University Of Mosul

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

بكالوريوس - هندسة النفط والتعدين

Table of Contents

1. Overview

This catalogue is about the courses (modules) given by the program of Petroleum and Mining Engineering University to gain the Bachelor of Science degree. Currently, the program delivers (27) Modules for (4) semester and 2 level with an additional stage being added each year until it reaches four stages, (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

2. Undergraduate Courses 2024-2025

Module 1

Code	Course/Module Title	ECTS	Semester
PRE 111	Geology for engineers I	7	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	4	86	89
Description			
Geology is the science of the Earth, its composition and structure, its history, and its past plant and animal life. Modern geology developed in the late 18th century as a result of the need for a practical knowledge of rocks and minerals in the mining industry. The geology is divided into two major groups. The first, called Physical Geology deals with the materials that constitute the Earth (soils and rocks), the structures and surface features of the Earth, and the processes that created these structures. The second group called Historical Geology deals with the history of the Earth. Geology is further divided into a number of branches according to the subject matter that is covered or to the industrial or commercial applications. Subject matters of possible interest to engineers include: Petrology: systematic study of rocks and their origin. It consists of Petrography (identification, description, and classification of rocks) and Petrogenesis (study of origin of rocks); Mineralogy: study of rock constituents or minerals; Crystallography: deals with the atomic structure of minerals and their external appearance; Geochemistry: study of the chemistry of rocks; Geomorphology: study of landforms, their origin and development; Stratigraphy: study of layered rocks, mostly those of sedimentary origin; Structural Geology: deals with the position of rock bodies, their deformation, and fracturing; Geophysics: application of principles of physics to the study of the Earth. It consists of Geomagnetic (study of Earth's magnetic field) and Seismology (study of earthquakes); and Geodesy: study of the form and size of the Earth; Paleontology: study of life of past geologic periods and evolution of plants and animals; Engineering Geology: geology and engineering; Hydrogeology, Hydrology: study			

of underground and surface water.
A good understanding of geology concepts plays an extremely important role in reservoir characterization, as it can be used to predict where oil accumulations might occur.

Module 2

Code	Course/Module Title	ECTS	Semester
PRE 112	Engineering mechanics I	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	87
Description			
Statics is a type of science that helps people design safe and strong structures, like bridges and buildings. It's all about studying how things stay in place even when they are not moving. This is important for engineers and physicists who want to understand how materials react to different forces, like the ones that happen when an airplane takes off or lands. By studying statics, people can make better things and improve technology. Statics is a branch of mechanics that deals with the study of stationary objects and systems under the action of external forces. In other words, statics is concerned with the analysis of forces acting on objects that are not in motion. It is an essential subject for engineers and physicists as it is the foundation for the study of mechanics, which is the branch of physics that deals with the motion of objects. Statics is a crucial sub-topic of mechanics and is essential in engineering and physics courses. It deals with the study of forces acting on objects that are not moving. The primary objectives of statics are to determine the forces acting on an object, the moments of forces acting on an object, and the equilibrium conditions of an object. The study of statics is essential for the design of structures, such as bridges, buildings, and machines, to ensure that they are safe and reliable. The study of statics is also important in understanding the behavior of materials under different conditions. It helps engineers and physicists to understand how different materials react to external forces and how they can be designed to withstand these forces. For example, in aerospace engineering, the study of statics is essential in the design of aircraft and spacecraft to ensure that they can withstand the forces of takeoff, landing, and flight. In general, the study of statics is crucial for the development of new technologies and the improvement of existing ones.			

Module 3

Code	Course/Module Title	ECTS	Semester
PRE 113	Mathematics I	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	72
Description			
Mathematics is a vital tool in engineering, playing a crucial role in analysis, design, and problem-solving. It offers engineers a logical and systematic framework to comprehend and manipulate the physical world effectively. In engineering, mathematics is utilized to model and describe intricate systems and phenomena. Engineers can create equations and establish relationships that accurately represent real-world situations, enabling precise calculations and predictions. Concepts like calculus, differential equations, linear algebra, and statistics are applied to analyze the behavior and performance of structures, machines, circuits, and fluid flows. Mathematics also aids the design process by providing optimization techniques that assist engineers in finding optimal solutions within specified constraints. It allows for the quantification and management of uncertainty through probability theory and statistical analysis, ensuring reliable and robust engineering designs. Furthermore, mathematics forms the foundation for numerical methods and computer simulations, facilitating the development and testing of engineering systems before their physical implementation. Ultimately, mathematics serves as the backbone of engineering, empowering engineers to innovate, solve intricate problems, and create efficient and dependable solutions across various engineering disciplines. Add individual feedback			

Module 4

Code	Course/Module Title	ECTS	Semester
UOM102	English I (Reading & Writing)	2	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	33	17
Description			
By teaching the English language we can use it independently or alongside a general English course book such as New Headway or New Headway Plus. studying English grammar is so important to strengthen the student's capacity of English language rules, as well as the scientific study of petroleum glossaries to enrich the students of petroleum and mining engineering with specialization vocabularies cause they are so important during practicing their work. The course focuses on developing the specific skills required for academic studies and exploring strategies for success in academic learning. It also offers guidance in key study areas and provides plenty of practice to encourage learner independence.			

Module 5

Code	Course/Module Title	ECTS	Semester
PRE 114	Engineering Drawing	7	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	4	93	82
Description			
Engineering drawing is a basic course for all undergraduate Engineering program and it is a type of technical drawing which considered as the language of engineers used to define the requirements for engineering product or components.the purpose of an engineering drawing is to clearly and accurately capture all geometric features of a product or component so that a manufacturer or engineer can produce the required item . This course is therefore introduced to provide the basic understanding of the fundamentals of Engineering Drawing, mainly visualization, graphics theory, standards and conventions of drawing, the tools of drawing and the use of Drawings in engineering applications. The topics covered are based on the syllabus for undergraduate studies in engineering. The lectures would be arranged in a sequence and starts from the basic concepts of geometrical constructions and engineering curves and progress to the principles of isometric drawing Towards the end of the course it is expected that the students would be matured to visualize the engineering component from any drawing sheet. , and Learning how to draw the shapes, angels and lines and others which is essential for engineer and Develop student’s imagination and ability to represent the shape size and specifications of physical objects. and Understand the main idea of using dimension for engineering drawing and it will give students ability to draw three dimension objects on the paper . chosen problems will be solved to illustrate the concepts clearly.			

Module 6

Code	Course/Module Title	ECTS	Semester
UOM104	Human Rights & Democracy	2	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	17	33
Description			
The importance of human rights and democracy lies in the study of the student regarding the most important rights stipulated in the divine laws, especially Islamic Sharia, as well as international agreements such as the Universal Declaration of Human Rights of 1948 and the International Covenants on Civil, Political, Economic, Social, and Cultural Rights, and domestic laws of countries, such as constitutions, especially the Constitution of the Republic of Iraq for the year 2005, and international organizations such as the International Committee of the Red Cross. It also aims to familiarize the student with the importance of democratic systems, knowledge of the forms of democratic systems and types of governance in terms of exercising power. On the other hand, it acquaints the student with the democratic experiences that preceded us for the purpose of benefit. What are the advantages of			

Module 7

Code	Course/Module Title	ECTS	Semester
PRE 121	Geology for engineers II	7	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	4	93	82
Description			
Geology is the science of the Earth, its composition and structure, its history, and its past plant and animal life. Modern geology developed in the late 18th century as a result of the need for a practical knowledge of rocks and minerals in the mining industry. The geology is divided into two major groups. The first, called Physical Geology deals with the materials that constitute the Earth (soils and rocks), the structures and surface features of the Earth, and the processes that created these structures. The second group called Historical Geology deals with the history of the Earth. Geology is further divided into a number of branches according to the subject matter that is covered or to the industrial or commercial applications. Subject matters of possible interest to engineers include: Petrology: systematic study of rocks and their origin. It consists of Petrography (identification, description, and classification of rocks) and Petrogenesis (study of origin of rocks); Mineralogy: study of rock constituents or minerals; Crystallography: deals with the atomic structure of minerals and their external appearance; Geochemistry: study of the chemistry of rocks; Geomorphology: study of landforms, their origin and development; Stratigraphy: study of layered rocks, mostly those of sedimentary origin; Structural Geology: deals with the position of rock bodies, their deformation, and fracturing; Geophysics: application of principles of physics to the study of the Earth. It consists of Geomagnetic (study of Earth's magnetic field) and Seismology (study of earthquakes); and Geodesy: study of the form and size of the Earth; Paleontology: study of life of past geologic periods and evolution			

of plants and animals; Engineering Geology: geology and engineering; Hydrogeology, Hydrology: study of underground and surface water.
A good understanding of geology concepts plays an extremely important role in reservoir characterization, as it can be used to predict where oil accumulations might occur.

Module 8

Code	Course/Module Title	ECTS	Semester
122	Engineering mechanics II	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	80	20
Description			
Dynamics is studying how things move and how different forces affect how they move. It helps us understand how planets move in space and how machines work. It's really important in science and helps us learn about how things in the world move. Dynamics is a branch of physics that deals with the study of motion and forces acting on a body. It is the study of how objects move, interact with each other, and respond to different forces. Dynamics is an important subject in physics, and it is used to explain many natural phenomena, from the movement of planets to the behavior of tiny particles. Dynamics is concerned with the motion of objects, and it is often used to describe the movement of objects in three dimensions. In dynamics, the focus is on understanding how forces affect the motion of an object. The forces that act on an object can be external, such as gravity, friction, or air resistance, or they can be internal, such as the forces that hold the particles of an object together. Dynamics is a complex subject, and it requires a deep understanding of physics and mathematics to fully grasp its principles. Dynamics is a fundamental part of physics, and it is used in many different fields, from engineering to astronomy. Understanding dynamics is crucial in the design and construction of machines and structures, as it allows engineers to predict how these objects will behave under different forces. In astronomy, dynamics is used to study the movement of planets and stars, and it is used to predict the behavior of celestial bodies over time. As such, dynamics is a critical subject in physics, and it is essential for anyone who wants to study the natural world in depth.			

Module 9

Code	Course/Module Title	ECTS	Semester
PRE 123	Mathematics II	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	71	54
Description			
Mathematics II is a foundational course designed for first-year engineering students, focusing on advanced mathematical concepts essential for problem-solving in engineering contexts. The course covers domain and range, graphing trigonometric functions, limits, differentiation techniques, and various integration methods, including applications of definite integrals. It introduces students to polar coordinates and parametric equations, enabling them to model and analyze physical systems. Emphasis is placed on applying mathematics to petroleum engineering, such as calculating reservoir volumes. Through lectures and labs, students enhance their analytical skills, logical reasoning, and ability to relate mathematical principles to real-world engineering problems.			

Module 10

Code	Course/Module Title	ECTS	Semester
UOM101	Arabic	2	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	33	17
Description			
The *Arabic Language* course for engineering students aims to enhance their proficiency in Modern Standard Arabic through accurate reading, effective speaking, active listening, and clear expression. The course focuses on essential grammar topics such as verbs, subject and predicate, verbal and nominal sentence structures, grammatical cases (including objects and their types), number rules, and punctuation marks, while also addressing common language errors. It strengthens students' connection to Arab-Islamic heritage through the study of classical and modern Arabic literature, including poetry by notable Abbasid-era poets and Badr Shakir al-Sayyab. The course also develops students' literary appreciation and encourages scientific research in Arabic language studies. Learning is supported through lectures, quizzes, assignments, reports, and interactive classroom activities that foster confident and accurate language use.			

Module 11

Code	Course/Module Title	ECTS	Semester
PRE 124	Engineering drawing using AUTOCAD	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	93	32
Description			
Engineering drawing using computer refers to use of computer to prepare production information enabling to manufactured and it is a technique for executing graphical commands in the aim of creating technical drawing using computer software. Computer -assisted drawing therefore offers you the great advantage of being able to make multiple modifications, additions, or deletions of elements quickly and easily, without ruining the whole drawing. in engineering drawing using computer can be created a 2D or 3D and it allow the addition of supplementary information such as dimensions ,description of components. The advantage of using computer in engineering drawing is improve the speed of drawing and improve quality of drawn information also reduce development cost and generat visualization during the design process to help decision making additionally improve accuracy and reduce error and enable changes to be made more easily and so facilities the consideration of a wider range of options and allow drawing to be generated at a wide range of scales and with the addition of accurate information such as dimensions also it allow easy re _use of information .in this course they are studying not only the software (AutoCAD) but they are studying the engineering drawing subjects and applying it in AutoCAD such as projections and isometric drawing and 3D .			

Module 12

Code	Course/Module Title	ECTS	Semester
PRE 125	Principals of Petroleum Engineering	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	0	48	77
Description			
Fundamentals of Reservoir Rock Properties discusses several essential rock properties needed for petroleum engineers and geoscientists. The topics covered are porosity, rock compressibility, permeability, fluid saturation, electrical properties of reservoir rocks, wettability, capillary pressure, and relative permeability. The final chapter integrates all the properties with a discussion on the application. The book covers the topics in a step-by-step fashion with tons of illustrative figures. Each topic is presented clearly with a wide range of illustrations and simplified explanations.			

Module 13

Code	Course/Module Title	ECTS	Semester
UOM103	Computer	3	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	33	42
Description			
Computer I : introduces students to modern computer fundamentals and productivity software essential for petroleum engineering applications. The course covers hardware components and file management in Windows. Students gain hands-on experience with Microsoft Office tools including Word for document creation and formatting, Excel for spreadsheet operations and charting, and PowerPoint for professional presentations. Instruction encompasses internet navigation, search engines, email communication, and basic web page design. By integrating theoretical lectures with practical labs, learners develop critical thinking through problem-solving exercises and tutorials. This foundation equips petroleum engineering students with digital literacy and software proficiency required for academic and industry tasks.			

Module 14

Code	Course/Module Title	ECTS	Semester
PRE211	Structural of Geology	4	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	41	59
Description			
Structural Geology module introduces students to the fundamental principles and methods for analyzing geological structures in the Earth's crust. Through lectures, seminars, and practical lab exercises, learners study strike and dip measurement, stress and rigorous strain analysis, Mohr circle construction, and brittle and ductile deformation. The course emphasizes geological mapping, cross-section interpretation, and focal mechanism analysis. Students investigate fault classification, fold geometry, deformation fabrics, and hydraulic fracturing applications. Field trips and case studies on Appalachian tectonics reinforce theory. By the end of the module, students will interpret complex structural features and evaluate their significance for petroleum reservoir characterization			

Module 15

Code	Course/Module Title	ECTS	Semester
PRE212	Fundamentals of Petroleum Reservoir. Eng. I	5	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	78	47
Description			
Reservoir engineering is a branch of Petroleum engineering that applies scientific principles to produce oil and gas from the reservoir with high economic recovery. So, reservoir engineer to do that needs: 1. Applied mathematics. 2. Basic laws of physics and chemistry related to behavior of fluids in reservoir rocks. 3. Geology. 4. Experience and practice. The goal of reservoir engineering is to set up a development project to study the behavior of the reservoir (throughout the life of the field) to derive the information required to reserve estimation, development planning and production operation optimization.			

Module 16

Code	Course/Module Title	ECTS	Semester
PRE212	Petroleum Properties	4	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	37
Description			
This Petroleum Properties course (PRE213) familiarizes students with the foundational theories and processes governing petroleum origin and composition. Topics include organic and inorganic formation theories, reservoir accumulation conditions, and the classification of crude oil by API gravity, density, and viscosity. Laboratory sessions develop experimental skills for assessing physical properties such as flash point, fire point, water and sediment content, and vapor pressure. Students also explore hydrocarbon and non-hydrocarbon compounds, refining processes, and the production of petroleum derivatives. By integrating lectures, labs, and assignments, the course equips students with the analytical and practical expertise needed for petroleum characterization and downstream processing.			

Module 17

Code	Course/Module Title	ECTS	Semester
PRE 214	Mathmatics III	5	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	48	52
Description			
This module aims to develop students' mathematical skills and analytical thinking required in petroleum engineering. Emphasis is placed on applying advanced calculus, vector analysis, and differential equations to solve real-world engineering problems. Topics include multiple integrals, vector fields, line and surface integrals, and second-order differential equations. Students will learn how to build mathematical models to evaluate engineering scenarios and prevent costly errors in practice. Through lectures, tutorials, and assignments, the module supports critical thinking, problem-solving, and decision-making essential for economic and technical analysis in the oil and gas industry.			

Module 18

Code	Course/Module Title	ECTS	Semester
PRE 215	Thermodynamics	4	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	37
Description			
Starting with recognizing how thermodynamics is a core subject in many fields. Learn how to calculate the pressure, temperature, and volume and their related quantities by Understanding what is meant by ideal gas laws. The subject provides a clear view of the effects of heat/cold reactions on the thermodynamic process. It explains the energy forms and their governing equations so that the student knows each energy and how to translate it into equations. Describe the power plants, energy cycles, and fuel operations, and define the first law of thermodynamics. Identify the dryness fraction of the pure substance elements and their applications. Define the second law of thermodynamics. Then the applications of the second law; the operations of the Carnot engine and its cycle, and the operations of heat engines, pumps, and refrigerator engines.			

Module 19

Code	Course/Module Title	ECTS	Semester
PRE216	Fluid Mechanics	4	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	37
Description			

Fluid mechanics, the branch of science that deals with the study of fluids (liquids and gases) 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 substances that flows is called as 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 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:

- **Fluid statics:**

The fluid which is in state of rest is called as static fluid and its study is called as fluid statics.

- **Fluid kinematics:**

The fluid which is in state of motion is called as moving fluid. The study of moving fluid without considering the effect of external pressures is called as fluid kinematics.

- **Fluid dynamics:**

The branch of science which studies the effect of all pressures including the external pressures on the moving fluid is called as fluid dynamics.

Module 20

Code	Course/Module Title	ECTS	Semester
UOM2032	Computer 2	3	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	1	33	42
Description			

Programming in MATLAB is widely used in petroleum engineering for various tasks and analyses. MATLAB offers a robust set of tools and functionalities that are particularly relevant to the petroleum industry.
One of the application of MATLAB in petroleum engineering is reservoir simulation. MATLAB provides powerful numerical computing capabilities, making it suitable for solving complex partial differential

equations that govern fluid flow in reservoirs. Engineers can develop customized reservoir simulators to model the behavior of hydrocarbon reservoirs and optimize production strategies.
Another area where MATLAB is valuable is in data analysis and visualization. Petroleum engineers can use MATLAB to process and analyze large datasets, including well log data, production data, and seismic data. The built-in functions and libraries in MATLAB enable efficient data manipulation, statistical analysis, and visualization, facilitating insights into reservoir characteristics and performance.
Additionally, MATLAB is employed in well test analysis, production optimization, and decision-making processes. It allows engineers to perform advanced calculations, uncertainty analysis, and optimization algorithms to optimize well placement, production rates, and reservoir management strategies.
In summary, MATLAB's programming capabilities enhance the effectiveness of petroleum engineers by providing tools for reservoir simulation, data analysis, and decision-making, ultimately optimizing hydrocarbon recovery and production.

Module 21

Code	Course/Module Title	ECTS	Semester
UOM2022	English 2	2	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	33	17
Description			
This module enhances students' English language proficiency for academic and professional use in petroleum engineering. It focuses on developing reading, writing, listening, and speaking skills through real-world scientific and technical contexts. Grammar, vocabulary, and sentence structure are reinforced, with emphasis on technical terminology used in oil and gas industries. Students engage in writing reports, analyzing scientific texts, and participating in discussions. The course aims to boost confidence in using English accurately and effectively in academic tasks, while promoting critical thinking and research-based writing. Assessments include quizzes, assignments, reports, and exams to monitor language improvement.			

Module 22

Code	Course/Module Title	ECTS	Semester
PRE 220	Strength of Materials	4	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	37
Description			
Strength of Materials is that branch of engineering mechanics which deals with structural elements behavior under load and understand how a structural element responds to applied loads and induced stress distribution (normal, shear and combined) and demonstrates the concept of structural design			

The knowledge and abilities taught in this course are an essential prerequisite for subsequent courses involving structure analysis, design of concrete and steel, and most of structure engineering courses.
This course Introduces the basics of normal stresses due to normal force and bending moments and determines of normal stresses in elastic bodies. Also it determines of the shear stresses in homogenous sections for different straining actions under applied static loads, determines of combined stresses analytically and graphically, and determines of stability of columns. The student will also learn to calculate, plot, and interpret stress transformations, Max & Principal stresses and other stress components by the use of Mohr's Circles in Plane Stress.

Module 23

Code	Course/Module Title	ECTS	Semester
PRE223	Mathmatics IV	5	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	48	37
Description			
This module builds upon previous mathematics courses to equip students with advanced mathematical techniques relevant to petroleum engineering. It covers multiple integrals, vector fields, line and surface integrals, and second-order differential equations. The course emphasizes the application of these methods in analyzing petroleum projects, evaluating economic viability, and solving engineering problems. Students gain insights into mathematical modeling, physical interpretation, and economic assessment in oil and gas operations. Through lectures, tutorials, and problem-solving sessions, the module fosters analytical skills and decision-making capabilities essential for professional practice in the petroleum and mining sectors.			

Module 24

Code	Course/Module Title	ECTS	Semester
PRE224	Petrophysical Rocks properties	7	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	4	93	82
Description			
This module provides an in-depth understanding of petrophysical rock properties essential for reservoir characterization and petroleum engineering. Students explore key concepts such as porosity, permeability, fluid saturation, and rock-fluid interactions. Emphasis is placed on measurement techniques, including core analysis and well-log interpretation, and their applications in evaluating reservoir quality and performance. The course integrates theoretical knowledge with practical decision-making in hydrocarbon exploration, reserve estimation, and enhanced oil recovery (EOR). Through lectures, tutorials, and seminars, students develop analytical skills necessary for interpreting petrophysical data and applying it to real-world petroleum reservoir challenges.			

Module 25

Code	Course/Module Title	ECTS	Semester
PRE225	Occupational Safety and Healthy	4	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	41	59
Description			
This module introduces the fundamental principles of occupational safety and health, focusing on hazard identification, risk assessment, and environmental protection. Students explore mechanical, electrical, chemical, and thermal hazards, along with workplace best practices to minimize risks. The course emphasizes the development of skills to design, implement, and manage effective safety systems. Key topics include hazardous waste, fire safety, airborne contaminants, and industry-specific risks in the oil and gas sector. Through lectures, labs, and assessments, students gain the knowledge necessary to comply with safety regulations and promote a culture of health and environmental responsibility in engineering workplaces.			

Module 26

Code	Course/Module Title	ECTS	Semester
UOM2012	Arabic 2	2	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	1	33	17
Description			
This module enhances students' proficiency in classical Arabic by focusing on grammar, syntax, and literary appreciation. Students develop skills in accurate reading, speaking, and writing, with attention to eloquence, clarity, and correct expression. The course deepens understanding of grammatical structures such as subject-predicate relationships, grammatical particles, and spelling rules. It also explores key poets of the Abbasid era, including Al-Mutanabbi, Abu Tammam, and Abu Firas Al-Hamdani, fostering literary taste and cultural appreciation. Through seminars and interactive activities, students refine their communication skills, correct linguistic errors, and engage with the richness of Arabic heritage and expression.			

Module 27

Code	Course/Module Title	ECTS	Semester
PRE313	Crimes of the Baath regime in Iraq	2	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	33	17
Description			
This module examines the crimes committed by the Baath regime in Iraq, with a focus on their social, psychological, and environmental impacts. Students will explore human rights violations, the use of internationally prohibited weapons, mass grave documentation, and the legacy of systematic oppression. The course fosters critical thinking by connecting historical crimes with legal, ethical, and human rights frameworks. It emphasizes the role of democratic governance and transitional justice in addressing past atrocities. Through lectures, tutorials, and interactive activities, students develop analytical skills and an informed understanding of justice and accountability in post-conflict societies.			

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