

# MODULE DESCRIPTION FORM

Module Information			
Module Title	Analytical Chemistry		Module Delivery
Module Type	Basic		Theory ✓ Lab ✓ Tutorial ✓ Seminar ✓
Module Code	MPH102		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1	Semester of Delivery	1
Administering Department	Medical Physics	College	College of Sciences
Module Leader	Mohammed Abbas Jebur	e-mail	<a href="mailto:mohammed.jebur@uowa.edu.iq">mohammed.jebur@uowa.edu.iq</a>
Module Leader's Acad. Title	Assist Lect	Module Leader's Qualification	Ms.c
Module Tutor	Ashraf Hussain Saleh	e-mail	<a href="mailto:ashraf.h@uowa.edu.iq">ashraf.h@uowa.edu.iq</a>
Peer Reviewer Name	Dr. Ahmed Musa	e-mail	<a href="mailto:ahmed.mo@uowa.edu.iq">ahmed.mo@uowa.edu.iq</a>
Scientific Committee Approval Date	2026-12-20	Version Number	V 1.0

Relation with other Modules			
Prerequisite module	No	Semester	/
Co-requisites module	No	Semester	/

  
أ.د. سيماء حسين نونيل  
٢٠٢٥ - ٢٠٢٦



  
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**Department Head  
Approval**

**Dean of the College  
Approval**

**Module Aims, Learning Outcomes and Indicative Contents**

<b>Module Objectives</b>	<ul style="list-style-type: none"><li>. To provide a basic knowledge and understanding of essential chemical and physical principles for analytical chemistry.</li><li>. To introduce basic analytical techniques and practical aspects of classical chemical analysis.</li><li>. To solve problems related to chemical analysis and interpret analytical results</li></ul>
<b>Module Learning Outcomes</b>	<ol style="list-style-type: none"><li>1. explain the fundamentals of analytical chemistry and steps of a characteristic analysis.</li><li>2. expresses the role of analytical chemistry in science.</li><li>3. compare qualitative and quantitative analyses.</li><li>4. explain the volumetric analysis calculations</li><li>5. evaluate the analytical data in terms of statistics.</li><li>6. estimates kinds of errors in chemical analysis.</li><li>7. evaluates the effects of systematic errors on analytical results.</li></ol>
<b>Indicative Contents</b>	<p>Indicative content includes the following:</p> <p>Theoretical analytical chemistry includes the theoretical part of titrimetric methods of analysis with examples to understand how to prepare sample, calibrate it and analysis it to know its chemical information such as concentration, pH etc. (12)</p> <p>The quantitative analysis includes the explaining the technique that uses mathematical and statistical modeling, measurement, and research to understand behavior, and how it will be useful to the student in their life.(12)</p> <p>The elementary concept includes the Strong and weak electrolytes; important weight and concentration units, the evaluation of analytical data: Definition of terms. An introduction to gravimetric analysis: Statistical analysis of data; rejection of data; precipitation methods; gravimetric factor. (10)</p> <p>Chemical equilibrium includes the state of a system in which the concentration of the reactant and the concentration of the products do not change with time, and the system does not display any further change in properties. (14)</p> <p>Ionic equilibrium includes the equilibrium established between the unionized molecules and the ions in the solution of weak electrolytes is called ionic equilibrium.(12)</p>

	<p>Acids and bases the explain the meaning of their concept and the available theories that were obtained to describe their behavior.(15)</p> <p>Buffer solution includes the describe an acid or a base aqueous solution consisting of a mixture of a weak acid and its conjugate base, or vice versa.(15)</p>
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<b>Learning and Teaching Strategies</b>	
<b>Strategies</b>	<ul style="list-style-type: none"> <li>• <b>Discussion:</b> This strategy promotes active student engagement and encourages critical thinking. Students participate in group or whole- class discussions, sharing their perspectives, asking questions, and analyzing ideas.</li> <li>• <b>Cooperative Learning:</b> This approach involves organizing students into small groups to work collaboratively on tasks or projects. It fosters teamwork, communication skills, and peer learning.</li> <li>• <b>Reciprocal Teaching:</b> This strategy involves students taking turns leading discussions and summarizing key points. They actively engage in predicting, questioning, clarifying, and summarizing information to enhance comprehension.</li> <li>• <b>Effective learning strategies in the classroom</b> focus on active engagement, personalized learning, and utilizing various tools to enhance understanding and retention. These strategies aim to make learning more engaging, relevant, and impactful for students.</li> </ul>

<b>Student Workload (SWL)</b>			
<b>Structured SWL (h/sem)</b>	78	<b>Structured SWL (h/w)</b>	5.2
<b>Unstructured SWL (h/sem)</b>	97	<b>Unstructured SWL (h/w)</b>	6.4
<b>Total SWL (h/sem)</b>	<b>173 + 3 final = 175</b>		

<b>Module Evaluation</b>							
		Time/Number		Weight (Marks)		Week Due	Relevant Learning Outcome
		TH	LAB	TH	LAB		
<b>Formative assessment</b>	<b>Quizzes</b>	2	2	4	10	5 and 11	3,7
	<b>Homework assignment</b>	2	1	4	10	6 and 13	1,8
	<b>Onsite Assignments</b>	-	-	-	-	Continuous	All
	<b>Projects</b>	1	7	2	10	14	All
<b>Summative assessment</b>	<b>Midterm Exam</b>	1		10		7	
	<b>Final Exam</b>	3hr		50		15	
<b>Total assessment</b>				100 Marks			

### Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Introduction to Analytical Chemistry-Classification of Volumetric Methods
Week 2	Formality and Molarity with examples. Seminar-1
Week 3	Titrimetric Methods (Precipitation Titrimetry) . Tutorial of lec-1 and 3
Week 4	Standardization and End-Points
Week 5	Oxidation-Reduction Reactions Tutorial of lec-4
Week 6	Applications of Neutralization Titrations. Seminar-2
Week 7	Mid-semester Exam
Week 8	Discussion the Mid-semester Exam
Week 9	Constructing of redox titration curves. Seminar-3
Week 10	Oxidation-Reduction indicators
Week 11	Titration curves in Titrimetric Methods .Seminar-4
Week 12	pH effect on Solubility .Tutorial of lec-10 and 11
Week 13	Factors affected the pH of buffer solution. Seminar-5
Week 14	Chemical Equilibrium with examples
Week 15	Buffer solutions with examples .Tutorial of lec-14 and 15

### Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	Demonstration of some laboratory equipment.
Week 2	Separation and identification of group 1 cations (individual test).
Week 3	Preparation and standardization of an acid.
Week 4	Determination of the percentage of acetic acid.
Week 5	Discussion for the reports of experiment 2, 3 and 4.
Week 6	Prepare 0.1 N of sodium hydroxide powder.
Week 7	Prepare 0.1 M of sodium chloride powder.
Week 8	Precipitation of anion elements (Cl and Br)
Week 9	Discussion for the reports of experiment 4 and 5.
Week 10	Discussion of Projects-1
Week 11	Determination of chloride by the Volhard method.
Week 12	Preparation and standardization of 0.1N KMnO <sub>4</sub> .
Week 13	Discussion for the reports of experiment 6 and 7
Week 14	Gravimetric determination of Nickel.
Week 15	Discussion of Projects-2

### Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Fundamental of Analytical Chemistry, Douglas A. Skoog, Donald M. West, F. James Holler and Stanley R. Crouch.	No
Recommended Texts	Modern Analytical Chemistry.	No
Websites	<a href="https://sciences.uodiyala.edu.iq">https://sciences.uodiyala.edu.iq</a>	

## Grading Scheme

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