The University of Jordan
Department of Chemistry
General Chemistry II (0303102)
Course Syllabus
First Semester 2020/2021

TEXTBOOK:

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

EVALUATION SCHEME, GRADING SYSTEM & EXAM DATES:

Quizzes and Assignments	20%	During the Semester
Mid-Term	30%	Date and time: TBA
Final exam	50%	Date and time: TBA
Total	100%	

INSTRUCTORS:

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The **office Hours** for the instructors will be posted in the Moodle.

COURSE OUTLINE:

Chapter 11: States of Matter; Liquids and Solids (6 lectures)

11.1 Comparison of Gases, Liquids, and Solids; **11.2** Phase Transitions; **11.3** Phase Diagrams; **11.4** Properties of Liquids: Surface Tension and Viscosity; **11.5** Intermolecular Forces: Explaining Liquid Properties. *Excluded sections: 11.6, 11.7, 11.8, 11.9, 11.10.*

Chapter 12: Solutions (5 lectures)

12.1 Types of Solutions; **12.2** Solubility and the Solution Process; **12.3** Effects of Temperature and Pressure on Solubility; **12.4** Ways of Expressing Concentration;**12.5** Vapor Pressure of a Solution; **12.6** Boiling-Point Elevation and Freezing-Point Depression; **12.7** Osmosis; **12.8** Colligative Properties of Ionic Solutions. *Excluded section: 12.9.*

Chapter 13: Rates of Reactions (5 lectures)

13.1 Definition of Reaction Rate; **13.2** Experimental Determination of Rate; **13.3** Dependence of Rate on Concentration; **13.4** Change of Concentration with Time; **13.5** Temperature and Rate; Collision and Transition-State Theories; **13.6** Arrhenius Equation; **13.7** Elementary Reactions; **13.8** The Rate Law and the Mechanism; **13.9** Catalysis.

Chapter 14: Chemical Equilibrium (5 lectures)

14.1 Chemical Equilibrium—A Dynamic Equilibrium; **14.2** The Equilibrium Constant; **14.3** Heterogeneous Equilibria: Solvents in Homogeneous Equilibria; **14.4** Qualitatively Interpreting the Equilibrium Constant; **14.5** Predicting the Direction of Reaction; **14.6** Calculating Equilibrium Concentrations; **14.7** Removing Products or Adding Reactants; **14.8** Changing the Pressure and Temperature; **14.9** Effect of a Catalyst.

Chapter 15: Acids and Bases (4 lectures)

15.1 Arrhenius Concept of Acids and Bases; **15.2** Bronsted–Lowry Concept of Acids and Bases; **15.3** Lewis Concept of Acids and Bases; **15.4** Relative Strengths of Acids and Bases; **15.5** Molecular Structure and Acid Strength; **15.6** Autoionization of Water; **15.7** Solutions of a Strong Acid or Base; **15.8** The pH of a Solution.

Chapter 16: Acid-Base Equilibria (3 lectures)

16.1 Acid-Ionization Equilibria; **16.2** Polyprotic Acids; **16.3** Base-Ionization Equilibria; **16.4** Acid–Base Properties of Salt Solutions; **16.5** Common-Ion Effect; **16.6** Buffers. *Excluded section: 16.7*

Chapter 17: Solubility and Complex-Ion Equilibria (2 lectures)

17.1 The Solubility Product Constant; **17.2** Solubility and the Common-Ion Effect; **17.3** Precipitation Calculations. *Excluded sections: 17.4, 17.5, 17.6, 17.7.*

Chapter 18: Thermodynamics and Equilibrium (6 lectures)

18.2 Entropy and the Second Law of Thermodynamics; **18.3** Standard Entropies and the Third Law of Thermodynamics; **18.4** Free Energy and Spontaneity; **18.5** Interpretation of Free Energy; **18.6** Relating ΔG° to the Equilibrium Constant; **18.7** Change of Free Energy with Temperature. *Excluded section: 18.1*

Chapter 19: Electrochemistry (6 lectures)

19.2 Construction of Voltaic Cells; **19.3** Notation for Voltaic Cells; **19.4** Cell Potential; **19.5** Standard Cell Potentials and Standard Electrode Potentials; **19.6** Equilibrium Constants from Cell Potentials; **19.7** Dependence of Cell Potential on Concentration; **19.11** Stoichiometry of Electrolysis. *Excluded sections: 19.1, 19.8, 19.9, 19.10.*

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. Make-up exams are strictly applied according to university regulations. 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 will 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!*