

# University of Mosul جامعة الموصل



*First Cycle – Bachelor's Degree (B.Sc.) - Geology*

بكالوريوس – علوم الارض



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### 1. Overview

This catalogue is about the courses (modules) given by the program of Department of Geology to gain the Bachelor of Science degree. The program delivers (xx) 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 علوم الأرض للحصول على درجة بكالوريوس العلوم. يقدم البرنامج (٤٠) 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 2023-2024

#### Module 1

Code	Course/Module Title	ECTS	Semester
GEO-1101	General Geology I	8.00	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	5	93	107
Description			
Studying the earth and the creation of the universe, and the divisions of the earth and its parts. Identifying the main elements of the earth's crust, studying minerals and their types, and methods of diagnosing them. And then the study of igneous rocks and the method of their origin and divisions. Sedimentary rocks, their types, characteristics, methods of formation, and areas of formation (depositional environments). As well as metamorphic rocks, methods of transformation, conditions of transformation and their divisions. Identify the factors affecting the weathering of rocks and methods of transporting sediments, their aggregation and cohesion.			

#### Module 2

Code	Course/Module Title	ECTS	Semester
GEO-1102	Crystallography	8.00	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	5	93	107

Description
The student will study and classify the crystal structure of minerals in terms of the external shape and internal structure of the crystal and the identification of minerals as well as knowledge of the internal structure of the crystals and the study of its parts, which in turn determines the crystalline system.

### Module 3

Code	Course/Module Title	ECTS	Semester
COS-1103	Chemistry	8.00	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	5	93	107
Description			
This section includes a description of the module, 100-150 words			

### Module 4

Code	Course/Module Title	ECTS	Semester
Sci-101	Mathematic	2.00	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17
Description			
<p>1-Understanding and applying a variety of mathematical methods: The student learns a variety of different mathematical methods and techniques that can be used to solve complex mathematical problems.</p> <p>2-Developing critical thinking skills: Analysis, synthesis and critical thinking skills are enhanced when students learn mathematical methods. Students are encouraged to think systematically and deeply analyze mathematical problems.</p> <p>3-Ability to solve complex mathematical problems: Students learn how to analyze and understand complex mathematical problems and apply appropriate mathematical methods and techniques to solve them correctly.</p> <p>4-Creative thinking and innovation: Learning mathematical methods encourages creative thinking and innovation in the field of solving mathematical problems. Students learn how to develop new and unique solutions using mathematical methods</p>			

**Module 5**

Code	Course/Module Title	ECTS	Semester
UOM-104	Democracy & Human Right	2.00	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17
Description			
1- Identify the nature of human rights and democracy 2- Identify the characteristics of human rights 3- Identify the historical stages that human rights have gone through 4- Identify the generations of human rights 5- Identify international humanitarian law and international human rights law 6- Identify human rights in Arab constitutions 7- Identify the concept of Shura and democracy 8- Identify democracy in modern and contemporary Arab and Islamic reality 9- Identify the characteristics and disadvantages of direct democracy 10- Identify the types of parliamentary systems 11- Identify contemporary classifications of democracy			

**Module 6**

Code	Course/Module Title	ECTS	Semester
UOM-101	Arabic Language	2.00	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17
Description			
<p>Introducing students to the basics of the Arabic language. Also breaking the barrier of shyness and increasing their confidence inside and outside the classroom. There is a great opportunity to engage them in short discussions where they can write or express themselves orally. In addition to the above, the course will improve their reading, writing, listening and speaking skills as students, and strengthen students' literary ability to appreciate the styles of the language and realize its beauty</p> <p>Introduction to communication in general and the Arabic language in particular, with an introduction to the categories of words (parts of speech) in the Arabic language [4 hours]. Explanation of each part of speech in the Arabic language such as nouns, pronouns, verbs, adjectives, adverbs, prepositions, conjunctions and conjunctions [16 hours]. Basic skills in learning the English language: reading and writing are gradually introduced over the past weeks [6 hours]. The last part is dedicated to some error correction and feedback sessions [2 hours].</p>			

**Model 7**

Code	Course/Module Title	ECTS	Semester
GEO-1214	General Geology II	8.00	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	5	93	107
Description			
<p>The study aims to introduce students in the first stage to the science of geology and all its branches and specializations. This is done by giving preliminary introductory lectures in a simplified and in-depth manner to all the disciplines that the student will learn in the coming stages, so that he will be prepared later to delve deeper into those disciplines when he learns them in the future. Students will be taught structural geology, surface and groundwater science. And take an important look at the theory of plate tectonics. Introducing students to historical geology and the most important rules adopted in determining geological time in both its relative and absolute types, the geological time scale and stratigraphy with its main lines</p>			

**Model 8**

Code	Course/Module Title	ECTS	Semester
GEO-1205	Mineralogy	8.00	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	5	93	107
Description			
<p>The course includes the principles of mineralogy and the study of the chemical and physical properties of the various minerals, as well as the study of the classification and chemical composition of minerals. The course also includes the economic importance of minerals and their distribution in different types of rocks and sediments. In a practical course, the students describe the minerals with hand specimens and a description of the physical and other properties of minerals to reach the correct name of the mineral, leading to the development of the student's skills to characterize all types of minerals and distinguish them by properties.</p>			

**Module 9**

Code	Course/Module Title	ECTS	Semester
GEO-1206	Physics	7.00	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	5	93	82
Description			
<p>Physics is the fundamental science that explores the nature of matter, energy, and the forces that</p>			

govern the universe. It seeks to understand how objects move, interact, and behave at different scales, from subatomic particles to galaxies. Physics is divided into branches such as classical mechanics, electromagnetism, thermodynamics, quantum mechanics, and relativity. It plays a crucial role in technology, engineering, and everyday life, influencing innovations like electricity, computers, and space exploration. By using mathematical models and experiments, physicists uncover the laws that shape reality, making physics essential for advancing science and understanding the cosmos.

#### Module 10

Code	Course/Module Title	ECTS	Semester
GEO-1207	Statistics	2.00	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17
Description			
<p>Statistics is the science of collecting, analyzing, interpreting, and presenting data to make informed decisions. It is widely used in various fields, including business, economics, healthcare, and social sciences. Statistics is divided into two main branches: descriptive statistics, which summarizes data through measures like mean, median, and standard deviation, and inferential statistics, which draws conclusions from samples using probability theory. Statistical methods help in identifying trends, making predictions, and testing hypotheses. With the rise of big data and artificial intelligence, statistics plays a crucial role in data-driven decision-making, enhancing accuracy and efficiency in problem-solving across multiple domains.</p>			

#### Module 11

Code	Course/Module Title	ECTS	Semester
UOM-103	Computer	3.00	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	12
Description			
<p>This program is meant for those students who have low-level literacy in computer use and only partial understanding of the functions of a computer. And so, the students are introduced to this program to improve computer literacy. The students must apply their knowledge to use office skills before use the advanced geology software.</p> <ul style="list-style-type: none"> <li>– Describe why computers are important.</li> <li>– Explain how computers work.</li> <li>– Explain the difference between computer hardware and computer software.</li> <li>– Describe what an operating system is.</li> <li>– Identify the operating system you have on your own computer and phone.</li> <li>– Explain office productivity and communications software.</li> <li>– Start up and shut down computers properly.</li> <li>– Use the mouse and keyboard to complete tasks on the computer.</li> </ul>			

- Identify the different groups of keys on the computer.
- Create, open, save, and manage files and folders

#### Module 12

Code	Course/Module Title	ECTS	Semester
UOM-102	English Language	2.00	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	13
Description			
<p>English is a global language spoken by over 1.5 billion people worldwide. It originated from Old English, influenced by Latin, Norse, and French. As the primary language of international business, science, and the internet, English plays a crucial role in global communication. It has a vast vocabulary and flexible grammar, making it adaptable and dynamic. English is the official or widely spoken language in many countries, including the United States, the United Kingdom, Canada, Australia, and India. It is also the most commonly taught second language. Mastering English opens doors to education, career opportunities, and cultural exchange across the world.</p>			

#### Module 13

Code	Course/Module Title	ECTS	Semester
GEO-2318	Optical Mineralogy	6.00	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	93	57
Description			
<p>Optical Mineralogy includes a wide range of basic and advanced fundamentals knowledge . 1. - Definition of all terms related to light and the most important hypotheses that explained the different light phenomena.</p> <p>2. Explain the difference between the types of light (polarized, normal, monochromatic, etc.) and how to obtain each one of them.</p> <p>3. Summarize what is meant by uniaxial indicatrix, biaxial indicatrix and isotropic indicatrix .</p> <p>4-. Discus &amp; explain the process of double refraction in detail and how to benefit from it practically, and how refractive index</p> <p>5---Explain the parts of the polarizing microscope, its working mechanism, and how to make maximum use of it in the study of minerals and rocks</p>			

#### Module 14

Code	Course/Module Title	ECTS	Semester
GEO-2309	Paleontology	5.00	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62

Description
<p>The description includes two parts: <b>Part A include the theoretical topics:</b>  Introduction, organisms groups , types of fossils, taxonomic position , general characteristic of Ostracoda, importance of Ostracoda study (as fossils), morphology of Echinod, Echinod parts , description of margins, features and structures used for the orientation of the shell, external feature, internal features, terminology of Echinod, dimorphism.  Ecology, distribution of marine Echinod, factors controlled of the distribution of Echinod, distribution of environments according to the salinity levels, Paleoecology.  coccolithophores, trilobite , graptolite morphology and formation.  Ecology of Echinod, functions of shell, geologic distribution, effect of marine change on distribution, evolutionary responses, terminology of Echinoid.  Revision problem classes</p> <p><b>Part B – Practical labs</b>  Shape, measurements of shell and parts, orientation, features, external structures, internal structures, ornamentation, description of some index species.  graptolite shape, Echinod orientation, Echinod size, ultrastructural component, element arrangement, orientation in plain view, crystallography, systematic paleontology, description of some index species.</p>

#### Module 15

Code	Course/Module Title	ECTS	Semester
GEO-23010	Sedimentology	5.00	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
<ol style="list-style-type: none"> <li>The student will understand the nature of sedimentary materials.</li> <li>The students will be able to describe the shapes, sizes, fabric and porosity of sedimentary rocks.</li> <li>The students will be able to will be able to understand how sedimentary rocks originate through a set of processes that begins with weathering, transportation and deposition</li> <li>The students will be able to will be able to understand the processes of transportation, deposition and formation of sedimentary structures.</li> <li>The students will be able to understand the origin of sedimentary structures.</li> <li>The students will be able to classify the different types of sedimentary structures.</li> </ol> <p>The students will be able will be able to understand the processes of transportation, deposition and formation of sedimentary structures</p>			

#### Module 16

Code	Course/Module Title	ECTS	Semester
UOM- 2025	Crimes of the defunct Baath Party	2.00	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17



Description
The defunct Baath Party, which ruled Iraq under Saddam Hussein, committed numerous crimes marked by brutality and oppression. It systematically suppressed political opponents through arbitrary arrests, torture, and executions. The party orchestrated genocidal campaigns, including the Al-Anfal campaign (1988), which targeted Kurds, killing thousands and using chemical weapons in Halabja. It brutally crushed the 1991 uprisings in the south and north, massacring civilians. Shiites, Kurds, and other minorities faced persecution, while forced disappearances and mass graves became hallmarks of its rule. The regime also engaged in wars, economic mismanagement, and repression, leaving a legacy of suffering and destruction.

#### Module 17

Code	Course/Module Title	ECTS	Semester
GEO-23011	petrology	5.00	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
<p>Module description includes the following.</p> <p><b>Part A – Theoretical lectures</b>  The Principal Subdivisions of the Earth's Interior, Types of rocks, rock cycle, Igneous rocks, Classifications of igneous rocks, Chemical Composition of Igneous Rocks, Chemical Effect on the Mineral Composition, Mineralogical classifications, Grain Size and Occurrence, Discuss the Bowen 's reaction series and description of the most common rocks.  Metamorphism, Factors Controlling Metamorphism, Types of Metamorphism, Grade of Metamorphism, Metamorphic Zones, Mineral assemblage, Metamorphic facies.  Advantages of sedimentary rocks, General classification of sedimentary rocks, Clastic rocks/ Sandstones, Conglomerate and shale, Chemical–Biochemical Rocks/ Carbonate rocks, Evaporites rocks, Other Chemical–Biochemical Rocks/ chert rocks, phosphorites, organic rocks, others.  Revision problem classes</p> <p><b>Part B – Practical labs</b>  Igneous Rocks (Introduction), Acidic Igneous Rocks, Intermediate Igneous Rocks, Basic Igneous Rocks, Ultrabasic Igneous Rocks.  Metamorphic Rocks (Introduction), Metamorphic Rocks (Non-foliated rocks), Metamorphic Rocks (Foliated rocks).  Clastic rocks/Sandstones, Clastic rocks/Conglomerate and shale, Chemical–Biochemical Rocks/Carbonate rocks, Chemical –Biochemical Rocks/Evaporites rocks, Other Chemical –Biochemical Rocks/ chert rocks, phosphorites, organic rocks, others.</p>			

#### Module 18

Code	Course/Module Title	ECTS	Semester
GEO-23012	Geomorphology	5.00	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)

2	2	63	62
<b>Description</b>			
<p>Geomorphology is the scientific study of Earth's landforms, their origins, evolution, and the processes that shape them. It examines natural features such as mountains, valleys, rivers, and coastlines, focusing on how factors like erosion, weathering, tectonic activity, and climate influence landscapes over time. Geomorphologists analyze both gradual changes, like soil formation and sediment deposition, and rapid events, such as landslides and earthquakes. The field integrates geology, hydrology, climatology, and biology to understand surface dynamics. Applications include environmental management, hazard assessment, and land-use planning, making geomorphology essential for sustainable development and mitigating natural disasters.</p>			

#### Module 19

Code	Course/Module Title	ECTS	Semester
UOM-2012	Arabic Language 2	2.00	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17
<b>Description</b>			
<p>Introducing students to the basics of the Arabic language. Also breaking the barrier of shyness and increasing their confidence inside and outside the classroom. There is a great opportunity to engage them in short discussions where they can write or express themselves orally. In addition to the above, the course will improve their reading, writing, listening and speaking skills as students, and strengthen students' literary ability to appreciate the styles of the language and realize its beauty</p> <p>Introduction to communication in general and the Arabic language in particular, with an introduction to the categories of words (parts of speech) in the Arabic language [4 hours]. Explanation of each part of speech in the Arabic language such as nouns, pronouns, verbs, adjectives, adverbs, prepositions, conjunctions and conjunctions [16 hours]. Basic skills in learning the English language: reading and writing are gradually introduced over the past weeks [6 hours]. The last part is dedicated to some error correction and feedback sessions [2 hours].</p>			

#### Module 20

Code	Course/Module Title	ECTS	Semester
GEO-24013	Igneous Petrology	5.00	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47
<b>Description</b>			
<p>Indicative content includes the following.</p> <p><b>Part A – Theoretical lectures</b></p> <p>Introduction, The Principal Subdivisions of the Earth's Interior, crust, mantle, core, Pyrolite Model, Forms and Structures of Intrusive Rocks such as Dykes, Sills, Batholiths, and Ophiolite Complexes, Tectonite peridotite rocks, Cumulated Rocks, Classification of Igneous Rocks, Chemical Classification,</p>			

Chemical Effect on the Mineral Composition, Mineralogical classifications, textural classification. Magmatic Differentiation, Partial Melting, Bowen's Reaction Series, Crystal fractionation, Petrogenesis, Magma Generation, Mechanism of melting, Generation of Basaltic Magma, Generation of Granitic Magma.

Tectonic Setting and Conclusions of Basaltic and Granitic Rocks, Plate Tectonics, Plate boundaries or margins, Tectonic Environments, Oceanic Igneous Rocks.

Physical Chemistry and Physical Properties of the Synthetic Magmas, Phase Rule, Phase diagram, One Component (Unary) Systems, Two Components (Binary) Systems, Three Components (Ternary) Systems, Four Components (Quaternary) Systems.

Revision problem classes

**Part B – Practical labs**

Introduction of Igneous Rocks, Diagnostic features of igneous minerals by the microscope, Textures of Igneous Rocks, Classification of Igneous Rocks, Acidic Igneous, Types of Acidic Igneous Rocks. Intermediate Igneous Rocks, Types of Intermediate Igneous Rocks, Basic Igneous Rocks, Types of Basic Igneous Rocks, Ultrabasic Igneous Rocks, Types of Ultrabasic Igneous Rocks.

## Module 21

Code	Course/Module Title	ECTS	Semester
GEO-24014	Micropaleontology I	4.00	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	22
Description			
<p>This module includes the following.</p> <p><b>Part A – Theoretical lectures</b></p> <p>Introduction, Micropaleontology, scientific terms, Binomial Nomenclature, the kingdom of live, living foraminifera, life cycle of foraminifera, the description the test of foraminifera, classification. Geological history foraminifera, Ecology of foraminifera, Application of foraminifera. Organic Microfossils, Definition, types, applications. spores&amp; pollen grains (definition, life cycle, life cycle, affinity, production, morphological characters, wall composition, classification, Distribution, Evolutionary trends &amp; Historical geology). (8hrs)</p> <p>10-Acritarch group: morphology, affinity, classification, historical geology, ecology</p> <p>11-Chitinozoa group: morphology, life cycle, affinity, classification, historical geology, ecology.</p> <p>12-Dionflagellatesgroup: morphology, life cycle affinity, classification, historical geology, ecology.</p> <p>Indicative content includes the following.</p> <p>Revision problem classes.</p> <p><b>Part B – Practical labs</b></p> <p>Composition and microstructure of the wall, chambers test shape and chamber arrangement, aperture, suture line, ornamentation, periphery of test, umbilical characters.</p> <p>Spores &amp; pollen grains (types, morphology, symmetry, wall types, laesurae types, ornamentation, classification)</p> <p>Acritarchs (types, morphology, y, wall types, pylome types, classification)</p> <p>Chitinozoa (morphology, wall types, basal margin structure types, classification)</p>			

**Module 22**

Code	Course/Module Title	ECTS	Semester
GEO-24015	Sedimentary Petrology	4.00	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	22
Description			
<p>This description includes the following.</p> <p>Introduction, Particle composition. Major Minerals, Quartz, Feldspars, Coarse Mica, Clay minerals, Heavy minerals, Rock fragments, Mineral Cements, Matrix Minerals, sandstones maturity, Classification of sandstones, Classification of epiclastic sandstone, Petrography and chemistry of sandstones, Quartz arenites, Feldspathic arenites, Lithic arenites. Other sandstones. [10 hrs]</p> <p>Gravels, Conglomerates, and Breccias, Composition of framework clasts, Composition of matrix and cements, Sedimentary structures in conglomerates, classification of conglomerates, General statement, Classification by relative clast stability, Classification by clast lithology, Classification by clast size, extraformational (terrigenous gravel) conglomerates and breccias, Orthoconglomerates, Paraconglomerates (Conglomeratic Mudstone), Intraformational Conglomerates and Breccias . [8 hrs]</p> <p>Shale (Mudstone), composition, chemical composition, classification, origin of shale, diagenesis of siliciclastic sedimentary rocks, eogenesis, mesogenesis, telogenesis. [10 hrs].</p> <p>Siliceous sedimentary rocks (cherts) , Mineralogy and texture, Principal kinds of cherts, Bedded and nodular chert, Deposition of chert , Precipitation of chert from seawater, Biogenic removal of silica, Nonbiogenic cherts, Replacement chert.</p> <p>Carbonate sedimentary rocks, Limestone, Introduction, Mineralogy</p> <p>Major components of limestones, Identification of carbonate minerals, Noncarbonate components</p> <p>Carbonate grains, Peloids, coated grains, Lithoclasts,</p> <p>Skeletal grains (bioclasts), Microcrystalline carbonate (lime mud), Sparry calcite</p> <p>Classification of carbonate rocks, Folk's classification (1962), Dunham's classification (1962).\</p> <p>Nonmarine carbonates, Lacustrine carbonates, Carbonates in rivers, streams, and springs, Caliche (calcrete) carbonates,</p> <p>Dolomites, Introduction, Mineralogy of dolomites, Dolomite textures, Origin of dolomite.</p> <p>Diagenesis of carbonate rocks, Introduction, Biogenic Alteration, Cementation, Dissolution, Neomorphism, Replacement</p> <p>Evaporites, Introduction, Gypsum and Anhydrite, Nodular anhydrites, Laminated anhydrites, Massive anhydrite, Halite.</p> <p>Origin of Evaporite Deposits, Depositional Models for Evaporites.</p>			

**Module 23**

Code	Course/Module Title	ECTS	Semester
GEO-24016	Metamorphic petrology	4.00	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	22
Description			

Metamorphic petrology is the study of rocks that have undergone transformation due to heat, pressure, and chemically active fluids within the Earth's crust. These rocks form from pre-existing igneous, sedimentary, or even other metamorphic rocks through processes like recrystallization, phase changes, and mineral reactions. Common metamorphic rocks include schist, gneiss, and marble. Metamorphism occurs in different settings, such as regional metamorphism in mountain belts and contact metamorphism near magma intrusions. Key factors influencing metamorphism include temperature, pressure, and fluid composition. Studying metamorphic rocks helps geologists understand tectonic processes, crustal evolution, and the conditions deep within the Earth.

#### Module 24

Code	Course/Module Title	ECTS	Semester
GEO-24117	Invertebrates Paleontology	4.00	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	37
Description			
<p>content includes the following.</p> <p><b>Part A – Theoretical lectures</b></p> <p>Introduction , Metamorphism Factors of metamorphism Geothermal gradient Prograde metamorphism Retrograde metamorphism 18hrs Type of metamorphism Local metamorphism Regional metamorphism Grade of metamorphism Index minerals Isograds 18hrs, Phase rule Univariant system Bivariant System Mineral assemblage Types of metamorphism reactions 18hrs Triangular diagrams Metamorphic facies 12hrs</p> <p><b>Part B – Practical labs</b></p> <p>Introduction of Metamorphic rocks METAMORPHIC MINERALS. 3hrs CONTACT (THERMAL) METAMORPHISM. Description of the rock slides for contact metamorphic rocks First Quiz 6hrs DYNAMIC METAMORPHISM Description of the rock slides for dynamic metamorphic rocks 6hrs REGIONAL METAMORPHISM ( BARROVIAN-TYPE) Description of the rock slides for regional metamorphic rocks Second</p>			

#### Module 25

Code	Course/Module Title	ECTS	Semester
GEO-24018	Geotectonic	4.00	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	37
Description			
<p>Geotectonics is the study of the structure, movement, and deformation of Earth's lithosphere, focusing on large-scale geological processes. It explores how tectonic forces shape continents, ocean basins, and mountain ranges over millions of years. The theory of plate tectonics is central to geotectonics, explaining how Earth's crust is divided into rigid plates that move over the semi-fluid mantle. These movements result in geological phenomena such as earthquakes, volcanic activity, and mountain formation. Geotectonics also examines fault systems, rift valleys, and subduction zones,</p>			

where plates interact in different ways—colliding, pulling apart, or sliding past each other. Understanding geotectonics is crucial for predicting natural disasters, exploring mineral resources, and studying Earth's evolutionary history. Scientists use tools like GPS measurements, seismic data, and geological mapping to analyze tectonic movements and their effects on the planet's landscape.

#### Module 26

Code	Course/Module Title	ECTS	Semester
UOM-2032	Computer 2	3.00	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	12
Description			
A computer is an electronic device designed to perform a variety of tasks, including calculations, data storage, and processing. It operates based on instructions provided through software applications and input devices like a keyboard and mouse. The computer's core components include the central processing unit (CPU), which carries out calculations and executes commands, and memory (RAM), which temporarily stores data for quick access. The hard drive or solid-state drive (SSD) provides long-term data storage. Additionally, computers are equipped with output devices like monitors and printers for visual or physical results. Over time, computers have evolved from large, complex machines to compact, powerful devices, with modern computers supporting multitasking, networking, and internet connectivity. They are essential in various fields, such as education, business, science, and entertainment. With continuous advancements, computers have become more user-friendly, efficient, and integrated into daily life.			

#### Module 27

Code	Course/Module Title	ECTS	Semester
UOM-2022	English Language 2	2.00	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17
Description			
The English language is a global means of communication spoken by millions of people worldwide. It is considered a West Germanic language, originating in Anglo-Saxon England. Over the centuries, English has evolved and absorbed words from Latin, French, and other languages, becoming a rich, versatile language. It is the dominant or official language in many countries, such as the United States, the United Kingdom, Canada, and Australia. English is widely used in business, education, science, and technology, making it an essential language for international communication. With its diverse vocabulary and relatively simple grammar compared to other languages, English has become one of the most widely spoken and studied languages in the world.			

**Module 28**

Code	Course/Module Title	ECTS	Semester
GEO-35019	Structural Geology I	6.00	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
Structural geology is the branch of geology that focuses on the study of rock formations and their structures. It involves understanding the processes that shape the Earth's crust, such as folding, faulting, and metamorphism, and how these processes influence the distribution and behavior of rocks. Structural geologists examine features like folds, faults, joints, and rock layers to interpret the history of tectonic forces that have acted on the Earth over time. This field is crucial for understanding natural phenomena like earthquakes, mountain formation, and plate tectonics, as well as for practical applications in areas such as mineral exploration, petroleum geology, and civil engineering.			

**Module 29**

Code	Course/Module Title	ECTS	Semester
GEO-35020	Remote Sensing	4.00	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	22
Description			
Remote sensing refers to the process of acquiring information about an object or phenomenon without making direct physical contact with it. This is typically achieved through the use of satellites, drones, aircraft, or ground-based sensors that collect data in the form of electromagnetic radiation (such as visible light, infrared, or radar waves). The data captured is then processed and analyzed to gain insights into various aspects of the Earth's surface, including land use, vegetation, temperature, and topography. Remote sensing is widely used in fields such as environmental monitoring, agriculture, disaster management, urban planning, and climate studies, providing valuable information for decision-making and resource management.			

**Module 30**

Code	Course/Module Title	ECTS	Semester
GEO-35021	Gravity & magnetic method	5	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47
Description			
Part A – gravity Introduction, Geophysics definition, types of Geophysics methods, Gravity definition , important of			

gravity method in our life , general characteristic of gravity methods and the basic theoretical principles of gravity method, importance of gravity interpretation, Units of gravity, geological feature affecting to density of rock, measuring gravity, gravity method technique, gravity data corrections ,local and regional anomaly, the ambiguity of sub-surface gravity anomaly, interpretation of gravity data .

**Part B- Magnetic method**

Introduction of magnetic methods, basic principles of magnetic method and theoretical principles, Units and earth magnetic field, rock magnetism measure of magnetic field, magnetic survey, correction of magnetic observation, magnetic anomaly, magnetic data interpretation.

**Module 31**

Code	Course/Module Title	ECTS	Semester
GEO-35022	Geochemistry	5.00	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
<p>Introduction, construction of the earth , Earth's Interior , Seismic data on the earth's interior , Density Distribution , Heat and Pressure Distribution , Material of earth interior , Rocks of Deep Origin : Ophiolite Complexes , Diamond bearing Kimberlite Pipes , Xenolith . , Experimental Studies , Earth Crust , The chemical composition of the Earth Crust. [10 hrs]</p> <p>Material of The Mantle , Material of the Upper Mantle , Transition Zone of Earth Mantle, Lower Mantle Material , Outer Core , Inner Core, Meteorite , Geochemical Classification of Elements . [8 hrs]</p> <p>Geochemistry of supergene environment , Hypogene Environment , Geochemistry of Sediment and Sedimentary Rocks , Weathering , Physical weathering , Chemical weathering , Chemical weathering reactions, Weathering products , Factors controlling the behavior of elements in sedimentary environments , Ionic potential for elements , Power ( Potential ) of hydrogen (pH) , Oxidation-reduction (redox) potential</p>			

**Module 32**

Code	Course/Module Title	ECTS	Semester
GEO-35023	Stratigraphy	5.00	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
<p>Introduction, principle of correlation. Correlation of Stratigraphy, methods of rock correlation, biostratigraphy units, time Stratigraphy units, element and FACTORS, classification of sedimentary Environments, continental env. Terrestrial env., aqueous env. Marine env</p>			



**Module 33**

Code	Course/Module Title	ECTS	Semester
GEO-35124	Micropaleontology II	5.00	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47
Description			
<p>Introduction, organisms groups , types of microfossils, taxonomic position , general characteristic of ostracoda, importance of ostracoda study (as microfossils), morphology of ostracoda, calcareous parts , outer lamella, inner lamella, description of margins, features and structures used for the orientation of the carapace, external feature, internal features, ornamentation, terminology of ostracode, dimorphism. [10 hrs]</p> <p>Ecology, distribution of marine ostracoda, factors controlled of the distribution of ostracoda, distribution of environments according to the salinity levels, Paleoecology</p>			

**Module 34**

Code	Course/Module Title	ECTS	Semester
GEO-36125	Structural Geology II	6.00	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
<p>Introduction to geological structures, genetic and geometric classification of joints. Attitude of joints , joints in the field, academic and economic importance of joints, faults types and various classifications modes, field criteria of faults, faults and it relation with principal stress axes. Balance cross section concept and measure of shortening ratio.</p>			

**Module 35**

Code	Course/Module Title	ECTS	Semester
GEO-36026	Field Geology	5.00	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47
Description			
<p>Introduction to field geology. Outline and Approach of Field Behavior. Relation with other geosciences. Types of Geological maps and Base Maps. Methods of Position Finding on Maps. Methods of geological mapping. Traversing types-controlling traverse. Description rocks in the field. Determination of top of beds by sedimentary structures. Descriptive fold elements in the field</p>			

**Module 36**

Code	Course/Module Title	ECTS	Semester
GEO-36027	Basin analysis and Sequence Stratigraphy	5.00	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47
Description			
1- Preface and introduction, Aims of basins analysis study, Sedimentary basin concept. 2- Mechanisms of basin formation, Basin plains, Vertical and horizontal basin zonation 3- Controls on sediment accumulation, Tectonic setting classification of sedimentary basins 4- basins related to lithospheric extension (divergent) 5- basins related to subduction (convergent) 6- basins related to strike slip tectonics. 7- basins related to crustal loading, complex and hybrid basins, the record of tectonics in stratigraphy. 8- Concepts and principles of sequence stratigraphy 9- Basin- margin concepts 10- Definitions of sea- level, Accommodation, sediment supply, Orders of cyclicity 11- Basin architecture (Progradation, Retrogradation, aggradation) 12- sequence boundaries and their correlative conformities 13- Systems tract definition 14- Sequence stratigraphy of wireline logs			

**Module 37**

Code	Course/Module Title	ECTS	Semester
GEO-36028	Sedimentary environments	6.00	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
<p>Introduction to sedimentary environments - Classification of sedimentary environments</p> <p>Facies and Facies models, marine or nonmarine?, marine fossils, carbonate rocks, red beds, evaporite chemistry. Continental or terrestrial environments, Introduction, Fluvial systems, Alluvial fans, Sedimentary processes on fans. River systems, Channel form, Sediment Transport Processes in River, Floodplain Deposition, Characteristics of Fluvial Deposits, Palaeosols, How do you know it's Fluvial? Eolian Desert systems, Introduction, Global wind patterns, desert environment, Life in deserts, Characteristics of Aeolian deposits Lakes Environments, Introduction, Lake formation, Lake hydrology, freshwater Lakes, Deep lake facies. Saline lakes, Life in Lakes, Characteristics of lake deposits.</p> <p>The Marine Realm: Morphology and Processes, Introduction, Divisions of the marine realm, Deltas Environment, Introduction, Classification of deltas, Fluvial-Dominated Deltas, Tide-Dominated Deltas, Wave-Dominated Deltas, Fan Deltas, Delta Cycles, Characteristics of deltaic deposits</p>			

**Module 38**

Code	Course/Module Title	ECTS	Semester
GEO-36029	Geology of Iraq	5.00	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47
Description			
Introduction, Some Basic Information on the Position and Structure of Iraq, boundaries of Arabian plate, Tectonic Divisions of Iraq according to Jassim and Goff (2006), Stable shelf Units, Unstable shelf Units, Zagros suture Units, Development of Arabian Plate, Margins of Arabian plate, Tectonostratigraphic megasequence: TMS, TMS Ap1, TMS Ap2, TMS Ap3, paleogeography in Early Paleozoic, TMS Ap4, TMS Ap5, Active Margin And Back-Arc Basin			

**Module 39**

Code	Course/Module Title	ECTS	Semester
GEO-36030	Methodology	3.00	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	48	27
Description			
Methodology in research refers to the systematic process used to collect, analyze, and interpret data to address a research question or hypothesis. It outlines the steps and procedures followed, ensuring that the study is valid, reliable, and reproducible. Methodology includes the research design, data collection methods (e.g., surveys, experiments, or interviews), sampling techniques, and data analysis strategies. It also addresses ethical considerations, ensuring that the research is conducted with integrity and respect for participants. The methodology section helps readers understand how the study was conducted and justifies the choices made, providing transparency and allowing others to replicate or evaluate the research.			

**Module 40**

Code	Course/Module Title	ECTS	Semester
GEO-47031	Geological Field	6.00	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
Geological field trips are essential for practical learning in geology, allowing students and professionals to observe geological formations and processes firsthand. These trips typically involve visiting natural sites like mountains, rock formations, or volcanic areas to study their structure, composition, and history. Field trips offer an opportunity to apply theoretical knowledge to real-world scenarios,			

enhancing the understanding of earth processes such as tectonics, erosion, and sedimentation. They also provide valuable experiences in mapping, rock identification, and data collection. These excursions are fundamental for geologists to develop critical skills in fieldwork, which are crucial for understanding the Earth's dynamic nature and solving geological problems.

#### Module 41

Code	Course/Module Title	ECTS	Semester
GEO-47032	Engineering Geology	5.00	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47
Description			
<p>Introduction to Engineering Geology.</p> <ul style="list-style-type: none"> <li>-Physical Properties of Rocks 1 (Density, Porosity &amp; Permeability).</li> <li>- Physical properties of Rocks 2 (Ultrasound velocities, slake durability).</li> <li>- Mechanical properties of Rocks (Uniaxial compressive strength, Tensile strength, Triaxial com. Str.).</li> <li>-Outcrop description (orientation, roughness &amp; wall strength).</li> <li>- Site investigations (seepage water (seepage water, block size &amp; persistence).</li> <li>- Rock engineering (major rock mass classification).</li> <li>- Rock quality designation (RQD) index.</li> <li>- Dam geology (needs for dam construction, Dam types.</li> <li>- Subsurface opening (Natural opening, Artificial opening).</li> <li>- Mohr's circles for spatial (3-D) stress analysis. Tunnel geology</li> </ul>			

#### Module 42

Code	Course/Module Title	ECTS	Semester
GEO-47033	Petroleum Geology	6.00	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
<p>Introduction, the relation of petroleum geology to sciences in general, the petroleum system, basic vocabulary, historical development, the origin of petroleum, inorganic origin theory, metal carbide theory, cosmic origin theory, the organic origin theory, organic carbon in sediments, inversion of organic matter to petroleum, stages of organic matter maturation, diagenesis, catagenesis, metagenesis, types of kerogen. Source rocks, the basic composition of petroleum, the hydrocarbon constituents of petroleum, the nonhydrocarbon constituents of petroleum, physical properties of oils, specific gravities of oils, viscosities of oils, colours and relative indices of oils.</p> <p>Porosity, controls on porosity, sorting, grain packing, compaction, cementation, dissolution, dolomitisation, permeability, controls on permeability, reservoir rocks, migration of petroleum, primary migration, secondary migration, dismigration, vertical and horizontal migration, migration mechanism, seal rocks</p>			

**Module 43**

Code	Course/Module Title	ECTS	Semester
GEO-47134	Ore Geology	5.00	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47
Description			
<p>Introduction, Economic Geology, Ore geology, Principal steps in the exploitation of ore, Factors affecting the value of cut-off grade, Ore genesis, Magmas and Magmatic fluids, Early and Late magmatic ore-deposits .</p> <p>Metasomatism, Stages of Formation of Metasomatic ores, Factors affecting the formation of Metasomatic Ores, Origin (types) of hydrothermal fluids, The Movement of Hydrothermal Fluids, Types of processes of hydrothermal ore deposition.</p> <p>Types of alteration and their ore association, Metamorphic ores, Metamorphosed ores, Submarine Exhalative and Volcanogenic oredeposits, Major types of chemical sedimentary ores, evaporates ore deposits, Placer ore-deposits</p>			

**Module 44**

Code	Course/Module Title	ECTS	Semester
GEO-47035	Environmental Geology	5.00	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47
Description			
<p>Introduction, definition of environmental terms, types of environmental hazards, The hadean era ,the archian era (development of earth),development of hydrosphere ,development of atmosphere and oxygen, the ozone , drought &amp; desertification ,global warming,earthquakes &amp;volcanoes ,mass movement ,,coastal hazards ,</p> <p>Floods, mass extinction ,dust storms, acidic rains ,medical geology ,,vegetation (indicator plants ,botany ,biogeochemical anomalies ....etc.) geozoology</p>			

**Module 45**

Code	Course/Module Title	ECTS	Semester
GEO-47036	Computer Application in Earth science	3.00	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	12
Description			
Computer applications in Earth science play a crucial role in analyzing, modeling, and simulating			

complex environmental processes. Geographic Information Systems (GIS) are widely used to analyze spatial data, allowing scientists to map and interpret features such as landforms, weather patterns, and ocean currents. Remote sensing technologies enable the collection of data from satellites and aerial sensors, which are used to study Earth's surface and atmosphere. Computer models also simulate natural phenomena, such as climate change, volcanic activity, and seismic events, providing insights into potential future scenarios. Additionally, data analysis tools assist in managing large datasets, making Earth science research more efficient and accurate. These applications enhance our understanding and prediction capabilities of Earth's dynamic systems.

#### Module 46

Code	Course/Module Title	ECTS	Semester
GEO-48037	Hydrogeology	5.00	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47
Description			
Part A – Theoretical lectures an introduction hydrogeological cycle Groundwater Pumping test Groundwater modeling [12 hrs] hydrogeochemistry Part B – Practical labs Introduction hydrogeological cycle Groundwater Pumping test hydrogeochemistry			

#### Module 47

Code	Course/Module Title	ECTS	Semester
GEO-48138	Well Logging	5.00	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47
Description			
Introduction, the presentation of log data, borehole types, mud logging, mud additives, functions of drilling mud, types of drilling fluids, basic well logging equipment, wireline log tools, log tool types, electrical logs, mechanical logs, radioactive logs, acoustic Logs, well logging history, advantages and limitations of well logging. Basic theory on resistivity, Important terminology, definitions, and equations, Porosity, effective			

porosity, permeability, water saturation, the borehole environment, drilling mud, invasion, mud cake, mud filtrate, invaded zone, uninvaded zone, flushed zone, transition zone.

Hydrocarbon saturation, Bulk volume of movable and residual hydrocarbon, resistivity logs, advantages of resistivity logs, resistivity log types, old resistivity logs, modern resistivity logs, induction log, spontaneous potential (self-potential)

Caliper log, Gamma-ray log, total gamma-ray, spectral gamma ray, density log (RHOB), density porosity, neutron log, neutron log applications, sonic log, sonic log applications, lithology identification using well log analysis, porosity identification using well log analysis

#### Module 48

Code	Course/Module Title	ECTS	Semester
GEO-48039	Exploration geochemistry	6.00	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
<p>Introduction to geochemical exploration , What is geochemical exploration , Methods of Geochemical Exploration and Mineral Prospecting works, the geochemical Environments , Primary environment , Secondary environment , geochemical dispersion and mobility , mobility of elements in primary environment , mobility of elements in secondary environment, geochemical coherence , Indicator elements , pathfinder elements.</p> <p>Primary dispersion patterns , Syngenetic patterns, Geochemical province, local syngenetic pattern, Epigenetic patterns, hydrothermal dispersion patterns , dispersion patterns by the influence of temperature and pressure on the late minerals, Secondary dispersion patterns, mechanical dispersion patterns, hydromorphic dispersion patterns , biochemical dispersion patterns .</p> <p>Introduction to isotopes , decay mechanism of radioactive isotopes , the general age equation, Mass Spectrometer , The K-Ar method of dating, Argon–argon (<math>^{40}\text{Ar}/^{39}\text{Ar}</math>) method of dating.</p> <p>Rb-Sr Method of Dating, The Uranium , Thorium–Lead methods of dating , The Carbon-14 method of dating, Stable isotopes, Oxygen and Hydrogen isotopes , Sulfur Isotopes.</p> <p>Revision problem classes</p>			

#### Module 49

Code	Course/Module Title	ECTS	Semester
GEO-48040	Geology of Industrial Rocks	6.00	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
<p>Introduction, Classification of economic minerals about using as raw materials for the different industries, Mining operations , Mineral Processing Technology, Classification of industrial minerals &amp; rocks ,</p> <p>Building and Construction materials , Aggregates, Uses of sand and gravel, Physical and mechanical properties of aggregate , Classification of Lightweight Aggregates, Building stones, Types of building</p>			

stones .

Features of building stone, Building stones in Iraq, Plaster (juss) industry , Metallurgical and refractory materials , Cement Industry , Manufacture stages of Portland cement, Kinds of cement, Structural clay products, Ceramic materials

#### Module 50

Code	Course/Module Title	ECTS	Semester
GEO-48041	Seismic & electrical methods	5.00	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47
Description			
<p>Introduction of seismic methods, Stress and strain , Elastic moduli, Seismic waves , Some basic principles for seismic waves, Ray paths in layered media (waves partitioning), Seismic refraction explorations, Seismic refraction explorations(Principles, Data acquisition, processing and interpretation) , limitations of seismic refraction exploration,.</p> <p>Seismic reflection explorations (Principles, Data acquisition, processing and interpretation)</p> <p>Introduction of geoelectrical methods, Geoelectrical properties of minerals and rocks (resistivity and conductivity), Resistivity method, [</p> <p>Self potential method, EM method, IP method. Advances and limitation of geoelectrical methods.</p>			

#### Module 51

Code	Course/Module Title	ECTS	Semester
GEO-48042	Research Project	3.0	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	48	27
Description			
<p>A research project involves systematic investigation aimed at answering specific questions or solving problems. The project typically begins with defining a clear research problem or hypothesis. Researchers collect and analyze data through various methods, such as experiments, surveys, or case studies, depending on the field of study. The findings are then interpreted and discussed to understand the implications of the results. Research projects may lead to new discoveries, innovations, or a deeper understanding of a particular subject. The process is structured, requiring critical thinking, analysis, and clear communication of results in reports or academic papers. Collaboration, ethical considerations, and thorough documentation are essential throughout the research process.</p>			



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دقق الملف من قبل

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اسم مدير شعبة ضمان الجودة والأداء الجامعي: محمود عبد الحق الصميدعي

التاريخ

التوقيع



: التوقيع

اسم رئيس القسم: أ.د. عمر احمد البدراني

: التاريخ

