



Course Specification

(Bachelor)

Course Title: Undergraduate Research Project

Course Code: CHEM 499

Program: B.Sc.

Department: Chemistry

College: Science

Institution: King Saud University

Version: 4/2024

Last Revision Date: December 13, 2024



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A. General information about the course:

1. Course Identification

1. Credit hours:

3 credits (0+0+3)

2. Course type

A. University College Department Track Others

B. Required Elective

3. Level/year at which this course is offered:

8th level, 4th year

4. Course general Description:

In CHEM 499 course, each student is assigned an original research problem and is expected to leverage their prior knowledge and experience to gather information and work towards finding a solution. The department's laboratories, along with available chemicals and instruments, are provided to support the student's research progress. Students are required to deliver a comprehensive research presentation, both in the form of a poster and an oral presentation, to an assessment committee. Additionally, a well-documented research report must be submitted and retained in the Chemistry Department.

5. Pre-requirements for this course (if any):

Completion of 7th level

6. Co-requirements for this course (if any):

None

7. Course Main Objective(s):

After completing the course, students will be able to:

1. Gain hands-on experience in the research process.
2. Develop and demonstrate the ability to tackle research problems effectively.
3. Acquire knowledge that will enhance academic and professional growth.
4. Prepare and present a written report, along with a poster and oral presentation.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	90 h	100%
2	E-learning	-	
3	Hybrid <ul style="list-style-type: none"> • Traditional classroom • E-learning 	-	
4	Distance learning	-	

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	6 h
2.	Laboratory/Studio	84 h
3.	Field	-
4.	Tutorial	-
5.	Others (specify)	-
Total		90 h

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Demonstrate the ability to design, execute, and analyze an original research project, utilizing appropriate methodologies and techniques relevant to their field of study.	K1	<ul style="list-style-type: none"> - Project-based learning - Regular meetings with a faculty mentor 	<ul style="list-style-type: none"> - Lab performance assessment
1.2	Collect, interpret, and analyze data effectively, using appropriate tools and technologies, while ensuring accuracy and reliability of findings.	K2	<ul style="list-style-type: none"> - Hands-On Laboratory Work - Data analysis workshops 	<ul style="list-style-type: none"> - Data analysis tasks



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
				- Written research report
2.0	Skills			
2.1	Apply critical thinking and problem-solving skills to identify, analyze, and address complex research questions, drawing upon existing knowledge and research.	S2	- Interactive Seminars - Hands-On Laboratory Work	- Lab performance assessment
2.2	Develop and present a well-organized, coherent written research report, showcasing the research process, findings, and conclusions with clear and effective scientific communication.	S3	- Workshops focused on scientific writing - Guided report drafting	- Workshop attendance - Written research report - Instructor and committee members feedback on research report
2.3	Deliver a professional oral presentation of research findings, supported by a visually engaging poster, demonstrating effective communication and public speaking skills.	S4	- Presentation practice sessions - Poster design workshops	- Oral Presentation - Poster evaluation - Committee members' feedback
3.0	Values, autonomy, and responsibility			
3.1	Adhere to ethical guidelines and professional standards in conducting research, ensuring integrity, objectivity, and responsibility throughout the research process.	V1	- Ethics Discussion - workshops on professional ethics	- Advisor and committee members' feedback
3.2	Engage in constructive discussions and seek feedback from peers, advisors, and committee members,	V2	- Collaborative research projects - Feedback sessions - Peer evaluation	Advisors' feedback



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	integrating their input to improve the quality and depth of the research.			

C. Course Content

No	List of Topics	Contact Hours
1.	Specific workshops focused on data analysis tools, how to search databases, and writing skills	6
	1.1 Safety and Security in Chemical Laboratories	
	1.2 Scientific Writing for Research	
	1.3 Literature Review and Citation Writing in Research	
	1.4 Overview of Some Useful Software Programs for Scientific Research Writing.	
	1.5 Presentation and Public Speaking Skills	
	1.6 Design of Scientific Poster	
2	Collection of background literature	6
3	Proposal discussion and design of experiments	9
4	Performing practical experiments	21
5	Data processing	20
6	Results interpretation and discussion	14
7	Report writing	8
8	Preparation for the seminar presentation and poster	3
9.	Final evaluation seminar	3
Total		90

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Workshops attendance	1st-6th	12%
2.	Student performance in research project	2 nd -15 th	48%
3.	Student Report of research project	13 th	20%



No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
4.	Student Presentation of research project	14 th	10%
4.	Student Poster of research project	14 th	10%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Relevant Website.
Supportive References	Book references and scientific articles related to chosen topic.
Electronic Materials	Digital library and access to the scientific periodicals
Other Learning Materials	Different scientific software

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Research Laboratories
Technology equipment (projector, smart board, software)	Smartboard and internet access in the demonstration room. E-podium & data show.
Other equipment (depending on the nature of the specialty)	Lab equipment related to the research topic. Availability of molecular models, structural programs, chemicals, glassware, relevant safety equipment and facilities.





F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	<ul style="list-style-type: none"> - Assessment committee - academic accreditation committee - Students 	Direct assessment from student evaluation; through oral presentation and final essay and indirect assessment through online survey on LMS and on edugate.
Effectiveness of Students' assessment	- Faculty and Peer Reviewer	Direct assessment from student evaluation, and analyzing the course report
Quality of learning resources	Supervisor/Students	Indirect assessment through Surveys
The extent to which CLOs have been achieved	Program coordinator	Direct

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	ACADEMIC ACCREDITATION COMMITTEE
REFERENCE NO.	B-01-4-24
DATE	Dec. 14, 2024

