	Ministry of Higher Education and Scientific Research - Iraq University of Tikrit College of Petroleum Process Engineering Department of Petroleum and Gas Refining Engineering	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Analytical Chemistry**			**Module Delivery**	
Module Type	**Support**			☒ Theory ☐Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**PGR112**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	**UGI**		**Semester of Delivery**		**1**
Administering Department	**PGR**		**College**	**PPE**	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		**MSc**
Module Tutor	**N/A**		**e-mail**	**N/A**	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	**1.0**	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**None**	**Semester**	
Co-requisites module	**None**	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Types of analytical chemistry, Errors, Statistical Treatment of Analytical Data and Separation Techniques, and Classifying Analytical Techniques. To study the Quantitative Methods of Analysis, Qualitative Methods of Analysis, and Applications of Analytical Chemistry. To study the Units for Expressing Concentration of Solutions, Stoichiometric Calculation, and Preparing Solutions. To know the Basic Tools and operations of Analytical Chemistry. To study the basics of spectroscopic methods of analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Understand the principles behind quantitative and qualitative analysis of chemical samples. Know how to design experiments to separate chemical components from mixtures. Understand the operating principles of analytical instrumentation, including UV-visible spectroscopy, atomic absorption spectroscopy, and electrochemical devices. Know how to use equilibrium chemistry to explain titration experiments.
Indicative Contents المحتويات الإرشادية	Part A: Definition of Analytical chemistry and solution concentration expressions [12 hr.]. Part B: Stoichiometric Calculations and Solutions Preparing [8 hr.]. Part C: Quantitative methods of analysis [20 hr.] Part D: Qualitative methods of analysis [16 hr.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to motivate students' participation in the class by raising questions and inquiries while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials, symposiums, simple experiments that are interesting to the students, and self-assessment tests.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	59	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	66	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (20)	5 and 10	#1 - #5, #6 - #10
	Assignments	2	8% (8)	4 and 13	#1- #4 and #5 - #13
	Projects / Lab.	4	8% (8)	Continuous	All
	Seminar	1	4% (4)	13	#5, and #6 - #14
Summative assessment	Midterm Exam	2hr	10% (10)	7	#1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	The Analytical Process & Chemical Measurements
Week 2	Concentration units; Molarity, Formality, Normality, Molality
Week 3	Stoichiometric Calculations and Solutions Preparing
Week 4	Gravimetric Methods of Analysis/ Precipitation Gravimetry
Week 5	Gravimetric Methods of Analysis/ Volatilization Gravimetry
Week 6	Gravimetric Methods of Analysis/ Particulate Gravimetry
Week 7	Titrimetric Methods of Analysis/ Titrations Based on Acid–Base Reactions
Week 8	Titrimetric Methods of Analysis/ Based on Complexation Reactions (EDTA Titration)
Week 9	Titrimetric Methods of Analysis/ Titrations Based on Redox Reactions
Week 10	Titrimetric Methods of Analysis/ Precipitation Titrations
Week 11	Spectroscopic Methods of Analysis/ UV-Vis Spectroscopy
Week 12	Spectroscopic Methods of Analysis/ Atomic Absorption Spectroscopy
Week 13	Electrochemical Methods of Analysis
Week 14	Potentiometric Methods of Analysis
Week 15	**Preparatory week before final exam**
Week 16	**Final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Lab 1: Introduction to the tools of analytical chemistry**
Week 2	**Lab 2: preparation standard solutions**
Week 3	**Lab 3: Determination of moisture content in a soil/ coal sample**
Week 4	**Lab 4: Estimation of HCl and CH_3COOH in mixture using acid base indicators**
Week 5	**Lab 5: Determination of Carbon Dioxide in a polluted water sample**
Week 6	**Lab 6: Determination of iron as iron (III) oxide by Gravimetry**
Week 7	**Lab 7: Estimation of Al^{3+} in the given solution using standard EDTA solution (Back Titration)**
Week 8	**Lab 8: Laboratory Reagents & Solvents: solubility tests**
Week 9	**Lab 9: Determination of dye concentration by UV-vis spectroscopy**
Week 10	**Lab 10: Metal content by atomic absorption**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Handbook of analytical chemistry by Harvey**	**Yes**
Recommended	**Fundamentals of analytical chemistry by Skoog Douglas A.**	**No**
Websites		

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.