



<b>University of Petra</b>	 جامعة البترا University of Petra	 جامعة البترا - خمسة وعشرون عاما University of Petra Anniversary
<b>Faculty of arts and sciences</b>		
<b>Department of Chemistry</b>		
		<b>كلية الآداب والعلوم</b>
		<b>قسم الكيمياء</b>

### Course Syllabus

**Year:** 2016/2017

**Semester:** First

Course No.	Course Title	Prerequisite	Co-requisite	Credit Hours Lectures / Lab	ECT value: European Credit Transfer System
101344	Instrumental methods for analysis- Lab	101241	-	1	4

Instructor Name	e-mail	Office No.	Office ext.	Office Hours
DR. ABDEL MNIM ALTWEIQ	aaltweiq@uop.edu.jo	7114	6500	Sun., Tues., Thurs.: 10 <sup>00</sup> -11 <sup>00</sup> and 13 <sup>00</sup> – 14 <sup>00</sup> (Sun.) Mon., Wed.: 11 - 12

<b>Course Description</b>	A practical course of qualitative and quantitative chemical analysis by using different Instrumental methods. These methods include ultraviolet/visible spectroscopy, flame photometer, infrared absorption spectroscopy, electro analytical methods, high performance liquid chromatography and gas chromatography.
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#### Course Objectives

1. To develop in students the ability to apply their chemical knowledge and skills to the solution of theoretical and practical problems in chemistry.
2. To provide students with a knowledge and skills base from which they can proceed to further studies in specialized areas of analytical and instrumental chemistry or multi-disciplinary areas involving chemistry.
3. To instill in students a sense of enthusiasm for analytical and instrumental chemistry, an appreciation of its application in different contexts and to involve them in an intellectually stimulating and satisfying experience of learning and studying.

Course Intended Learning Outcomes (ILOs) and their Alignment with Program ILOs:  
 Successful completion of this module should lead to the following learning outcomes:

Course ILOs	Program ILOs	Teaching and Learning Method	Assessment Method
<b>Knowledge (K)</b>			
1. Describe the principles of quantitative and qualitative chemical analysis using different instrumental techniques.	<b>K (3)</b>	Explaining and discussion	Mid and final exams
<b>Intellectual Skills (I)</b>			
1. Estimate chemical data by performing calculations related to Faraday law, Nernst equation, Ohm low, and calculate the concentration by applying the electrochemical methods by the calibration and the normal chemical calculations.	<b>I (2)</b>	Explaining and discussion	Mid and final exams
<b>Practical skills (P)</b>			
1. Use of laboratory equipment and standard procedures & safely.	<b>P (1)</b>		Lab supervisor's evaluation
2. Prepare scientific reports.	<b>P (4)</b>		Reports Marks
<b>Transferable Skills (T)</b>			
1. Communication skills, covering both written and oral communication.	<b>T (1)</b>		

Assessment Methods:

Assessment method	Grade	Comments
Midterm Exam	25	<ul style="list-style-type: none"> <li>- Every student should bring his own scientific calculator when entering the exam lab. Calculators are not allowed to be exchanged between students during exam.</li> <li>- Students are not allowed to carry their mobiles inside exam lab.</li> </ul>
Reports	30	
Evaluation	5	
Final Exam	40	
Total	100	

Learning References:

1- Textbook: Principles of Instrumental analysis, 6 <sup>th</sup> Edition, D. A, Skoog, J. Holler & S. R. Crouch, Thomas Brook/Cole, 2007
2- References: Laboratory Manual of instrumental methods for analysis
3- Other Resources: << a lecture rooms with data show facility>>

### Course Schedule:

Week	Topics	Topic Details	Reference
1	Spectrophotometry in the visible region	To verify Beer's law and use it to determine an unknown concentration	Manual
2	Determination of iron in natural water	To determine the iron concentration in a real sample using the spectrophotometric technique.	Manual
3	UV-Visible absorption spectroscopy of caffeine and acetylsalicylic acid	<ol style="list-style-type: none"><li>1. To determine the concentrations of two different substances by using the UV spectrophotometry</li><li>2. Apply Beer's law for a mixture of substances.</li></ol>	Manual
4	IR spectroscopy	<ol style="list-style-type: none"><li>1. Perform chemical analysis using IR spectroscopy</li><li>2. Interpret the spectra that resulted from analysis from IR spectroscopy</li></ol>	Manual
5	Conductimetric titration of an acid mixture	Perform the conductometric titration to find a concentration of acid mixture	Manual
6	Liquid- solid chromatography	<ol style="list-style-type: none"><li>1. Separation of two substances by using the liquid-solid chromatography</li><li>2. Learn how to prepare the separation column</li></ol>	Manual
7	Ion- exchange chromatography	<ol style="list-style-type: none"><li>1. Separation of two substances by using ion-exchange chromatography</li><li>2. Learn how to prepare the cation exchange column</li></ol>	Manual
8	Determination of caffeine by HPLC	<ol style="list-style-type: none"><li>1. Perform the separation process caffeine</li><li>2. Calculate the efficiency and other parameters from a chromatogram</li></ol>	Manual
9	Determination of fluoride by ion selective electrode	<ol style="list-style-type: none"><li>1. Perform the real sample preparation</li><li>2. Perform the analysis by ISE to determine the concentration of fluoride in toothpaste</li></ol>	Manual
10	Determination of calcium by atomic absorption spectroscopy	Perform the analysis by AAS to determine the concentration of calcium	Manual

### Course Policies<sup>i</sup>

- Attendance Policy: University regulations apply to attendance.
- Academic Honesty: Academic dishonesty is an unacceptable mode of conduct, and will not be tolerated in any form at University of Petra. All persons involved in academic dishonesty and plagiarism in any form will be disciplined in accordance with University rules and regulations.

<b>Approved by</b>	<b>Name</b>	<b>Date</b>	<b>Signature</b>
Coordinator of Curriculum Committee	Dr. Abdel mnim Altweiq	16.10.2017	
Faculty Dean/ Head of Department	Prof. Mohamad Alanain	16.10.2017	

**Controlled  
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<sup>i</sup> Additional information may be added in this section according to the nature of the course