

University of Mosul جامعة الموصل



*First Cycle – Bachelor's Degree (B.Sc.) – Petroleum
and Refining Engineering*

بكالوريوس - هندسة نفط وتكرير



Table of Contents

1. Overview
2. Undergraduate Modules 2025-2026
3. Contact

1. Overview

This catalogue is about the courses (modules) given by the program of Petroleum and Refining Engineering to gain the Bachelor of Science degree. The program delivers (52) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظرة عامة

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج هندسة النفط والتكرير للحصول على درجة بكالوريوس العلوم. يقدم البرنامج (48) مادة دراسية، على سبيل المثال، مع (٦٠٠٠) إجمالي ساعات حمل الطالب و ٢٤٠ إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2025-2026

Module 1

Code	Course/Module Title	ECTS	Semester
PRE111	Principles of process engineering I	7	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2	87	88
Description			
This module provides the introduction to refining engineering for first year students. The material covered in the module will enable students to understand the professional role of a chemical engineer. The module introduces students to engineering problem solving approaches and applying fundamental principles to develop pragmatic solutions for topics such as process scale up. The methods applied are relevant tools used by chemical engineers in their day to day role. This module will also provide insights into the latest technology developments in the field of chemical engineering.			

Module 2

Code	Course/Module Title	ECTS	Semester
PRE112	Analytical chemistry	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	59	66
Description			

Analytical chemistry is a course that focuses on the principles and techniques of chemical analysis. The course covers various topics such as quantitative analysis, chemical equilibrium, acid-base and redox titrations, spectroscopic methods, chromatography, and electrochemical methods. In addition, students will learn how to design experiments, collect and analyze data, and interpret results. The course is designed to provide students with a strong foundation in analytical chemistry, which is a fundamental area of chemistry that has applications in many fields such as environmental monitoring, petroleum engineering, and materials science.

Module 3

Code	Course/Module Title	ECTS	Semester
PRE113	Mathematics I	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	59	91
Description			
The science of structure, order, and relation that has evolved from elemental practices of counting, measuring, and describing the shapes of objects. It deals with logical reasoning and quantitative calculation, and its development has involved an increasing degree of idealization and abstraction of its subject matter. The objective of this course is to present straight line, derivative, Limit, the integral, application to definite integral, the matrix, application of matrix, grammer method to solving linear system, hyperbolic Functions and derivatives and Integrals of hyperbolic functions			

Module 4

Code	Course/Module Title	ECTS	Semester
UOM1031	Computer Programming I	3	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	45	30
Description			
Microsoft Office is a suite of productivity software developed by Microsoft Corporation. It is widely used for various tasks in both personal and professional settings. Microsoft Office includes a collection of applications that offer a range of features to create, edit, and manage documents, spreadsheets, presentations, emails, and more. The main applications within the suite are: ➤ Microsoft Word: A word processing program used for creating and editing text-based documents such as letters, reports, and essays. It provides a variety of formatting options and features for document layout and design. ➤ Microsoft Excel: A powerful spreadsheet application used for organizing, analyzing, and manipulating numerical data. Excel provides tools for creating formulas, charts, graphs, and performing complex calculations. ➤ Microsoft PowerPoint: A presentation software used to create slide-based presentations. It			

allows users to combine text, images, videos, and other multimedia elements to deliver visually engaging presentations.

Module 5

Code	Course/Module Title	ECTS	Semester
PRE115	Engineering mechanics and strength of materials	4	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	59	41
Description			
Engineering Mechanics is a course that focuses on understanding the behavior of physical systems under different loads and conditions. In the statics portion of the course, we explore how forces and moments affect the equilibrium of rigid bodies and structures. Topics covered include the analysis of trusses and frames, the calculation of reactions and internal forces, and the application of static equilibrium equations to solve engineering problems. This course is essential for any aspiring engineer as it provides a fundamental understanding of how structures and machines work and how to design them to withstand different loads and environments.			

Module 6

Code	Course/Module Title	ECTS	Semester
PRE116	Engineering Drawing I	3	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	45	30
Description			
The engineering drawing course is designed to teach students the fundamentals of creating and interpreting technical drawings. These drawings are used in fields such as engineering, architecture, and manufacturing to communicate ideas and specifications. During the course, you will learn about the various types of technical drawings, including orthographic, isometric, and perspective drawings. You will also learn about the different tools and techniques used to create these drawings, such as drafting software and traditional drafting tools like T-squares and compasses. Additionally, you will learn about the various standards and conventions used in technical drawing, such as dimensioning and tolerances. By the end of the course, you should have a strong understanding of how to create accurate and detailed technical drawings that can be used to communicate complex ideas and designs.			

Module 7

Code	Course/Module Title	ECTS	Semester
UOM1021	English Language I	2	1

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	1	31	19
Description			
English language courses are designed to help individuals improve their reading, writing, listening, and speaking skills in the English language. They are typically offered at various levels, from beginner to advanced, to cater to the needs of different learners. The courses usually cover grammar, vocabulary, pronunciation, and comprehension skills, which are essential to communicate effectively in English. They often use a variety of teaching methods, including lectures, discussions, group activities, and multimedia resources to make learning fun and engaging. Overall, taking an English language course can help you build confidence in communicating with English speakers, expand your career opportunities, and enhance your cultural awareness.			

Module 8

Code	Course/Module Title	ECTS	Semester
PRE121	Principles of process engineering II	7	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2	87	88
Description			
This module provides the introduction to refining engineering for first year students. The material covered in the module will enable students to understand the professional role of a chemical engineer. The module introduces students to engineering problem solving approaches and applying fundamental principles to develop pragmatic solutions for topics such as process scale up. The methods applied are relevant tools used by chemical engineers in their day to day role. This module will also provide insights into the latest technology developments in the field of chemical engineering.			

Module 9

Code	Course/Module Title	ECTS	Semester
PRE122	Organic chemistry	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	59	66
Description			
The classification usually begins with hydrocarbons: compounds that contain only carbon and hydrogen. and the taxonomies derived from them, see below. Other elements that present themselves in atomic formation are called active groups which have a decisive effect on the chemical and physical properties of the compound, and thus groups with the same atomic formation have similar properties, which can be mixing with water, acidic, basic, chemically active, antioxidant, or some other properties. Some active groups may also be free radicals, similar to those found in inorganic chemistry, and are defined			

as atomic formation that moves through a chemical reaction from one compound to another without changing.

Module 10

Code	Course/Module Title	ECTS	Semester
PRE121	Mathematics II	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	59	91
Description			
The science of structure, order, and relation that has evolved from elemental practices of counting, measuring, and describing the shapes of objects. It deals with logical reasoning and quantitative calculation, and its development has involved an increasing degree of idealization and abstraction of its subject matter. The objective of this course is to present Transcendental function ,Application of exponential and logarithmic function ,Hyperbolic Trigonometric function and inverse Hyperbolic Trigonometric function, Methods of integral, Complex numbers and Differential equation.			

Module 11

Code	Course/Module Title	ECTS	Semester
PRE124	Introduction to petroleum technology	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	0	59	91
Description			
Engineering mechanics (dynamic) is a course that focuses on the study of moving bodies and the forces that act upon them. This field of study is essential in understanding how things move, how they react to forces, and how they can be controlled or manipulated. Through the study of dynamic engineering mechanics, you will learn about motion, forces, energy, and momentum, as well as how they relate to each other. You will also learn about the different types of forces, such as friction, gravity, and centripetal forces, and how they affect the motion of objects. Overall, the course aims to help you develop a deeper understanding of how the world around us works, and how we can use this knowledge to design and build better structures, machines, and systems.			

Module 12

Code	Course/Module Title	ECTS	Semester
UOM1040	Right and Freedoms	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)

2	0	31	19
Description			

Module 13

Code	Course/Module Title	ECTS	Semester
PRE126	Workshops	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
0	2	31	19
Description			
Study Workshop Skills by explaining principles of all workshop skills. Explain a basic information about turning, milling, casting, welding, and other skills. Use all available possibilities in workshop to explain skills to students. Explain workshop skills theoretically and experimentally. Show pupils How to manufacture all spare part experimentally.			

Module 14

Code	Course/Module Title	ECTS	Semester
UOM1011	Arabic language I	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		31	19
Description			

Module 15

Code	Course/Module Title	ECTS	Semester
PRE211	Engineering Mathematics I	5	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	59	66
Description			
The mathematics course typically covers a range of topics, depending on the level of the course. Some			

common topics in a mathematics course might include algebra, geometry, trigonometry, calculus, statistics, and probability. Students will learn about mathematical concepts and techniques, and they'll have the opportunity to apply these ideas to solve problems and complete assignments. Additionally, some mathematics courses may involve computer-based assignments or projects, which can help students develop their computational skills and gain experience with modern technology.

Module 16

Code	Course/Module Title	ECTS	Semester
PRE 212	Fluid flow I	5	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	59	66
Description			
This description of the academic program provides a brief summary of the most important characteristics of the program and the learning outcomes expected of the student to achieve, demonstrating whether he has made the most of the available opportunities. It is accompanied by a description of each course within the program. It aims to teach the student the properties of oil and natural gas and related knowledge of crude oil, how it is formed and classified, and the chemical and physical properties of crude oil. Introduce the student to the purpose of testing or measuring these properties. As well as teaching students about the types of crude oil and how to dry and remove salinity from it. Introducing students to the most important typical characteristics of crude oil and how to stabilize crude oil using multiple methods.			

Module 17

Code	Course/Module Title	ECTS	Semester
PRE213	Thermodynamic I	5	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	73	77
Description			
Thermodynamics studies the relationship between heat, work, and other forms of energy. It is particularly concerned with describing how thermal energy is converted from one form of energy to another. It also studies how thermal energy affects matter. It can be defined as the energy possessed by a substance or system due to temperature. It is the energy of the moving or vibrating molecules of the substance.			

Module 18

Code	Course/Module Title	ECTS	Semester
UOM2032	Computer II	3	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	45	30
Description			

Module 19

Code	Course/Module Title	ECTS	Semester
PRE 215	Petroleum chemistry	6	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	59	91
Description			
Petroleum chemistry is the study of the origin, exploration, and production of hydrocarbons (oil and gas) from the earth's subsurface. The course covers a range of topics, including the formation and migration of petroleum, the structural and stratigraphic traps that can contain it, the tools and techniques used in exploring for oil and gas, and the methods used to extract and process hydrocarbons once they are discovered. Additionally, the course includes discussions on the environmental impact of petroleum exploration and production, as well as the future of the petroleum industry in light of changing energy needs and emerging technologies.			

Module 20

Code	Course/Module Title	ECTS	Semester
PRE 216	Material engineering and Corrosion	4	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	45	55

Description
Materials and Corrosion Engineering is a specialized field concerned with the study of how the environment affects materials, specifically how materials interact with their surroundings to cause corrosion. The primary goal is to understand the causes of corrosion and develop solutions to prevent or reduce it. Corrosion is a specialized branch concerned with applying scientific knowledge, natural laws, and material resources to design and implement materials, structures, devices, systems, and procedures aimed at dealing with the natural phenomenon known as corrosion. Corrosion engineering is generally associated with mining, but it is also relevant to non-metals, including ceramics.

Module 21

Code	Course/Module Title	ECTS	Semester
UOM2022	English Language II	2	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	27	23
Description			
English language courses are designed to help individuals improve their reading, writing, listening, and speaking skills in the English language. They are typically offered at various levels, from beginner to advanced, to cater to the needs of different learners. The courses usually cover grammar, vocabulary, pronunciation, and comprehension skills, which are essential to communicate effectively in English. They often use a variety of teaching methods, including lectures, discussions, group activities, and multimedia resources to make learning fun and engaging. Overall, taking an English language course can help you build confidence in communicating with English speakers, expand your career opportunities, and enhance your cultural awareness.			

Module 22

Code	Course/Module Title	ECTS	Semester
PRE221	Engineering mathematics II	6	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	59	91
Description			
The mathematics course typically covers a range of topics, depending on the level of the course. Some common topics in a mathematics course might include algebra, geometry, trigonometry, calculus, statistics, and probability. Students will learn about mathematical concepts and techniques, and they'll have the opportunity to apply these ideas to solve problems and complete assignments. Additionally, some mathematics courses may involve computer-based assignments or projects, which can help students develop their computational skills and gain experience with modern technology.			

Module 23

Code	Course/Module Title	ECTS	Semester
PRE 222	Fluid flow II	6	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	87	63
Description			
Fluid Flow, the branch of science that deals with the study of fluids (liquids and gasses) in a state of rest or motion, is an important subject of Civil, Mechanical, and Chemical Engineering. Its various branches are fluid statics, fluid kinematics, and fluid dynamics. A substance that flows is called a fluid. All liquid and gaseous substances are considered to be fluids. Water, oil, and others are very important in our day-to-day life as they are used for various applications. For instance, water is used for the generation of electricity in hydroelectric power plants and thermal power plants, water is also used as the coolant in nuclear power plants, oil is used for the lubrication of automobiles etc. Fluid Mechanics is the branch of science that studies the behavior of fluids when they are in state of motion or rest. Whether the fluid is at rest or motion, it is subjected to different forces and different climatic conditions and it behaves in these conditions as per its physical properties. Fluid mechanics deals with three aspects of the fluid: static, kinematics, and dynamics aspects.			

Module 24

Code	Course/Module Title	ECTS	Semester
PRE223	Thermodynamics II	6	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	73	77
Description			
Thermodynamic is a form of energy that can be converted from one form to another or transferred between objects. For example, to operate electric motors, turbines convert heat into mechanical energy. The mechanical energy is then converted into electrical energy by the motor to light electric bulbs. The electric bulb then converts the electrical energy into light, which is absorbed by surfaces and ultimately converted back into heat. To study the relationship between heat and other forms of energy, physicists established the science of thermodynamics as a branch of physics. The goal is to understand how thermal energy is converted to and from other forms of energy and how these transformations affect matter. Thermal energy is defined as the energy possessed by a substance or system as a result of its temperature, and it expresses the energy of moving or vibrating particles.			

Module 25

Code	Course/Module Title	ECTS	Semester
UOM2050	regime crimes	2	4

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		30	20
Description			

Module 26

Code	Course/Module Title	ECTS	Semester
PRE 225	Properties of Petroleum & Products	6	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	63	87
Description			
Petroleum properties is the branch of engineering that focuses on the exploration, production, and optimization of oil and gas resources. It involves a wide range of technical and scientific disciplines, including geology, geophysics, drilling engineering, reservoir engineering, production engineering, and petrophysics. The fundamental principles of petroleum engineering include understanding the geological structures and formations that contain oil and gas reserves, designing and drilling wells to extract the resources, and optimizing the production process to maximize the yield of the reservoir. This involves analyzing data from geological surveys and exploration, designing and implementing drilling programs, and developing strategies to manage the reservoir and production facilities. Petroleum engineers also work on projects related to oil and gas transportation, storage, and refining, as well as environmental and safety issues related to the petroleum industry.			

Module 27

Code	Course/Module Title	ECTS	Semester
PRE 226	Electrical Technology	4	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	59	41
Description			
Electrical Engineering Technology is the field of engineering technology that applies and utilizes the principles of electrical engineering. Like electrical engineering, it deals with the design, implementation, installation, manufacture, operation, and/or maintenance of electrical/electronic systems. However, EET is a specialized discipline with a greater emphasis on application, theory, applied design, and implementation, whereas electrical engineering may place a more general focus on theory and conceptual design. Electrical/Electronic Engineering Technology is the largest branch of engineering technology and encompasses a variety of subdisciplines, such as applied design, electronics, embedded			

systems, control systems, instrumentation, communications, and power systems.

Module 28

Code	Course/Module Title	ECTS	Semester
UOM2012	Arabic language II	2	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		22	28
Description			

Module 29

Code	Course/Module Title	ECTS	Semester
PRE311	Engineering Analysis I	4	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	59	41
Description			
Petroleum reservoir engineering is a branch of petroleum engineering that focuses on the characterization, modeling, and management of subsurface reservoirs containing hydrocarbons. It involves studying various properties of reservoirs, such as porosity, permeability, fluid flow, and pressure, to determine how best to extract oil or natural gas from them. Reservoir engineers use a variety of tools and techniques, such as well testing, numerical modeling, and simulation, to optimize the production of hydrocarbons from reservoirs while minimizing costs and maximizing profits. The ultimate goal of petroleum reservoir engineering is to ensure the safe and efficient extraction of valuable hydrocarbons from the earth.			

Module 30

Code	Course/Module Title	ECTS	Semester
PRE312	Mass transfer I	5	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	59	66
Description			

Mass transfer objectives are essential for evaluating one's understanding of mass transfer principles and operations in chemical engineering. They assess knowledge of diffusion, absorption, distillation, extraction, and other mass transfer processes. By answering mass transfer objective questions, individuals can enhance their skills in designing and analyzing mass transfer systems, which are crucial for the effective operation of chemical processes.

Module 31

Code	Course/Module Title	ECTS	Semester
PRE313	Petroleum refining process I	6	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	73	77
Description			
The primary objective of the petroleum refining process is to convert crude oil into usable petroleum products. This involves breaking down crude oil into its various components and reconfiguring them into new products that meet the market's demands. The refining process aims to minimize the production of heavier, lower-value products and maximize the production of lighter, higher-value products such as gasoline, diesel fuel, and jet fuel. The process also includes the preparation of crude oil for processing, removal of impurities, and the conversion of heavier components into lighter, high-value products.			

Module 32

Code	Course/Module Title	ECTS	Semester
PRE314	Reactor design	5	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	59	66
Description			
Reactor design Objective: The fundamental goal of reactor design is to convert reactants into the desired product at a predetermined rate and yield, while ensuring the process is safe, cost-effective, and scalable from laboratory to industrial scale. This involves selecting the appropriate reactor type, operating conditions, and configuration to achieve the target conversion and selectivity.			

Module 33

Code	Course/Module Title	ECTS	Semester
PRE315	Heat transfer I	4	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)

2	2	59	41
Description			
This course provides a comprehensive introduction to heat transfer fundamentals and their applications. The course introduces students to the analysis of steady-state and transient one-multi dimensional heat conduction.			

Module 34

Code	Course/Module Title	ECTS	Semester
PRE316	Petrochemical engineering	6	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	59	91
Description			
Petrochemical Engineering is a specialized branch of Chemical Engineering focused on converting petroleum and natural gas into useful products such as fuels, plastics, and chemicals. The course combines principles of chemistry, physics, and mathematics to help students understand the extraction, refining, and processing of crude oil and natural gas efficiently. This course trains students in process design, plant operations, and energy management, along with sustainable practices for minimizing environmental impact. It provides practical knowledge of refinery processes, petrochemical production, and modern technologies used in the energy sector. Graduates gain technical and analytical skills applicable to the global oil, gas, and chemical industries.			

Module 35

Code	Course/Module Title	ECTS	Semester
PRE321	Engineering Analysis II	4	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	59	41
Description			
Petroleum reservoir engineering is a branch of petroleum engineering that focuses on the study of subsurface reservoirs that contain oil and gas. A course in petroleum reservoir engineering would typically cover topics such as fluid properties, rock properties, reservoir simulation, well testing, production forecasting, and more. Students in this course will learn about the different types of reservoirs, how to model reservoir behavior, how to optimize production, and how to design and manage well systems, among other things. The course will also cover the latest technologies and techniques used in the field of petroleum reservoir engineering. Overall, a course in petroleum reservoir engineering is a challenging and rewarding program that equips students with the knowledge and skills they need to become successful professionals in the oil and gas industry.			

Module 36

Code	Course/Module Title	ECTS	Semester
PRE322	Mass transfer II	5	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	59	66
Description			
Mass transfer objectives are essential for evaluating one's understanding of mass transfer principles and operations in chemical engineering. They assess knowledge of diffusion, absorption, distillation, extraction, and other mass transfer processes. By answering mass transfer objective questions, individuals can enhance their skills in designing and analyzing mass transfer systems, which are crucial for the effective operation of chemical processes.			

Module 37

Code	Course/Module Title	ECTS	Semester
PRE323	Petroleum refining process II	6	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	73	77
Description			
The primary objective of the petroleum refining process is to convert crude oil into usable petroleum products. This involves breaking down crude oil into its various components and reconfiguring them into new products that meet the market's demands. The refining process aims to minimize the production of heavier, lower-value products and maximize the production of lighter, higher-value products such as gasoline, diesel fuel, and jet fuel. The process also includes the preparation of crude oil for processing, removal of impurities, and the conversion of heavier components into lighter, high-value products.			

Module 38

Code	Course/Module Title	ECTS	Semester
PRE324	Catalysts in petroleum refinery	5	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	59	66
Description			
The primary objectives of catalysts in petroleum refineries are to accelerate chemical reactions, reduce energy consumption, and minimize environmental impact. Catalysts enable the conversion of crude oil into valuable products such as gasoline, diesel, jet fuel, and various petrochemicals by facilitating various chemical reactions. They help to lower the activation energy required for these reactions, making the process of breaking down hydrocarbons much easier and faster. Additionally, catalysts are			

used in a variety of refining processes, including cracking, hydro treating, and isomerization, to produce higher-quality products while minimizing the formation of unwanted byproducts.

Module 39

Code	Course/Module Title	ECTS	Semester
PRE325	Heat transfer II	6	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	87	63
Description			
This course provides a comprehensive introduction to heat transfer fundamentals and their applications. The course introduces students to the analysis of steady-state and transient one-multi dimensional heat conduction.			

Module 40

Code	Course/Module Title	ECTS	Semester
PRE326	Numerical methods and optimization	4	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	59	41
Description			
Numerical analysis is the branch of mathematics and computer science that deals with solving a given mathematical problem involving methods based on rigorous mathematical analysis and leads to an approximate(non-exact) solution. Such problems originate generally from the real world. Such problems originate generally from real-world applications of algebra, geometry, and calculus, and these problems occur throughout the natural sciences, social sciences, engineering, medicine, and business. In this course, we introduce the field of computational techniques for solving problems concerning Calculus, Linear algebra and Differential Equations.			

Module 41

Code	Course/Module Title	ECTS	Semester
PRE411	Special petroleum process	5	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	--	59	66
Description			
Process engineering is a crucial discipline within the oil and gas industry, responsible for designing,			

implementing, and optimizing processes that transform raw hydrocarbons into refined products such as gasoline, diesel, and petrochemicals. It plays an integral role in ensuring efficiency, safety, and compliance with environmental regulations, making it a key factor in the industry's overall success. As global energy demand rises, the oil and gas sector faces challenges such as fluctuating prices, environmental concerns, and technological advancements. Process engineers work to mitigate these challenges by improving operational efficiency, reducing waste, and ensuring that production facilities run safely and cost-effectively.

Module 42

Code	Course/Module Title	ECTS	Semester
PRE412	Plant design and utilities	6	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	73	77
Description			
Utility Plant Design is the systematic process of planning, conceptualizing, and engineering facilities that provide essential services such as power generation, water treatment, waste management, and other industrial utilities. This specialized field of industrial design encompasses the comprehensive development of infrastructure systems that support manufacturing operations, municipal services, and various industrial processes. The discipline integrates multiple engineering domains, including mechanical, electrical, civil, and chemical engineering, to create efficient and sustainable utility facilities that meet specific operational requirements while adhering to safety standards and environmental regulations.			

Module 43

Code	Course/Module Title	ECTS	Semester
PRE413	Process dynamic	5	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	73	52
Description			
Drilling engineering is a course that focuses on the design, planning, and execution of drilling operations. It covers the principles of drilling fluid systems, drilling mechanics, bit design, drill string design, wellbore stability, and casing and cementing programs. Students in this course will learn how to select the appropriate drilling equipment, how to analyze drilling data in real-time, and how to optimize drilling processes to enhance efficiency and safety. Additionally, the course also covers the regulatory and environmental considerations that come with drilling operations. Overall, drilling engineering is a highly specialized field that requires a deep understanding of geology, physics, and engineering principles, and this course provides the foundation for a career in this exciting field.			

Module 44

Code	Course/Module Title	ECTS	Semester
PRE414	Unit operation I	6	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	87	63
Description			
A unit operation is a basic step in a process that involves physical change or chemical transformation. These operations include separation, crystallization, evaporation, filtration, polymerization, isomerization, and other reactions. They are essential for creating the overall process and are connected to produce the desired product from starting materials. The concept of unit operations was developed by Arthur Dehon Little in 1916, and it has since become a fundamental principle in chemical engineering. Unit operations are classified into five classes: Fluid flow processes, Heat transfer processes, and others. They are used in various industries, including food, pharmaceuticals, and chemicals, to transform raw materials into value-added products.			

Module 45

Code	Course/Module Title	ECTS	Semester
PRE415	Petroleum pollution	5	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3		59	66
Description			
Petroleum pollution refers to the contamination of the environment due to the improper disposal, accidental leakage, or intentional release of petroleum products, including crude oil and its derivatives like gasoline and diesel. This pollution can occur from various sources, such as oil spills during transportation, leaks from storage tanks, and runoff from urban areas. The consequences of petroleum pollution are significant, affecting wildlife, human health, and ecosystems, and necessitating immediate remedial actions to mitigate its impact.			

Module 41

Code	Course/Module Title	ECTS	Semester
PRE416	Project I	3	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	45	30
Description			
Secondary oil recovery is a stage in the process of extracting crude oil from underground reservoirs. It			

follows the primary oil recovery phase. This technique typically involves injecting water or other fluids into the reservoir to maintain reservoir pressure, sweep the oil towards production wells, and improve oil recovery efficiency. Some common secondary recovery methods include water flooding, gas injection. Water Flooding method involves injecting water into the reservoir through injection wells to displace the remaining oil towards production wells. Water flooding can help maintain reservoir pressure, sweep the oil trapped in the rock pores, and increase the recovery factor. In Gas Injection technique, gases such as natural gas or carbon dioxide (CO₂) are injected into the reservoir. Gas injection methods include gas flooding. Gas flooding involves injecting gas into the reservoir to sweep and displace the oil towards production wells.

Module 42

Code	Course/Module Title	ECTS	Semester
PRE421	Gas technology	5	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	--	59	66
Description			
The engineering project course is a challenging and rewarding educational opportunity for students to apply their knowledge and skills in engineering to solve real-world problems. This course typically involves working in teams to design, build, test, and refine a project that meets a specific set of requirements. Projects can range from developing a new product, to improving an existing system, to conducting research in a particular field of engineering. Throughout the course, students will have the opportunity to work closely with faculty and industry professionals to gain valuable insights and feedback. The engineering project course is a great way for students to develop their problem-solving, teamwork, and communication skills, while also gaining practical experience in their chosen field of engineering.			

Module 43

Code	Course/Module Title	ECTS	Semester
PRE422	Equipment design	6	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	73	77
Description			
The engineering design course is a comprehensive study of the principles and practices involved in designing and developing engineering products. The course covers a wide range of topics, including engineering graphics, computer-aided drafting and design (CADD), materials science, product development, and manufacturing processes. Students will learn how to identify and analyze problems, design solutions, and create detailed plans and specifications for engineering projects. They will also learn how to use a variety of tools and technologies to bring their designs to life, including 3D printing, CNC machining, and computer simulation software. Throughout the course, students will work on a			

variety of real-world design challenges, putting their skills into practice and developing a portfolio of engineering projects that demonstrate their abilities.

Module 44

Code	Course/Module Title	ECTS	Semester
PRE423	Process control	6	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	73	52
Description			
This description of the academic program provides a brief summary of the most important characteristics of the program and the learning outcomes expected of the student to achieve, demonstrating whether he has made the most of the available opportunities. It is accompanied by a description of each course within the program. It aims to teach the student the properties of natural gas and what is related to it in terms of knowledge of natural gas, how it is formed and classified, and gas specifications. Introducing students to the chemical and physical properties and basic concepts of natural gas processing. As well as teaching students how to treat gas field and how to choose the desalination process.			

Module 45

Code	Course/Module Title	ECTS	Semester
PRE424	Management and economics of petroleum projects	5	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	--	59	66
Description			
The petroleum production engineering course is designed to provide students with an understanding of the various aspects of petroleum production, including reservoir engineering, drilling operations, well completion and stimulation, and surface facilities. Students will learn about the various techniques used in oil and gas production, such as secondary and tertiary recovery methods, and will gain hands-on experience through laboratory exercises and field trips. The course will also cover the economic and environmental considerations involved in petroleum production, such as risk management, sustainability, and regulatory compliance. Overall, this course is ideal for students who wish to pursue a career in the oil and gas industry or related fields.			

Module 46

Code	Course/Module Title	ECTS	Semester
PRE425	Unit operation II	6	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	87	63
Description			
The reservoir simulation course is designed to provide an in-depth understanding of the principles and applications of reservoir simulation for the development and management of oil and gas reservoirs. It covers the fundamentals of fluid flow, rock properties, well performance, and reservoir characterization. The course also includes the modeling and simulation techniques used in the industry, such as numerical methods, grid generation, and history matching. Participants will learn to use software tools commonly used in the industry, as well as industry best practices in simulation modeling, interpretation, and analysis of simulation results. By the end of the course, participants will be able to apply reservoir simulation techniques to optimize field development plans, improve production performance, and make informed reservoir management decisions.			

Module 47

Code	Course/Module Title	ECTS	Semester
PRE426	Project II	3	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	45	30
Description			
Enhanced Oil Recovery (EOR) refers to a set of techniques and methods used to extract additional crude oil from reservoirs after the primary and secondary recovery methods have been exhausted. These techniques involve injecting various substances into the reservoir to alter the properties of the oil or reservoir rock, allowing for improved oil displacement and recovery. The three primary methods of EOR are thermal, chemical, and miscible gas injection. Thermal method involves injecting heat into the reservoir to reduce the viscosity of the oil, making it easier to flow and recover. In Chemical methods, Chemicals are injected into the reservoir to alter the properties of the oil or rock and improve oil recovery. In Miscible Gas Injection gases such as carbon dioxide (CO₂) or natural gas are injected into the reservoir to mix with the oil, reducing its viscosity and improving its flow characteristics.			

Module 48

Code	Course/Module Title	ECTS	Semester
------	---------------------	------	----------

PRE412	Engineering Project II	6	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	1	32	18
Description			
The engineering project course is a challenging and rewarding educational opportunity for students to apply their knowledge and skills in engineering to solve real-world problems. This course typically involves working in teams to design, build, test, and refine a project that meets a specific set of requirements. Projects can range from developing a new product, to improving an existing system, to conducting research in a particular field of engineering. Throughout the course, students will have the opportunity to work closely with faculty and industry professionals to gain valuable insights and feedback. The engineering project course is a great way for students to develop their problem-solving, teamwork, and communication skills, while also gaining practical experience in their chosen field of engineering.			

Contact

Program Manager:

Ahmad Abdull-Salam Aabid | Ph.D. in Chemical Engineering | Lecturer.

Email: ahmadchemical1991@uomosul.edu.iq

Mobile no.: 009647707465791

Program Coordinator:

Majid Majdi Abed Al-Majeed Al-Mutwali | Ph.D. in Geology | Professor

Email: majidmutwaly@uomosul.edu.iq

Mobile no.: 009647705255017