



Academic Course Specification Form

استمارة توصيف المقرر الأكاديمي

القسم الخاص بالطالب Section Concerning the Student

1. Course Code:	CHEMY 311	1. رمز المقرر:
2. Course Title	Analytical Chemistry II	2. اسم المقرر:
3. College:	Science	3. الكلية:
4. Department:	Chemistry	4. القسم:
5. Academic Program:	Bachelor of Science in Chemistry	5. البرنامج الأكاديمي:
6. Course Credits:	3-0-3	6. عدد الساعات المعتمدة:
7. Course NQF Level:	7	7. مستوى المقرر وفقا للإطار الوطني للمؤهلات:
8. Notional Hours:	133	8. عدد الساعات الافتراضية:
9. NQF Credits:	13	9. عدد الساعات المعتمدة للمقرر وفقا للإطار الوطني للمؤهلات:
10. Prerequisite:	CHEMY 211	10. المتطلب السابق للمقرر:
11. Lectures Timing & Location:		11. وقت المحاضرة ومكانها:
12. General Mode of Teaching and Learning	تقليدي Traditional	12. النمط العام للتعليم والتعلم:

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May 2024

Changing any elements of the form is strictly prohibited.
يرجى عدم تغيير أي عنصر من عناصر الاستمارة

13. Course Coordinator:		13. منسق المقرر:
14. Course Instructor:		14. مدرّس المقرر:
15. Office Hours and Location:		15. الساعات المكتبية ومكانها:
16. Instructor's Email:		16. البريد الإلكتروني لمدرّس المقرر:
17. Academic Year:		17. السنة الأكاديمية:
18. Semester:		18. الفصل الدراسي:
19. Textbook(s):		19. الكتب الدراسية للمقرر:
Skoog, Douglas A., et al. Fundamentals of analytical chemistry. Cengage learning, 10 th Edition 2021.		
20. References:		20. المراجع:
Skoog, Douglas A., F. James Holler, and Stanley R. Crouch. <i>Principles of instrumental analysis</i> . Cengage learning, 2017.		
21. Other Learning Resources Used (e.g. e-learning, field visits, periodicals, software, etc.):		21. مصادر التعلّم الأخرى (مثال: التعلّم الإلكتروني، زيارات ميدانية، دوريات، برمجيات، إلخ....)
22. Course Description (as published in the College Catalogue):		22. توصيف المقرر (حسب ما ورد في دليل الكلية):
Analytical sampling; introduction to spectrochemical methods of analysis; instruments for optical spectroscopy; molecular absorption spectroscopy; molecular fluorescence spectroscopy; applications of molecular spectroscopy; atomic spectroscopy; introduction to analytical separations techniques; chromatography; instrumentations and applications for gas chromatography (GC); high-performance liquid chromatography (HPLC).		
23. Course Intended Learning Outcomes (3 to 5 CILOs):		23. مخرجات التعلّم للمقرر (CILOs) (3 إلى 5 مخرجات تعلّمية):
1. Identify the methods of obtaining representative environmental samples		
2. Compare different methods of analysis including spectroscopic and chromatographic methods		
3. Explain some major principles and applications of different spectroscopic and chromatographic methods		
4. Use some advanced skills to apply spectroscopic and chromatographic principles to deduce qualitative and quantitative information		
5. Use the library to retrieve information on the most appropriate analytical techniques for the analysis of samples		
24. Course Assessment Percentages (as per Regulations of Study and Examination at the University of Bahrain):		24. أساليب التقييم ونسبها المئوية (بحسب نظام الدراسة والامتحانات في جامعة البحرين):

Assessment التقييم	Type النوع	Percentage النسبة	Assessment Date تاريخ التقييم
Midterm I	Individual فردى	20%	
Midterm II	Individual فردى	20%	
Quizzes	Individual فردى	10%	
Assignments	Individual فردى	10%	
Final Exam	Individual فردى	40%	
Total	100%		
25. Description of Topics Covered		25. وصف الموضوعات التي ينبغي تناولها:	
Topic Title (e.g. chapter/experiment title) الموضوع		Description التفصيل	
CH 1: Sampling		This chapter describes sampling techniques and tools (storage, air samplers). Sample pretreatment (grinding, drying, leaching, filtering). Ashing techniques (dry ashing, low-temperature ashing, wet ashing).	
CH 2: Introduction to Spectrochemical Methods		Click or tap here to enter text.	
CH 3: Instruments for optical spectroscopy		Instrument components, optical materials, spectroscopic sources, continuum sources in the UV/VIS region, Continuum sources in the infrared region, wavelength selectors, monochromators and polychromators, gratings, the Echelle grating, radiation filters, interference filters, absorption filters, detecting and measuring radiant energy, properties of radiation transducers, types of transducers, photon detectors, thermal detectors, signal processors and readout, sample containers. Ultraviolet/visible photometers and spectrophotometers, single-beam instruments, double-beam instruments. Infrared spectrophotometers, dispersive infrared instruments, Fourier transform instruments.	
CH 4: Molecular Fluorescence spectroscopy		This chapter defines Theory of molecular fluorescence, relaxation processes, fluorescent species. Effect of concentration on fluorescence intensity. Fluorescence instrumentation. Applications of fluorescence methods. Molecular phosphorescence spectroscopy. Chemiluminescence methods.	
CH 5: Atomic Spectroscopy		Origins of atomic spectra, emission spectra, absorption spectra, fluorescence spectra, widths of atomic spectral lines. Production of atoms and	

			ions, sample introduction systems, plasma sources, inductively coupled plasma, flame atomizers, properties of flames. Atomic emission spectroscopy, analyte interferences, applications. Atomic absorption spectroscopy line-width effects in atomic absorption, instrumentation, line sources, source modulation. Flame atomic absorption, quantitative analysis, detection limits and accuracy.	
CH 6: Introduction to analytical separation			Introduction to analytical separation, elution in column chromatography, migration rates of solutes, band broadening and column efficiency, variables affecting column efficiency, column resolution, applications of chromatography.	
CH 7: Gas Chromatography			This chapter defines Instruments for gas liquid chromatography, carrier gas system, sample injection system, column configurations and column ovens, chromatographic detectors, gas chromatographic columns and stationary phases, capillary columns, packed columns. Applications of gas-liquid chromatography, quantitative analysis.	
CH 8: High-performance liquid chromatography			This chapter details Instrumentation, mobile phase reservoirs and solvent treatment systems, pumping systems, columns for HPLC, detectors. Partition chromatography, bonded-phase packings, normal and reversed phase packings, choice of mobile and stationary phases, adsorption chromatography, ion chromatography, and size exclusion chromatography. Applications.	
26. Weekly Schedule			26. الجدول الأسبوعي	
Week الأسبوع	Date التاريخ	Topics Covered الموضوعات المتناولة	CILOs مخرجات التعلم للمقرر (CILOs)	Teaching/Assessment Mode and Method منهجية ونمط التدريس/التقييم
1		Chapter 1	1,2,3,4,5	تقليدي Traditional
2		Chapter 2	2,3,4,5	تقليدي Traditional
3		Chapter 3	2,3,4,5	تقليدي Traditional
4		Chapter 3	2,3,4,5	تقليدي Traditional
5		Chapter 4	2,3,4,5	تقليدي Traditional
6		Chapter 4	2,3,4,5	تقليدي Traditional
7		Chapter 4	2,3,4,5	تقليدي Traditional
8		Chapter 4	2,3,4,5	تقليدي Traditional
9		Chapter 5	2,3,4,5	تقليدي Traditional
10		Chapter 5	2,3,4,5	تقليدي Traditional
11		Chapter 6	2,3,4,5	تقليدي Traditional
12		Chapter 7	2,3,4,5	تقليدي Traditional
13		Chapter 7	2,3,4,5	تقليدي Traditional

14		Chapter 8	2,3,4,5	Traditional تقليدي
15		Chapter 8	2,3,4,5	Traditional تقليدي
16				Choose an item.
27. Academic Integrity Statement			27. بيان النزاهة الأكاديمية	
Students are to observe the highest level of honesty and academic ethics in pursuit of their academic goals as per UOB Regulations of Student Conduct and Academic Integrity, Anti-plagiarism Policies , and Students' Rights and Responsibilities Handbook . The consequences for cheating, plagiarism, unauthorized collaboration, and other forms of academic dishonesty can be very serious and will be dealt with as per the aforementioned policies and regulations.			يتعيّن على الطلبة الالتزام بأعلى مستويات الصدق والأمانة والأخلاق الأكاديمية في سعيهم لتحقيق أهدافهم الأكاديمية وفقاً للوائح سلوك الطلاب والنزاهة الأكاديمية، سياسات مكافحة الانتحال ، و دليل حقوق الطلبة وواجباتهم ، المعمول بها في جامعة البحرين. يمكن لعواقب الغش والسرقة الأدبية والتعاون غير المصرح به وغيرها من أشكال عدم الأمانة الأكاديمية أن تكون خطيرة للغاية وسيتم التعامل معها وفقاً للسياسات واللوائح المذكورة آنفاً.	
28. Attendance and Absence Regulations			28. نظام الحضور والغياب	
Students are required to adhere to regular attendance for class lectures and practical sessions, as determined by the nature of the course, as per Article (33) of Regulations of Study and Examination at the University of Bahrain .			يجب على الطلبة الالتزام بالحضور المنتظم للمحاضرات الصفية والعملية، حسبما تحدده طبيعة المقرر الدراسي، ووفقاً للمادة (33) من نظام الدراسة والامتحانات في جامعة البحرين .	