زانکۆی پۆلیتەکنیکی هەولێر
ERBIL POLYTECHNIC UNIVERSITY

وەزارەتی خوێندنی باڵا و توێژینەوەی زانستی

Crude Oil Refinery Course Catalogue 2023-2024

College	**Erbil Technology College**	
Department	**Petroleum technology**	
Module Name	**Crude Oil Refinery**	
Module Code	**COR301**	
Semester	**3**	
Credit	**6**	
Module type	**Core**	
Weekly hours	**3**	
Weekly hours (Theory)	**(3)hr Class**	**(180)hr Workload**
Weekly hours (Practical)	**( )hr Class**	**( )hr Workload**
Lecturer (Theory)	**Dr Shara Kamal Mohammed**	
Phone number		
Email	**shara.mohammed@epu.edu.iq**	

Mission:

- **Course overview:**

This course is one of the core modules in the Department of petroleum technology. It provides the fundamentals besides the full understanding of the downstream oil industry. It provides a theoretical background including the physical conditions in the process of production in addition to preparing crude oil for refinery. The main focus of the course is the principles of the refinery process. Detailed information is provided about the chemical and physical processes that occur in refinery. This includes types of refinery units, refinery units' compositions; also, process occurs in distillation towers such as heat and mass transfer. The module also presents methods to improve the quality of petroleum products, which has an important application in industry. In other words, the course provides full information which prepares the student to operate refinery units.

- **Course objective:**

By the end of the academic year, the students should have the information and the understanding about the following aspects:

•A theoretical background in petroleum, creation, composition, properties, fractions, and storage.

•Preparing crude oil for sale or refinery, Physical conditions in the production process (crude oil treating such as desalting).

•A theoretical background in the refinery process.

•Different types of refinery and equipment.

•The properties of the petroleum products (fractions).

•Improve the quality of petroleum products.

•Heavy oil extraction techniques, gas process and process refinery wastes

Student's obligation

Students must be prepared to ask and answer questions during lectures regarding the materials as it is covered. In addition to class lectures based on material in the textbook, we may cover material in more detail or discuss recent modifications in refineries beyond what is covered in the textbook. In these cases, supplementary course material will be provided to the student as handouts or web links. Discusses students' suggestions, opinions, and questions during teacher office hours. In addition, a continuous system of quizzes is applied throughout the academic year to evaluate the students' progress. Students are also required to Prepare reports, seminars, and other activities.

- **Forms of teaching**

In this course the following materials are used as teaching assistance :

- A PC and data show to show the lectures content and display related videos.
- White board might be used to explain the lectures subjects.
- Smart board can also be used for the same purpose.

- **Assessment scheme**

6% Mid. Theory exam 4%

4%Quiz

40% Activity

15% final theory

Specific learning outcome:

At the end of the course students will:

-Know fundamentals of petroleum refining, types of energy resources, fundamentals of crude oil treatment and natural gas processing, fundamentals and purposes of re-refining processes and properties of main oil products.

-Be able to understand technical terms in the field of petroleum refining.

-Be able to prepare and deliver oral and written reports on professional topics (petroleum refining).

Course Reading List and References:

- Riazi, M.R., 2005. Characterization and properties of petroleum fractions (Vol. 50). ASTM international.
- Fahim, M.A., Al-Sahhaf, T.A. and Elkilani, A., 2009. Fundamentals of petroleum refining. Elsevier.
- Chaudhuri, U.R., 2016. Fundamentals of petroleum and petrochemical engineering. CRC Press.
- Meyers, R.A., 2004. Handbook of petroleum refining processes. McGraw-Hill.
- Speight, J.G., 2014. The chemistry and technology of petroleum. CRC press.

Course topics (Theory)	Week	Learning Outcome
Petroleum (Introduction) What Does Petroleum Mean?, Petroleum reservoir, Petroleum Creation, Crude Oils, Elemental composition of crude oils, Chemical Composition of Hydrocarbons, Petroleum Products Compositions	1	Learn about oil creation and composition.
Processing Operations in a Petroleum Refinery 1 Crude oil treating, Separator, Major components of separator, Classification of Separator, Free Water Knockout, Heater-Treater, Typical Oil Treating Facility, Saltwater Disposal.	2	Understand the process of crude oil treating.
Processing Operations in a Petroleum Refinery 2 Crude oil receiving, floating roof tank, Crude Oil Desalting,	3	Understand crude oil storage and desalting

Types of Salts in Crude Oil, Desalting process, Desalter Operating Variables		process.
<u>Sulfur in Crude Oil</u> Sweet and Sour Crude Oil, Properties of sweet crude oil, Sulfur in crude oil, Types of Organic Sulfur Compounds, Sulfur Compounds, Sulfur in Petroleum Products	4	Learn about Sulfer in crude oil.
<u>Refinery 1 (Refining Process1)</u> Refining Definition and Purpose, Refining Processes, Refinery configuration, Distillation, Distillation Columns, Basic Operation, Atmospheric Distillation, Vacuum Distillation, Crude Oil Distillation Products and uses.	5	Understand the process of refining and introduce the distillation process and products.
<u>Refinery 2 (Refining Process1)</u> Thermal Cracking Process, Visbreaking, Cocking, Catalytic Process, Catalytic Cracking, Hydrocracking	6	Understand the process of refining types of cracking processes.
<u>Refinery 3 (Refining Process3)</u> Alkylation, Polymerization, Isomerization	7	Learn Alkylation, Polymerization, and Isomerization processes
<u>Natural gas (Properties)</u> Natural Gas, Chemical Composition of Natural Gas, Natural Gas Combustion, Physical Properties of Natural Gas, Different Forms of Natural Gas, Use of natural gas, Treating Natural Gas,	8	Introduce natural gas
<u>Gas processing (LPG)</u> Liquefied Petroleum Gas (LPG), Gas Treating, Gas Sweetening Process	9	Learn about LPG and its processes
<u>Types of Petroleum (Heavy Oils)</u> Conventional petroleum, Heavy Oil, Tar San Bitumen	10	Learn about Heavy oils