	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al-Anbiyaa College of Advanced Technologies Department of Radiology and Nuclear Medicine Techniques	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Principles of Chemistry 1			**Module Delivery**	
Module Type	Core			☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	RSNM101				
ECTS Credits	7.00				
SWL (hr/sem)	175				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Radiology and Nuclear Medicine		**College**	College of Advanced Technologies	
Module Leader	Yusor Fadhil Abdulameer		**e-mail**	yusor.fadhil@ouwa.edu.iq	
Module Leader's Acad. Title	Lecturer Dr.		**Module Leader's Qualification**	PhD	
Module Tutor	Yusor Fadhil Abdulameer		**e-mail**		
Peer Reviewer Name	Name		**e-mail**		
Scientific Committee Approval Date	21/1/2026		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Principles of Chemistry	**Semester**	1
Co-requisites module	NA	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This module aims to equip students with fundamental knowledge of chemical principles necessary for further study in scientific and health-related disciplines. It seeks to develop an understanding of atomic and molecular structure, periodic trends, chemical bonding, stoichiometry, thermochemistry, acids and bases, and chemical equilibrium. The module also aims to enhance students' quantitative and analytical skills, promote scientific reasoning, and enable students to apply chemical concepts to laboratory practice and real-world problems in accordance with academic and safety standards.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon successful completion of this module, students will be able to: 1. Demonstrate understanding of the fundamental principles of chemistry, including atomic structure and periodic trends. 2. Explain different types of chemical bonding and molecular structure. 3. Apply stoichiometric concepts to balance chemical equations and perform quantitative calculations. 4. Describe the physical states of matter and gas laws. 5. Explain basic thermochemical concepts and energy changes in chemical reactions. 6. Distinguish between acids and bases and explain pH calculations. 7. Describe the concept of chemical equilibrium and factors affecting it. 8. Perform basic laboratory experiments while adhering to safety regulations and good laboratory practice. 9. Interpret simple experimental data and present results using appropriate scientific terminology.
Indicative Contents المحتويات الإرشادية	Introduction to chemistry and basic laboratory safety • Atomic structure and periodic trends • Chemical bonding and molecular structure • Stoichiometry and chemical calculations • States of matter and gas laws • Thermochemistry and energy changes • Acids, bases, and pH

	• Chemical equilibrium • Introduction to organic and biochemistry concepts

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The module will be delivered through a combination of the following strategies: • Lectures to introduce core concepts and theories. • Interactive tutorials and problem-solving sessions to reinforce understanding and develop analytical skills. • Laboratory practical to develop experimental skills and apply theoretical knowledge. • Group discussions and case studies to enhance critical thinking and communication. • Self-directed learning through assigned readings and online resources. • Formative assessments (quizzes, assignments) to monitor progress and provide feedback.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	74	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	101	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation
تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	5	5 % (5)	2,5,8,10,13	LO # 1, 4, 5, 7,8
	Assignments	5	5 % (5)	1,4,7,11,15	LO # 1-15
	Lab.	10	10 % (10)	1-9	LO # 1-15
	Report	10	10 % (10)	1-8	LO # 1-15
Summative assessment	**Midterm Exam**	3 hr.	20 % (20)	9	LO # 1-15

	Final Exam	3 hr.	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction to Analytical Chemistry** Matter, structure of atom, periodic table, chemical bonds
Week 2	**Methods of Analysis** Qualitative & quantitative methods, principles of analysis
Week 3	**Solutions – Preparation & Concentration** Standard solution, concentration units (%, formal, molar, normal)
Week 4	**Molar & Normal Solutions** Calculations, dilutions, practical examples
Week 5	**Statistical Treatment of Analytical Data** Accuracy, mean, deviation, standard deviation, systematic & random errors, relative & absolute errors
Week 6	**Chemical Reactions** Equilibrium constant, reaction rate, catalysts, solubility, ionization
Week 7	**Neutralization & Acid-Base Theory** pH, buffers, titration endpoints, calculations
Week 8	**Oxidation-Reduction Equilibria** Redox reactions, balancing equations, practical examples
Week 9	**Precipitation Methods (Gravimetry)** Formation of ppt., types of ppt., titration, calculations
Week 10	**Spectroscopy** Optical spectroscopy, Beer's law, applications
Week 11	**Structure of Carbon Compounds** Alkanes, alkenes, alkynes, halogen compounds

Week 12	**Alcohols** Classification, properties, reactions
Week 13	**Aldehydes & Ketones** Properties, reactions, basic mechanisms
Week 14	**Carboxylic Acids, Amines, Aromatics, Hydrocarbons** Structure, properties, reactions
Week 15	**Nitro Compounds, Sulphonic Acids, Phenols, Aromatic Carboxylic Acids, Polynuclear Hydrocarbons** Overview, reactions, applications

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Laboratory instruction , safety rule , equipments
Week 2	Identification of some common inorganic cation
Week 3	Identification of some common inorganic anions
Week 4	Measurement Techniques: Mass, Volume, Temperature, and Density
Week 5	Scientific Measurements and Significant Figures
Week 6	Preparation of Solutions and Concentration Calculations
Week 7	Chemical Reactions: Observation of Physical and Chemical Changes
Week 8	Types of Chemical Reactions (Precipitation, Acid-Base, Redox), Redox)
Week 9	Stoichiometry Experiment: Mole Concept and Reaction Yield
Week 10	Acids and Bases: pH Measurement and Indicators
Week 11	Buffer Solutions and Their Importance in Biological Systems
Week 12	Gas Laws Experiment
Week 13	Reaction Rate and Factors Affecting Chemical Reactions
Week 14	Thermochemistry: Heat of Reaction and Calorimetry
Week 15	Preparation of Solutions and Concentration Calculations

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Chemistry: The Central Science – Brown, LeMay & Bursten 2. Chemical Principles – Zumdahl & DeCoste 3. OpenStax Chemistry 2e (Open Educational Resource) 4. CRC Handbook of Chemistry and Physics	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

رئيس القسم
م.د. يسر فاضل عبد الامير
التاريخ :

استاذ المادة
م.د. يسر فاضل عبد الامير
التاريخ: