SULTAN QABOOS UNIVERSITY

COURSE OUTLINE

PROGRAM: Chemistry

1. Course Code	CHEM4446		
2. Course Title	Advanced Instrumental Analysis		
3. Credits	4		
4. Pre-requisite Course (s)	CHEM4441		
5. Co-requisite Course (s)			
6. Equivalent Course (s)	This course can replace CHEM4442		
7. Course Category (*Specify either as* Elective *or* Requirement *and appropriate level: College, Department, etc.)*	☐ University Requirement	☐ University Elective	
	☐ College Requirement	☐ College Elective	
	☒ Department Requirement	☐ Department Elective	
	☐ Other (specify):		
8. Course Owner	College: Science	Department: Chemistry	
9. Course Type	Core		
10. Language of Instruction	English		

11. Course Description

An advanced course covering the applications of instrumental methods in various life a. Emphasis is on the quantitative aspects of analysis. Instrumental methods are covered under three headings: separation methods, spectroscopic techniques, and electrochemical methods.

12. Teaching/Learning Strategies

Lectures (3 h), Lab (3 h)

13. Evaluation Methods

Final Examination 45%; Laboratory 15%; Midterm Tests 30%, quizzes/assignment 10%.

Quiz1 - Week 6 (6th March, 2024).

Test 1 -Week 7 (13th March, 2024)

Quiz 2- Week 9 (27th March 2024)

Test 2 - Week 13 (24th April, 2024).

In case an exam or test is canceled due to a holiday it will automatically be moved to the next week. Test 1 and Test 2 date and time to be arranged during lab period if possible. There will be quizzes/assignment after each chapter. Quizzes/assignment will be a week after completion of the chapter.

Note: Exact date/day and time of the test and quizzes to be decided depending on the final timetable.

14. Required Course Core Material

15. Matching Course Objectives with the Program Outcomes and with SQU Graduate Attributes

* ***Click here*** ***to view a list of action verbs use in developing objectives***

SQU Graduate Attributes

A. SQU graduates should be able to:	B. SQU graduates possess	C. SQU graduates should relish good citizenship qualities, conscious of their national identity and socially responsible, engage in community affairs and mindful of contemporary issues.
1. apply the knowledge and skills relevant to the specialization 2. communicate effectively and use information and communication technologies 3. critically analyze complex information and present it in simple legible manner	1. interpersonal communication skills and alignment with culture of international labour market to assist them in practical life and in living successfully 2. skills and motivation for independent learning and engagement in lifelong learning and research 3. work ethics and positive values, and enjoy intellectual independence and autonomy 4. teamwork skills and display potential leadership qualities	

#	Course Learning Objective	Relevant Program Outcome(s)	Applicable Attribute(s)
1.	Be Recognize and explain the different analytical techniques and their applications.	PO1	A1
2.	Select, modify and apply the most suitable technique for a given analytical problem.	PO6 & PO10	B2
3.	Choose the optimum instrumental operating conditions for a given technique.	PO2 & PO6	A2
4.	Integrate the general chemical knowledge to instrumentation to make informed judgments and solve chemical analysis problems.	PO3	A3 & B2
5.	Discuss the features of instruments used in chemical analysis.	PO1	A1
6.	Describe the components, modes, and operation of various analytical instruments.	PO1 & PO6	A1 & A2
7.	Collect meaningful scientific data and use statistical methods to manipulate and interpret such data.	PO8	A3
8.	Communicate and present analytical data effectively.	PO11	A2 & B1
9.	Be a good team player to achieve common goals.	PO5	B4
10.	Be able to manage their time, meet deadlines and organize their work efficiently.	PO4	P3
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16. Student Responsibilities

It is the student's responsibility to know and comply with all University Academic Regulations relevant to participation in this course. These regulations specifically include the Attendance and Student Academic Misconduct policies.

For attendance, it is the student's responsibility to be punctual and to attend all classes.

Students are expected to perform their work with honesty and avoid any academic misconduct, which is defined as the use of any dishonest or deceitful means to gain some academic advantage or benefit. This can take many forms, including but not

limited to, the following: copying, plagiarism, collusion and forging documents. For full details please refer to the Undergraduate Academic Regulations and to the Student Academic Misconduct Policy.

Additionally, this course requires that you:

Should attend all quizzes and tests. Only official excuses will be acceptable, however, no make-up test/quiz will be given.

COURSE INFORMATION			
Course Code	CHEM4446	**Course Title**	Instrumental Analysis
Year/Semester	2024/Spring	**Section**	10
Day, Time, and Place	Mon/Wed, 8.00-9.20 (D03) Lab: Mon/Wed, 10.00-12.50 SCI2106 (Analytical Lab)		

Course Coordinator	Prof. Salma Mohamed Al-Kindy		
Office Location		**Office Hours**	By appointment
Office Ext.	1494	**Email**	alkindy@squ.edu.om

Tentative Schedule

Week	Lecture/Topic	Material to be Covered	Assignment /Exam	Weight (%)
1	Ch 1 Chemical Measurements	All sections (revision-Reading assignments)		
2	Ch 21 Atomic Spectroscopy	21.1-21.7	Quiz1/test1/final	
3	Ch 22 Mass Spectrometry	22.1-22.5	HW1/test 1/final	
4	Ch 23 Analytical Separation	23.2-23.5 (revision-Reading assignments)	HW2	
5	Ch 24 Gas Chromatography	24.1-24.4 & 28.3	Quiz2/test2/final	
6	Ch 25 High-Performance Liquid Chromatography	25.1-25.5	Quiz3/test2/final	
7	Ch 26 Chromatographic Methods /CE	26.1-26.7	HW3/Final	
8	Ch 17 Electroanalytical Techniques	17.1 -17.5	Final	
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15				

APPENDIX A: INSTRUCTORS OF MULIPLE SECTIONS

Section	Instructor	Day, Time, and Location	Office Location and Extension	Email	Office Hours

APPENDIX B: ADDITIONAL INFOMARION

Program Learning Outcomes

PO1: demonstrate factual knowledge of chemistry
PO2: assimilate new information into existing knowledge
PO3: integrate knowledge in problem-solving, critical thinking, and analytical reasoning.
PO4: appraise time requirements for assigned tasks, and manage time appropriately
PO5: work within a team
PO6: use modern instrumentation and techniques to conduct experiments following established procedures
PO7: use and dispose of chemicals safely following appropriate procedures and regulations
PO8: employ efficient use of computers for data acquisition and analysis
PO9: use information sources to retrieve chemical information
PO10: formulate hypothesis, design, and perform experiments
PO11: communicate chemical information to specialist and non-specialist audiences