Course Syllabus

According to JORDAN National Qualification Framework (JNQF)

Course Name: Industrial Chemistry 1

Course Number: 11013251

D040_JNQF_Rev 2
Ref: Deans Council (05) Decision No. (06) **Date**: 18 / 10 / 2021
Ref: Quality Assurance Council Session (03) Decision No. (03) **Date**: 05 / 10 / 2021

General Course Information:

Course title	Industrial Chemistry 1
Course number	11013251
Credit hours	3
Education type	Face-to-Face
Prerequisites/corequisites	1101241
Academic Program	Bachelor
Program code	01
Faculty	Science
Department	Chemistry
Level of course	Third year
Academic year /semester	2021/2022- Second Semester
Awarded qualification	Bachelor degree in chemistry
Other department(s) involved in teaching the course	-
Language of instruction	English
Date of production/revision	6/3/2022

Course Coordinator:

Coordinator's name	Dr. Samer Hasan Hussein-Al-Ali
Office No	7320
Office Phone extension number	2749
Office Hours	Sun, Tue, Thru (12-1)
Email	samer.alali@iu.edu.jo

Other Instructors:

Instructor's Name:	
Office No	
Office Phone extension number	
Office Hours	
Email	

Course Description *(English/Arabic)*:

English	Basic consideration, characteristics of the chemical industry, raw materials for chemical industry, production processes for organic chemical industries, basic chemicals from petroleum, industrial polymers, detergents, selected industrial processes.
Arabic	مبادئ اساسية في الصناعة; خصائص الصناعات الكيميائية; المواد الخام في الصناعات الكيميائية; عمليات الإنتاج في الصناعات الكيماوية العضوية; المواد الكيميائية الأساسية من النفط; البوليمرات الصناعية; المنظفات; عمليات صناعية مختارة.

Text Book: ***Author(s), Title, Publisher, Edition, Year, Book website.***

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

References: ***Author(s), Title, Publisher, Edition, Year, Book website.***

* H. A. Wittcoff, B. G. Reuben, J. S. Plotkin, Industrial Organic Chemicals, Third Edition, 2012, John Wiley.

* K. Weissermel, H.-J. Arpe, Industrial Organic Chemistry, Fourth Edition, 2003, Wiley-VCH, Weinheim, Germany.

Course Educational Objectives (CEOs):

1.	Gain knowledge about the structure of chemical industry.
2.	Understand the features of a selected chemical process.
3.	Understand the origin, chemical nature and describe the extraction, processing and uses of the crude oil fractions.
4.	Learn about different mechanisms of polymerization.
5.	Discuss the production of soaps and detergents.

Intended Learning Outcomes (ILO's):

1.	**Subject Intended learning outcomes (ILOs) describe what students are expected to know and be able to do at the end of the course. These outcomes are related to the knowledge, skill and competence that students acquire:**	**Relationship to CEOs**	**Contribution to PLOs**	**Bloom Taxonomy Levels***	**Descriptors****
2. A	Knowledge and Understanding:				
3. A1	Will be able to know the structure of chemical industry (Raw material, bulk material, …etc.)	1	2	Knowledge	Knowledge
4. A2	will be able to describe the chemical nature and processing of crude oil.	3	3	Knowledge	competency
5. A3	will be able to describe soap and detergent preparation process.	5	2	Knowledge	Knowledge
6. B	Intellectual skills:				
7. B1	Will be able to categorizes polymerization reactions with respect to mechanisms and distinguishes differences of these reactions.	4	3	Comprehension	competency
8. B2	Will be able to explains some chemical production processes	2	3	Comprehension	competency
9. B3	Will be able to solve problems related to material balance	1	1	Analysis	skill

Program Learning Outcome (PLOs):

Program Learning Outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills, and behaviours that students acquire as they progress through the program. A graduate of the (Chemistry) program will demonstrate		Descriptors
1.	Describe the fundamental scientific principles and theories across the four subfields of chemistry (Organic, inorganic, analytical and physical).	Knowledge
2.	Identify and confirm chemical compounds structures as well as determine chemical composition.	Knowledge
3.	Establish and concludes mechanisms of physical and chemical processes in addition to the ability of mastering qualitative and quantitative determination.	competency
4.	Solve the scientific problems using different mechanisms and procedures based on critical thinking.	skill
5.	Conduct scientific experiments in chemistry.	competency
6.	Commitment and interest in lifelong learning, and collaborate effectively with other people in a team.	competency
7.	Prepare logical, organized and concise written reports, and oral and poster presentations that effectively communicate chemical content to other scientists.	skill
8.	Commitment to the ethical principles of chemical research.	competency
9.	Find information about chemistry through databases and information	skill
10.	Evaluation of calculations in chemistry experiments and information analysis using computer software.	competency
11.	Demonstrate safety laboratory techniques.	skill

*** Descriptors according to the national qualifications framework (knowledge, skill, adequacy)**

Weekly Schedule *(please choose the type of teaching)*

√ **Face to Face**

□ **Hybrid** *(**2 Lectures** Face – To - Face **+1 Lecture** Asynchronous)*

□ **Hybrid (***1 Lectures* Face – To - Face ***+1 Lecture*** Asynchronous)

□ **Online** *(**2 Lectures** Synchronous **+1 lecture Asynchronous**)*

Week	First Lecture (Face – To - Face)	Second Lecture (Face – To - Face)	Third Lecture (Face – To - Face)	Ach. ILOs	Ach. PLOs	Descriptors**
1	**The Chemical Industry:** Introduction	Raw material for the Chemical Industry	The Structure of the Global Chemical Industry	A1	2	Knowledge
2	Basic consideration	Academic and industrial chemistries	Material balances	B3	1	skill
3	**Petrochemicals:** Natural gas	Crude Oils (Petroleum)	Hydrocarbon Compounds	A2	3	competency
4	Non-hydrocarbon Compounds	-Properties of Crude Oils -Hydrocarbon Intermediates	-Crude Oil Processing and Production of Hydrocarbon Intermediates	B1	3	competency
5	**Chemicals Based on ethylene** Introduction	Ethylene dichloride (EDC)	Vinyl chloride (vinyl chloride monomer)	B1	3	competency
6	Acetic acid	Ethylbenzene	Styrene Polyethylene	B2	3	competency
7	**Surfactants, Soaps and Detergents**	An Overview of the	Detergents, Shampoos and other Toiletry	A3	2	Knowledge

	-Composition and formulations methods	Chemical Ingredients used in Soaps,	Preparations:			
8	Surfactants, Bleaches	Bleaches, Buffers and Auxiliary agents (softeners, stiffeners,	fabric breathing, antistatic,	A3	2	Knowledge
9	pearl luster/ clouding,	moisturizers, thickening,	preservative, anti-oxidants, re-fattening, UV-absorber……..)	A1	2	Knowledge
10	**الاختبار النصفي**					
11	**Ammonia Production: Haber-Bosch Process** Use of ammonia;	Production challenges; Optimization;	Le Chetalier principle;	B2	3	competency
12	Le Chetalier principle;	Catalyst.	Catalyst.	B2	3	competency
13	**Sulfuric acid Production: Contact Process** Properties of Sulfuric Acid	-Properties of Sulfuric Acid	-The Production of Sulfuric Acid	B2	3	competency
14	The Production of Sulfuric Acid	Uses of sulfuric acid	Uses of sulfuric acid	B2	3	competency
15	Students' Presentations	Students' Presentations	Students' Presentations	A1	2	Knowledge
16	**الاختبار النهائي**					
17						

* **K: Knowledge, S: Skills, C: Competency**

Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

- Interactive videos
- Practice Labs
- Discussion Forums
- Quizzes
- Other Interactive online activities
- Reports

Course Policies:

A- Attendance policies:

The maximum allowed absences is 15% of the lectures.

B- Absences from exams and handing in assignments on time:

Midterm exam can be retaken based on approval of excuse by the instructor's discretion.

Not handing assignment on time will incur penalties.

C- Academic Health and safety procedures

D- Honesty policy regarding cheating, plagiarism, and misbehaviour:

Cheating, plagiarism, misbehaviour will result in zero grade and further disciplinary actions may be taken.

E- Grading policy:

- All homework is to be posted online through the e-learning system.
- Exams will be marked within 72 hours and the marked exam papers will be handed to the students.
- Online Activities (Course Videos, Practice labs, Discussion Forums, Quizzes) **20%**
- Midterm **30%**
- Final Exam **50%**

F- Available university services that support achievement in the course: **E-Learning Platform, Labs, Library.**

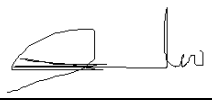
Required equipment:

- **PC / Laptop with webcam and mic**
- **Internet Connection**
- **Access to the IU E-Learning Platform at: https://elearn.iu.edu.jo/**
- **E-learning plan**
- Satisfaction questionnaires for online and face-to-face learning
- Software for e-learning
- Training

Assessment Tools implemented in the course:

- Final Exam
- Midterm Exam
- Quizzes
- Homework
- Improvement plans for online or face-to-face teaching

Responsible Persons and their Signatures:

Course Coordinator	**Dr. Samer Al-Ali**	**Completed Date**	6/3/2022
		Signature	

Received by (Department Head)	**Dr. Manal khabbas**	**Received Date**	7/3/2022
		Signature