COURSE DESCRIPTIONS

Faculty	Science				
Department	Chemistry			**NQF level**	
Course Title	General chemistry (1)	**Code**	190101	**Prerequisite**	
Credit Hours	3	**Theory**	3	**Practical**	
Course Leader	Dr. Ahmad Lafi	**email**	a.ahmad@jadara.edu.jo		
Lecturers	Dr. Ahmad Lafi Dr. Haneen Al Othman	**emails**	a.ahmad@jadara.edu.jo h.alothman@jadara.edu.jo		
Lecture time	08:30-10:00 am	**Classroom**	F413	**Attendance**	Fulltime
Semester	1st semester 2025/2026	**Production**	2017	**Updated**	2025
Type of Teaching	✓Blended				

Short Description

Introduction; Atoms, molecules and ions; Stoichiometry; Reactions in chemical solutions; Atomic structure; Periodic table, Chemical bonding (I): covalent bonds; chemical bonding (II): Molecular geometry and hybridization; Gases.

Course Objectives

1. Recognize the basics and fundamental concepts related to matter and its properties, atomic structure, atoms, molecules, ions, the periodic table, stoichiometry, solutions, chemical reactions, chemical equations and balancing, and chemical bonding.

2. Solve problems related to measurements, stoichiometry, solutions, chemical reactions, atomic structure, and gases

3. Determine names of chemical compounds, solubility of chemical compounds, types of chemical bonding, types of chemical reaction, polarity of molecules, molecular geometry, hybridization and periodicity in periodic table.

Learning Outcomes

A. Knowledge - Theoretical Understanding

A1 Be able to understand the basic concepts of stoichiometry
A2 Be able to understand the basic concepts of energy.
A3 Be able to understand the basic concepts of chemical equilibrium

B. Knowledge - Practical Application

A4 Understand concepts of atomic structure

C. Skills – Generic Problem Solving and Analytical Skills

B1 Distinguish energy applications needs and requirements

D. Skills – Communication, ICT, and Numeracy
B2 Analyze and compare the different applications requirements
E. Competence: Autonomy, Responsibility, and Context
C1 Implement solution of reactions rate C2 Implement solution of thermo chemistry.
Teaching and Learning Methods
✓ Face to Face Lectures ✓ Brain Storming ✓ Synchronous remote ✓ Asynchronous remote ✓ Using Video ✓ Discussions ☐ Research Project ☐ Problem solving
Assessment Methods
✓ Formative Assessment ✓ Midterm ✓ Final Exam

Course Contents					
Week	**Hours**	**CLOs**	**Topics**	**Teaching & Learning Methods**	**Assessment Methods**
1	3	B2, C3	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	Discussion Brainstorming Advanced Lecture (Presentations)	Short quizzes, Exams
2	3	A1, B2, C3	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	Discussion Brainstorming	Short quizzes, homework
3	3	A1, B2, C3	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 Chemical Reaction 3.8 Limiting Reactant, Theoretical	Advanced Lecture (Presentations) Discussion Brainstorming	quizzes - homework – exams

			and Percentage Yields		
4	3	B2, C3	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	Advanced Lecture (Presentations) Brainstorming	quizzes - homework – exams
5	3	A3, C3	4.6 Balancing Simple Oxidation–Reduction Equations 4.7 Molar Concentration 4.8 Diluting Solutions 4.9 Gravimetric Analysis 4.10 Volumetric Analysis	Advanced Lecture (Presentations) Brainstorming	quizzes - homework – exams
6	3	B1, B2, C1, C3	5.1 Gas Pressure and Its Measurement 5.2 Empirical Gas Law 5.3 The Ideal Gas Law 5.4 Stoichiometry Problems Involving Gas Volumes	Advanced Lecture (Presentations) Using instructional technologies	quizzes - homework – exams
7	3	B1, B2, C1, C3	5.5 Gas Mixtures: Law of Partial Pressures 5.6 Kinetic theory of an ideal gas 5.7 Molecular Speeds: Diffusion and Effusion	Advanced Lecture (Presentations) Using instructional technologies	quizzes - homework – exams
8+9	6	B1, B2, C1, C3	6.1 Energy and Its Units 6.2 First Law of Thermodynamics, Work and Heat 6.2 First Law of Thermodynamics, Work and Heat 6.3 Heat of Reaction, Enthalpy of Reaction 6.4 Thermochemical Equations	Advanced Lecture (Presentations) Using instructional technologies	quizzes – homework – exams
9+10	6	B1, C2	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	Advanced Lecture (Presentations) Using instructional technologies	quizzes - homework – exams
11+12	5	A3, C3	7.4 Quantum Mechanics 7.5 Quantum Numbers and Atomic Orbitals 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	Advanced Lecture (Presentations) Using instructional technologies	quizzes - homework – exams
12+13	4	A3, C3	8.6 Some Periodic Properties 9.1 Describing Ionic Bonds 9.2 Electron Configurations of	Advanced Lecture (Presentations)	quizzes - homework

			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	Using instructional technologies	– exams
13+14	4	B1, B2, C1, C3, A4	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 10.1 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	Advanced Lecture (Presentations) Using instructional technologies	quizzes - homework – exams
15+16			Final exam		

Infrastructure	
Textbook	Required book (s), assigned reading and audio-visuals: Chemistry, 11th ed., S. Zumdahl & S. Zumdahl, Brooks Cole, 2024.
References	B- Recommended book (s), materials, and media: General Chemistry, The essential concept, 7th ed., R. Chang, McGraw-Hill, 2016. (still the last edition)
Required reading	Textbooks are obligatory and required by the students
Electronic materials	Provided to the students through JU e-learning website.
Other	In addition to the above, the students will be provided with handouts by the lecturer.

Course Assessment Plan									
Assessment Method		**Grade**	**CLOs**						
			A1	**A3&a 2**	**B1**	**B2**	**C1**	**C2**	**A2**
First (Midterm)		30%	6	8	1	0	7	8	0
Second (if applicable)									
Final Exam		40%	5	7	5	5	4	7	7
Coursework									
sewo rk asses smen t	Assignments	15%	2	2	2	0	2	2	2
	Case study								

	Discussion and interaction								
	Group work activities								
	Lab tests and assignments								
	Presentations								
	Quizzes	15%	3	3	3	0	3	3	3
Total		100%	16	20	11	5	16	20	12

Plagiarism
Plagiarism is claiming that someone else's work is your own. The department has a strict policy regarding plagiarism and, if plagiarism is indeed discovered, this policy will be applied. Note that punishments apply also to anyone assisting another to commit plagiarism (for example by knowingly allowing someone to copy your code). Plagiarism is different from group work in which a number of individuals share ideas on how to carry out the coursework. You are strongly encouraged to work in small groups, and you will certainly not be penalized for doing so. This means that you may work together on the program. What is important is that you have a full understanding of all aspects of the completed program. In order to allow proper assessment that this is indeed the case, you must adhere strictly to the course work requirements as outlined above and detailed in the coursework problem description. These requirements are in place to encourage individual understanding, facilitate individual assessment, and deter plagiarism.