The University of Jordan
School of Engineering
Chemical Engineering Department

Program: B.Sc.
Academic Year:
Semester:

CHE 0915453: Petroleum Refining Engineering
Course Catalog (2019)

Origin and occurrence of petroleum, and its constituents. Refinery feedstocks and products. Industrial use of refinery products and the need for refining operations. Crude oil distillation. Chemical reactions and refinery operations of: delayed cooking, catalytic reforming and isomerization, catalytic cracking, Hydrotreating, catalytic hydrocracing and alkylation. Products blending and production of Lube oil. Asphalt technology. Supporting processes. Cost estimation and economic evaluation.

Credit hours	3	level	3	**Pre-requisite(s)**	**0905451**
Instructor Prof. Yahya Khraisha	**Office number CHE000**			**Office phone** Ext. 22881	
Course website https://elearning.ju.edu.jo/login/index.php Live Streaming Platform: Microsoft Teams		**E-mail** **khraisha@ju.edu.jo**		**Place** Refer to Registration website	

Textbooks:

- Mark J. Kaiser, Arno de Klerk, James H. Gary , Glenn E. Handwerk, 'Petroleum Refining: Technology, Economics, and Markets', 6th edition, CRC Press, 2019.
- Handouts

References:

- Gary, J.H. and G.E. Handwerk, ' Petroleum Refining Technology and Economics', 5th edition, Taylor&Francis Group , LLC, 2007.
- Speight, J.G. 'The Chemistry and Technology of Petroleum', 5rd edition, CRC Press, 2014.
- Mayer R.A., 'Handbook of Petroleum Refining Processes' , 3rd edition, McGraw-Hill, 2003.

Learning Objectives and Intended Learning Outcomes

Objectives	Outcomes
1. Understanding the importance of crude oil as an energy source and as a base material for several petrochemicals and chemical industries.	1.1 Gain knowledge to identify the significance of petroleum as an energy source for the developed and undeveloped countries. **O4** 1.2 Realizing the important of refining

	operations to obtain finished products. **O4**
2. Predicting the physical and chemical properties of crude oil	2.1 Understand the different methods to find the properties of petroleum crude oil and products. **O1**
3. Evaluating the crude oils and petroleum products.	3.1 Understand the different techniques to evaluate crude oils and petroleum products**. O1**
4. Understand the different chemical and physical operations in modern fully integrated refineries	4.1 Demonstrate ability to describe and analyze the processes of atmospheric and vacuum distillation. **O4** 4.2 Demonstrate ability to describe and analyze the thermal and catalytic petroleum processes. **O4** 4.3 Demonstrate ability to describe and analyze the treatment units of crude and petroleum product units. **O4** 4.4 Demonstrate ability to describe and analyze the asphalt and lube oil operations and treatments. **O4**
5. Application of chemical engineering principles to the analysis of refinery columns, furnaces, reactors and heat exchange equipment.	5.1 Demonstrate ability to describe and design the petroleum distillation columns and reactors. **O1**, **O2** 5.2 Demonstrate ability to describe and design the petroleum heat exchange equipment. **O1**, **O2**
6. Enhance the ability of students for life-long learning and communication skills.	6.1 Enhance students' skills through intensive use of available data resources and short projects with written and oral presentations. **O7**

Topics Covered

Week	Topic	Ref.
1	Introduction & Syllabus,	Handouts, Textbook
2	Refinery feed stocks and analysis	Handouts, Textbook
3	Refinery products and analysis	Handouts, Textbook
4	Crude distillation units	Handouts, Textbook
5	Pipe still Heaters and vacuum systems	Handouts, Textbook
6-7	Coking and thermal processes	Handouts, Textbook
8-9	Catalytic cracking and hydrocracking	Handouts, Textbook
10	Hydroprocessing and Hydrotreating	Handouts, Textbook
11-12	Catalytic reforming and isomerization	Handouts, Textbook
13	Alkylation and polymerization	Handouts, Textbook
14	Product blending units	Handouts, Textbook
15	Lube oil treatment units	Handouts, Textbook
16	Asphalt production and supporting units	Handouts, Textbook

Evaluation

Evaluation tools	Weight	Dates
Midterm Exam	30	Will be announced by the department
Project	10	Will be arranged between the 5th and 16th weeks
Quizzes and activities	10	-
Final Exam	50	Will be announced by the University

Relationship to Program Outcomes

O1	O2	O3	O4	O5	O6	O7				
X	X		X			X				

Relationship to CHE Program Objectives

PEO1	PEO2	PEO3	PEO4	PEO5	PEO6	PEO7	PEO8	PEO9	PEO10	PEO11
√	√	√		√						

Document Control

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