Ministry of Higher Education and Scientific Research

University of Baghdad

College of Science

Department of Geology

Course Syllabus Description

Bologna Process

Second Level

Geology Department

College of Science / University of Baghdad

2024 – 2025

Level Two (UGII)

Semester One

Module Information معلومات المادة الدراسية			
Module Title	**Invertebrate Fossils I**	**Module Delivery**	
Module Type	**Core**	☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**GEO2308**		
ECTS Credits	**6.00**		
SWL (hr/sem)	**150**		
Module Level	**UGII**	**Semester of Delivery**	**Three**
Administering Department	**Geology Dept.**	**College**	**College of Science**
Module Leader	**Afrah H. Saleh AL-Ekabi**	**e-mail**	**afrah.saleh @sc.uobaghdad.edu.iq**
Module Leader's Acad. Title	**Assistant Professor**	**Module Leader's Qualification**	**Ph.D.**
Module Tutor	**d.Anwar Khadem &Assi. Luay Sameer**	**e-mail**	**anwar.mousa@sc.uobaghdad.edu.iq**
Peer Reviewer Name	**Dr. Aiad Ali Hussein**	**e-mail**	**aiad.hussien@sc.uobaghdad.edu.iq**
Scientific Committee Approval Date	**01/09/2024**	**Version Number**	**2.0**

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	**None**	**Semester**	
Co-requisites module	**GEO-2412**	**Semester**	**Four**

Module Aims, Learning Outcomes and Indicative Contents اهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية	
Module Aims اهداف المادة الدراسية	1. **This module on individual projects and provides the students more information about the main phylum of animals.** 2. **Training the student to understand the shapes, modes of preservation, classification, nomenclature of species and genera.**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. **beneficialness the specifying geological time then educing the paleo environment.** 2. **Acquiring the skill of distinguishing between different geological formations.** 3. **Dealing with the basic laws of various earth sciences.** 4. **Using the principle of the past as a key to the present in reconstructing the geological history of the earth's formation and development.**
Indicative Contents المحتويات الارشادية	1. **Invertebrate Fossils is a branch of Geology which deals with an animal without a backbone. In fact, invertebrates don't have any any bones at all! Invertebrates that you may be familiar with include spiders, worms, snails, lobsters, crabs and insects like butterflies. However, humans and other animals with backbones are vertebrates. It focuses primarily on stratified phylum of animals that includes types of marine organisms & Mode of life**

	[15 hrs] 2. The principles on which the Invertebrate Fossils studies are based include order variety phylum of animals, [15 hrs]. 3. an organism must be an animal to be classified as an invertebrate, meaning they are members of the kingdom Animalia. [15 hrs]. 4. the species in question must lack a notochord during embryonic development and a backbone, also called a spine, and a spinal cord. 5. The majority of living animals are invertebrates. Invertebrates lack a backbone. [15 hrs]. 6. Invertebrates may have an incomplete or a complete digestive system. 7. Invertebrates vary in how they move and in the complexity of their nervous system. And Most invertebrates reproduce sexually. [15 hrs]. 8. They bring beauty into our lives, ensure we have food on our plates, and are at the heart of a healthy environment. The services they perform—pollinating, dispersing seeds, becoming food for wildlife, recycling nutrients, cleaning water, building reefs—are critical to life on our planet.
Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	1. Hands-on Experience: Hands-on experience allows students to develop observational skills, make connections between theoretical concepts and real-world examples, and enhance their understanding of stratigraphic principles. 2. Visual Aids: Utilize visual aids, such as diagrams, charts, maps, and photographs, to help students visualize and comprehend stratigraphic concepts. 3. Virtual Resources: Take advantage of virtual resources, such as interactive online modules. These resources can provide students with immersive experiences, allowing them to explore stratigraphic principles and study geological features virtually. 4. Case Studies and Real-life Examples: Present case studies and real-life examples that illustrate the application of stratigraphic principles in various contexts, such as paleoenvironmental reconstructions, or geological hazard assessments. These examples can help students understand the practical significance of the course. 5. Laboratory Work: Conduct laboratory exercises that involve the description and interpretation of samples. Encourage students to the laboratory data. 6. Collaborative Learning: Foster collaborative learning environments where students can work in groups or pairs to solve problems, analyze data. This approach encourages active engagement, promotes discussions, and allows students to learn from one another's perspectives and insights. 7. Multimedia Resources: Incorporate multimedia resources, such as videos, animations, and online lectures, to supplement traditional teaching methods. Multimedia resources can help reinforce key concepts. 8. Allows students to monitor their progress, identify areas of improvement, and reinforces learning. 9. Integration of Technology: Utilize geospatial software, stratigraphic modeling tools, and other technology-based resources to enhance the learning experience.

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	**80**	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	**5**

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	70	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 8
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Introduction of Paleontology
Week 2	Modes of Preservation
Week 3	Rules of species nomenclature & Time Geological Scale
Week 4	Habit (Mode of life) of marine organisms
Week 5	Taphonomy & Preservation
Week 6	Foraminifera
Week 7	Foraminiferal Test, Wall & Aperture
Week 8	Midterm Exam
Week 9	Radiolaria
Week 10	Classification of Radiolaria
Week 11	Phylum of Porifera (Sponge)
Week 12	Classification of Porifera (Sponge)
Week 13	Phylum Coelentrata (Cnidaria)
Week 14	Phylum Bryozoa
Week 15	Preparatory

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

Week	Material Covered

Week 1	**Lab1 : Introduction of Paleontology**
Week 2	**Lab2 : Modes of Preservation**
Week 3	**Lab3 : Rules of species nomenclature & Time Geological Scale**
Week 4	**Lab4 : Habit (Mode of life) of marine organisms**
Week 5	**Lab5 : Taphonomy & Preservation**
Week 6	**Lab6 : Forms of preservation**
Week 7	**Lab7 : Foraminifera**
Week 8	**Lab8 : Foraminiferal Test, Wall & Aperture**
Week 9	**Lab9 : Radiolaria**
Week 10	**Lab10 : Classification of Radiolaria**
Week 11	**Lab11 : Phylum of Porifera (Sponge)**
Week 12	**Lab12 : Classification of Porifera (Sponge)**
Week 13	**Lab13 : Phylum Coelentrata (Cnidaria)**
Week 14	**Lab14 : Phylum Bryozoa**
Week 15	**Lab15: Preparatory**

Learning and Teaching Resources
مصادر التعلم والتدريس

References	**Text**	**Available in the Library?**
Required Texts	**1. Fossils and Evolution – The theory and its supporting evidence د. عامر الخفاجي** **2. Foraminifera – جوزيف كوشمان** **3. principles of paleontology. Moore**	**Yes**
Recommended Texts	**مبادئ علم المستحاثات او المتحجرات شفيق مهدي**	**No**
Websites	**http://www.sepmstrata.org/page.aspx?pageid=229**	

Module Information معلومات المادة الدراسية			
Module Title	**Optical Mineralogy**	**Module Delivery**	
Module Type	**Core**	☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**GEO2309**		
ECTS Credits	**6.00**		
SWL (hr/sem)	**150**		
Module Level	**UGII**	**Semester of Delivery**	**Three**
Administering Department	**Geology Dept.**	**College**	**College of Science**
Module Leader	**Hasan Kattoof Jasim**	**e-mail**	**Hasan.jasim@sc.uobaghdad.edu.iq**
Module Leader's Acad. Title	**Lecturer**	**Module Leader's Qualification**	**Ph.D.**
Module Tutor	**Maysoon Omer Ali**	**e-mail**	**maysoon.ali@sc.uobaghdad.iq**
Peer Reviewer Name	**Dr. Aiad Ali Hussein**	**e-mail**	**aiad.hussien@sc.uobaghdad.edu.iq**
Scientific Committee Approval Date	**01/09/2024**	**Version Number**	**2.0**

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	**GEO-1205**	**Semester**	**Two**
Co-requisites module	**GEO-2413**	**Semester**	**Four**

Module Aims, Learning Outcomes and Indicative Contents اهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية	
Module Aims **اهداف المادة الدراسية**	**1. Optical Mineralogy aims to introduce the student to this very important science, which has many applications especial the identification the mineral through the polarizing microscopre, as rocks are composed in nature of minerals, and therefore the earth's crust will also be composed of minerals, which will affect many of the events that occur in the earth's crust, as well as the economic importance of minerals, which are included in Lots of industries.** **2. Optical Mineralogy is important not only in the study of minerals, but it has many practical applications in the field of medicine, engineering, agriculture and forensics** **3. Optical Mineralogy also aims to recognize that minerals are the main source of chemical elements, which are considered the basic element of many sciences, especially chemistry, physics and engineering branches.**
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	**1. Learn about the identification of minerals under the polarizing microscope** **2. Training on making thin section of minerals and rock types in geological workshops and how to manufacture them**

	3. Training on how to use a polarizing microscope, learn about all its parts, how to maintain it and replace its parts 4. Training on the skills of dealing with rock and mineral samples and how to determine the appropriate section for making slides
Indicative Contents **المحتويات الارشادية**	1. Optical Mineralogy aims to know the identification of minerals through the polarizing microscope by using thin section of minerals and rocks and friable sediments 2. Optical Mineralogy is the main branch of geology , , and this science is important, especially in mineral diagnostic processes that have many applications, especially in the classification of rocks, as well as the diagnosis of minerals of economic importance 3. Optical Mineralogy is not only concerned with the identification of minerals and rocks, but it is possible to study many applications through a polarizing microscope, such as dental slides, seeds, and the components of dust storms
Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	1. Mastering work skills in geological workshops and learning about the types of devices available in them and how to operate them 2. Training and mastering the process of making thin slices of minerals and rocks and getting acquainted with the most important materials needed to manufacture thin slices of minerals and rocks and mastering the manufacturing steps 3. Mastering the process of diagnosing minerals through the optical properties of minerals and the relationship of polarized light to minerals when light penetrates a mineral slice 4. Understanding and comprehending the basic characteristics of each mineral and what is the basic characteristic of the diagnosis through which the move is made to determine the mineral composition of the three types of igneous, sedimentary and metamorphic rocks

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	**80**	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	**5**
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	**70**	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	**4**
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**150**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 8
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100		

	Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	**Introduction to Optical Mineralogy**
Week 2	**The Nature and properties of Light, retardation , vibration , wave length**
Week 3	**Concept and Methods of Polarization: Types of Polarizers, Minerals as Polarizers**
Week 4	**Types of polarized Light : Generation of Polarized light, Minerals and polarized light**
Week 5	**Refraction of Light and Snell's Low: Concepts, Applications, Methods of Measurements**
Week 6	**Types of polarizes microscopes: Transmitted and Reflected Light microscopes**
Week 7	**Optical Poetries: Concepts of optical properties, and who they work on minerals**
Week 8	**Mid Theoretical Examination.**
Week 9	**Plane Polarized Light Properties Color and Peleochroism**
Week 10	**Relief, Cleavage and Refractive Index**
Week 11	**Form and Habit of Minerals**
Week 12	**Cross Nichols Polarized light Properties , Quartz Wedges**
Week 13	**Extinction, Twining, Interference Colors, Accessories Plates**
Week 14	**Sign of Elongation and Interference Figures and Optic Sign , Optical Indicatrix, Rock Forming minerals**
Week 15	**Preparatory week**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	**Material Covered**
Week 1	**Lab 1: Introduction and applications of Optical Properties**
Week 2	**Lab 2: Sample preparation for thin section preparation , Parts of Microscopes**
Week 3	**Lab 3: Types of Samples and Epoxy**
Week 4	**Lab 4: Plane polarized Light Properties**
Week 5	**Lab 5: Color and Paleochroism**
Week 6	**Lab 6: Cleavage**
Week 7	**Lab 7: Relief and refractive Index**
Week 8	**Lab 8: Form and Habit of Minerals**
Week 9	**Lab 9: Cross Nichols polarized light properties**
Week 10	**Lab 10: Twining and Extinction**

Week 11	**Lab11: Interference colors and color order**
Week 12	**Lab 12: Interference Figures and Optic Sign**
Week 13	**Lab 13: Sign of Elongation**
Week 14	**Lab 14: Optical properties of common rock forming minerals**
Week 15	**Preparatory week**

Learning and Teaching Resources
مصادر التعلم والتدريس

References	Text	Available in the Library?
Required Texts	**Kerr, P.F., 1959, Optical mineralogy, McGraw-Hill., New York. 442P.**	**Yes**
Recommended Texts	**Nesse, W. D., 2000, Introduction to Mineralogy, Oxford University Press, New York, 442P.**	**No**
Websites	**https://www.coursehero.com/file/9370916/uniaxial-minerals/**	

Module Information معلومات المادة الدراسية			
Module Title	**Structural Geology I**	**Module Delivery**	
Module Type	**Core**	☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**GEO2310**		
ECTS Credits	**6.00**		
SWL (hr/sem)	**150**		
Module Level	**UGII**	**Semester of Delivery**	**Three**
Administering Department	**Geology Dept.**	**College**	**College of Science**
Module Leader	**Janan M. Gorael**	**e-mail**	**Janan.gorael@scbaghdad.edu.iq**
Module Leader's Acad. Title	**Lecturer**	**Module Leader's Qualification**	**Ph.D.**
Module Tutor		**e-mail**	
Peer Reviewer Name	**Dr. Aiad Ali Hussein**	**e-mail**	**aiad.hussien@sc.uobaghdad.edu.iq**
Scientific Committee Approval Date	**01/09/2024**	**Version Number**	**2.0**

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	**None**	**Semester**	
Co-requisites module	**GEO-2414**	**Semester**	**Four**

Module Aims, Learning Outcomes and Indicative Contents اهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية	
Module Aims **اهداف المادة الدراسية**	• **The primary goal of structural geology is to use measurements of present-day rock geometries to uncover information about the history of deformation (strain) in the rocks, and ultimately, to understand the stress field that resulted in the observed strain and geometries.** • **Also to understand the structural evolution of a particular area due to plate tectonics.** • **Understanding of the structure (geometry) of the underlying rocks is vitally important in the mining and petroleum industries.** • **Recognize, classify, measure, record and analyze geological structures at a variety of scales and represent them in field note books and upon geological maps, sections and stereograms.**
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	• **Understand and describe the features formed in rocks when subject to stress, analyze the strain in these rocks and interpret the Paleostress field that affected the rock and caused the deformation** • **know the brittle, ductile and plastic deformation** • **understand deformation mechanisms at micro- and macro-scales** • **describe the geometry and properties of different deformation structures**

	• run structural fieldwork and use structural field data in geometrical and kinematic analyses • Visualize and interpret structural observations and measurements.
Indicative Contents **المحتويات الارشادية**	• An understanding of stress and its origins within the lithosphere. • An understanding of strain as it relates to naturally occurring deformation. • To observe deformed rocks and find an explanation for how and why they ended up in their present state. • To understand under which physical condition the rock was formed and how the structures were made. Small models are being demonstrated how stress, strain, temperature, and pressure worked.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	• Inquiry-based learning, where students explore a question or problem through observation, experimentation, or data analysis. • Peer instruction, where students answer questions and explain their reasoning. • Cooperative learning, which has students work in small groups to complete a task. • During class time, interactive activities, discussions are used.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	**80**	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	**5**
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	**70**	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	**4**
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**150**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	**2**	**10% (10)**	**5, 10**	**LO #1, 2, 10 and 11**
	Assignments	**2**	**10% (10)**	**2, 12**	**LO # 3, 4, 6 and 8**
	Projects / Lab.	**1**	**10% (10)**	**Continuous**	**All**
	Report	**1**	**10% (10)**	**13**	**LO # 5, 8 and 10**
Summative assessment	**Midterm Exam**	**2hr**	**10% (10)**	**8**	**LO # 1-7**
	Final Exam	**2hr**	**50% (50)**	**16**	**All**
Total assessment			**100% (100 Marks)**		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	**Force (F)**
Week 2	**Composition and resolution of forces**
Week 3	**Differential forces**
Week 4	**Stress**

Week 5	**The principal stress in native**
Week 6	**Deformation and strain**
Week 7	**Isotropic materials and an isotropic material**
Week 8	**Midterm Exam**
Week 9	**Three stages of deformation**
Week 10	**Brittle and ductile deformation**
Week 11	**Young's modulus (modulus of elasticity) E**
Week 12	**Factors controlling behavior of materials**
Week 13	**Homogeneous and heterogeneous deformation**
Week 14	**Pure shear and simple shear**
Week 15	**Preparatory Week**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	**Lab 1: Introduction to Topographic Maps**
Week 2	**Lab 2: How to draw a contour map from points of known elevation.**
Week 3	**Lab 3: Geological maps for Horizontal Beds**
Week 4	**Lab 4: Geological maps for Inclined Beds**
Week 5	**Lab 5: Geological maps and cross sections**
Week 6	**Lab 6: Geological maps for Unconformity surfaces**
Week 7	**Lab 7: Geological maps for Anticline Structure**
Week 8	**Midterm Exam**
Week 9	**Lab 8: Geological maps for Syncline Structure**
Week 10	**Lab 9: Geological maps for plunging Anticline**
Week 11	**Lab 10: Geological maps for plunging Syncline**
Week 12	**Lab 11: Geological maps for double plunging structures**
Week 13	**Lab 12: Geological maps for vertical fault**
Week 14	**Lab 13: Geological maps for inclined fault**
Week 15	**Preparatory Week**

Learning and Teaching Resources **مصادر التعلم والتدريس**		
References	**Text**	**Available in the Library?**

Required Texts	**Structural Geology Third Edition - Marland P. Billings, 1972 Structural Geology by Haakon Fossen, 2010**	**No**
Recommended Texts	**Earth Structure: An Introduction to Structural Geology and Tectonics Second Edition by Ben A. van der Pluijm and Stephen Marshak, 2004**	**No**
Websites		

علم اشكال الأرض – المرحلة الثانية / الفصل الأول

Module Information معلومات المادة الدراسية			
Module Title	**Geomorphology**	**Module Delivery**	
Module Type	**Core**	**☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar**	
Module Code	**GEO2311**		
ECTS Credits	**5.00**		
SWL (hr/sem)	**125**		
Module Level	**UGII**	**Semester of Delivery**	**Three**
Administering Department	**Geology Dept.**	**College**	**College of Science**
Module Leader	**Muaid Jaseem Rasheed**	**e-mail**	**muayid.j@sc.uobaghdad.edu.iq**
Module Leader's Acad. Title	**Assistant professor**	**Module Leader's Qualification**	**Ph.D.**
Module Tutor	**Zainab Damad Hassan**	**e-mail**	**zainab.hassan@sc.uobaghdad.edu.iq**
Peer Reviewer Name	**Dr. Aiad Ali Hussein**	**e-mail**	**aiad.hussien@sc.uobaghdad.edu.iq**
Scientific Committee Approval Date	**01/09/2024**	**Version Number**	**2.0**

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	**None**	**Semester**	
Co-requisites module	**GEO-2415**	**Semester**	**Four**

Module Aims, Learning Outcomes and Indicative Contents اهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية	
Module Aims اهداف المادة الدراسية	**1. This course aims to familiarize students with geomorphology and teach students how to describe and name landforms.The reason for their occurrence and then the explanation of these geomorphological phenomena. 2. Learn the basic principles of geomorphology. 3. Study the phenomena of weathering and erosion, their types, and their geomorphological effects on the formation of soils and sediments, their types,**

	and change. Geomorphological forms. Study of the phenomenon of desertification and geomorphology of deserts. 4. Study of rivers, river patterns, and valley development.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Knowledge and understanding: Upon completion of the course, the student will be able to absorb the following knowledge and understanding skills. • A1- Basic knowledge in the principles of geomorphology • A2- Identify the basic concepts and perceptions of the branches of geomorphology. • A3- Knowledge of the practical aspects of some basic concepts and their field applications. • A4- Acquire the ability to link the theoretical aspect of the branches of geomorphology with their various applications in geomorphological fields and different landforms • A5- Understand the relationship of geomorphology and its connection to other branches of science.
Indicative Contents المحتويات الارشادية	• The student's liking for the subject - • Simplify the material with drawing • Notifying the student of the importance of the subject in his current and future studies. • Cultivating the spirit of scientific competition among students and rewarding them for it
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Introductory lectures to give students a comprehensive overview of the subject matter • Covering the theoretical aspect by giving lectures or using modern technologies in presenting academic courses • Using microscopes and stereoscopes as means of teaching and clarification • Assigning students to solve assignments on specific topics and then discussing them during the lesson to demonstrate the extent of their familiarity with the acquired knowledge and so that they become capable of scientific research. • Assigning students to visit the library and websites to obtain academic knowledge of various geological sciences

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	**80**	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	**5**
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	**45**	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	**3**
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 8
	Projects / Lab.	1	10% (10)	Continuous	All

	Report	**1**	**10% (10)**	**13**	**LO # 5, 8 and 10**
Summative assessment	**Midterm Exam**	**2hr**	**10% (10)**	**8**	**LO # 1-7**
	Final Exam	**2hr**	**50% (50)**	**16**	**All**
Total assessment			**100% (100 Marks)**		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	**Introduction**
Week 2	**Concepts of geomorphology**
Week 3	**Concepts of geomorphology**
Week 4	**An Analysis of the Geomorphic processes**
Week 5	**Geomorphological processes and the impact of climate on them**
Week 6	**Weathering and its kinds and its Significance**
Week 7	**Soils , kinds ,profile .**
Week 8	**Midterm Exam**
Week 9	**River cycle**
Week 10	**Shapes resulting from river meanders**
Week 11	**Landslide**
Week 12	**Drainage Patterns and their Significance**
Week 13	**River terraces**
Week 14	**Deserts and Sand dunes**
Week 15	**Preparatory Week**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

Week	Material Covered
Week 1	**Lab 1: Introductions**
Week 2	**Lab 2: Contour Map**
Week 3	**Lab 3: Topographic Map 1**
Week 4	**Lab 4: Topographic Map 2**
Week 5	**Lab 5: Scales of Maps**
Week 6	**Lab 6: Longitude& Latitude**
Week 7	**Lab 7: Stream order & stream density**
Week 8	**Lab 8: Midterm Exam**

Week 9	**Lab 9: Generalized**
Week 10	**Lab 9: Slop map 1**
Week 11	**Lab 10: Slop map 2**
Week 12	**Lab 11: Map with v. shape**
Week 13	**Lab 12: v" rule"1**
Week 14	**Lab 13: v" rule"2**
Week 15	**Preparatory Week**

Learning and Teaching Resources **مصادر التعلم والتدريس**		
References	**Text**	**Available in the Library?**
Required Texts	**Fundamental of Geomorphology**	**Yes**
Recommended Texts	**According to the geomorphology titles in the course.**	**Yes**
Websites		

اللغة الانكليزية ٢ – المرحلة الثانية / الفصل الأول

Module Information **معلومات المادة الدراسية**			
Module Title	**English Language II**	**Module Delivery**	
Module Type	**Supportive**	☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**UOB206**		
ECTS Credits	**2.00**		
SWL (hr/sem)	**50**		
Module Level	**UGII**	**Semester of Delivery**	**Three**
Administering Department	**Geology Dept.**	**College**	**College of Science**
Module Leader	**Mohammed Hassan Nasser**	**e-mail**	**mohammed.nasser@sc.uobaghdad.edu.iq**
Module Leader's Acad. Title	**Lecturer**	**Module Leader's Qualification**	**PhD**
Module Tutor		**e-mail**	
Peer Reviewer Name	**Dr. Aiad Ali Hussein**	**e-mail**	**aiad.hussien@sc.uobaghdad.edu.iq**
Scientific Committee Approval Date	**01/09/2024**	**Version Number**	**2.0**
Relation with other Modules **العلاقة مع المواد الدراسية الاخرى**			

Prerequisite module	UOB-112	Semester	One
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents
اهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية

Module Aims **اهداف المادة الدراسية**	**1- To build upon the foundational English skills acquired in the first year, focusing on scientific contexts.** **2- To improve students' ability to read and comprehend scientific texts.** **3- To enhance writing skills for scientific reports, summaries, and essays.** **4- To develop effective oral communication skills for presentations and discussions.** **5- To expand vocabulary, including scientific terminology.**
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	**1. Scientific Vocabulary Proficiency** • **Students will acquire and effectively use scientific vocabulary relevant to their specific disciplines (e.g., biology, chemistry, physics).** • **Measurement: Assessed through vocabulary quizzes, scientific reports, and oral presentations.** **2. Improved Reading Comprehension of Scientific Texts** • **Students will be able to comprehend and critically analyze scientific articles, research papers, and textbooks written in English.** • **Measurement: Assessed through reading comprehension exercises, article summaries, and analysis tasks.** **3. Effective Scientific Writing Skills** • **Students will develop the ability to write clear, structured, and concise scientific reports, essays, and research papers in English.** • **Measurement: Assessed through writing assignments such as lab reports, research summaries, and essays that adhere to academic standards.** **4. Development of Listening Skills in Scientific Contexts** • **Students will improve their ability to understand spoken English in scientific contexts, including lectures, discussions, and multimedia content.** • **Measurement: Assessed through listening tests based on scientific podcasts, video lectures, and discussions on relevant topics.** **5. Effective Oral Communication in Science** • **Students will be able to deliver structured, confident oral presentations on scientific topics and engage in academic discussions using proper English.** • **Measurement: Assessed through oral presentations, group discussions, and debates on scientific issues.** **6. Enhanced Critical Thinking and Problem-Solving** • **Students will demonstrate critical thinking skills by analyzing, interpreting, and discussing scientific data and literature in English.** • **Measurement: Assessed through class discussions, critical reviews, and written responses to case studies or research findings.** **7. Collaboration and Teamwork in English** • **Students will work effectively in teams to produce joint projects, written assignments, or presentations, using English as the medium of communication.** • **Measurement: Assessed through group work and collaborative projects, such as co-written reports or group presentations on scientific topics.** **8. Understanding of Cross-Cultural Communication in Science** • **Students will develop an understanding of the role of English as a global**

	language in science, enhancing their ability to communicate in international academic and professional settings. • **Measurement: Assessed through participation in discussions about global scientific research, cultural contexts of science, and attending (or simulating) scientific conferences in English.** **9. Use of Technology for Language Learning and Research** • **Students will utilize digital tools and online resources effectively for language development and scientific research in English.** • **Measurement: Assessed through assignments that require students to use scientific databases, online journals, or language learning platforms.** **10. Academic Integrity and Ethical Communication** • **Students will understand and apply academic integrity principles, including proper citation and avoidance of plagiarism in English-language scientific writing.** • **Measurement: Assessed through written assignments that require proper citation of sources and adherence to academic writing standards.**
Indicative Contents **المحتويات الارشادية**	**1.Vocabulary and Terminology** • **Focus: Introducing and practicing essential scientific vocabulary relevant to various disciplines (biology, chemistry, physics, etc.).** • **Content: Word formation, use of prefixes/suffixes in scientific terms, and discipline-specific glossaries.** **2. Reading and Analyzing Scientific Texts** • **Focus: Developing strategies for reading comprehension and analysis of scientific literature.** • **Content: Skimming and scanning techniques, identifying main ideas and supporting details, and critical analysis of journal articles and research papers.** **3. Writing and Structure** • **Focus: Teaching the principles of scientific writing with emphasis on clarity, precision, and structure.** • **Content: Writing lab reports, abstracts, research papers, and scientific essays, including sections like introductions, methods, results, and discussions.** **4. Listening to Scientific Content** • **Focus: Enhancing listening skills through exposure to scientific lectures, podcasts, and discussions.** • **Content: Listening exercises based on TED talks, scientific seminars, and interviews with scientists, focusing on note-taking and extracting key information.** **5. Oral Presentation Skills**

	• **Focus: Training students in delivering presentations on scientific topics using clear and professional English.** • **Content: Presentation techniques, using visual aids (PowerPoint, posters), structuring talks, and handling Q&A sessions.**
Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	**1. Tailored Curriculum** • **Contextualization: Focus on scientific English, incorporating vocabulary and structures relevant to their field of study.** • **Integrating Language and Content: Combine English learning with scientific content to enhance both language and discipline-specific knowledge.** **2. Communicative Language Teaching (CLT)** • **Emphasis on Interaction: Encourage students to communicate in English, using real-life scenarios like presentations, lab reports, and scientific discussions.** • **Speaking and Listening Skills: Engage students in group discussions, debates, and role-plays about scientific topics.** **3. Task-Based Learning (TBL)** • **Practical Assignments: Use tasks such as writing abstracts, summaries of scientific articles, or conducting experiments and presenting results in English.** • **Problem-Solving Activities: Organize problem-based learning activities that require students to work in English, fostering collaboration and language use in context.** **4. Collaborative Learning** • **Group Projects: Encourage group work on projects like poster presentations or scientific writing tasks, promoting teamwork and communication skills.** • **Peer Learning: Facilitate peer review sessions where students critique each other's work, fostering critical thinking and language practice.** **5. Scaffolded Learning** • **Gradual Progression: Break down complex scientific texts and language into smaller, manageable units, providing step-by-step support.** • **Use of Visual Aids: Incorporate diagrams, charts, and visuals to simplify complex ideas and help students grasp scientific concepts in English.** **6. Use of Technology**

- **Language Learning Apps: Encourage the use of apps that focus on vocabulary building, grammar, and listening comprehension.**
- **Online Resources: Use online journals, podcasts, and videos related to science topics for listening practice and expanding scientific vocabulary.**

7. Writing Skill Development

- **Scientific Writing Focus: Teach students how to write lab reports, research papers, and scientific essays with correct structure and academic language.**
- **Drafting and Revising: Implement processes of drafting, peer feedback, and revision to help students improve their academic writing.**

8. Assessment and Feedback

- **Formative Assessment: Use quizzes, oral presentations, and written assignments to assess language development continuously.**
- **Feedback Focus: Provide detailed feedback on language use, especially on scientific terminology, grammar, and coherence in writing.**

9. Motivation and Engagement

- **Relating to Students' Interests: Use content that is interesting and relevant to science students, such as scientific discoveries, experiments, or technology updates.**
- **Gamification: Incorporate games and quizzes on scientific vocabulary and language skills to make learning more engaging.**

10. Cultural Awareness and Communication

- **Cross-Cultural Communication: Teach students the importance of English as a global language in science and technology, highlighting its use in international research and conferences.**

Understanding Contexts: Encourage discussions on scientific breakthroughs in English-speaking countries to provide cultural and contextual language learning.

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	**33**	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	**2**
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	**17**	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	**1**
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**50**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	**2**	**10% (10)**	**5, 10**	**LO #1, 2, 10 and 11**
	Assignments	**2**	**10% (10)**	**2, 12**	**LO # 3, 4, 6 and 8**
	Projects / Lab.	**1**	**10% (10)**	**Continuo**	**All**

				us	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Review of Basic Grammar and Vocabulary • Revisiting basic grammar rules (sentence structure, tenses, subject-verb agreement). • Introduction to more complex sentence structures (compound and complex sentences).
Week 2	Building vocabulary with a focus on science-related terms.
Week 3	Reading Comprehension of Scientific Texts • Strategies for reading and understanding scientific articles and textbooks.
Week 4	Identifying main ideas, supporting details, and conclusions in texts. • Exercises in summarising and paraphrasing scientific information.
Week 5	Writing Skills for Science • Writing clear and concise sentences. • Paragraph structure: topic sentences, supporting details, and conclusions.
Week 6	Introduction to writing scientific reports and essays. • Practice with short writing assignments.
Week 7	Introduction to Scientific Writing • Basic structure of scientific papers and lab reports. • Writing introductions, methods, results, and discussion sections. • Common mistakes in scientific writing at an intermediate level.
Week 8	Midterm Exam
Week 9	Oral Communication and Presentation Skills • Fundamentals of public speaking in a scientific context. • Planning and organising presentations.
Week 10	Using visual aids effectively (e.g., slides, charts). • Practicing short presentations on scientific topics.
Week 11	Technical Vocabulary and Language in Science • Expanding science-specific vocabulary. • Using technical terms correctly in context.
Week 12	Exercises in using scientific terminology in writing and speech. • Understanding and using prefixes, suffixes, and root words common in scientific language.
Week 13	Practical Writing and Speaking Exercises • Writing a short research report or essay on a scientific topic. • Peer review and feedback sessions. • Preparing and delivering a final presentation on a scientific topic. • Role-playing exercises for group discussions and Q&A sessions.
Week 14	Revision and Final Assessment • Review of key concepts and skills learned during the course. • Practice exercises for the final exam.

	• **Final presentations and peer evaluations.**
Week 15	**Preparatory Week**

Learning and Teaching Resources **مصادر التعلم والتدريس**		
References	**Text**	**Available in the Library?**
Required Texts	**New Headway: Intermediate: Student's Book**	**Yes**
Recommended Texts	• **English for Science and Technology" by Louis Trimble.** • **"Academic Vocabulary in Use" by Michael McCarthy and Felicity O'Dell.** • **Selected readings from scientific journals and textbooks relevant to students' fields.**	**No**
Websites		

Module Information معلومات المادة الدراسية			
Module Title	**Computer Skills Basic II**	**Module Delivery**	
Module Type	**Basic**	☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**UOB207**		
ECTS Credits	**3.00**		
SWL (hr/sem)	**75**		
Module Level	**UGII**	**Semester of Delivery**	**Three**
Administering Department	**Geology Dept.**	**College**	**College of Science**
Module Leader	**Dr. Imad Jasim**	**e-mail**	**emad.j@sc.uobaghdad.edu.iq**
Module Leader's Acad. Title	**Lecturer**	**Module Leader's Qualification**	**Ph.D.**
Module Tutor	**Abdallah A. Ibrahim Omar Fitian Rasheed**	**e-mail**	**abdullah.i@sc.oubaghdad.edu.iq**
Peer Reviewer Name	**Dr. Aiad Ali Hussein**	**e-mail**	**aiad.hussien@sc.uobaghdad.edu.iq**
Scientific Committee Approval Date	**01/09/2024**	**Version Number**	**2.0**

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	**UOB-113**	**Semester**	**One**
Co-requisites module	**None**	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents اهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية	
Module Aims **اهداف المادة الدراسية**	• This module aims to provide students with a practical and theoretical foundation in computer programming using Python and geospatial analysis using ArcGIS/ArcMap. It is designed to enhance computational thinking, problem-solving skills, and spatial data handling through real-world applications. The module prepares students for further study or careers involving programming and geographic information systems.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	By the end of this module, students will be able to: 1. Explain core concepts of programming and demonstrate proficiency in Python syntax and logic. 2. Apply conditional statements, loops, and data structures in problem-solving tasks. 3. Use ArcGIS/ArcMap tools to manage, analyze, and visualize spatial data effectively. 4. Create professional map layouts and perform spatial operations using standard GIS tools.

	5. Design and implement custom vector layers for digitizing real-world geographic features. 6. Integrate programming logic with geospatial analysis to solve applied computing problems.
Indicative Contents **المحتويات الارشادية**	• Introduction to Python and basic syntax • Variables, operations, and data types • Control structures: loops and conditionals • Data structures: lists and dictionaries • Introduction to ArcGIS and ArcMap interface • Selection methods and attribute tables in ArcMap • Working with layer properties and symbology • Map design and layout view • Geoprocessing tools (Buffer, Clip, Intersect, etc.) • Creating and editing vector layers • Integration of Python concepts in GIS contexts • Midterm and practical assessments • Final project or exam preparation
Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	• Lectures to introduce theoretical concepts and real-world applications • Hands-on lab sessions to reinforce programming and GIS skills through practical exercises • In-class demonstrations of software tools (Python IDEs, ArcMap functionalities) • Group discussions and problem-solving tasks to encourage collaborative learning • Formative assessments to provide feedback and track student progress • Summative assessments including a midterm and final project or exam to evaluate learning outcomes • Independent study to explore resources and complete assignments outside class hours

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	**50**	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	**3**
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	**25**	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	**1**
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**75**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	**2**	**10% (10)**	**5, 10**	**LO #1, 2, 10 and 11**
	Assignments	**2**	**10% (10)**	**2, 12**	**LO # 3, 4, 6 and 8**
	Projects / Lab.	**1**	**10% (10)**	**Continuous**	**All**
	Report	**1**	**10% (10)**	**13**	**LO # 5, 8 and 10**

Summative assessment	**Midterm Exam**	**2hr**	**10% (10)**	**8**	**LO # 1-7**
	Final Exam	**2hr**	**50% (50)**	**16**	**All**
Total assessment			**100% (100 Marks)**		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	**Introduction to Python Programming** • What is Python? History and evolution • Key features and advantages of Python • Common uses of Python (Web development, Data analysis, AI, GIS)
Week 2	**Python Variables** • Definition and declaration of variables • Naming conventions • Basic data types: integers, floats, strings, booleans • Type conversion and type checking
Week 3	**Python Operations** • Arithmetic and logical operators • Operator precedence • String operations and concatenation • Assignment and comparison operators
Week 4	**Python Lists** • What is a list? Use cases and syntax • Indexing and slicing • Iterating through lists • Common list methods: append(), remove(), len(), sort()
Week 5	**For Loops in Python** • Concept of iteration • for loop structure and range() function • Looping through strings and lists • Nested loops and practical examples
Week 6	**If Statements in Python** • Conditional logic: if, elif, else • Relational and logical operators • Practical scenarios using decision-making structures
Week 7	**Python Dictionaries**

	• Introduction to dictionaries: key-value pairs • Adding, updating, and deleting items • Looping through dictionaries • Dictionary methods and use cases
Week 8	**Midterm Exam**
Week 9	**Introduction to ArcGIS and ArcMap Interface** • Overview of Geographic Information Systems (GIS) • Real-world applications of ArcGIS • Components and layout of the ArcMap interface
Week 10	**ArcMap Selection Methods** • Feature selection: by clicking, attributes, and location • Using "Select by Attributes" and "Select by Location" tools • Combining selection methods for advanced filtering
Week 11	**ArcMap Layer Properties** • Understanding layers in GIS • Symbolization and classification • Managing table attributes and visibility
Week 12	**Layout View in ArcMap** • Difference between Data View and Layout View • Designing final map layouts
Week 13	**Geoprocessing Tools in ArcMap** • Introduction to spatial analysis • Tools like Buffer, Clip, Union, Intersect • Navigating and using ArcToolbox
Week 14	**Creating Vector Layers in ArcMap** • Types of vector data: point, line, polygon • Creating and editing new shapefiles • Attribute editing and feature drawing
Week 15	**Preparatory Week**
Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	**Introduction to Python**

	• Installing Python and setting up the environment • Using IDEs (e.g., IDLE, VS Code, Jupyter Notebook) • Writing and running your first Python script • Understanding syntax and indentation rules
Week 2	**Working with Variables** • Declaring variables and assigning values • Using input() for user input • Displaying output using print() • Simple programs involving variables and data types
Week 3	**Python Operations** • Performing arithmetic operations • Using comparison and logical operators • Writing expressions and evaluating results • Mini projects using calculations and logic
Week 4	**Python Lists** • Creating and modifying lists • Accessing elements using indexing • Iterating through lists with loops • Using list methods (append, insert, pop, etc.)
Week 5	**For Loops in Practice** • Writing for loops with range() • Looping through lists and strings • Nested loops • Loop-based exercises (e.g., number sequences, patterns)
Week 6	**If Statements** • Implementing conditional statements (if, elif, else) • Logical branching in code • Combining conditions using and, or, not • Problem-solving with conditions (e.g., grade checker)
Week 7	**Python Dictionaries** • Creating and accessing dictionaries • Adding and removing key-value pairs • Iterating over dictionaries using loops • Sample exercises using real-world data structures
Week 8	**Midterm Exam**
Week 9	**Introduction to ArcGIS and ArcMap Interface**

	• Opening ArcMap and exploring the interface • Adding data layers and exploring the Table of Contents • Understanding basic map navigation tools • Loading shapefiles and viewing attribute tables
Week 10	**Selection Methods in ArcMap** • Selecting features by attributes • Selecting features by location • Combining multiple selection methods • Highlighting and exporting selected features
Week 11	**Working with Layer Properties** • Changing symbology (color, size, style) • Classifying data based on attributes • Setting transparency and scale ranges • Managing label properties
Week 12	**Using Layout View** • Switching to Layout View • Inserting map elements: title, legend, north arrow, scale bar • Arranging layout components for presentation • Exporting maps to PDF or image formats
Week 13	**Using Geoprocessing Tools** • Performing Buffer, Clip, and Intersect operations • Accessing tools from ArcToolbox • Saving outputs and understanding tool parameters • Applying tools to solve spatial problems
Week 14	**Creating Vector Layers** • Creating new shapefiles (point, line, polygon) • Using the Editor toolbar to draw features • Adding and editing attribute data • Saving and managing custom layers
Week 15	**Preparatory Week**

Learning and Teaching Resources
مصادر التعلم والتدريس

References	**Text**	**Available in the Library?**
Required Texts	**Python Crash Course**	**No**
Recommended Texts		
Websites	**ArcMap Documentation:**	

	https://desktop.arcgis.com/en/documentation/ **Youtube Channel:** https://youtu.be/egyyIFlbrvU?si=EVZL-IAJDX3Yw-UP

Module Information معلومات المادة الدراسية			
Module Title	**Baath Regine Crimes in Iraq**	**Module Delivery**	
Module Type	**Supportive**	☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**UOB208**		
ECTS Credits	**2.00**		
SWL (hr/sem)	**50**		
Module Level	**UGII**	**Semester of Delivery**	**Three**
Administering Department	**Geology Dept.**	**College**	**College of Science**
Module Leader	**Dr. Mohanad Ahmed Yaseen**	**e-mail**	**mohannad.ahmed@sc.uobaghdad.edu.iq**
Module Leader's Acad. Title	**Lecturer**	**Module Leader's Qualification**	
Module Tutor		**e-mail**	
Peer Reviewer Name	**Dr. Aiad Ali Hussein**	**e-mail**	**aiad.hussien@sc.uobaghdad.edu.iq**
Scientific Committee Approval Date	**01/09/2024**	**Version Number**	**2.0**

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	**None**	**Semester**	
Co-requisites module	**None**	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents اهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية	
Module Aims **اهداف المادة الدراسية**	١. ان االجيال الحالية لم تعيش فترة الدكتاتورية والكثير منهم اليعرف معاناة الشعب والجرائم التي ارتكبها النظام المقبور ٢. بيان مدى سوء حكم النظام الشمولي والذي لم يقتصر فقط على داخل العراق بل على دول المجاور له ٣. توعية الطلبة على االضرار الكبيرة التي احدثها النظام البائد والجرائم التي ارتكبها بحق الشعب العراقي ٤. أظهار االضرار االقتصادية واالجتماعية والتنموية التي أحدثها النظام السابق ٥. بيان مدى وحشية النظام البائد واإلعدامات الجماعية ٦. بيان االساليب القمعية التي مارسها النظام البائد والتهجير القصري ٧. كبح الحريات العامة وتدهور مستوى االعالم والثقافة٧. -توضيح االضرار البيئية والزراعية التي ظهرت آثارها في السنوات السابقة والحالية ٨. بيان مدى سوء حكم النظام الشمولي والذي لم يقتصر فقط على داخل العراق بل على دول المجاورة ايضا ٩. ان الهدف من تدريس هذه المادة لمعرفة تاريخ تلك الحقبة السوداء ١٠. الهدف من هذه المادة ان الحكم في العراق لن يدوم باستخدام أدوات العنف والقوة مهما كانت مفرطة ١١. والعراق يجب ان يحكم بنظام سياسي يحترم العراقيين ومعتقدات ودياناتهم وقومياتهم وان يؤمن بالتعدد في المجتمع العراق

Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	١- التعرف على الجرائم النظام البائد في كبح الحريات العامة ٢- دراسة االنظمة السياسية في العراق نبذة تاريخية ٣- معرفة ابرز انتهاكات النظام البعثي للحقوق والحريات ٤- معرفة اثر سلوكيات النظام البعثي المقبور على المجتمع العراقي ٥- التوضيح لالجيال الحالية حقيقة حقبة تاريخية سوداء في تأريخ العراق المعاصر التي شهدت الظلم واالستبداد ٦- االطالع على وحشية واستبداد وقمع النظام البائد للشعب العراقي ٧- معرفة ان الظلم واالستبداد والحكم الدكتاتوري لن يدوم مهما كانت قسوته ٨- تعليم الطلبة وارشادهم على النظام السياسي الصحيح لحكم هذا الشعب الطيب. والذي يجب ان يبتعد عن ٩- الدكتاتورية والظلم وان يكون مبنى على العدالة واحت ارم التعددية الدينية والمذهبية والقومية توعية الطلبة الى حجم الدمار والتلوث البيئي الذي احدثته الحروب واستخدام اسلحة محرمة دوليا ١٠-بيان مدى قسوة النظام البعثي وقمعه للشعب والمقابر الجماعية التي ضمت رفاة آالف الشهداء االبرياء ١١-توعية الطلبة الى ماقام به النظام السابق من تهجير ابناء هذا البلد وكفائته العلمية واالدبية
Indicative Contents **المحتويات الارشادية**	• يتضمن المحتوى اإلرشادي ما ي الوصول حزب ً العراق من قبل بريطانيا وصوال ي يس ف البداية تتضمن نبذة تاريخية عن النظام السيا ي مقدمة ف البعث المقبور ال السلطة وكذلك دراسة جرايم حزب البعث منذ توليه السلطة والعبث بها كذلك توضيح ما اصاب العراق من اثار وكوارث عل يد هذا النظام الدكتاتوري المجرم الذي جسد اقس انواع التعسف والظلم والطغيان واالستبداد كذلك ارشاد الطلبة ال ان الظلم واالستبداد يدمر الشعوب ويجر الويالت عليها وبيان االثار بة ت التحتية والي ر كل مفاصل البالد فدمرت الب ي رتي خلفت ورائها تدمري ف رتي حدثت نتيجة الحروب العبثية ال ال 3رشق االوسط .كذلك تم تدمري كانت من افضل بلدان ال رتي ي هذه البالد وال والمياه والسماء واالشجار وكل رسئ ف ضر االبار النفطية ي حرب الكويت والخسائر االقتصادية الهائلة وت حرت البيئة المائية من خالل تشيب النفط ف رتي والب الزلنا ال يومنا هذا نرفع اثار ت التحتية والصناعة وفرض حصار دمر البيئة االجتماعي ة واالقتصادية ال يل .يل والداخ النظام البائد عل الصعيد الدولي
Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	• اإلستراتيجية المهمة التي تم تبنيها في هذه الوحدة هي توعية الطلبة وعملية تنمية مداركهم العقلية على فهم النظام السياسي العراقي البائد ومعرفة الجرائم التي ارتكبها النظام البائد وعمليه تحفيز الطلبة على التامل والتفكير في التحليل هذه الجرائم وانعكاساتها والعمل على محاربة الظلم والستبداد ورفض اي شكل من اشكال الدكتاتورية كذلك استخدام البرامج التفاعلية والتعليمية في استخدام االدوات التحليلية والنقدية وتشجيع الطلبة على البحث والحوار والنقاش على اسس معرفية تستند الى عمليات البحث العلمي والتدقيق والقراءة العميقة والفهم الجيد والرصانة العلمية وكذلك استخدام الوسائل العلمية واالساليب التفاعلية سواء كانت المسموعة والمرئية واعطاء االدلة المادية الواضحة على وحشية النظام السابق لكي يطلع الطلبة وتصبح لديهم قناعة علمية راسخة على هذة الحقبة السوداء والجرائم التي لم تشهد لها البشرية مثال .كذلك تنمية القدرة الذهنية والفكرية لدى الطلبة على معرفة .أالنظمة الصالحة. كذلك تفعيل الدور أالخالقي وزرع أالخالق والقيم والمبادئ الحميدة لدى الطلب

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	**33**	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	**2**
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	**17**	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	**1**
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**50**		

Module Evaluation **تقييم المادة الدراسية**				
	Time/Number	**Weight**	**Week Due**	**Relevant Learning**

			(Marks)		Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 8
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	مقدمة عن انتهاكات الحقوق والحريات
Week 2	نبذة وصفية عن االنظمة السياسية في العراق
Week 3	انتهاكات النظام البعثي للحقوق والحريات العامة
Week 4	اثر سلوكيات النظام البعثي في المجتمع وتسلطه على الدولة
Week 5	اثر المرحلة االنتقالية في محاربة السياسة االستبدادية
Week 6	الميدان النفسي واالجتماعي
Week 7	الدين والدولة
Week 8	Midterm Exam
Week 9	عسكرة المجتمع والثقافة واالعالم
Week 10	اثر القمع والحروب على البيئة والسكان
Week 11	التلوث البيئي واستعمال االسلحة المحرمة دوليا
Week 12	سياسة االرض المحروقة وتجفيف االهوار
Week 13	المقابر الجماعية وتدمير البيئة الزراعية
Week 14	-
Week 15	Preparatory Week

Learning and Teaching Resources
مصادر التعلم والتدريس

References	Text	Available in the Library?
Required Texts	منهاج جرائم حزب البعث البائد /٢٠٢٣جمهورية العراق/وزارة التعليم العالي والبحث العلمي/دائرة الدراسات والتخطيط	
Recommended Texts		
Websites		

Level Two (UGII)
Semester Two

Module Information معلومات المادة الدراسية			
Module Title	**Invertebrate Fossils II**	**Module Delivery**	
Module Type	**Core**	☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**GEO2412**		
ECTS Credits	**5.00**		
SWL (hr/sem)	**125**		
Module Level	**UGII**	**Semester of Delivery**	**Four**
Administering Department	**Geology Dept.**	**College**	**College of Science**
Module Leader	**Afrah H. Saleh AL-Ekabi**	**e-mail**	**afrah. saleh @sc.uobaghdad.edu.iq**
Module Leader's Acad. Title	**Assistant Professor**	**Module Leader's Qualification**	**Ph.D.**
Module Tutor	**d.Anwar Khadem &Assi. Luay Sameer**	**e-mail**	**mailto:anwar.mousa@sc.uobaghdad.edu.iq**
Peer Reviewer Name	**Dr. Aiad Ali Hussein**	**e-mail**	**aiad.hussien@sc.uobaghdad.edu.iq**
Scientific Committee Approval Date	**01/09/2024**	**Version Number**	**2.0**

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	**GEO-2308**	**Semester**	**Three**
Co-requisites module	**None**	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents اهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية	
Module Aims **اهداف المادة الدراسية**	1- **This module on individual projects and provides the students more information about the main phylum of animals.** 2- **Training the student to understand the shapes, modes of preservation, classification, nomenclature of species and genera.**
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. **beneficialness the specifying geological time then educing the paleo environment.** 2. **Acquiring the skill of distinguishing between different geological formations.** 3. **Dealing with the basic laws of various earth sciences.** 4. **Using the principle of the past as a key to the present in reconstructing the geological history of the earth's formation and development.**
Indicative Contents **المحتويات الارشادية**	1. **Invertebrate Fossils is a branch of Geology which deals with an animal without a backbone. In fact, invertebrates don't have any any bones at all! Invertebrates that you may be familiar with include spiders, worms, snails, lobsters, crabs and insects like butterflies. However, humans and other animals with backbones are vertebrates. It focuses primarily on stratified phylum of animals that includes types of marine organisms & Mode of life [15 hrs]** 2. **The principles on which the Invertebrate Fossils studies are based include order variety phylum of animals, [15 hrs].**

	3. an organism must be an animal to be classified as an invertebrate, meaning they are members of the kingdom Animalia. [15 hrs]. 4. the species in question must lack a notochord during embryonic development and a backbone, also called a spine, and a spinal cord. 5. The majority of living animals are invertebrates. Invertebrates lack a backbone. [15 hrs]. 6. Invertebrates may have an incomplete or a complete digestive system. 7. Invertebrates vary in how they move and in the complexity of their nervous system. And Most invertebrates reproduce sexually. [15 hrs]. 8. They bring beauty into our lives, ensure we have food on our plates, and are at the heart of a healthy environment. The services they perform—pollinating, dispersing seeds, becoming food for wildlife, recycling nutrients, cleaning water, building reefs—are critical to life on our planet.
Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	1. Hands-on Experience: Hands-on experience allows students to develop observational skills, make connections between theoretical concepts and real-world examples, and enhance their understanding of stratigraphic principles. 2. Visual Aids: Utilize visual aids, such as diagrams, charts, maps, and photographs, to help students visualize and comprehend stratigraphic concepts. 3. Virtual Resources: Take advantage of virtual resources, such as interactive online modules. These resources can provide students with immersive experiences, allowing them to explore stratigraphic principles and study geological features virtually. 4. Case Studies and Real-life Examples: Present case studies and real-life examples that illustrate the application of stratigraphic principles in various contexts, such as paleoenvironmental reconstructions, or geological hazard assessments. These examples can help students understand the practical significance of the course. 5. Laboratory Work: Conduct laboratory exercises that involve the description and interpretation of samples. Encourage students to the laboratory data. 6. Collaborative Learning: Foster collaborative learning environments where students can work in groups or pairs to solve problems, analyze data. This approach encourages active engagement, promotes discussions, and allows students to learn from one another's perspectives and insights. 7. Multimedia Resources: Incorporate multimedia resources, such as videos, animations, and online lectures, to supplement traditional teaching methods. Multimedia resources can help reinforce key concepts. 8. Allows students to monitor their progress, identify areas of improvement, and reinforces learning. 9. Integration of Technology: Utilize geospatial software, stratigraphic modeling tools, and other technology-based resources to enhance the learning experience

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا**			
Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	**80**	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	**5**
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	**45**	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	**3**
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**125**		
Module Evaluation			

تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 8
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	Phylum Brachiopoda
Week 2	Classification of Brachiopoda
Week 3	Phylum Mollusca
Week 4	Classification of Mollusca
Week 5	Phylum Mollusca / Class Pelecypoda (Bivalvia)
Week 6	Classification of Class Pelecypoda (Bivalvia) / Oysters & Rudistids
Week 7	Class Gastropoda
Week 8	Midterm Exam
Week 9	Class Cephalopoda
Week 10	Classification of Class Cephalopoda
Week 11	Phylum Arthropods/ Trilobites
Week 12	Morphology of Trilobites
Week 13	Phylum Echinodermata
Week 14	Classification of Echinodermata
Week 15	Phylum Chordata / Graptolites

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	Material Covered
Week 1	Lab1: Phylum Brachiopoda
Week 2	Lab2: Classification of Brachiopoda
Week 3	Lab3: Phylum Mollusca

Week 4	**Lab4: Classification of Mollusca**
Week 5	**Lab5: Phylum Mollusca / Class Pelecypoda (Bivalvia)**
Week 6	**Lab6: Classification of Class Pelecypoda (Bivalvia) / Oysters & Rudistids**
Week 7	**Lab7: Class Gastropoda**
Week 8	**Lab8: Classification of Class Gastropoda**
Week 9	**Lab9: Class Cephalopoda**
Week 10	**Lab10: Classification of Class Cephalopoda**
Week 11	**Lab11: Phylum Arthropods/ Trilobites**
Week 12	**Lab12: Morphology of Trilobites**
Week 13	**Lab13: Phylum Echinodermata**
Week 14	**Lab14: Classification of Echinodermata**
Week 15	**Lab15 :Phylum Chordata / Graptolites**

Learning and Teaching Resources
مصادر التعلم والتدريس

References	Text	Available in the Library?
Required Texts	**1. Fossils and Evolution – The theory and its supporting evidence د. عامر الخفاجي** **2. Foraminifera – جوزيف كوشمان** **3. principles of paleontology. Moore**	**Yes**
Recommended Texts	**مبادئ علم المستحاثات او المتحجرات شفيق مهدي**	**No**
Websites	**http://www.sepmstrata.org/page.aspx?pageid=229**	

Module Information معلومات المادة الدراسية			
Module Title	**Petrology**	**Module Delivery**	
Module Type	**Core**	☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**GEO2413**		
ECTS Credits	**5.00**		
SWL (hr/sem)	**125**		
Module Level	**UGII**	**Semester of Delivery**	**Four**
Administering Department	**Geology Dept.**	**College**	**College of Science**
Module Leader	**Dr. Maysoon Omar Ali**	**e-mail**	**Maysoon.Ali@sc.uobaghdad.edu.iq**
Module Leader's Acad. Title	**Assitant Professor**	**Module Leader's Qualification**	**Ph.D.**
Module Tutor	**Dr. Hasan K. Jasim** **Dr. Hiba Sadoon Mimar**	**e-mail**	**Hasan.jasim@sc.uobaghdad.edu.iq** **Hiba.mimar@sc.uobaghdad.edu.iq**
Peer Reviewer Name	**Dr. Aiad Ali Hussein**	**e-mail**	**aiad.hussien@sc.uobaghdad.edu.iq**
Scientific Committee Approval Date	**01/09/2024**	**Version Number**	**2.0**

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	**GEO-2309**	**Semester**	**Three**
Co-requisites module	**None**	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents اهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية	
Module Aims **اهداف المادة الدراسية**	**1. Contribute to the process of scientific progress, raise the level of education, and provide the labor market with graduates to work in all fields of the country's rocks, mineral and environmental investment.** **2. Petrology deals with mineralogical and textural parameters for different rock types classification and physical –chemical conditions for the formation of these rocks in with different aspects of parent rocks .** **3. Training the student on the most important methods of determining the type of rock depending on mineralogical and textural classification , and the relationship of the rocks to each other this is the key to discovery and development of minerals resources ,and because fundamental principles learned from petrology have applications in modern industry.**
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	**1. Acquiring the ability and skill in field interpretation and elicitation.** **2. Acquiring the skill of distinguishing between different minerals and rock tyoes.** **3. Dealing with the basic laws of various earth sciences.**

	4. Using the principle of the past as a key to the present in reconstructing the geological history of the earth's formation and development.
Indicative Contents **المحتويات الارشادية**	1. Petrology is a branch of Geology which deals with the types of rocks in relation to the way of their formation. 2. It focuses primarily on rocks that include igneous, sedimentary, and metamorphic rock. It also includes study the relationship between them [15 hrs] 3. The principles on which the petrologic studies are based include order of Rock types, its classification, textural and minerals composition, [15 hrs]. 4. Scientific study of rocks that deals with their composition, texture,and structure; their occurrence and distribution ; and their origin in relation to physicochemical lconditions and geological processes [15 hrs]. 5. It is concerned with all three types of rocks –igneous, sedimentary and metamorphic .[15 hrs]. 6. Petrology includes the subdisciplines of experimental petrology and petrography experimental petrology involves the laboratory synthesis of rocks for the purpose of ascertaining the physical and chemical conditions under which rock formation occurs 15 hrs].
Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	1. Fieldwork and Hands-on Experience: Fieldwork is an essential component of petrology. Engage students in field trips or field-based exercises where they can observe and analyze rock outcrops, interpret sedimentary structures, and collect samples. Hands-on experience allows students to develop observational skills, make connections between theoretical concepts and real-world examples, and enhance their understanding of stratigraphic principles. 2. Visual Aids: Utilize visual aids, such as diagrams, charts, maps, and photographs, to help students visualize and comprehend petrology m concepts. Use geological maps to demonstrate the distribution and relationships between different rock units and incorporate stratigraphic columns to illustrate the vertical succession of strata. 3. Virtual Resources: Take advantage of virtual resources, such as interactive online modules, virtual field trips, and digital simulations. These resources can provide students with immersive experiences, allowing them to explore stratigraphic principles and study geological features virtually. 4. Case Studies and Real-life Examples: Present case studies and real-life examples that illustrate the application of stratigraphic principles in various contexts, such as oil and gas exploration, paleoenvironmental reconstructions, or geological hazard assessments. These examples can help students understand the practical significance of petrology and its relevance in different disciplines. 5. Laboratory Work: Conduct laboratory exercises that involve the description and interpretation of rock samples, including the identification of lithology,mineralogy , sedimentary structures, and fossil content. Encourage students to determine the texture and classification of hand specimen . 6. Collaborative Learning: Foster collaborative learning environments where students can work in groups . This approach encourages active engagement, promotes discussions, and allows students to learn from one

	another's perspectives and insights. 7. Multimedia Resources: Incorporate multimedia resources, such as videos, animations, and online lectures, to supplement traditional teaching methods. Multimedia resources can help reinforce key concepts, illustrate geological processes, and provide additional visual and auditory learning opportunities. 8. Concept Mapping: Encourage students to create charts or diagrams that depict the relationships between different petrology concepts, principles, and processes. . 9. Continuous Assessment and Feedback: Implement regular assessments, such as quizzes, assignments, or class discussions, to gauge student understanding and provide timely feedback. This allows students to monitor their progress, identify areas of improvement, and reinforces learning. 10. Integration of Technology: Utilize geospatial software, stratigraphic modeling tools, and other technology-based resources to enhance the learning experience. These tools can facilitate data analysis, visualization, and interpretation, providing students with valuable skills applicable to the field of petrology.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	**80**	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	**5**
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	**45**	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	**3**
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**125**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 8
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Introduction to Petrology
Week 2	Rock Forming Minerals
Week 3	Igneous Rocks

Week 4	**Texture of igneous rocks**
Week 5	**Mineralogy of igneous rocks**
Week 6	**Bowen Reaction Series**
Week 7	**Structures of igneous rocks**
Week 8	**Midterm Exam**
Week 9	**Textures of sedimentary rocks**
Week 10	**Mineralogy of sedimentary rocks**
Week 11	**Sedimentary structures**
Week 12	**Metamorphic Rocks**
Week 13	**Textures of Metamorphic rocks**
Week 14	**Mineralogy of Metamorphic rocks**
Week 15	**Preparatory Week**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	**Lab 1: Introduction to Petrology**
Week 2	**Lab 2: Preparing of the thin section of petrography**
Week 3	**Lab 3: classification of Igneous Rocks**
Week 4	**Lab 4: Textures of igneous rocks**
Week 5	**Lab 5: Plutonic igneous rocks**
Week 6	**Lab 6: Volcanic igneous rocks**
Week 7	**Lab 7: Sedimentary Rocks**
Week 8	**Lab 8: Midterm Exam**
Week 9	**Lab 9: Clastic Sedimentary Rocks**
Week 10	**Lab 10: Chemical Sedimentary Rocks**
Week 11	**Lab 11: Biochemical Sedimentary Rocks**
Week 12	**Lab 12: Metamorphic Rocks**
Week 13	**Lab 13: Classification and textures of Metamorphic Rocks**
Week 14	**Lab 14: Preparatory week before the final Exam**
Week 15	**Lab 15: Preparatory Week**

Learning and Teaching Resources
مصادر التعلم والتدريس

References	Text	Available in the Library?
Required Texts	**Raymond, 2009:The Study of Igneous, Sedimentary and Metamorphic Rocks .**	**Yes**
Recommended Texts	**Hyndman: Petrology of Igneous and Metamorphic Rocks**	**Yes**
Websites	**WWW.Geology.com**	

Module Information معلومات المادة الدراسية			
Module Title	**Structural Geology II**	**Module Delivery**	
Module Type	**Core**	☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**GEO-2414**		
ECTS Credits	**5.00**		
SWL (hr/sem)	**125**		
Module Level	**UGII**	**Semester of Delivery**	**Four**
Administering Department	**Geology Dept.**	**College**	**College of Science**
Module Leader	**Mahmood abdulameer salman**	**e-mail**	**mahmoodalsaady@18gmail.com**
Module Leader's Acad. Title	**Assistant Professor**	**Module Leader's Qualification**	**Ph.D.**
Module Tutor		**e-mail**	
Peer Reviewer Name	**Dr. Aiad Ali Hussein**	**e-mail**	**aiad.hussien@sc.uobaghdad.edu.iq**
Scientific Committee Approval Date	**01/09/2024**	**Version Number**	**2.0**

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	**GEO-2310**	**Semester**	**Three**
Co-requisites module	**GEO-3519**	**Semester**	**Five**

Module Aims, Learning Outcomes and Indicative Contents اهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية	
Module Aims **اهداف المادة الدراسية**	• **The primary goal of structural geology is to use measurements of present-day rock geometries to uncover information about the history of deformation (strain) in the rocks, and ultimately, to understand the stress field that resulted in the observed strain and geometries.** • **Also to understand the structural evolution of a particular area due to plate tectonics.** • **Understanding of the structure (geometry) of the underlying rocks is vitally important in the mining and petroleum industries.** • **Recognize, classify, measure, record and analyze geological structures at a variety of scales and represent them in field note books and upon geological maps, sections and stereograms.**
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	• **Understand and describe the features formed in rocks when subject to stress, analyze the strain in these rocks and interpret the Paleostress field that affected the rock and caused the deformation** • **know the brittle, ductile and plastic deformation** • **understand deformation mechanisms at micro- and macro-scales** • **describe the geometry and properties of different deformation**

	structures • run structural fieldwork and use structural field data in geometrical and kinematic analyses • Visualize and interpret structural observations and measurements.
Indicative Contents **المحتويات الارشادية**	• An understanding of stress and its origins within the lithosphere. • An understanding of strain as it relates to naturally occurring deformation. • To observe deformed rocks and find an explanation for how and why they ended up in their present state. • To understand under which physical condition the rock was formed and how the structures were made. Small models are being demonstrated how stress, strain, temperature, and pressure worked.
Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	• Inquiry-based learning, where students explore a question or problem through observation, experimentation, or data analysis. • Peer instruction, where students answer questions and explain their reasoning. • Cooperative learning, which has students work in small groups to complete a task. • During class time, interactive activities, discussions are used.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	**80**	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	**5**
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	**45**	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	**3**
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**125**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 8
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Interpretation of structure geology
Week 2	The fold and the elements of fold

Week 3	**Classification of fold**
Week 4	**Classification of fold based on the thickness of layers**
Week 5	**Dynamics of fold**
Week 6	**The fractures and types of fractures**
Week 7	**The joints**
Week 8	**Classification nof joints**
Week 9	**The faults**
Week 10	**Elements of faults**
Week 11	**Classification of faults**
Week 12	**The genetic classification of faults**
Week 13	**Mechanical of faults**
Week 14	**Criteria of faults**
Week 15	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

Week	Material Covered
Week 1	**Introduction by using stereographic projection of the structural plane**
Week 2	**Determination of true dip and strike line from two apparent dips**
Week 3	**Determination of apparent dip from strike line and true dip**
Week 4	**Determination the true dip from strike line and the apparent dip**
Week 5	**Determination the elements of fold(plunging, fold axis, axial plane and inter limb angle)**
Week 6	**Define the terms of Descriptive geometry**
Week 7	**True dip from strike and apparent dip**
Week 8	**True dip from two apparent dip**
Week 9	**Determination of strike and true dip from three points**
Week 10	**Determination the thickness and depth of strata**
Week 11	**Line of intersection**
Week 12	**Vertical fault**
Week 13	**Inclined fault**
Week 14	**Determination the stress on the fault**
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
References	**Text**	**Available in the Library?**
Required Texts	**Structural geology for Marland P. Billings**	**Yes**
Recommended Texts		
Websites		

Module Information معلومات المادة الدراسية			
Module Title	**Remote Sensing**	**Module Delivery**	
Module Type	**Core**	☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**GEO2415**		
ECTS Credits	**5.00**		
SWL (hr/sem)	**125**		
Module Level	**UGII**	**Semester of Delivery**	**Four**
Administering Department	**Geology Dept.**	**College**	**College of Science**
Module Leader	**Muaid jassim Rasheed**	**e-mail**	**muayid.j@sc.uobaghdad.edu.iq**
Module Leader's Acad. Title	**Ass. prof.**	**Module Leader's Qualification**	**Ph.D.**
Module Tutor	**Zainab Damad Hassan**	**e-mail**	**zainab.hassan@sc.uobaghdad.edu.iq**
Peer Reviewer Name	**Dr. Aiad Ali Hussein**	**e-mail**	**aiad.hussien@sc.uobaghdad.edu.iq**
Scientific Committee Approval Date	**01/09/2024**	**Version Number**	**2.0**

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	**GEO-2311**	**Semester**	**Three**
Co-requisites module	**GEO-3512**	**Semester**	**Five**

Module Aims, Learning Outcomes and Indicative Contents اهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية	
Module Aims **اهداف المادة الدراسية**	• **This module aims to review fundamentals of Remote Sensing &Arial survey.** • **The purpose of this module is to prepare students for the development and** • **Analysis of remote sensing data sets, which are essential to Geomorpholog, Hydrology ,Environment and many branches of Geology.**
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	• **When applying and using remote sensing science in geology, we can** • **understand the topographic and geomorphological reality of vegetation and** • **land cover, patterns of water drainage, rivers and soils, pollution in the air, water and soil, the nature of minerals and rocks, and many outcomes of the** • **great development that has occurred in this field, which saves effort and** • **money in a very short time.**
Indicative Contents **المحتويات الارشادية**	• **Guiding students on the importance of remote sensing as an applied science and an important tool for many branches of geology.**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• **It depends on reviewing lectures as well as understanding and skill in using remote sensing programs, and here is the ERDAS program**

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	**80**	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	**5**
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	**45**	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	**3**
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 8
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Introduction in photography
Week 2	Kind of photography
Week 3	Scales of photography
Week 4	Introduction to fundamentals (R.S.)
Week 5	The electromagnetic spectrum
Week 6	Electromagnetic Radiation
Week 7	Interactions with the atmosphere
Week 8	Midterm Exam
Week 9	Radiation
Week 10	Characteristics of images
Week 11	Satellites characteristics
Week 12	Sensors
Week 13	Resolution

Week 14	**Image processing & Image classification**
Week 15	**Preparatory Week**

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
Week	**Material Covered**
Week 1	**Introduction to aerial image , History and Important.**
Week 2	**Definition of the aerial image, its components, types, the difference between the vertical and the oblique image, the scale of the image.**
Week 3	**Definition of the satellite image, its components, specifications, definition of the regions of the electromagnetic spectrum. Introduction to the erdas program.**
Week 4	**Image information. Profile, pixel data, histogram.**
Week 5	**How to subset an image of a regular and irregular area.**
Week 6	**Enhancement.**
Week 7	**Layer stack**
Week 8	**Midterm Exam**
Week 9	**Mosaic**
Week 10	**Unsupervised classification**
Week 11	**Supervised classification**
Week 12	**Geometric correction of the image**
Week 13	**Normalized difference vegetation and water index**
Week 14	**How to change the overlay of channels, how to combine a multispectral image such as Landsat 30m with an image with high spatial resolution such as SPOT.**
Week 15	**Preparatory Week**

Learning and Teaching Resources **مصادر التعلم والتدريس**		
References	**Text**	**Available in the Library?**
Required Texts	• **Fundamentals of Remote Sensing. Natural** • **Recourse's Canada .Canada center for remote sensing.**	**Yes**
Recommended Texts	**Remote Sensing Geology by Ravi P.Gupta**	**Yes**
Websites	**Accessing scientifically websites from Wikipedia or universities (lectures and videos).**	

Module Information معلومات المادة الدراسية			
Module Title	**Sedimentology**	**Module Delivery**	
Module Type	**Core**	☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**GEO2416**		
ECTS Credits	**4.00**		
SWL (hr/sem)	**100**		
Module Level	**UGII**	**Semester of Delivery**	**Four**
Administering Department	**Geology Dept.**	**College**	**College of Science**
Module Leader	**Hasan Kattoof Jasim**	**e-mail**	**Hasan.jasim@sc.uobaghdad.edu.iq**
Module Leader's Acad. Title	**Lecturer**	**Module Leader's Qualification**	**Ph.D.**
Module Tutor	**Maysoon Omer Ali Hiba Sadoon Mohsen**	**e-mail**	**maysoon.ali@sc.uobaghdad.iq hiba.mimaar@sc.uobaghdd.edu.iq**
Peer Reviewer Name	**Dr. Aiad Ali Hussein**	**e-mail**	**aiad.hussien@sc.uobaghdad.edu.iq**
Scientific Committee Approval Date	**01/09/2024**	**Version Number**	**2.0**

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	**None**	**Semester**	
Co-requisites module	**GEO-3521**	**Semester**	**Five**

Module Aims, Learning Outcomes and Indicative Contents اهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية	
Module Aims **اهداف المادة الدراسية**	**1. Sedimentology aims to identify the types of loose sediments, how they are formed, the way they are transported, and the places and environments in which they deposition.** **2. Introducing the importance of sedimentology, which is the link between earth science and all natural, medical and engineering sciences, agricultural and pure sciences**
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	**1. Training in identifying and diagnosing the types of sediments of sediment, chemical and organic** **2. Training on the skills of dealing with different types of sediment and mastering how to study its physical and chemical properties** **3. Mastering the most important applications needed by all engineering scientific disciplines and pure sciences that deal with sediment of all kinds and its industrial and engineering applications.**
Indicative Contents **المحتويات الارشادية**	**1. Identifying the types of sediments, which are clearly seen during field work and reconnaissance field trips.**

	2. Sedimentology are among the most important branches of earth science and have important applications in many engineering and scientific fields 3. Iraq has a huge amount of sediments, so students must understand and understand how to deal with sediments, the way to deal with them in geological workshops and in the field , how to make slides for these sediments and rocks, and how to study them under a polarizing microscope

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	1. Training on the skills of collecting samples for sediment from the field and how to deal with them in the laboratory and geological workshop . 2. Mastering the process of preparing samples for the various types of analyses that can be conducted on sediment and sedimentary rocks. 3. Thinking about the applications that can be made on sediments, which are considered one of the most important requirements of most applied research. 4. Sediments have many applications, in addition to their engineering and industrial importance, as there are many of them that are considered precious stones, as well as being the basic component of many geological museums and what is known as geological parks and geoparks.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	**80**	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	**5**
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	**20**	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	**1**
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**100**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 8
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Introduction to Sedimentology – How are sediment formed, classification of sediment
Week 2	Field Technique , collection of samples , sample description,
Week 3	Types of sediment , clastic, chemical , organic and their main sedimentological properties, weathering and erosion
Week 4	Sedimentary Environments, Continental, transitional, marine , sedimentological properties of sedimentary environments, Energy,

Week 5	**The physical processes of sediments, especially the methods of transport and sedimentation, Reynolds number, types of loads loads,**
Week 6	**Texture of Sediments, Grain size , grain shape (roundness and sphericity), sorting , packing)**
Week 7	**Grain size scale, units of measurement (mm and phi units). Main Technique of Grain Size measurement (Vierner, settling velocity, sieving**
Week 8	**Mid Theoretical Examination**
Week 9	**Shape of Sediments: roundness, sphericity, Projection and visual techniques**
Week 10	**Stability and Maturity of Sediments, maturity index**
Week 11	**Dust Storms, factors and model of dust storms formation**
Week 12	**Main Technique of Mineral Separation, froth flotation, heavy liquids, magnetic techniques**
Week 13	**Sedimentary Structures, classification, groups, Iraqi examples**
Week 14	**Application of Sedimentology, industrials and economic applications**
Week 15	**Final Theoretical Examination**
Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	**Material Covered**
Week 1	**Lab 1: Introduction, Classification and Types of Sediments**
Week 2	**Lab2: Presentation of Sedimentological Data**
Week 3	**Lab 3: Grain Size of Mixture of sediments**
Week 4	**Lab 4: Grain Size Analysis of gravels**
Week 5	**Lab 5: Grain Size Analysis of Sand by Sieving**
Week 6	**Lab 6: Grain Size analysis of sand from thin section**
Week 7	**Lab 7: Grain Size Analysis of Mud Fraction by Pipette Analysis**
Week 8	**Lab 8: Mid Examination of Sedimentology**
Week 9	**Lab 9: Shape analysis of Gravels**
Week 10	**Lab 10: Shape Analysis of Sand from Thin Section**
Week 11	**Lab 11: Heavy Mineral Analysis**
Week 12	**Lab 12: Paleocurrent Analysis**
Week 13	**Lab 13: Sedimentological Section and Facies Analysis**
Week 14	**Lab 14: Clay Mineralogy**
Week 15	**Lab 15: Final Practical Examination of Sedimentary Rocks**
Learning and Teaching Resources مصادر التعلم والتدريس	

References	Text	Available in the Library?
Required Texts	Folk, R., 1974, Petrology of Sedimentary Rocks. Hamphill, Texas, 182P.	Yes
Recommended Texts	Selley, R. C., 2000, Applied sedimentology, Academic Press, 521P.	Yes
Websites	https://www.cliffsnotes.com/study-guides/geology/sedimentary-rocks/clastic-sedimentary-rocks	

إحصاء - المرحلة الثانية / الفصل الثاني

Module Information معلومات المادة الدراسية			
Module Title	Statistic	Module Delivery	
Module Type	Basic	☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	GEO2417		
ECTS Credits	4.00		
SWL (hr/sem)	100		
Module Level	UGII	Semester of Delivery	Four
Administering Department	Geology Dept.	College	College of Science
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	
Peer Reviewer Name	Dr. Aiad Ali Hussein	e-mail	aiad.hussien@sc.uobaghdad.edu.iq
Scientific Committee Approval Date	01/09/2024	Version Number	2.0

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents اهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية	
Module Aims اهداف المادة الدراسية	1. To provide students with a solid foundation in Calculus at degree level and equip them with a knowledge of the necessary methods and techniques in applied mathematics for further study. 2. It deals with the basic concept of functions limit, continuity, derivation and their consequences. 3. To develop problem solving skills and understanding of differentiation rules through the application.
Module Learning	1. Students will become familiar with functions and limits. They will gain an

Outcomes **مخرجات التعلم للمادة الدراسية**	**understanding of convergence of sequences and series, and understanding of the foundations of differentiation and integration.** **2. Students will be able to compute limits of sequences and series, find derivatives, integrate elementary functions.** **3. Students will have enhanced skills in the following areas: modelling, spatial awareness, abstract reasoning and numeracy.**
Indicative Contents **المحتويات الارشادية**	• **The course will supply the students with basic concepts of differentiation (chain, product, quotient). Derivatives of standard functions (powers, polynomials, trigonometric). The exponential function: and logarithm as inverse. Derivatives of inverse functions via chain rule, local extrema and curve sketching.**

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	• **The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.**

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	**33**	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	**2**
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	**67**	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	**4**
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**100**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	**2**	**10% (10)**	**5, 10**	**LO #1, 2, 10 and 11**
	Assignments	**2**	**10% (10)**	**2, 12**	**LO # 3, 4, 6 and 8**
	Projects / Lab.	**1**	**10% (10)**	**Continuous**	**All**
	Report	**1**	**10% (10)**	**13**	**LO # 5, 8 and 10**
Summative assessment	**Midterm Exam**	**2hr**	**10% (10)**	**8**	**LO # 1-7**
	Final Exam	**2hr**	**50% (50)**	**16**	**All**
Total assessment			**100% (100 Marks)**		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	**Basic concepts: sets, lines, circles and functions.**
Week 2	**Domain, range and inverse of functions.**
Week 3	**Derivative: motivation, informal definition of limit**

Week 4	**Limits properties**
Week 5	**Continuity**
Week 6	**Trigonometric functions, their target and continuity**
Week 7	**Derivative rules of elementary functions**
Week 8	**Midterm Exam**
Week 9	**Derivatives of trigonometric and inverse trigonometric functions**
Week 10	**Applications of derivative; maximum and minimum**
Week 11	**Mean value theorem with applications**
Week 12	**Roll's theorem with applications**
Week 13	**Introduction to L'Hospital's rule**
Week 14	**Graph sketching**
Week 15	**Preparatory Week**

Learning and Teaching Resources
مصادر التعلم والتدريس

References	**Text**	**Available in the Library?**
Required Texts	**Thomas Calculus, Joel R. Hass, Maurice D. Weir, 15th edition (2022).**	**Yes**
Recommended Texts	**Differential calculus and their applications, M. Barun, 3rd edition, Applied mathematical sciences.**	**No**
Websites	**https://www.sciencebooksonline.info/mathematics.html**	

Module Information معلومات المادة الدراسية			
Module Title	**Statistic**	**Module Delivery**	
Module Type	**Supportive**	☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**UOB205**		
ECTS Credits	**2.00**		
SWL (hr/sem)	**50**		
Module Level	**UGII**	**Semester of Delivery**	**Four**
Administering Department	**Geology Dept.**	**College**	**College of Science**
Module Leader	**Dr. Leqaa faleh owdaa**	**e-mail**	**leqaa.falih@ircoedu.uobaghdad.edu.iq**
Module Leader's Acad. Title	**Lecturer**	**Module Leader's Qualification**	**Ph.D.**
Module Tutor		**e-mail**	
Peer Reviewer Name	**Dr. Aiad Ali Hussein**	**e-mail**	**aiad.hussien@sc.uobaghdad.edu.iq**
Scientific Committee Approval Date	**01/09/2024**	**Version Number**	**2.0**

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
Prerequisite module	**None**	**Semester**	
Co-requisites module	**None**	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents اهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية	
Module Aims **اهداف المادة الدراسية**	١. تهدف إلى تنمية روح الإعتزاز باللغة العربيَّة للمحافظة على الهوية العربيَّة. ٢. تهدف إلى تأهيل الطلبة بالمعارف والمخرجات الخاصة علم النحو، والصرف، والإملاء؛ لتمكنه من الكتابة الصحيحة والتعبير السليم وتقويم لسانه. ٣. تهدف إلى تنمية ذوق الطالب الأدبي وإثراء تحصيله وإغناء زاده من الفكر العربي والإسلامي. ٤. تهدف إلى تطوير مهارات الطلاب اللغويَّة التي تؤهلهم للإبداع المتميز. ٥. تهدف إلى تنمية مهارات التحدث بـ (اللغة العربيَّة). ٦. تهدف إلى الارتقاء بمستوى الطلبة من الجانب المهني والبحثي.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	١. التعرف على الظواهر اللغويَّة كونها إحدى خصائص اللغة العربيَّة التي تميزت بها. ٢. التعرف على قواعد كتابة الألف اللينة في آخر الكلمة، والتمييز بين الألف الطويلة والقصيرة عن طريق ذكر مواضع كل منهما وتوضيح ذلك بذكر الأمثلة. ٣. التعرف على الإستثناء من حيث تعريفه وأدواته وحكمه وبيان ذلك بالأمثلة التوضيحية. ٤. التعرف على الحال من حيث تعريفه وحكمه وبيان ذلك بالأمثلة التوضيحية. ٥. التعرف على التمييز من حيث تعريفه وحكمه وبيان ذلك بالأمثلة التوضيحية. ٦. التعرف على المفاعيل الخمسة وبيان أحكامها بكونها من منصوبات الأسماء وبيان ذلك بالأمثلة التوضيحية. ٧. التعرف على حروف الجر بكونها من مجرورات الأسماء، والتمييز بين معانيها، وبيان حكمها مع توضيح ذلك بذكر الأمثلة. ٨. التعرف على الاسم المذكر والاسم المؤنث من حيث تعريفهما، وأقسامهما مع ذكر الأمثلة التوضيحية. ٩. التمييز بين اللام الشمسية واللام القمرية من حيث النطق والكتابة، وذلك من حيث تعريفهما ومعرفة حروف

	كل منهما. ١٠. التعريف بحروف الحذف والزيادة في الكلمة، وبيان ذلك بالأمثلة التوضيحية . ١١. تعريف الطالب بمواضع الوقف في اللغة العربيَّة لما فيه من أهمية لإصال المعلومات إلى المتلقي بشكل صحيح فضلاً عن تمكنه من فهم النص فهماً صحيحاً . ١٢. تمكين الطالب من معرفة المواضع الإعرابية للكلمات داخل النص، ومعرفة معاني بعض الكلمات ، فضلاً عن استخراج الأهداف منه. ١٣. التعرف على الشاعر المتنبي بكونه من شعراء العصر العباسي. ١٤. التعرف على الشاعرة نازك الملائكة بكونها إحدى رواد الشعر الحر الحديث في العراق.
Indicative Contents **المحتويات الارشادية**	• الظواهر اللغوية: التَّرادف ، المشترك اللفظي، التَّضاد. • الألف اللينة: الألف الطويلة، الألف القصيرة. • الإستثناء. • الحال. • التمييز. • المفاعيل الخمسة: منصوبات الأسماء ، المفعول به، المفعول فيه، المفعول المطلق، المفعول لأجله، المفعول معه. • حروف الجر: مجرورات الأسماء، معاني حروف الجر. • الاسم المذكر والمؤنث: تعريف الاسم المذكر، والاسم المؤنث، أقسام الاسم المذكر والمؤنث. • اللام الشمسية، اللام القمرية، الحذف والزيادة. • الوقف. • سورة لقمان، إعراب سورة لقمان ، تفسير سورة لقمان. • الشاعر المتنبي: حياته، مؤلفاته. • الشاعرة نازك الملائكة : حياتها، مؤلفاتها.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	• الاستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه الوحدة هي تشجيع الطلاب على المشاركة في التمارين والتطبيقات النحوية والإملائية، مع تحسين مهارات التفكير والتحليل في الوقت نفسه. ويتم تحقيق ذلك عن طريق الفصول والبرامج التعليمية التفاعلية والنظر في أنواع التطبيقات التي تتضمن بعض الأنشطة التي تهم الطلبة.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) **الحمل الدراسي المنتظم للطالب خلال الفصل**	**33**	**Structured SWL (h/w)** **الحمل الدراسي المنتظم للطالب أسبوعيا**	**2**
Unstructured SWL (h/sem) **الحمل الدراسي غير المنتظم للطالب خلال الفصل**	**17**	**Unstructured SWL (h/w)** **الحمل الدراسي غير المنتظم للطالب أسبوعيا**	**1**
Total SWL (h/sem) **الحمل الدراسي الكلي للطالب خلال الفصل**	**50**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 8
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**Material Covered**
Week 1	**الظواهر اللغويَّة: الترادف ، المشترك اللفظي، التضاد.**
Week 2	**قواعد كتابة الألف اللينة في آخر الكلمة.**
Week 3	**الإستثناء.**
Week 4	**الحال.**
Week 5	**التمييز.**
Week 6	**المفاعيل الخمسة: المفعول به، المفعول فيه، المفعول المطلق، المفعول لأجله، المفعول معه.**
Week 7	**حروف الجر ومعانيها.**
Week 8	**امتحان نصف الفصل**
Week 9	**الاسم المذكر والمؤنث.**
Week 10	**الحروف من حيث النطق والكتابة: اللام الشمسية والقمرية، الحذف والزيادة.**
Week 11	**الوقف.**
Week 12	**نص من سورة لقمان.**
Week 13	**الشاعر المتنبي.**
Week 14	**الشاعرة نازك الملائكة.**
Week 15	**اسبوع تحضيري**

Learning and Teaching Resources مصادر التعلم والتدريس		
References	**Text**	**Available in the Library?**
Required Texts	**القرآن الكريم** **- الأدب العربي في العصر العباسي: د. ناظم رشيد.** **- إعراب القرآن وبيانه: محيي الدين درويش.** **- التطبيق الصرفي: د. عبده الراجحي.** **- تفسير الكشاف: للزمخشري.** **- جامع الدروس العربيَّة: الشيخ مصطفى الغلاييني.** **- ديوان المتنبي.** **- ديوان نازك الملائكة.** **- شرح ابن عقيل: ابن عقيل، تحقيق: محمد محي الدين عبد الحميد.** **- الشعر العراقي الحديث مرحلة وتطور: د. جلال الخياط** **- فقه اللغة العربيَّة وخصائصها: د. إميل بديع يعقوب.** **- المفيد في أحكام التلاوة والتجويد: القارئ الشيخ رافع العامري.** **- الوجيز في اللغة العربيَّة: أ.د. محيي هلال السرحان.**	**Yes**
Recommended Texts	**Electromagnetic theory (book). 2000.vol.1**	**No**
Websites		