



# Course Specification

## (Bachelor)

Course Title: **Project**

Course Code: **ICEM 470**

Program **Chemistry**

Department **Chemistry**

College: **Science**

Institution: **Majmaah University**

Version: : **TP-153**

Last Revision Date: 14 December 2024



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## A. General information about the course:

### 1. Course Identification

1. Credit hours: ( 4 hours)

#### 2. Course type

A. University College Department Track Others

B. Required Elective

3. Level/year at which this course is offered: ( level 7)

#### 4. Course General Description:

The research project forms part of the final year of the BSc degree program in chemistry

This course is provide the basic concepts of scientific research, and methods of data survey in international data basis using both traditional as well as digital methods, ethics of scientific research.

This course aims to hone the skills and abilities of the students required to conduct scientific research through application and laboratory practice of what the student has learned in different courses coherently not separate for all the concepts studied by the students during their whole undergraduate years. In order to insure an optimum performance level of the educational process in the preparation of cadres specialized and capable of dealing and solving problems related to the community and the surrounding environment, and to maximize the benefits from the graduation research project.

Students will undertake a research project under the supervision of an academic in the discipline of chemistry that will provide advanced knowledge and skills for professional or highly skilled work. The intention is that students will collect and present novel scientific data of a quality that could be published in the scientific literature

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

The student should have completed 108 hours before to joining the Project

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

-

#### 7. Course Main Objective(s):



The main aims of the research project are

- Provide advanced knowledge in a particular area within the field of modern chemical research.
- Develop knowledge and research skills

Acquire the necessary skills to perform chemical research in a professional environment.

educate the student in the practice of research project. This involves many aspects including

- competency in laboratory/computer work
- objective interpretation of the student's own experimental results and comparison with those already published in the scientific literature
- the ability to solve problems through innovative and independent thought
- Organizational skills in the collation and reporting of results.

## 2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid <ul style="list-style-type: none"> <li>• Traditional classroom</li> <li>• E-learning</li> </ul>	-	-
4	Distance learning	-	-

## 3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	60
3.	Field	
4.	Tutorial	
5.	Others (specify)	
<b>Total</b>		<b>90</b>

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			





Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.1	Explain research texts and literature review, interpret and extract information from journal articles relevant to the project	<b>K1</b>	Lectures. - Conduct scientific research. - Seminars. -Discussions	Research seminar Tutorials Workshops Literature report
1.2	Explain Chemical Reactions and Stoichiometry concepts to problems involving mass, moles, and solution molarity	<b>K3</b>	-Brainstorming Effective education	Group project work Oral Examination Scheduled meetings Rubric assessment
<b>2.0</b>	<b>Skills</b>			
2.1	Perform the Laboratory experiments using the right scientific methods and proper safety procedures in project .	<b>S1</b>	Project Based Learning Active Learning Strategies Effective education and collaborative education Self learning strategy Brainstorming, Discussions	Written reports presentations Research seminar Written Project Reports Literature report Practical performance Scheduled meetings Workshops - Evaluation of research and presentation Rubric assessment
2.2	Communicate effectively orally and written using appropriate presentation formats for different issues with recipients of different types.	<b>S2</b>		
2.3	Demonstrate the ability to use modern technology and statistical applications that are used in the various fields of chemistry.	<b>S3</b>		



Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.4	Solve chemical problems related to different applications of chemistry through critical thinking to develop appropriate rational, explanations, and answers.	S4		
<b>3.0</b>	<b>Values, autonomy, and responsibility</b>			
3.1	Apply standards of integrity, transparency, and ethical behavior in various Academic and professional fields	V1	Problem solving strategy Discovery strategy Collaborative learning strategy Peer learning strategy	Research seminar Written Project Workshops Group project work
3.2	Demonstrate the ability to work independently and with groups.	V2	Self learning strategy	Scheduled meetings The student's cooperation during the achievement of the project
3.3	Self-development, assess own learning and performance and autonomously make decisions regarding self-development and/or tasks based on convincing evidence.	V3	Interactive learning Cooperative learning	The student's understanding of the project and its results  Performance appraisal Behavioral observation Assessment of Reports Assessment of Group presentations



Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
				Indirect assessment

### C. Course Content

No	List of Topics	Contact Hours
1.	Introduction of research project	
2.	Research Methodology	2
3.	Conduct scientific literature searches	2
4.	Optimal use of databases in the search for information	2
5.	Read, interpret and extract information from journal articles relevant to the project	2
6.	Reading and Writing, introduction, keywords, Abstract	2
7.	Use the draw program to draw chemical compounds	2
8.	Writing and Organization the presentation on PowerPoint	2
9.	Design the protocol including the steps of work following the suitable timetable	2
10.	Identify different practical techniques and methods to assess chemical parameters related to the subject under study.	4
11.	Special Topics in Chemistry	2
12.	Chemical Enterprise and Professional Skills	2
13.	Ethics in Science and Technology.	2
14.	Apply ethical recommendations during research project .	2
<b>Total</b>		<b>30</b>
<b>Practical part</b>		
1-	According to the branch chosen within the various branches of chemistry	
<b>Total</b>		<b>60</b>

### D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Scheduled meetings	During the semester	10%
2.	Knowledge and Understanding of the project and its results	During the semester	10%





No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
3.	Criteria use for assessing student performance( Practical performance ,Level of understanding, experimental design, creativity, hard work, quality of writing, artwork)	During the semester	20%
4.	Presentation 1	5 <sup>th</sup> week	10%
5.	Presentation 2 and poster	12 <sup>th</sup> week	10%
6.	Final report (Research Projects Evaluation Committee)	End of semester	40%
<b>Total</b>			<b>100%</b>

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

## E. Learning Resources and Facilities

### 1. References and Learning Resources

<b>Essential References</b>	Handbook of Research Methodology, Dr. Shanti Bhushan Mishra Dr. Shashi Alok 2017. Walkington, H. Students as Researchers: Supporting Undergraduate Research in the Disciplines in Higher Education; Higher Education Academy: York, UK, 2017.
<b>Supportive References</b>	Gentile, J.; Brenner, K.; Stephens, A. Undergraduate Research Experiences for STEM Students: Successes, Challenges, and Opportunities; National Academies Press: Washington, DC, USA, 2017.
<b>Electronic Materials</b>	<a href="https://sdl.edu.sa/SDLPortal/Publishers.aspx">https://sdl.edu.sa/SDLPortal/Publishers.aspx</a> <a href="https://www.sciencedirect.com/">https://www.sciencedirect.com/</a> <a href="https://www.sciencedirect.com/journal/journal-of-advanced-research">https://www.sciencedirect.com/journal/journal-of-advanced-research</a> <a href="https://scholar.google.com/">https://scholar.google.com/</a> <a href="https://www.chem.tamu.edu/undergraduate/undergraduate-research.php">https://www.chem.tamu.edu/undergraduate/undergraduate-research.php</a> <a href="https://www.mmu.ac.uk/study/undergraduate/course/bsc-chemistry-with-option-to-study-overseas">https://www.mmu.ac.uk/study/undergraduate/course/bsc-chemistry-with-option-to-study-overseas</a> <a href="https://www.researchgate.net/">https://www.researchgate.net/</a>
<b>Other Learning Materials</b>	<b><u>ChemDraw Professional 17.0 Suite</u></b> <u>ACD/ChemSketch :: Draw Chemical Structures :: ACD/Labs</u> <u>ACD/ChemSketch for Academic and Personal Use</u> <a href="https://chemaxon.com/marvin">https://chemaxon.com/marvin</a> <b>Origin pro 8</b>

### 2. Required Facilities and equipment



Items	Resources
<b>facilities</b> (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Class room, research laboratory
<b>Technology equipment</b> (projector, smart board, software)	The electronic platform, data show, Smart Board
<b>Other equipment</b> (depending on the nature of the specialty)	Virtual laboratories Research laboratory Library

## F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Student evaluation (electronically questionnaire) organized by the University
Effectiveness of Students assessment	Department	Analysis of electronically questionnaire. the Make decision through department Council
Quality of learning resources	Department / staff members	Analysis of course report by Chemistry Department Council
The extent to which CLOs have been achieved	Department Faculty	CLO Analysis Report
Other		

**Assessors** (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify))

**Assessment Methods** (Direct, Indirect)

## G. Specification Approval

<b>COUNCIL /COMMITTEE</b>	Chemistry Department Council	
<b>REFERENCE NO.</b>	17	
<b>DATE</b>	15/6/1446	16/12/2024

