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

1.	**Course Title**	Applied Chemistry
2.	**Course Number**	0333751
3.	**Credit Hours (Theory, Practical)**	(3,0)
	Contact Hours (Theory, Practical)	(3,0)
4.	**Prerequisites/ Corequisites**	-
5.	**Program Title**	MSc in Chemistry
6.	**Program Code**	0303
7.	**School/ Center**	Science
8.	**Department**	Chemistry
9.	**Course Level**	1-2
10.	**Year of Study and Semester (s)**	1-2
11.	**Other Department(s) Involved in Teaching the Course**	-
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**	9/11/2024
16.	**Revision Date**	16/11/2024

17. Course Coordinator:

Name: Prof. Dr. Ehab AlShamaileh	Contact hours: Daily
Office number: 024	Phone number: 22141 and 22131
Email: ehab@ju.edu.jo	

18. Other Instructors:

Name:
Office number:
Phone number:

19. Course Description:

Application of chemical thermodynamics and kinetics to industrial chemical processes, catalytic reactions and catalysts in the chemical industry, industrial separation methods.

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. Develop independent research skills to solve complex problems, focusing on analytical and critical thinking.

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. Maintain ethical standards in research.

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. **Acquire basic understanding of how the thermodynamics, reaction kinetics, and reactor type contribute to the overall process design and technological choices.**
2. **Perform simple calculations of mass and heat balance in continuous chemical processes.**
3. **Attain basic quantitative and qualitative knowledge about heterogeneous and homogeneous catalysis, adsorption and reaction kinetics, and reactor theory.**
4. **Know the common types of industrial catalysts and their properties.**

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

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)	√	√	√	√	√

23. Topic Outline and Schedule:

Week	Lecture	Topic	CLO/s Linked to the Topic	Learning Types Face to Face (FF) Blended (BL) Fully Online (FO)	Platform Used	Synchronous (S) Asynchronous (A)	Evaluation Methods	Learning Resources
1	1	Industrial chemical processes	1,2	FF	Class	S	Written Exams	Books in Industrial Chemistry Thermodynamics and kinetics
2	2	Chemical process thermodynamics	1,2	FF	Class	S	Written Exams	
3	3	Chemical process kinetics	1,2	FF	Class	S	Written Exams	
4	4	Catalytic reactions	3,4	FF	Class	S	Written Exams	
5	5	Catalysts in the chemical industry	3,4	FF	Class	S	Written Exams	
6	6	Heterogeneous and homogeneous catalysis	3,4	FF	Class	S	Written Exams	
7	7	Adsorption and reaction kinetics	1,2	FF	Class	S	Written Exams	
8	8	Chemical reactor theories	1,2	FF	Class	S	Written Exams	
9	9	Industrial processes for the modern society	1,2	FF	Class	S	Written Exams	
10	10	Chemical processes design	1,2	FF	Class	S	Written Exams	
11	11	Industrial separation methods	3,4	FF	Class	S	Written	

							Exams	
12	12	Excursion to a chemical plant	1-4	FF	Class	S	Written Exams	
13	13	Applied project	1-4	FF	Class	S	Eval.	
14	14	Applied project	1-4	FF	Class	S	Eval.	
15	15	Applied project	1-4	FF	Class	S		
16	16						Final Exam	

24. Evaluation Methods:

Opportunities to demonstrate 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
Midterm Exam	30	1-7	1,2.3	10th week	Written Exam
Projects (Term paper and presentation)	30	All topics	1,2,3.4	14th week	MS Teams and Class
Final Exam	40	All Chapters	1,2,3.4	16th week	Written Exam

25. Course Requirements:

(e.g.: students should have a computer, internet connection, webcam, account on a specific software/platform…etc.):

26. Course Policies:

A-Attendance policies: Students should attend at least 80% of the total number of lectures.

B-Absences from exams and submitting assignments on time: Students who miss an exam must submit and acceptable excuse and then a makeup exam will be appointed.

C-Health and safety procedures: Students should follow the university regulations.

D-Honesty policy regarding cheating, plagiarism, misbehavior: According to university regulations.

E-Grading policy: 1. Mid exam 30% 2. Projects 30% 3. Final exam: 40%. The current university's letter grade scale is adopted.

F- Available university services that support achievement in the course: Central library, personal computer labs at different locations in the university, e-learning site, faculty member's website, etc..

27. References:

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

1st Edition, Chemical Thermodynamics: Theory and Applications By W.J. Rankin, 2020

B- Recommended books, materials, and media:

1. Levenspiel, O. - Chemical Reaction Engineering: This classic textbook provides a comprehensive overview of the principles of chemical reaction engineering, including detailed discussions on reactor design and analysis.
2. Fogler, H. S. - Elements of Chemical Reaction Engineering: Known for its clear explanations and practical examples, this book is an excellent resource for understanding the fundamentals of chemical reactors and their applications.
3. Smith, J. M. - Chemical Engineering Kinetics: Focused on the kinetics of chemical reactions, this text offers insights into the rate processes that govern reactor performance.
4. Nauman, E. B. - Chemical Reactor Design, Optimization, and Scaleup: This book covers advanced topics in reactor design and optimization, making it ideal for those interested in scaling up chemical processes.
5. Journal of Industrial and Engineering Chemistry: A leading journal that publishes cutting-edge research articles on industrial chemistry and chemical engineering, including studies on reactor technologies.

28. Additional information:

Name of the Instructor or the Course Coordinator: **Prof. Ehab AlShamaileh**	Signature: *Ehab AlShamaileh*	Date: 16/11/2024
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:** **……..……**