Form: Course Syllabus	Form Number	EXC-01-02-02A
	Issue Number and Date	2/3/24/2022/2963 05/12/2022
	Number and Date of Revision or Modification	
	Deans Council Approval Decision Number	2/3/24/2023
	The Date of the Deans Council Approval Decision	23/01/2023
	Number of Pages	06

1.	Course Title	Research Methods in Chemistry
2.	Course Number	0333791
3.	Credit Hours (Theory, Practical)	3,0
	Contact Hours (Theory, Practical)	3,0
4.	Prerequisites/ Corequisites	N.A
5.	Program Title	Master's in chemistry
6.	Program Code	
7.	School/ Center	Science
8.	Department	Chemistry
9.	Course Level	Master Level
10.	Year of Study and Semester (s)	First/second year and First/second
11.	Other Department(s) Involved in Teaching the Course	N.A
12.	Main Learning Language	English
13.	Learning Types	☒Face to face learning ☐Blended ☐Fully online
14.	Online Platforms(s)	☐Moodle ☒Microsoft Teams
15.	Issuing Date	1-11-2024
16.	Revision Date	

17. Course Coordinator:

Name: Prof. Kamal Sweidan — Contact hours: any time via e-mail

Office number: 204 — Phone number: +96265353000-Ext. 22155,

Email: k.sweidan@ju.edu.jo

18. Other Instructors:

Name: N.A
Office number:
Phone number:
Email:
Contact hours:

19. Course Description:

The scientific method and the general principles of scientific research in chemistry represented by examples of major achievements in chemical research, treatment of chemical data and experiment design, information retrieval and scientific and technical report writing, intellectual property protection of chemical inventions, the students will be required to prepare and present seminars on selected topics which will form part in their assessment.

The used Rubric to evaluate the students are to following:

School	**Science**			**Department**	**Chemistry**
Course name	**Research Methods in Chemistry**			**Course No.**	0333791
Year		**Semester**		**Evaluation No.**	
Exam date				**Exam time**	

Student name	
Instructor name	
Evaluator name	

Evaluation

	Evaluation Criteria	**Description**	**Degree (1-5)**
1	**Clarity and Presentation**	**Ability to deliver content in an organized and clear manner, using appropriate language.**	
2	**Mastery of the Subject**	**Depth of understanding and ability to explain concepts clearly and accurately**	
3	**Relevance and modernity of bibliography**	**Utilization of recent scientific references from diverse sources (mostly within the last 10 years).**	
4	**Content Organization**	**Logical sequence and arrangement of ideas, with a clear introduction and conclusion.**	

5	Visual Aids and Techniques Used	Effective use of available presentation tools (slides, illustrations, charts, etc.).	
6	Interaction with Audience	Ability to answer questions and engage positively with the audience.	
7	Time Management	Adherence to allocated presentation time and its suitability with the content.	
8	Critical Thinking and Analysis	Ability to analyze the topic from different angles and provide new perspectives.	
Total (/40)			

Strengths:

Weaknesses:

Additional Notes

20. **Program Student Outcomes (SO's):** (To be used in designing the matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program)
SO1. Demonstrate comprehensive knowledge and understanding of chemistry topics, achieving expertise in foundational research principles.
SO2. Maintain ethical standards in research.
SO3. Improve communication of scientific knowledge through structured reports, presentations, and discussions.
SO4. Engage in activities that enhance practical scientific skills and improve professional expertise.
SO5. Develop independent research skills to solve complex problems, focusing on analytical and critical thinking.

21. **Course Intended Learning Outcomes (CLO's):** (Upon completion of the course, the student will be able to achieve the following intended learning outcomes)

1. Identify different levels of chemical literature using various search engines and world-wide publishers, journals, patents, and the various types of chemical publications.
2. Apply different software programs including: Chemdraw, Endnote, SciFinder,……
3. Identify components of article research and how to design and write each component.

4. Understand ethical principles governing chemical research (copyright protection laws and plagiarism).
5. Apply seminar presentation skills and writing scientific proposals and posters.

Course CLOs	The learning levels to be achieved					
	Remembering	**Understanding**	**Applying**	**Analysing**	**evaluating**	**Creating**
1	√	√				
2		√	√			
3		√	√	√	√	√
4		√				
5	√	√	√	√	√	√

22. The matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program:

Program SO's / Course CLO's	SO (1)	SO (2)	SO (3)	SO (4)	SO (5)
CLO (1)	√		√	√	
CLO (2)			√		
CLO (3)				√	
CLO (4)		√			
CLO (5)	√	√	√	√	√

23. Topic Outline and Schedule:

Week	Lecture	Topic	CLO/s Linked to the Topic	Learning Types Face to Face (FF) Blended (BL)	Platform Used	Synchronous (S) Asynchronous (A)	Evaluation Methods	Learning Resources
1	1.1	Definition of Scientific Research	1	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
	1.2	A Scientific observation A research hypothesis A null hypothesis	1	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
	1.3	Types of research	1	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
2	2.1	Pure and applied scientific research	1	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
	2.2	Identifying the research problem and the research method to solve it	1	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
	2.3	Experimental research: aims and designing	1	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
3	3.1	Results-Significance Test	1	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
	3.2	Conclusion and generalization	1	FF	Microsoft Teams	A	Quiz, Midterm and	See Ref.

							Final Exams	
	3.3	Types of research designing	1	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
4	4.1	Scientific research ethics	4	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
	4.2	Authorship	4	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
	4.3	Author responsibilities and plagiarism	4	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
5	5.1	Types of research	3	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
	5.2	ChemDraw program-1	2	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
	5.3	ChemDraw program-2 training	2	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
6	6.1	Literature Review: Access to a multi-database of scientific research such as: Scopus, PubMed, ScienceDirect, SciFinder.	1	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
	6.2	Literature Review: Practical Training.	1	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
	6.3	QUIZ 1		FF	Microsoft Teams	A	Quiz, Midterm and	See Ref.

							Final Exams	
7	7.1	Interpretation of published paper/note/review/…..	3	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
	7.2	Abstract-components	3	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
	7.3	Abstract-components, training by students	3	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
8	8.1	Introduction-components	3	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
	8.2	Introduction-components, training by students	3	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
	8.3	Experimental Part-components	3	FF	Microsoft Teams	A	Quiz, Midterm and Final Exams	See Ref.
9	9.1	MidExam		FF	Microsoft Teams	A	Quizzes and Final Exam	See Ref.
	9.2	Oral presentation of students-1	5	FF	Microsoft Teams	A	Quizzes and Final Exam	See Ref.
	9.3	Oral presentation of students-2	5	FF	Microsoft Teams	A	Quizzes and Final Exam	See Ref.
10	10.1	Components of results and discussion-1	3	FF	Microsoft Teams	A	Quizzes and Final Exam	See Ref.
	10.2	Components of results and discussion-2	3	FF	Microsoft Teams	A	Quizzes and	See Ref.

							Final Exam	
	10.3	Quiz 2		FF	Microsoft Teams	A	Quizzes and Final Exam	See Ref.
11	11.1	Conclusion and Acknwlegment-1	3	FF	Microsoft Teams	A	Quizzes and Final Exam	See Ref.
	11.2	Conclusion and Acknwlegment-2	3	FF	Microsoft Teams	A	Quizzes and Final Exam	See Ref.
	11.3	Training of analyzing paper-Group 1,2,….	3+5	FF	Microsoft Teams	A	Quizzes and Final Exam	See Ref.
12	12.1	Training of analyzing paper-Group 1,2,….	3+5	FF	Microsoft Teams	A	Quizzes and Final Exam	See Ref.
	12.2	Analysis of reviews	3	FF	Microsoft Teams	A	Quizzes and Final Exam	See Ref.
	12.3	Analysis of notes, short communications	3	FF	Microsoft Teams	A	Quizzes and Final Exam	See Ref.
13	13.1	References styling in a scientific writing-Endnote program	2	FF	Microsoft Teams	A	Quizzes and Final Exam	See Ref.
	13.2	Endnote-training by students	2	FF	Microsoft Teams	A	Quizzes and Final Exam	See Ref.
	13.3	Quiz 3		FF	Microsoft Teams	A	Quizzes and Final Exam	See Ref.
14	14.1	Preparing a good presentation	5	FF	Microsoft Teams	A	Quizzes and Final Exam	See Ref.
	14.2	Preparing a good poster	5	FF	Microsoft Teams	A	Quizzes and Final Exam	See Ref.

	14.3	Writing and presenting a thesis proposal -1	5	FF	Microsoft Teams	A	Quizzes and Final Exam	See Ref.
15	15.1	Writing and presenting a thesis proposal -2	5	FF	Microsoft Teams	A	Quizzes and Final Exam	See Ref.
	15.2	Writing and presetting a thesis proposal -3	5	FF	Microsoft Teams	A	Quizzes and Final Exam	See Ref.
	15.3	Open-Discussion	1-5	FF	Microsoft Teams	A	Quizzes and Final Exam	See Ref.
16							Final Exam	

24. Evaluation Methods:

Opportunities to demonstrate the achievement of the CLOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	CLO/s Linked to the Evaluation activity	Period (Week)	Platform
Quiz 1	10	1.1-6.2	1	6	In Class
Quiz 2	10	9.2-10.2	1-4	10	In Class
Quiz 3	10	11.1-13.3	3-4	13	In Class
Midterm	30	1.1-8.1	1-4	9	In Class
Final Exam	40	1.1-15.3	1-5	16	In Class

25. Course Requirements:

Students should have a computer and internet connection

26. Course Policies:

A- Attendance policies: Maximum 20% absence is allowed.
B- Absences from exams and submitting assignments on time: Incomplete Exams are conducted later after arrangement a new date.
C- Health and safety procedures: This is a theoretical course.
D- Honesty policy regarding cheating, plagiarism, misbehavior: The general Jordan University's laws are applied in any case of cheating.
E- Grading policy: Letters scale is applied.
F- Available university services that support achievement in the course: Free Internet-access and E-learning,

27. References:

A- Required book(s), assigned reading and audio-visuals:

From Research to Manuscript A Guide to Scientific Writing, Author: Michael Jay Katz, Springer, 2009

B- Recommended books, materials, and media:

Selected online research methodology materials, such as: http://explorable.com/research-methodology
http://www.slideshare.net/sheetal321

28. Additional information:

Required Database, SciFinder, Web of Science, Scopus, …etc

Name of the Instructor or the Course Coordinator: **Prof. Kamal Sweidan**	Signature: ……..……	Date: ……..……
The Head of Graduate Studies Committee/ Department Chemistry **Dr. Murad AlDamen, Prof.**	**Signature:** **……..……**	**Date:** **……..……**
The Head of Department of Chemistry **Dr. Murad AlDamen, Prof.**	**Signature:** **……..……**	**Date:** **……..……**
Vice Dean for Graduate Studies and Scientific Research / School of Science **Dr. Kamal Sweidan, Prof.**	**Signature:** **……..……**	**Date:** **……..……**
The Dean of School of Science **Dr. Mahmoud I. Jaghoub, Prof.**	**Signature:** **……..……**	**Date:** **……..……**