


COURSE OUTLINE TEMPLATE

	SULTAN QABOOS UNIVERSITY COLLEGE OF SCIENCE BACHELOR OF SCIENCE IN CHEMISTRY COURSE OUTLINE	Other logo
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I. COURSE INFORMATION			
COURSE CODE	CHEM3391		
COURSE TITLE	COMPUTERS IN CHEMISTRY		
OMAN QUALIFICATION FRAMEWORK (OQF) LEVEL	6		
CREDIT HOURS	3		
CONTACT HOURS	4		
PRE-REQUISITES	CHEM2102 AND CHEM3322 AND LANC2058		
CO-REQUISITES			
EQUIVALENT COURSES			
INCOMPATIBLE COURSES			
COURSE CATEGORY	<input type="checkbox"/> University Requirement	<input type="checkbox"/> University Elective	
	<input type="checkbox"/> College Requirement	<input type="checkbox"/> College Elective	
	<input type="checkbox"/> Department Requirement	<input checked="" type="checkbox"/> Department Elective	
	<input type="checkbox"/> Specialization Requirement	<input type="checkbox"/> Specialization Elective	
	<input type="checkbox"/> Other (specify):		
COURSE OWNER	College: Science		Department: Chemistry
	Center:		Unit:
DELIVERY MODE	<input checked="" type="checkbox"/> Face to Face	<input type="checkbox"/> Blended	<input type="checkbox"/> Online
COURSE TYPE	<input type="checkbox"/> Lecture		<input type="checkbox"/> Lecture/Lab
	<input type="checkbox"/> Lecture/Seminar		<input type="checkbox"/> Lecture/Studio
	<input checked="" type="checkbox"/> Lecture/Tutorial		<input type="checkbox"/> Lecture/Lab/Tutorial or Seminar

	<input type="checkbox"/> Tutorial	<input type="checkbox"/> Laboratory (Practical)	
	<input type="checkbox"/> Field or Work Placement	<input type="checkbox"/> Studio	
	<input type="checkbox"/> Seminar	<input type="checkbox"/> Internship	
	<input type="checkbox"/> Workshop	<input type="checkbox"/> Project	
	<input type="checkbox"/> Thesis	<input type="checkbox"/> Other (specify):	
LANGUAGE OF INSTRUCTION	English		
COURSE DESCRIPTION	<p>This skills-based course familiarizes students with some of the many ways in which desktop computers can enhance their study, understanding and communication of chemistry. The course is taught in three modules covering: chemistry problem solving; chemical representation and information retrieval; and an introduction to molecular modelling. In the final weeks of the semester the students work on individual projects involving the creation of a computer-based presentation or report consolidating skills learnt throughout the semester.</p> <p>A good working knowledge of Microsoft Office software is assumed</p>		
TEACHING AND LEARNING STRATEGIES	<input type="checkbox"/> Augmented Reality	<input type="checkbox"/> Flipped Classroom	
	<input type="checkbox"/> Blended Learning	<input checked="" type="checkbox"/> Problem-Based Learning	
	<input checked="" type="checkbox"/> Discovery-Based Learning	<input checked="" type="checkbox"/> Project-Based Learning	
	<input checked="" type="checkbox"/> Student-Led Learning	<input type="checkbox"/> Team-Based Learning	
	<input type="checkbox"/> Work-Based Learning	<input type="checkbox"/> Other (specify):	
ASSESSMENT COMPONENT AND WEIGHT	<input checked="" type="checkbox"/> In-term exams (s) (30%)	<input type="checkbox"/> Quizzes (%)	<input type="checkbox"/> Other (specify): (%)
	<input checked="" type="checkbox"/> Homework (15%)	<input checked="" type="checkbox"/> Project (10%)	
	<input checked="" type="checkbox"/> Final examination (45%)	<input type="checkbox"/> Practical/ Lab (%)	
TEXTBOOKS AND EDUCATIONAL MATERIAL	<p>Lecture notes, guided tutorial worksheets and videos, and software manuals available through Moodle.</p> <p>Guided projects through Coursera</p>		
GRADING METHOD	<input checked="" type="checkbox"/> A-F Scale	<input type="checkbox"/> Pass/Not Pass	<input type="checkbox"/> Other (specify):
GRADING METHOD DESCRIPTION			
A-F GRADING SCALE:	Range	Letter Grade	Description
	≥90	A	Exceptional performance: All course objectives achieved and met in a consistently outstanding manner.
	≥86	A-	
	≥81	B+	

	≥77	B	Very Good Performance: The majority of the course objectives achieved (majority being at least two-thirds) and met in a consistently thorough manner.
	≥73	B-	
	≥68	C+	Satisfactory Performance: At least most of course objectives have been achieved and met satisfactorily
	≥64	C	
	≥60	C-	
	≥55	D+	Minimally Acceptable Performance: The course objectives met at a minimally acceptable level.
	≥50	D	
	<50	F	Unacceptable performance: The course objectives not met at a minimally acceptable level.
PASS/NOT PASS:			
OTHER:			

II. SEMESTER INFORMATION			
SEMESTER/YEAR	Fall/2024	SECTION(S)	01
DAY AND TIME	Tue, Thu, 10:00 -11:50	VENUE(S)	Sci 0018
COURSE COORDINATOR	John Husband	COURSE TEAM	
COORDINATOR OFFICE	2045	OFFICE HOURS	
COORDINATOR EXTENSION	2235	COORDINATOR EMAIL	johnh@squ.edu.om

III. ALIGNMENT OF COURSE LEARNING OUTCOMES (CLO), PROGRAM LEARNING OUTCOMES (PLO), GRADUATE ATTRIBUTES (GA), AND OMAN QUALIFICATION FRAMEWORK (OQF) CHARACTERISTICS			
CLO	PLO	SQU GA	OQF CHARACTERISTICS (LEVEL)
1. Demonstrate correct and consistent formatting when reporting scientific information and data	2	1	1 (5)
	11	2	2 (6)
		3	3 (6)

		5	
2. Apply numerical methods to analyze chemical data	3	1	1 (6)
	4	2	2 (6)
	8	3	3 (7)
		6	6 (5)
3. Create figures and schemes of publishable quality using ChemDraw software	2	1	1 (5)
	4	2	2 (6)
	11	3	3 (6)
		5	5 (5)
4. Plan and perform molecular modelling calculations using Chem3D software and interpret the results using chemical knowledge	2	1	1 (7)
	3	2	2 (6)
	4	4	4 (5)
	8	5	5 (5)
	10		
5. Demonstrate efficient on-line literature searches using the journal databases and primary literature sources available through the SQU Main-Library portal	4	1	1 (6)
	9	2	2 (6)
		5	5 (5)
		6	6 (5)
6. Demonstrate the ability to learn independently using the online Coursera platform	2	5	5 (5)
	4	6	6 (6)
7.			
8.			
9.			

IV. COURSE LEARNING OUTCOMES (CLOS) AND ASSESSMENT CRITERIA AND METHODS (FOR EACH CLO)

CLO1: Demonstrate correct and consistent formatting when reporting scientific information and data

ASSESSMENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)		ASSESSMENT METHODS
A)	Strictly follow the prescribed course format for written documents/reports.	Assignments, Exams, Project
B)	Strictly follow the prescribed course format for graphical representation of data.	Assignments, Exams, Project

C)	Strictly follow the prescribed course format for presentation of chemical structures, reactions and mechanisms	Assignments, Exams, Project
CLO2: Apply numerical methods to analyze chemical data		
ASSESSMENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)		ASSESSMENT METHODS
A)	Recognize when data is best suited to analyses using numerical methods (rather than analytical solution)	Assignments (1&2), Exam 1, Final Exam
B)	Demonstrate accurate use of the method of successive approximation	Assignments (1&2), Exam 1, Final Exam
C)	Demonstrate accurate use of the method of least squares	Assignments (1&2), Exam 1, Final Exam
CLO3: Create figures and schemes of publishable quality using ChemDraw software		
ASSESSMENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)		ASSESSMENT METHODS
A)	Strictly follow the prescribed course format for presentation of chemical structures, reactions and mechanisms	Assignments (ChemDraw1&2), Exam 2, Project, Final Exam
B)	Demonstrate chemical accuracy in chemical drawings	Assignments (ChemDraw1&2), Exam 2, Project, Final Exam
C)	Demonstrate the ability to interpret, reorganize and blend published chemical drawings to meet a prescribed objective	Assignments (ChemDraw 2), Exam 2, Project, Final Exam
CLO4: Plan and perform molecular modelling calculations using Chem3D software		
ASSESSMENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)		ASSESSMENT METHODS
A)	Demonstrate the technical skills required to perform a variety of molecular modelling calculations	Assignments (Chem3D 1&2), Project, Final Exam
B)	Match an appropriate calculation type with the desired property to be investigated	Project, Final Exam
C)	Plan and undertake a calculation strategy to investigate a specific chemical result or observation	Project, Final Exam
CLO5: Demonstrate efficient on-line literature searches using the journal databases and primary literature sources available through the SQU Main-Library portal		

ASSESSMENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)		ASSESSMENT METHODS
A)	Demonstrate the technical skills necessary to use chemistry (science) specific literature databases and tools	Project, Final Exam
B)	Employ a suitable search strategy to find general background and specific content details on a given topic	Project
C)	Use contextual information to find a specific article (or similar) in a timely manner	Final Exam
CLO6: Demonstrate the ability to learn independently using the online Coursera platform		
ASSESSMENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)		ASSESSMENT METHODS
A)	Demonstrate the technical skills necessary to use the Coursera platform	Coursera end-of-course assessment
B)	Pass the final assessment exams of assigned Coursera projects	Coursera end-of-course assessment, course reflection document/survey
C)	Justify the selection of a self-chosen Coursera project and pass the final assessment exams of a the selected course	Coursera end-of-course assessment, course selection and reflection document/survey

V. COURSE CONTENT AND SCHEDULE				
WEEK	LECTURES #	TOPICS/ SUBJECTS	READINGS/ CHAPTERS	REMARKS (e.g., ASSESSMENTS)
1	1	Course Intro	Course outline	
	2	Excel Basics	Moodle handout	Excel Practice Assgn
2	1	Excel Basics/Graphing	Moodle handout	Excel Practice Assgn
	2	Excel Graphing/Report format		Excel Practice Assgn_Word
3	1	Excel: Method of Successive Approximation	Moodle handout Excel Goal Seek Example	Excel Assignment 1 Part A
	2			Excel Assignment 1 Part B

4	1	Excel: Method of Least Squares	Moodle handout Excel Solver Example	Excel Assignment 2 Part A
	2		Previous Exams	Excel Assignment 2 Part B
5	1	ChemDraw Basics	Moodle handout	ChemDraw Practice Assgn
	2	ChemDraw Schemes		ChemDraw Assgn 1
6	1	ChemDraw Schemes Exam 1 discussion	Moodle handout	ChemDraw Assgn 1
	2			Exam 1
7	1	Mendeley Referencing	Moodle handout	ChemDraw Assgn 1
	2	ChemDraw Mechanisms		ChemDraw Assgn 2
8	1	ChemDraw	Moodle handout	ChemDraw Assgn 3
	2	ChemDraw	Previous Exams	ChemDraw Assgn 3
9	1	Chem3D Basics/Visualization	Moodle handout	Chem3D Practice Assgn
	2	Chem3D Molecular Mechanics		Chem3D Assgn 1
10	1	Chem3D Molecular Mechanics	Moodle handout	Chem3D Assgn 1
	2	Chem3D Molecular Mechanics Exam 2 discussion		Chem3D Assgn 1
11	1			Exam 2
	2	Chem3D Semi-empirical	Moodle handout	Chem3D Assgn 2
12	1	Chem3D Semi-empirical	Moodle handout	Chem3D Assgn 2
	2	Chem3D Semi-empirical	Moodle handout	Chem3D Assgn 2
13	1	Literature Search	Moodle handout	Literature Search Practice
	2	Literature Search		Assignment
14	1	Project	Moodle handout	
	2	Project		
15	1	Project		
	2	Project		Project Report
16				

VI. ADDITIONAL INFORMATION (e.g., RUBRICS, etc.)

VII. STUDENTS 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 attendance requirements and student academic code of conduct.

ACADEMIC INTEGRITY	The University expects the students to approach their academic endeavors with the highest academic integrity. Please refer to the Undergraduate Academic Regulations .
ADD AND DROP	Students who wish to drop or add the course should review the Undergraduate Academic Regulations .
ATTENDANCE	Sultan Qaboos University has a clear requirement for students to attend courses, detailed in the Undergraduate Academic Regulations .
ASSESSMENT AND GRADING	To ensure the provision of a sound and fair assessment and grading, please review the Undergraduate Academic Regulations .
GRADE APPEAL	Students who wish to appeal their grades should review the Undergraduate Academic Regulations .
CLASSROOM POLICIES	Students are expected to dress professionally during class time as required by the University. Use of phones or any other electronic devices in the classroom during class time is strictly prohibited. Unauthorized use may lead to faculty member confiscation of the device for the remainder of the class. Behavior that persistently or grossly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. A student responsible for disruptive behavior may be required to leave the class.
LATE AND MAKE-UP WORK	Students are required to meet the course objectives by submitting coursework no later than the assigned due date. Students may be allowed to submit late work if approved by the course coordinator. Assignments submitted after the due date may be penalized.

MISSED EVALUATIONS	All quizzes, tests, clinical evaluations, and exams must be completed by the date they are assigned. If a quiz, test, or exam is missed due to a documented emergency situation (e.g., medical emergency, death in the immediate family), it is the student's responsibility to contact the instructor. Make-up exams will not be given for assessment criteria less than 25% of the course grade, but marks will be normalized over the other assessment components for students with valid proof of emergency situation (e.g. medical sick leave)
OTHER	

Course Outline Appendix

A. PROGRAM LEARNING OUTCOMES

1. Demonstrate factual knowledge of chemistry

2. Assimilate new information into existing knowledge
3. Integrate knowledge in problem-solving, critical thinking, and analytical reasoning.
4. Appraise time requirements for assigned tasks, and manage time appropriately
5. Work within a team
6. Use modern instrumentation and techniques to conduct experiments following established procedures
7. Use and dispose of chemicals safely following appropriate procedures and regulations
8. Employ efficient use of computers for data acquisition and analysis
9. Use information sources to retrieve chemical information
10. Formulate hypothesis, design, and perform experiments
11. Communicate chemical information to specialist and non-specialist audience

B. SQU GRADUATE ATTRIBUTES

1. Cognitive Capabilities
2. Skill and Professional Capability
3. Effective Communication
4. Autonomy and Leadership
5. Responsibility and Commitment
6. Development and Innovation

C. OQF CHARACTERISTICS

1. Knowledge
2. Skills
3. Communication, Numeracy, and Information and Communication Technology Skills.
4. Autonomy and Responsibility
5. Employability and Values
6. Learning to learn