1. Chemistry and Measurement (3 lectures)

1.1 Modern Chemistry; **1.2** Experiment and Explanation; **1.3** Law of Conversation of Mass; **1.4** Matter: Physical State and Chemical Composition; **1.5** Measurement and Significant Figures; **1.6** SI Units; **1.7** Derived Units; **1.8** Units and Dimensional Analysis.

2. Atoms, Molecules, and Ions (4 lectures)

2.3 Nuclear Structure and Isotopes; **2.4** Atomic Weights; **2.8** Naming Simple Compounds; **2.9** Writing Chemical Equations; **2.10** Balancing Chemical Equations. *Excluded sections: 2.1, 2.2, 2.5, 2.6, 2.7*

3. Calculations with Chemical Formulas and Equations (5 lectures)

3.1 Molecular Weight and Formula Weight; **3.2** The Mole Concept; **3.3** Mass Percentages from the Formula; **3.4** Elemental Analysis: Percentages of Carbon, Hydrogen, and Oxygen; **3.5** Determining Formulas; **3.6** Molar Interpretation of a Chemical Equation; **3.7** Amounts of Substances in a Chemical Reaction; **3.8** Limiting Reactant, Theoretical and Percentage Yields.

4. Chemical Reactions (5 lectures)

4.1 Ionic Theory of Solutions and Solubility Rules; **4.2** Molecular and Ionic Equations; **4.3** Precipitation Reactions; **4.4** Acid-Base Reactions; **4.5** Oxidation-Reduction Reactions; **4.6** Balancing Simple Oxidation–Reduction Equations; **4.7** Molar Concentration; **4.8** Diluting Solutions; **4.9** Gravimetric Analysis; **4.10** Volumetric Analysis.

5. The Gaseous State (5 lectures)

5.1 Gas Pressure and Its Measurement; **5.2** Empirical Gas Laws; **5.3** The Ideal Gas Law; **5.4** Stoichiometry Problems Involving Gas Volumes; **5.5** Gas Mixtures: Law of Partial Pressures; **5.6** Kinetic Theory of an Ideal Gas; **5.7** Molecular Speeds: Diffusion and Effusion; **5.8** Real Gases.

6. Thermochemistry (5 lectures)

6.1 Energy and Its Units; **6.2** First Law of Thermodynamics, Work and Heat; **6.3** Heat of Reaction, Enthalpy of Reaction; **6.4** Thermochemical Equations; **6.5** Applying Stoichiometry to Heats of Reaction; **6.6** Measuring Heats of Reaction; **6.7** Hess's Law; **6.8** Standard Enthalpies of Formation. *Excluded section: 6.9*

7. Quantum Theory of the Atom (3 lectures)

7.1 The Wave Nature of Light; **7.2** Quantum Effects and Photons; **7.3** The Bohr Theory of the Hydrogen Atom; **7.4** Quantum Mechanics; **7.5** Quantum Numbers and Atomic Orbitals.

8. Electron Configurations and Periodicity (4 lectures)

8.1 Electron Spin and Pauli Exclusion Principle; **8.2** Building-Up Principle and the Periodic Table; **8.3** Writing Electron Configurations Using the Periodic Table; **8.4** Orbital Diagrams of Atoms, Hund's Rule; **8.6** Some Periodic Properties. *Excluded sections: 8.5, 8.7*

9. Ionic and Covalent Bonding (5 lectures)

9.1 Describing Ionic Bonds; **9.2** Electron Configurations of Ions; **9.3** Ionic Radii; **9.4** Describing Covalent Bonds; **9.5** Polar Covalent Bonds and Electronegativity; **9.6** Writing Lewis Electron-Dot Formulas; **9.7** Delocalized Bonding: Resonance; **9.8** Exceptions to the Octet Rule; **9.9** Formal Charge and Lewis Formulas; **9.10** Bond Length and Bond Order; **9.11** Bond Enthalpy.

10. Molecular Geometry and Chemical Bonding Theory (3 lectures)

10.1 The Valence-Shell Electron-Pair Repulsion (VSEPR) Model; **10.2** Dipole Moment and Molecular Geometry; **10.3** Valence Bond Theory; **10.4** Description of Multiple Bonding; **10.5** Principles of Molecular Orbital Theory. *Excluded sections: 10.6, 10.7*

Academic Integrity: All students are expected to follow the rules and instructions of The University of Jordan. Absences exceeding 15% of the total number of class meetings will result in (F) grade. All incidents of cheating or breaching the discipline, during the class meeting and/or the exam, will be taken very seriously and will not be tolerated.

A piece of advice to our students: Keep up to date in your study. Cramming does not work in chemistry courses. Work out, by yourself, as many exercises and problems as you can (you'll find a lot of them at the end of each chapter). Remember that chemistry is studied with a pen in the hand and a lot of papers on the desk! By doing so, it is most likely that you will have a deep understanding of the subject and will get excellent marks. *Good Luck!*