COURSE OUTLINE TEMPLATE

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

I. COURSE INFORMATION			
COURSE CODE	CHEM4416		
COURSE TITLE	**INORGANIC CHEMISTRY LABORATORY FOR APPLIED CHEMIST**		
OMAN QUALIFICATION FRAMEWORK (OQF) LEVEL	**7**		
CREDIT HOURS	1		
CONTACT HOURS	3		
PRE-REQUISITES	CHEM3311 AND (CHEM3326 OR CHEM4426)		
CO-REQUISITES	CHEM4411		
EQUIVALENT COURSES	X		
INCOMPATIBLE COURSES	NA		
COURSE CATEGORY	☐ University Requirement	☐ University Elective	
	☐ College Requirement	☐ College Elective	
	☐ Department Requirement	☐ Department Elective	
	☐ Specialization Requirement	☐ Specialization Elective	
	☒ Other (specify): Major Requirement		
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 laboratory course introduces synthetic inorganic chemistry and physical techniques of characterization to applied chemistry students. Experiments illustrates the basic concepts and principles of coordination chemistry covered in the theory co-requisite course CHEM4411 and students learn to plan, execute, analyze and report experimental work scientifically.	
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 (s) (%)	☐ Quizzes (%)	☒ Other (specify): Seminar (10%)
	☐ Homework (%)	☐ Project (%)	
	☒ Final examination (40%)	☒ Practical/ Lab (50%)	

TEXTBOOKS AND EDUCATIONAL MATERIAL	Lab manual and additional notes		
GRADING METHOD	☒ A-F Scale	☐ Pass/Not Pass	☐ 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+	**Very Good Performance:** The majority of the course objectives
	≥77	B	

	≥73	B-	achieved (majority being at least two-thirds) and met in a consistently thorough manner.
	≥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)**	
DAY AND TIME		**VENUE(S)**	SCI 1006
COURSE COORDINATOR	Dr. Arief C. Wibowo	**COURSE TEAM**	
COORDINATOR OFFICE	SCI 2026	**OFFICE HOURS**	
COORDINATOR EXTENSION	2351	**COORDINATOR EMAIL**	a.wibowo@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 ability to synthesize, isolate, and purify transition metal coordination complexes	**2** **4** **7** **10**	**1** **5** **6**	**1 (7)** **4 (7)** **6 (7)**

2. Demonstrate ability to use appropriate physical techniques to characterize coordination complexes	**6** **8**	**1** **6**	**1 (7)** **6 (7)**
3. Demonstrate correct and consistent English and technical formatting when reporting scientific information and data	**11**	**3** **5**	**3 (7)** **5 (7)**
4. Interpret and explain experimental results using correct theories	**1** **2** **9**	**1**	**1 (7)**
5. Demonstrate ability to write logically organized, well researched, properly referenced and well thought-out comprehensive scientific reports based on personal and group work	**5** **9** **11**	**1** **2** **3** **4** **6**	**1 (7)** **2 (7)** **3 (7)** **4 (7)** **6 (7)**
6. Demonstrate ability to give eloquent, confident and competent oral presentation on scientific findings	**9** **11**	**1** **2** **3** **4**	**1 (7)** **2 (7)** **3 (7)** **4 (7)**
7.			
8.			
9.			
10.			

IV. COURSE LEARNING OUTCOMES (CLOS) AND ASSESSMENT CRITERIA AND METHODS (FOR EACH CLO)		
CLO1: Demonstrate ability to synthesize, isolate, and purify transition metal coordination complexes		
ASSESSMENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)		**ASSESSMENT METHODS**
A)	Demonstrate knowledge and skills in chemical synthesis, purification, and isolation of coordination complexes	Lab book and reports, seminar, and final exam
B)	Showcase synthesized product in terms of quality and quantity and all the required processes and calculations	Lab book and reports, seminar, and final exam

CLO2: Demonstrate ability to use appropriate physical techniques to characterize coordination complexes		
ASSESSMENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)		**ASSESSMENT METHODS**
A)	Display necessary calculations with correct results and/or spectra (or pattern) of UV-Vis, IR, magnetic, conductivity, and PXRD	Lab book and reports, seminar, and final exam
B)		
C)		
CLO3: Demonstrate correct and consistent English and technical formatting when reporting scientific information and data		
ASSESSMENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)		**ASSESSMENT METHODS**
A)	Demonstrate correct and consistent English and technical formatting in a lab book, following strictly the prescribed scientific journal format	Lab book
B)		
C)		
CLO4: Interpret and explain experimental results using correct theories		
ASSESSMENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)		**ASSESSMENT METHODS**
A)	Demonstrate correct interpretation and analysis with appropriate explanation using proper theories on the obtained results from UV-Vis, IR, magnetic, conductivity, and PXRD measurements	Lab book and reports, seminar, and final exam
B)		
C)		
CLO5: Demonstrate ability to write logically organized, well researched, properly referenced and well thought-out comprehensive scientific reports based on personal and group work		
ASSESSMENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)		**ASSESSMENT METHODS**
A)	Demonstrate correct and consistent English and technical formatting in lab reports, following strictly the prescribed scientific journal format	Lab reports and seminar

B)		
C)		
CLO6: Demonstrate ability to give eloquent, confident and competent oral presentation on scientific findings		
ASSESSMENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)		**ASSESSMENT METHODS**
A)	Demonstrate correct and consistent English and technical terms in the presentation slides and during oral presentation, following strictly the prescribed scientific journal format	Seminar
B)		
C)		
CLO7: -		
ASSESSMENT CRITERIA (TO ACHIEVE THIS OBJECTIVE, THE STUDENT MUST)		**ASSESSMENT METHODS**
A)	-	
B)		
C)		

V. COURSE CONTENT AND SCHEDULE				
WEEK	**LECTURES #**	**TOPICS/ SUBJECTS**	**READINGS/ CHAPTERS**	**REMARKS (e.g., ASSESSMENTS)**
1	Lecture	Concise theories of UV-Vis, IR, PXRD, magnetic, conductivity for coordination complexes	Handouts (Moodle)	Throughout the semester: -Students will be divided into groups; Individual work for results sharing -All complexes to be characterized by conductivity, magnetism, IR, UV-Vis (and PXRD)
2-4	Synthesis and characterizations of	Related chapter(s) in	Related chapter(s) in CHEM4411	Hand in the Lab Book for marking (week 4)

	four Chromium complexes $[Cr(urea)_6)]Cl_3$; $K_3[Cr(ox)_3]\cdot 3H_2O$; $[Cr(en)_3]Cl_3]\cdot 2H_2O$; $K_3[Cr(NCS)_6]$	CHEM4411		
5-6	Synthesis of and characterization of Ni(II) complexes	Related chapter(s) in CHEM4411	Related chapter(s) in CHEM4411	
7-8	Synthesis and characterization of $[Mn(acac)_3]$; Characterization of $KMnO_4$ & Mn(II) complexes	Related chapter(s) in CHEM4411	Related chapter(s) in CHEM4411	Hand in the Lab Book for marking; Cr complexes typed report (week 7)
9	Seminar presentations session 1			Hand in the Lab Book for marking; Ni complexes typed report
10	Seminar presentations session 2			
11	Seminar presentations session 3			
12	Lab exam (Practical)			
13				
14	Lab exam (Theory)			
15				
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