COURSE OUTLINE TEMPLATE

	SULTAN QABOOS UNIVERSITY **COLLEGE OF SCIENCE** **BACHELOR OF SCIENCE IN CHEMISTRY** **COURSE OUTLINE**	Other logo

I. COURSE INFORMATION			
COURSE CODE	CHEM3335		
COURSE TITLE	**PHYSICAL CHEMISTRY LABORATORY 1**		
OMAN QUALIFICATION FRAMEWORK (OQF) LEVEL	**6**		
CREDIT HOURS	2		
CONTACT HOURS	3		
PRE-REQUISITES	CHEM3333		
CO-REQUISITES	NONE		
EQUIVALENT COURSES	X		
INCOMPATIBLE COURSES			
COURSE CATEGORY	☐ University Requirement	☐ University Elective	
	☐ College Requirement	☐ College Elective	
	☒ Department Requirement	☐ Department Elective	
	☒ Specialization Requirement	☐ Specialization Elective	
	☐ Other (specify):		
COURSE OWNER	College: Science	Department: Chemistry	
	Center:	Unit:	
DELIVERY MODE	☒ Face to Face	☐ Blended	☐ Online
COURSE TYPE	☐ Lecture	☒ Lecture/Lab	

	☐Lecture/Seminar	☐ Lecture/Studio	
	☐ Lecture/Tutorial	☐ Lecture/Lab/Tutorial or Seminar	
	☐ Tutorial	☐ Laboratory (Practical)	
	☐ Field or Work Placement	☐ Studio	
	☐ Seminar	☐ Internship	
	☐ Workshop	☐ Project	
	☐ Thesis	☐ Other (specify):	
LANGUAGE OF INSTRUCTION	English		
COURSE DESCRIPTION	This is the first of two courses in physical chemistry laboratory intended for training students to individually perform experiments, interpret and discuss the collected database on the physical chemistry theories and write up reports in journal format. The course introduces students to fundamental physical chemistry concepts such as basic thermodynamics (equilibrium constant, enthalpy of protonation, heat transfer and phase transition), kinetics and rate of reactions, phase diagrams (binary and ternary systems), thermo-chemistry, electrochemistry and adsorption equilibrium.		
TEACHING AND LEARNING STRATEGIES	☐ Augmented Reality	☐ Flipped Classroom	
	☒ Blended Learning	☒ Problem-Based Learning	
	☒ Discovery-Based Learning	☐ Project-Based Learning	
	☐ Student-Led Learning	☐ Team-Based Learning	
	☒Work-Based Learning	☐ Other (specify):	
ASSESSMENT COMPONENT AND WEIGHT	☐ In-term exams (%)	☐ Quizzes (%)	☒ Other (specify): Instructor Evaluation (10%)
	☐ Homework (%)	☐ Project (%)	
	☒ Final examination (30%)	☒ Practical/ Lab (60%)	
TEXTBOOKS AND EDUCATIONAL MATERIAL	Supplementary Handouts (Internally Prepared Manual)		

GRADING METHOD	☒ A-F Scale	☐ Pass/Not Pass	☐ Other (specify):

GRADING METHOD DESCRIPTION			
A-F GRADING SCALE:	Range	Letter Grade	Description
	90 and above	A	**Exceptional performance:** All course objectives achieved and met in a consistently outstanding manner.
	89-86	A-	
	85-81	B+	**Very Good Performance:** The majority of the course objectives achieved (majority being at least two-thirds) and met in a consistently thorough manner.
	80-77	B	
	76-73	B-	
	72-68	C+	**Satisfactory Performance:** At least most of course objectives have been achieved and met satisfactorily
	67-64	C	
	63-60	C-	
	59-55	D+	**Minimally Acceptable Performance:** The course objectives met at a minimally acceptable level.
	54-50	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)**	10,20 and 30
DAY AND TIME		**VENUE(S)**	
COURSE COORDINATOR	Laila AlMaqbali	**COURSE TEAM**	Ishaq Alnafi, Aafaq Tantray
COORDINATOR OFFICE	2058	**OFFICE HOURS**	11:30-1:00
COORDINATOR EXTENSION	1478	**COORDINATOR EMAIL**	lailak@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. Manipulate and interpret scientific data involving simple physical measurements	**1** **2** **3**	**1** **2**	**1** **2** **6**
2. Capability to operate and fix the correct experimental conditions of available instruments	**1** **2** **3**	**1** **2**	**1** **2**
3. Understand the concepts of kinetics, thermodynamics and their applications to real life situations	**1** **2** **3**	**1** **2**	**1** **2**
4. Acquire a good computer literacy (word processing and spreadsheet processes)	**1** **2** **3**	**1** **2**	**1** **2**
5. Discuss the results of each experiment in the view of physical chemistry theories and write reports in journal format	**1** **2** **3**	**1** **2**	**1** **2**

IV. Course Learning Outcomes (CLOs) and Assessment Criteria and Methods (for each CLO)		
CLO1: 1.Manipulate and interpret scientific data involving simple physical measurements		
Assessment Criteria (to achieve this objective, the student must)		**Assessment Methods**
A)	Use the available laboratory equipment and other glassware	Lab Reports and Instructor Evaluation
B)	Analyze the experimental data in terms of plotting curves	Lab Reports

CLO2: CAPABILITY TO OPERATE AND FIX THE CORRECT EXPERIMENTAL CONDITIONS OF AVAILABLE INSTRUMENTS		
ASSESSMENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)		**ASSESSMENT METHODS**
A)	Use the available laboratory equipment and other glassware	Lab Reports and Instructor Evaluation
B)	Integrate theoretical concepts with practicalities of measurement	Lab Reports and Instructor Evaluation
CLO3: UNDERSTAND THE CONCEPTS OF KINETICS, THERMODYNAMICS AND THEIR APPLICATIONS TO REAL LIFE SITUATIONS		
ASSESSMENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)		**ASSESSMENT METHODS**
A)	Understand the Concepts of Thermodynamics	Lab report and final Exam
B)	Predict the effect of catalysis on a chemical reaction	Lab report and final Exam
B)	Calculate the rate of a chemical reaction	Lab report and final Exam
CLO4: ACQUIRE A GOOD COMPUTER LITERACY (WORD PROCESSING AND SPREADSHEET PROCESSES)		
ASSESSMENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)		**ASSESSMENT METHODS**
A)	Know how to use LINEST equation and interpt the data	Lab report
B)	Calculate the pH of a solution	Lab report
C)	Write a report in Word with constructed graphs from Excel	Lab report
CLO5: DISCUSS THE RESULTS OF EACH EXPERIMENT IN THE VIEW OF PHYSICAL CHEMISTRY THEORIES AND WRITE REPORTS IN JOURNAL FORMAT		
ASSESSMENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)		**ASSESSMENT METHODS**
A)	Search for the literature values in papers	Lab report and final Exam
B)	Construct a report that is similar to a research paper	Lab report and final Exam
C)	Understand the concepts and theirs meninges	Lab report and final Exam

V. COURSE CONTENT AND SCHEDULE				
WEEK	**LECTURES #**	**TOPICS/ SUBJECTS**	**READINGS/ CHAPTERS**	**REMARKS (e.g., ASSESSMENTS)**
1	1	Introduction to the Course	-	-
2	2	Determination of the Acid Dissociation Constant of an Indicator **(p*Ka*)**.	Lab Manual	Lab report & Final Exam
3	3	Enthalpy of Protonation of Glycine **(Glycine)**.	Lab Manual	Lab Report & Final Exam
4	4	Determination of a Rate Law ***(Kinetics)***.	Lab Manual	Lab Report & Final Exam
5	5	Electrolytic Conductance ***(Cond 1 &2)***: **Part (1):** Measurement of conductivity and molar conductivity of a strong electrolyte.	Lab Manual	Lab Report & Final Exam
6	6	**Part (2):** Determination of the Dissociation constant of a weak acid.	Lab Manual	Lab Report & Final Exam
7	7	Thermodynamic Properties of Water ***(Thermodyn.)***	Lab Manual	Lab Report & Final Exam
8	8	Phase Diagram of Three Liquids ***(Ternary)***.	Lab Manual	Lab Report & Final Exam
9	9	Adsorption of an organic acid by activated carbon	Lab Manual	Lab report & Final Exam

		in aqueous medium ***(Adsorption)***.		
10				
11				
12				
13				
14				
15	Final Exam			Final Exam

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