

Course Syllabus

1	Course title	INDUSTRIAL CHEMISTRY I	
2	Course number	(0303351)	
3	Credit hours	3	
	Contact hours (theory, practical)	3+0	
4	Prerequisites/corequisites	Physical Chemistry I	
5	Program title	Chemistry	
6	Program code	03	
7	Awarding institution	The University of Jordan	
8	School	Science	
9	Department	Chemistry	
10	Course level	4 th year	
11	Year of study and semester (s)	1 st semester 2023-2024	
12	Other department (s) involved in teaching the course	none	
13	Main teaching language	English	
14	Delivery method	<input checked="" type="checkbox"/> Face to face learning <input type="checkbox"/> Blended <input type="checkbox"/> Fully online	
15	Online platforms(s)	<input type="checkbox"/> Moodle <input checked="" type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input type="checkbox"/> Others.....	
16	Issuing/Revision Date		

17 Course Coordinator:

Name:	Imad Hamadneh	Contact hours:	Sun, Tus, Thu 9:30-10;30
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**18 Other instructors:**

Name:

Office number:

Phone number:

Email:

Contact hours:

Name:

Office number:

Phone number:

Email:

Contact hours:

19 Course Description:

This course covers the basic consideration, characteristics of the chemical industry, material and energy balance, raw materials for the chemical industry, production processes for organic chemical industries, basic chemicals from petroleum, industrial polymers, detergents, chemical industrial process development, the technology of chemical processes, selected industrial processes



20 Course aims and outcomes:

A- Aims:

B- Students Learning Outcomes (SLOs):

Upon successful completion of this course, students will be able to:

CLO-1. Problem-Solving: Graduates will be able to apply mathematical and scientific knowledge to calculate the reactor's volume, the reaction's ordering, the separation techniques, and the reaction time. (ASO-1)

CLO-2. Identify, formulate, and solve technical or scientific problems relevant to Industrial Chemistry. (ASO-1 & ASO-2)

CLO-3. Communication: Graduates will be able to communicate scientific information effectively and accurately to a range of audiences, including both technical and non-technical audiences. (ASO-1 & ASO-5)

SLOs SLOs of the course	SLO (1)	SLO (2)	SLO (3)	SLO (4)	SLO (5)
CLO-1	✓				
CLO-2	✓	✓			
CLO-3	✓				✓

21. Topic Outline and Schedule:

Week	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources	
1	1.1	Introduction	1 & 2						
	1.2	characteristics	1 & 2						
	1.3	History	1, 2, &3						
2	2.1	Industrial Chemical Kinetics	1 & 2						
	2.2	Reaction Control and orders	1 & 2						
	2.3	0 th , 1 st , and 2 nd order kinetics	1 & 2						
3	3.1	Industrial Catalysis and Catalysts: Kinetics of industrial catalytic processes	1,2 &3						
	3.2	Structure and preparation.	1 & 2						
	3.3	heterogeneous catalysts	1 & 2						
4	4.1	Industrial Separation Processes	1,2 &3						
	4.2	Phase separation	1,2 &3						

	4.3	Distillation, Extraction.	1 & 2						
5	5.1	Energy Introduction, Classification of fuels.	1 & 2						
	5.2	Calorific value of a fuel.	1 & 2						
	5.3	Types of energy used in the chemical industry.	1 & 2						
6	6.1	Organic Chemicals from Coal Origin of coal, Types of coal, Carbonization of coal.	1 & 2						
	6.2	high and low-temperature carbonization	1 & 2						
	6.3	Liquid fuels from coal (Coal hydrogenation)	1 & 2						
7	7.1	Gasification, Fuel gases	1 & 2						
	7.2	water gas.	1 & 2						
	7.3	natural gas.	1 & 2						
8	8.1	Syngas. Cracking processes.	1 & 2						

	8.2	Reforming processes.	2 &3						
	8.3	Direct oxidation.	2						
9	9.1	II-Primary Petrochemicals I Alkanes, Alkenes, and Alkynes Methane and carbon monoxide,	2						
	9.2	C2-C3, Acetylene, Ethylene, Propylene.	1 & 2						
	9.3	C4 hydrocarbons	1 & 2						
10	10.1	III-Primary Petrochemicals II Aromatic hydrocarbons Introduction	1 & 2						
	10.2	Manufacturing routes, Benzene,	1 & 2						
	10.3	Manufacturing routes, Xylenes, Cumene	1 & 2						
Week	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources	

11	11.1	Dyestuff Industry-organic	1 & 2						
	11.2	Dyestuff Industry-inorganic	1 & 2						
	11.3	Polymer Industry,	1 & 2						
12	12.1	classifications	2						
	12.2	Type of synthesis	1, 2, &3						
	12.3	properties	1 & 2						
13	13.1	Elastomer's	1 & 2						
	13.2	Natural & Synthetic Elastomers	1 & 2						
	13.3	Chemical synthesis of elastomers	1 & 2						
14	14.1	Cellulose and Paper Industry	2 & 3						
	14.2	Fibers	2& 3						
	14.3	Detergent Industry.	1, 2 & 3						
15	15.1	Chemical Industry in Jordan: Introduction	2& 3						
	15.2	NaCl, KCl	2 & 3						
	15.3	Phosphate industry	2 & 3						


22 Evaluation Methods:

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

Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform
1 st exam	30	1.The Chemical Industry Characteristics, History 2.Industrial Chemical Kinetics and Reaction Control , Batch processes, Continuous processes, Industrial Catalysis and Catalysts 3.Industrial Separation Processes , Phase separation, Distillation, Extraction.	1,2 &3	6-7	
2 nd exam	20	Energy: Classification of fuels. Organic Chemicals from Coal , and petrol Organic Chemicals from Petroleum and Natural Gas. Preparation of Primary Petrochemicals	1,2 &3	10-11	
Final	50	Industrial Chemical Kinetics and Reaction Control Industrial Separation. Energy,Organic Chemicals from Coal, and petrol Organic Chemicals from Petroleum and Natural Gas.	1, 2 &3	18	



		Dyestuff Industry, Paper and Cellulose Industry, Polymer Industry, Detergent Industry			

23 Course Requirements

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

24 Course Policies:

A- Attendance policies:

B- Absences from exams and submitting assignments on time:

C- Health and safety procedures:

D- Honesty policy regarding cheating, plagiarism, misbehavior:

E- Grading policy:

F- Available university services that support achievement in the course:

25 References:

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

1. C. A. Heaton, An Introduction of Industrial Chemistry, Blackie, Glasgow, 1991
2. H. White, Introduction to Industrial Chemistry, Wiley-interscience, New York, 1986

B- Recommended books, materials, and media:

1. 1 P. Chenier Survey of Industrial Chemistry, Third Edition, Kluwer Academic / Plenum Publishers, New York, 2002,



2. H. A. Wittcoff, B. G. Reuben, J. S. Plotkin, Industrial Organic Chemicals, Second Edition, John Wiley, Wiley-Interscience, 2004.
3. K. Weissmehl, H.-J. Arpe, Industrial Organic Chemistry, Second Edition, VCH, Weinheim, Germany, 1993
4. Basic Organic Chemistry Part 5: Industrial Products, J. M. Tedder, A. Nechvatal, A. H. Jubb, John Wiley, Chichester, 1975

26 Additional information:

Name of Course Coordinator: ---Imad Hamadneh-----Signature: ----- Date: ----- ---
Head of Curriculum Committee/Department: ----- Signature: ----- ---
Head of Department: ----- Signature: ----- -
Head of Curriculum Committee/Faculty: ----- Signature: ----- -
Dean: ----- Signature: -----