MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

دقق الملف من قبل

شعبة ضمان الجودة والأداء الجامعي

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

التاريخ

التوقيع

التوقيع :

اسم رئيس القسم: أ.د. عمر احمد البدراني

التاريخ :

Module Information معلومات المادة الدراسية					
Module Title	**Hydrogeology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	**GEO-48037**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	4		**Semester of Delivery**	8	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Mohammed sheet Mohammed Ramzi Taka		**e-mail**	dr.mohammedsheettaka@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dheyaa Ghawi Salih		**e-mail**	Dhiaaalsultani@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	٥/٥٥/٢٠٢٤		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Clarification of how Hydrogeology can make significant contributions to a useful in geosciences. 2. Identify groundwater and surfacewater which are useful in Hydrogeology. 3. This course deals with the basic concept of the most important factors that specify metals aspects of this modulare. 4. Learn about the most important scientific terms (Terminology) and their definitions related to this topic. 5. To understand the impact of these physical & chemical factors in water structure. 6. To perform different types of water structure applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The student will study and classify surfacewater and groundwater structure of minerals in terms of the external shape and internal structure of the water and the identification of minerals as well as knowledge of the hydrogeology structure and the aquifers and the study of its parts, which in turn determines the water system
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures an introduction hydrogeological cycle [12 hrs] Groundwater [16 hrs] Pumping test [12 hrs] Groundwater modeling[12 hrs] hydrogeochemistry [12 hrs] Part B – Practical labs Introduction hydrogeological cycle [12 hrs] Groundwater [12 hrs] Pumping test [6 hrs] hydrogeochemistry [10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	It is a science specialized in the study and classification of hydrogeology in terms of the surfacewater and groundwater and the identification of the type of aquifers it contains as well as knowledge of the porosity and Darcys law.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٧٨	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	an introduction Definition of hydrogeology and watercycle
Week 2	Precipitation
Week 3	Surface runoff
Week 4	Evaporation and infiltration
Week 5	River flow
Week 6	Stream flow analysis
Week 7	Flow nets
Week 8	Ground water Hydrogeology

Week 9	Aquifers
Week 10	Porosity and Permeability
Week 11	Darcys Law
Week 12	Pumping test
Week 13	Water pollution
Week 14	Ground water modeling
Week 15	Hydrogeochemistry

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction
Week 2	Rainfall analysis.
Week 3	Morphometric analysis.
Week 4	Filtration capacity measurment
Week 5	Evaporation measurment
Week 6	River flow analysis
Week 7	**Hydrograph**
Week 8	Drawing groundwater levels
Week 9	Flow net
Week10	Pumping test measuring
Week 11	Classification of ground water modeling
Week 12	Hydrogeochemistry
Week 13	Drilling engineer

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		Yes
Recommended Texts		Yes
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Well logging**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-48138**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	4		**Semester of Delivery**	8	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Omar Khalooq Mohammed Sajed		**e-mail**	o.k.mohammed-sajed@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Radhwan Khaleel Hayder		**e-mail**	dr.radhwanatroshe@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Petroleum geology	**Semester**	Seven
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives	1. Clarifying how studying this course can significantly contribute to the petroleum geology field. 2. Identify porosity and permeability, which help identify reservoir quality. 3. This course deals with the basic concept of well logging and the reservoir properties generally depending on the rock properties, including the rock's electrical and radioactivity properties. 4. Learn about the most critical scientific terms (Terminology) and their definitions related to this topic. 5. To understand the impact of this course on reservoir characterisation and identify their fluid. 6. This course employs the well logging study to identify main reservoir properties, including lithology, shale volume, porosity and fluid saturation.
Module Learning Outcomes	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Define well logging and describe logging tool types. 2. Definitions of main terms and historical achievements. 3. Description of borehole environment. 4. Explanation of hydrocarbon saturation and how to calculate. 5. Clarification of the general operating principle of the resistivity logs; normal device, induction, laterolog, microresistivity and their applications. 6. Interpretation the general operating principle of the caliper logs, spontaneous potential logs (Sp) including their principles and applications. 7. Explanation of the general operating principle of the gamma-ray logs including the application of the gamma-ray log to shale content evaluation. 8. Clarification of the density logs including their principles and applications. 9. Identify porosity derived from density logs. 10. Interpretation of the neutron logs; neutron response of minerals, porosity and fluids. 11. Explanation of the sonic log; transit time of shales and sonic response of minerals and porosity. 12. Identification lithology and porosity from wireline logs.
Indicative Contents	Indicative content includes the following. Part A – Theoretical lectures Introduction, the presentation of log data, borehole types, mud logging, mud additives, functions of drilling mud, types of drilling fluids, basic well logging equipment, wireline log tools, log tool types, electrical logs, mechanical logs, radioactive logs, acoustic Logs, well logging history, advantages and limitations of well logging. [*10* hrs] Basic theory on resistivity, Important terminology, definitions, and equations, Porosity, effective porosity, permeability, water saturation, the borehole environment, drilling mud, invasion, mud cake, mud filtrate, invaded zone, uninvaded zone, flushed zone, transition zone. [*8* hrs]

	Hydrocarbon saturation, Bulk volume of movable and residual hydrocarbon, resistivity logs, advantages of resistivity logs, resistivity log types, old resistivity logs, modern resistivity logs, induction log, spontaneous potential (self-potential) [*10* hrs] Caliper log, Gamma-ray log, total gamma-ray, spectral gamma ray, density log (RHOB), density porosity, neutron log, neutron log applications, sonic log, sonic log applications, lithology identification using well log analysis, porosity identification using well log analysis. [8 hrs] Revision problem classes. [3 hrs] Part B – Practical labs Introduction to well logging, core and log, borehole environment, resistivity logs, caliper logs, spontaneous potential logs (Sp), gamma ray logs. [18 hrs] Density logs, neutron logs, sonic logs, lithology estimation from wireline logs, porosity estimation from wireline logs. [18 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The course includes the principles, methods and techniques used in drilling and well logging field which expanding students' perceptions about this science and its contents it includes that help in formation evaluation and petrophysical properties of hydrocvarbon reservoir. In addition to using different techniques including crossplots, equations, and integrated set of well logs in distinguishing the lithology, porosity, and fluid saturation. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods for logging and oilfield visits which are very important for the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction to well logging
Week 2	Main terms, definitions, and historical achievements
Week 3	Borehole environment
Week 4	Hydrocarbon saturation
Week 5	The resistivity logs; normal device, induction, laterolog, microresistivity.
Week 6	The caliper logs, spontaneous potential logs (Sp); principles and application
Week 7	The gamma ray logs; application of the gamma ray log to shale content evaluation.
Week 8	The density logs; principles and application
Week 9	Porosity derived from density logs
Week 10	The neutron logs; neutron response of minerals and fluids.
Week 11	Porosity derived from neutron logs
Week 12	Sonic log; transit time of shales
Week 13	Porosity derived from sonic logs
Week 14	Lithology estimations from wireline logs
Week 15	Porosity estimations from wireline logs

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to well logging.
Week 2	Lab 2: Core and log description.
Week 3	Lab 3: Borehole environment.
Week 4	Lab 4: The resistivity logs (Exercise-1).
Week 5	Lab 5: The resistivity logs (Exercise-2).
Week 6	Lab 6: The caliper logs, spontaneous potential logs (Sp).
Week 7	Lab 7: The gamma ray logs.
Week 8	Lab 8: The density logs.
Week 9	Lab9: The neutron logs.
Week10	Lab 10: Sonic logs.
Week 11	Lab 11: Lithology estimation from wireline logs.
Week 12	Lab 12: Porosity estimations from wireline logs.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Asquith, G., and Krygowski, D., 2004.** Basic well log analysis. American Association of Petroleum Geologists, Tulsa, Oklahoma, 244 p. **Asquith, G. and Gibson, C.R., 1982.** Basic well log analysis for geologists, American association of petroleum geologists, Tulsa, Oklahoma, 216p.	No Yes
Recommended Texts	**Catuneanu, O., 2006.** Principles Sequence Stratigraphy, First edition. Elsevier, Amsterdam, 375p. **Darling, T., 2005.** Well logging and formation evaluation. Gulf professional publishing, Elsevier, 326p. **Rider, M.H., 2002.** The geological interpretation of well logs, 2nd edition, Rider-French Consulting Ltd, 280p.	No No No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Exploration geochemistry**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-48039**				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		4	**Semester of Delivery**		8
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Flyah Hassan Abbas		**e-mail**	flyahabas@uomosul.edu.iq	
Module Leader's Acad. Title		lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Ann Abdulsattar Ismail		**e-mail**	annabdulsattar@uomosul.edu.iq	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		02/06/2023	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Geochemistry	**Semester**	5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Clarification of how studying this course can make significant contributions to the applied geochemistry field. 2. Identify important of elements and isotopes concentrations which are useful in Exploration geochemistry &isotope geology. 3. This course deals with the principles of geochemical exploration and isotopes geology , and how to use the results of geochemical analysis to infer the locations of the ore body, as well as the uses of geochemical analyzes of isotopes in determining the ages of different geological events. 4. Learn about the most important scientific terms (Terminology) and their definitions related to this topic. 5. To understand the impact of this course on methods of geochemical exploration and isotopes . 6. This course employs how to deal with analytical data and use it to infer the places where economic materials are collected, as well as identify ways to determine the ages of geological events using the results of isotope analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Define geochemical exploration and describe its tool types. 2. Definitions of main terms and methods of geochemical exploration and Mineral Prospecting works . 3. Description of the geochemical environments and mobility . 4. Explanation of geochemical dispersion patterns . 5. Discuss the geochemical coherence , indicator elements and pathfinder elements . 6. Interpretation the Primary and secondary dispersion patterns . 7. Define isotopes geology and describe its tool types. 8. Explain the decay mechanism of radioactive isotopes and the general age equation 9. Explanation of the K-Ar method of dating . 10. Discuss the Argon–argon ($^{40}Ar/^{39}Ar$) method of dating . 11. Explanation of the Rb-Sr method to determine dating. 12. Description the U-Th-Pb method of dating and stable isotopes.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction to geochemical exploration , What is geochemical exploration , Methods of Geochemical Exploration and Mineral Prospecting works, the geochemical Environments , Primary environment , Secondary environment , geochemical dispersion and mobility , mobility of elements in primary environment , mobility of elements in secondary environment, geochemical coherence , Indicator elements , pathfinder elements. [10 hrs] Primary dispersion patterns , Syngenetic patterns, Geochemical province, local syngenetic pattern, Epigenetic patterns, hydrothermal dispersion patterns , dispersion patterns by the influence of temperature and pressure on the late

	minerals, Secondary dispersion patterns, mechanical dispersion patterns, hydromorphic dispersion patterns , biochemical dispersion patterns .[8 hrs] Introduction to isotopes , decay mechanism of radioactive isotopes , the general age equation, Mass Spectrometer , The K-Ar method of dating, Argon–argon ($^{40}Ar/^{39}Ar$) method of dating. [10 hrs] Rb-Sr Method of Dating, The Uranium , Thorium–Lead methods of dating , The Carbon-14 method of dating, Stable isotopes, Oxygen and Hydrogen isotopes , Sulfur Isotopes. [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs The movement of elements between rock and solution, The loss and gain of elements in the rock, The evalution of weathering from gain and loss, Geochemical mapping by the moving average method, Statistical treatment (distribution type of elements) (2 parts), The effect of topography on the exploration of ore location. [18 hrs] K-Ar method of dating, Argon–argon (40Ar/39Ar) method of dating, the Rb-Sr method to determine dating, the effect of heating on the metamorphism, Rb-Sr isochron method and dating ages of igneous rocks. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The course includes the principles, methods and techniques used in geochemical exploration and isotopes geologe field which expanding students' perceptions about this science and its contents it includes that help in evaluation how to use the results of geochemical analysis to infer the locations of the ore body, as well as the uses of geochemical analyzes of isotopes in determining the ages of different geological events.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction to geochemical exploration, Methods of Geochemical Exploration and Mineral Prospecting works .
Week 2	The Geochemical Environments, Geochemical dispersion and mobility , Mobility of elements in primary environment , Mobility of elements in secondary environment .
Week 3	Geochemical Coherence , Indicator Elements , Pathfinder Elements .
Week 4	Primary dispersion patterns , Syngenetic patterns : Geochemical province , Local syngenetic pattern.
Week 5	Epigenetic patterns : Hydrothermal dispersion patterns.
Week 6	Dispersion patterns by the influence of temperature and pressure on the late minerals .
Week 7	Secondary dispersion patterns : Mechanical dispersion patterns , Hydromorphic dispersion patterns, Biochemical dispersion patterns .
Week 8	Introduction to isotopes , Decay mechanism of radioactive isotopes .
Week 9	The general age equation
Week 10	Mass Spectrometer, The K-Ar method of dating
Week 11	Argon–argon (40Ar/39Ar) method of dating.
Week 12	Rb-Sr Method of Dating.
Week 13	Rb-Sr isochron method and dating ages of igneous rocks.
Week 14	The Uranium , Thorium–Lead methods of dating , The Carbon-14 method of dating.
Week 15	Stable isotopes : Oxygen and Hydrogen isotopes , Sulfur Isotopes.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: The movement of elements between rock and solution.
Week 2	Lab 2: The loss and gain of elements in the rock.
Week 3	Lab 3: The evaluation of weathering from gain and loss.
Week 4	Lab 4: Geochemical mapping by the moving average method.
Week 5	Lab 5: Statistical treatment (distribution type of elements) (part 1).
Week 6	Lab 6: Statistical treatment (distribution type of elements) (part 2).
Week 7	Lab 7: The effect of topography on the exploration of ore location.
Week 8	Lab 8:. K-Ar method of dating.
Week 9	Lab9: Argon–argon (40Ar/39Ar) method of dating.
Week10	Lab 10: the Rb-Sr method to determine dating.
Week 11	Lab 11: the effect of heating on the metamorphism.
Week 12	Lab 12: Rb-Sr isochron method and dating ages of igneous rocks.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Rose , A.W. and Gundlach ,H. (1980) :** Geochemical Exploration , Academic Press, Elsevier . 667p . **Allègre, C. J. (2008) :** Isotope geology , Cambridge University Press. 534p .	No No
Recommended Texts	**Ashoke, K. T. (2020) :** Geochemical Exploration and Modelling of Concealed Mineral Deposits , Springer International . 2010p. **Rasskazov ,S. V., Brandt, S. B. and Brandt, I. S. (2010) :** Radiogenic Isotopes in Geologic Processes , Springer Netherlands . 312p .	No No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
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Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Geology of Industrial Rocks**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-48040**				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		4	**Semester of Delivery**		8
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Oday Mohammed Salih Othman		**e-mail**	odayothman@uomosul.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		M.A.
Module Tutor	Ann Abdulsattar Ismail		**e-mail**	annabdusttar@uomosul.edu.iq	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		02/06/2023	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Ore Geology	**Semester**	8
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Classification of minerals and industrial rocks in terms of their presence and uses in order to evaluate them economically 2. Identify the main methods used in the extraction of minerals and industrial rocks 3. The student will know many types of Industrial minerals and Rocks especially nonmetallic , their characteristics, shapes, and its availability. 4. Learn about some of the important industries in which industrial minerals and rocks are used as raw materials, such as the manufacture of cement, plaster, etc
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. List with description, the Industrial minerals and Rocks. 2. Identify Characteristic properties of industrial minerals and rocks 3. Explain the classification of industrial minerals and rocks in terms of their industrial applications . 4. Explain the classification of Aggregates in terms of source and what are its uses and types 5. Discuss the Geological, physiomechanical & texture properties for building stone. 6. Identify the Identify the Building stones in Iraq. 7. Identify the Ceramic materials 8. Explain the properties and uses of clay minerals
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction, Classification of economic minerals about using as raw materials for the different industries, Mining operations , Mineral Processing Technology, Classification of industrial minerals & rocks , [*13* hrs] Building and Construction materials , Aggregates, Uses of sand and gravel, Physical and mechanical properties of aggregate , Classification of Lightweight Aggregates, Building stones, Types of building stones . [*10*hrs] Features of building stone, Building stones in Iraq, Plaster (juss) industry , Metallurgical and refractory materials , Cement Industry , Manufacture stages of Portland cement, Kinds of cement, Structural clay products, Ceramic materials . [*13* hrs] Revision problem classes [3 hrs] Part B – Practical labs Mining Excavation Methods . open-pit and underground mine, Evaluation of Ore

	Bodies (Sand and Gravel Deposit) , Processing and Beneficiation Methods. Improvement of Properties of Some Industrial Rocks Using Magnetic Separation Method, . [18 hrs] Methods of Measuring Some Physical Properties of Different Types of Rocks (Effects of Rocks Properties on Their Suitability for Using as Building Stones), Movement of Water in Rocks Capillarity: Height of water rise as a function of time , Portland Cement , Calcination of Limestone (The effect of burning temperature and time on properties of lime produced) [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions of this science and its contents that help in classifying industrial minerals and rocks found in nature and the possibility of using them as primary raw materials in many important industries, and knowing the workflow of these industries through conducting scientific trips to some factories such as cement factories and Al-Mishraq sulfur field, in addition to solving Some mathematical problem related to the methods of extracting these minerals and rocks and calculating some important physical characteristics to determine the possibility of using them as primary raw materials in many important industries

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Classification of economic minerals about using as raw materials for the different industries
Week 2	Mining operations
Week 3	Mineral Processing Technology (Treatment and Beneficiation)
Week 4	Classification of industrial minerals & rocks
Week 5	Building and Construction materials
Week 6	Geological forms (occurrence) of sand & gravel deposits
Week 7	Lightweight aggregates
Week 8	Types of building stones
Week 9	Building stones in Iraq
Week 10	Metallurgical and refractory materials
Week 11	Geology and the Cement Industry
Week 12	Structural clay products
Week 13	Brick making industry
Week 14	Kaolin or china clays
Week 15	**Industrial and Manufacturing Materials:**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1&2	Mining Excavation Methods . open-pit and underground mine
Week 3&4	Evaluation of Ore Bodies (Sand and Gravel Deposit)
Week 5	Processing and Beneficiation Methods. Improvement of Properties of Some Industrial Rocks Using Magnetic Separation Method
Week 6&7	Methods of Measuring Some Physical Properties of Different Types of Rocks (Effects of Rocks Properties on Their Suitability for Using as Building Stones)
Week 8	Movement of Water in Rocks Capillarity: Height of water rise as a function of time
Week 9&10	Portland Cement .
Week 11&12	Calcination of Limestone (The effect of burning temperature and time on properties of lime produced)

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Bates, R.L., 1969, Geology of the industrial rocks and minerals. Jensen, M.L. and Bateman, A.M., 1981, Economic mineral deposits. The Open University, 1974, Constructional and other bulk materials.	Yes Yes Yes
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Seismic & electrical methods**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-48041**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	4		**Semester of Delivery**	8	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Bashar Aziz Mahmoud		**e-mail**	basharaziz@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Zainab musadaq shanshal		**e-mail**	zainabmosadq@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	23/4/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Geophysics Gravity & Magnetic method	**Semester**	5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand seismic and geoelectrical data acquisition and processing. 2. Visualize seismic and geoelectrical data and develop interpretation capacity. 3. Interpret and map faults and seismic horizons. 4. Identify hydrocarbon accumulations using seismic data. 5. Identify water table using geoelectrical data. 6. Quantify and risk hydrocarbon accumulations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1- Acquisition of seismic and geoelectrical data. 2- Process and analyze collected seismic and geoelectrical data. 3- Employ appropriate modeling methodologies, and evaluate strengths, weaknesses, and limitations. 4- Infer seismic and electrical properties at depth and formulate geological interpretations from those properties. 5- Demonstrate effective team-work and communication skills. 6- Analyze the earthquakes parameters
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction of seismic methods, Stress and strain , Elastic moduli, Seismic waves , Some basic principles for seismic waves, Ray paths in layered media (waves partitioning), Seismic refraction explorations, Seismic refraction explorations(Principles, Data acquisition, processing and interpretation) , limitations of seismic refraction exploration,. [*10* hrs] Seismic reflection explorations (Principles, Data acquisition, processing and interpretation). [*8* hrs] Introduction of geoelectrical methods, Geoelectrical properties of minerals and rocks (resistivity and conductivity), Resistivity method, [*10* hrs] Self potential method, EM method, IP method. Advances and limitation of geoelectrical methods. [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs Elastic moduli determination, Seismic refraction problems (two layer case, three layer case, multi-layer case, incline reflector case). [18 hrs] Seismic reflection problems (horizontal reflector, incline reflector, static correction, dynamic correction, correlation, convolution, interpretation model. [18 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expand students' perceptions of these two geophysical methods and their contents that help in analyzing seismic and geoelectrical data. In addition to the use of various geophysical tools in the field geophysical survey to reveal what is under the surface of the earth, such as structures, hydrocarbon reservoirs, groundwater tables, buried mineral deposits...etc.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction - stress and strain – elastic moduli
Week 2	Seismic waves - some basic principles for seismic waves
Week 3	Ray paths in layered media (waves partitioning)
Week 4	Seismic refraction explorations (Data acquisition, processing)
Week 5	Interpretation of seismic refraction data – Advantages & limitation of seismic refraction interpretation
Week 6	Seismic reflection explorations (principles - Data acquisition)
Week 7	Processing & interpretation of seismic reflection data
Week 8	Seismology (introduction - causes of earthquakes – main parameters of earthquake – types of earthquake's scales)
Week 9	Geoelectrical methods (introduction – Electrical properties (Resistance, Conductance, Resistivity, & Conductivity)
Week 10	Electrical conductivity in mineral and rocks
Week 11	Parameters effecting in rocks conductivity, Archie's law
Week 12	Resistivity method (principles- types of electrodes spreading- geometric factors – interpretation)
Week 13	Self-potential method. (principles- data acquisition- interpretation)
Week 14	Electromagnetic methods (principles- data acquisition- interpretation)
Week 15	Induced polarization (principles- data acquisition- interpretation)

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Determination of elastic moduli.
Week 2	Lab 2: Snell`s law in various layer velocities.
Week 3	Lab 3: Reflection & Transmission coefficient (R &T).
Week 4	Lab 4: Seismic refraction data interpretation (two & Three layer case).
Week 5	Lab 5: Seismic refraction data interpretation (incline refractors).
Week 6	Lab 6: Seismic reflection (determination of horizontal reflector velocity and depth).
Week 7	Lab 7: Static correction.

Week 8	Lab 8:.Dynamic correction.
Week 9	Lab9: Earthquake's parameters determination.
Week10	Lab 10: Representation and interpretation of resistivity data two &three layer case) .
Week 11	Lab 11: Resistivity imaging (2D& 3D interpretation).
Week 12	Lab 12: Representation and interpretation of Em & IP data.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Telford, W.M., Geldart, L.P. and Sheriff, R.E. (1990),** Applied Geophysics. 2nd Edition, Cambridge University Press, Cambridge, 770p. **John M. Reynolds (2011**). An Introduction to Applied and Environmental Geophysics, Wiley-Blackwell , 696p.	Yes Yes
Recommended Texts	**Prem V. Sharma, (1997)**. Environmental and Engineering Geophysics 1st Edition, Cambridge University Press, 500 p. **G.V. Keller, Michael S. Zhdanov, (1994)**. The Geoelectrical Methods in Geophysical Exploration (Methods in Geochemistry and Geophysics), Elsevier Science, 884p.	Yes No
Websites	https://www.ug.edu.gh/physics/courses/phys362-principles-applied-geophysics https://www.geotomosoft.com	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Research Project**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	**GEO-48042**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	4		**Semester of Delivery**	8	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Methodology	**Semester**	7
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives	In the Research Project, you will have the opportunity to study an area of interest in depth. It will require you to use your creativity and initiative, while developing the research and presentation skills you will need in further study or work.
Module Learning Outcomes	this subject, students are expected to: 1. generate ideas to plan and develop a research project 2. understand and develop one or more capabilities in the context of their research 3. analyze information and explore ideas to develop their research 4. develop specific knowledge and skills 5. produce and substantiate a Research Outcome 6. review their research.
Indicative Contents	The purpose of the capabilities is to develop in students the knowledge, skills, and understanding to be successful learners, confident and creative individuals, and active and informed citizens. The capabilities that have been identified are: literacy numeracy information and communication technology capability critical and creative thinking personal and social capability ethical understanding intercultural understanding. The capabilities enable students to make connections in their learning within and across subjects in a wide range of contexts.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Students use the research framework as a guide to developing their research and applying knowledge, skills, and ideas specific to their research question. They choose one or more capabilities, explore the concept of the capability or capabilities, and how it or they can be developed in the context of their research.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.6

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

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	**What is a research project**
Week 2	**Research framework**
Week 3	**Find the right supervisor**
Week 4	**Don’t be shy, ask**
Week 5	**Select the right topic**
Week 6	**Keep your plan realistic**
Week 7	**Prepare a project timeline**
Week 8	**Teaching materials**
Week 9	**Write, written statement**
Week 10	**the Research Outcome**
Week 11	**Evaluation of the research processes used,**
Week 12	**specific to the research question.**
Week 13	**Collective literatures**
Week 14	**Reverences**

Week 15	Write the project

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Gluyas J. & Swarbrick R. (2004)** Petroleum Geoscience. Blackwell Publishing, 359 p. **North, F.K. (1985)** Petroleum Geology. Allen & Unwin, 607 p.	No Yes
Recommended Texts	**Selley R.C. (1997)** Elements of Petroleum Geology, 2nd edition. Academic Press, 490 p. Darling, T., 2005. **Hunt, J.M. (1995)** Petroleum Geochemistry and Geology, 2nd edition. W.H. Freeman & Co, 743 p.	No No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Geological field**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	GEO-47031				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	4		**Semester of Delivery**	7	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	لجنة العمل الحقلي		**e-mail**		
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**	z	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	GEO-36135	**Semester**	6
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1- تعلم وفهم ودمج المعلومات النظرية بالتطبيق الحقلي الميداني 2- ربط المفاهيم النظرية والعملية لمختلف التخصصات 3- المشاركة والمعايشة الحقلية بين مجاميع الطلابية من اجل الانخراط في السوق العمل والشركات الحكومية والاهلية بعد التخرج 4- القدرة على البحث العلمي واتخاذ القرارات العلمية في حال حدوث أي مشكلة
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. List with description, the geological formation. 2. Define the two types of geological compass (Silva and Brunton) 3. Define the various terms geological field work. 4. Definition of geological map terms and cross section. 5. Determine the map orientation and different procedures for precise location on the map. 6. Summarize what is meant by travers lines and dip and strike for beds site location. 7. Discuss the geological history and involvement of sequential events in the studied area reginal northern of Iraq. 8. Explain the different ways for true thickness measurement bedding plane or formations. 1. List and describe the different type of rocks and formations.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Theoretical lectures.</u> Introduction to structural geology, relation with other geosciences. force and stress components .derivative normal and shear stress by triangularly and by moher circle for stress. factor controlling behavior of materials. Brittle and ductile deformation. Stress ellipsoid .example of stress in rocks. strain and strain ellipsoids. Inhomogeneous strain. Coaxial and Non Coaxial strain. progressive strain. strain path. descriptive fold elements in the field, <u>Part B – practical labs.</u> Fundamentals of geological mapping, maps of horizontal ,inclined and vertical beds, training to draw the geological cross sections, mapping of folded strata (simple and overturned)with complete labeling, map view of faulted strata by normal ,reverse and strike slip types and vertical side view(cross section). Angular unconformity maps interpretation. complex geological map (fold ,fault, unconformity)with explanation of sequential events .

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	Expanding students' perceptions about this science and its contents it includes that help in Field work, Structural geology, historical of study area and methods analysis. In addition to the use of different of the ways in distinguishing the types of Geological maps through observations in the field and laboratory. This will be achieved through lectures, labs, and interactive tutorials and by types of practical determine methods for measure of true thickness. In the laboratory, students are trained to read and interpret geological maps, as well as drawing cross sections. In the theoretical and scientific aspects, illustrations and computer programs are used to communicate ideas clearly. For the purpose of students acquiring field skills, several geological trips are required in addition to the summer application in which students practice geological survey methods and field descriptions of geological formations and geomorphological and structural features.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7

assessment	**Final Exam**	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction – Potential methods exploration
Week 2	Seismic waves - some basic principles for seismic waves
Week 3	Ray paths in layered media (waves partitioning)
Week 4	Seismic refraction explorations (Data acquisition, processing)
Week 5	Interpretation of seismic refraction data – Advantages & limitation of seismic refraction interpretation
Week 6	Seismic reflection explorations (principles - Data acquisition)
Week 7	Processing & interpretation of seismic reflection data
Week 8	application of seismic method in geology
Week 9	Mineral and oil prospection
Week 10	Mechanical parameters (rock strength, soil stability, rippability etc.)
Week 11	Seismic Method in engineering Site Properties Assessment
Week 12	Fractures and fault zones
Week 13	seismic refraction methods in groundwater modeling studies
Week 14	Cavities
Week 15	seismic method in environmental geology

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Determination of elastic moduli.
Week 2	Lab 2: Snell`s law in various layer velocities.
Week 3	Lab 3: Reflection & Transmission coefficient (R &T).
Week 4	Lab 4: Seismic refraction data interpretation (two & Three layer case).

Week 5	Lab 5: Seismic refraction data interpretation (incline refractors).
Week 6	Lab 6: Seismic reflection (determination of horizontal reflector velocity and depth).
Week 7	Lab 7: Static correction.
Week 8	Lab 8:.Dynamic correction.
Week 9	Lab9: seismic data interpretation (oil investigation)1.
Week10	Lab 10: seismic data interpretation (oil investigation)2.
Week 11	Lab 11: Earthquake's parameters determination 1 .
Week 12	Lab 12: Earthquake's parameters determination 2.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Telford, W.M., Geldart, L.P. and Sheriff, R.E. (1990),** Applied Geophysics. 2nd Edition, Cambridge University Press, Cambridge, 770p. **John M. Reynolds (2011**). An Introduction to Applied and Environmental Geophysics, Wiley-Blackwell , 696p.	Yes Yes
Recommended Texts	**Prem V. Sharma, (1997)**. Environmental and Engineering Geophysics 1st Edition, Cambridge University Press, 500 p. **G.V. Keller, Michael S. Zhdanov, (1994)**. The Geoelectrical Methods in Geophysical Exploration (Methods in Geochemistry and Geophysics), Elsevier Science, 884p.	Yes No
Websites	https://www.ug.edu.gh/physics/courses/phys362-principles-applied-geophysics https://www.geotomosoft.com	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria

Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Petroleum geology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-47033**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	4		**Semester of Delivery**	7	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Radhwan Khaleel Hayder		**e-mail**	dr.radhwanatroshe@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Omar Khalooq Mohammed Sajed		**e-mail**	o.k.mohammed-sajed@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Sedimentary environments	**Semester**	Six
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives	1. Clarification of the petroleum system, including its elements, processes, and conditions. 2. This course can significantly contribute to the petroleum geology field from the point of view of source, reservoir, and cap rocks. 3. The course includes the principles of petroleum geology, including basic terms, petroleum composition, reservoir properties and conditions, oil and natural gas migration, and petroleum traps. 4. Learn about the most important scientific terms (Terminology) and their definitions related to this topic. 5. To understand the impact of this course on reservoir characterisation and identify their fluid. 6. This course clarifies the different types of migrations and traps that control generally the hydrocarbon accumulations.
Module Learning Outcomes	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Define petroleum geology and its relation to other sciences. 2. Definitions of main terms and historical achievements. 3. Description of the origin of petroleum. 4. Explanation of the organic carbon in sediments. 5. Clarification of the stages of organic matter maturation. 6. Interpretation of the basic composition of petroleum and physical properties of oils. 7. Explanation of porosity and controls on porosity. 8. Clarification permeability and reservoir rocks. 9. Identify migration of petroleum; primary and secondary migrations. 10. Interpretation of the migration mechanism 11. Explanation of the oil accumulation and nomenclature of traps. 12. Estimate of reserves and resources.
Indicative Contents	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction, the relation of petroleum geology to sciences in general, the petroleum system, basic vocabulary, historical development, the origin of petroleum, inorganic origin theory, metal carbide theory, cosmic origin theory, the organic origin theory, organic carbon in sediments, inversion of organic matter to petroleum, stages of organic matter maturation, diagenesis, catagenesis, metagenesis, types of kerogen. [*10* hrs] Source rocks, the basic composition of petroleum, the hydrocarbon constituents of petroleum, the nonhydrocarbon constituents of petroleum, physical properties of oils, specific gravities of oils, viscosities of oils, colours and relative indices of oils. [*8* hrs] Porosity, controls on porosity, sorting, grain packing, compaction, cementation, dissolution, dolomitisation, permeability, controls on permeability, reservoir rocks, migration of petroleum, primary migration, secondary migration, dismigration,

	vertical and horizontal migration, migration mechanism, seal rocks. [*10* hrs] Traps, classification of traps, structural traps, stratigraphic traps, hydrodynamic traps, combination traps, oil accumulation and nomenclature, basic statistics, estimate of reserves and resources of traps. [8 hrs] Revision problem classes. [3 hrs] <u>Part B – Practical labs</u> Introduction to well logging, core and log, borehole environment, resistivity logs, caliper logs, spontaneous potential logs (Sp), gamma ray logs. [18 hrs] Density logs, neutron logs, sonic logs, lithology estimation from wireline logs, porosity estimation from wireline logs. [18 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The course includes the principles, methods and terms used in the petroleum geology field which expands students' perceptions about this science and its contents it includes that help in understanding the petrophysical properties of hydrocarbon reservoirs. In addition to using different techniques including mapping, equations to distinguishing the trap types and identifying porosity, permeability and fluid saturation. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods for mapping, logging and oilfield visits which are very important for the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction to petroleum geology
Week 2	The Petroleum System; elements, processes and conditions
Week 3	Basic vocabulary
Week 4	Historical development
Week 5	The origin of petroleum; Inorganic and origin theory
Week 6	Organic carbon in sediments
Week 7	Stages of organic matter maturation
Week 8	The basic composition of petroleum and physical properties of oils
Week 9	Porosity and controls on porosity
Week 10	Permeability and reservoir rocks
Week 11	Migration of petroleum; primary and secondary migrations
Week 12	Migration mechanism
Week 13	Petroleum traps and their classifications
Week 14	Oil accumulation and nomenclature of traps
Week 15	Estimate of reserves and resources

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to petroleum geology.
Week 2	Lab 2: The Petroleum System; elements, processes and conditions.
Week 3	Lab 3: Subsurface maps.
Week 4	Lab 4: Structural maps (Fold traps).
Week 5	Lab 5: Structural maps (Fault traps).
Week 6	Lab 6: Isopach Maps
Week 7	Lab 7: Facies Maps.
Week 8	Lab 8: Porosity.
Week 9	Lab9: Permeability.
Week10	Lab 10: The basic composition of petroleum and physical properties of oils
Week 11	Lab 11: Petroleum traps.
Week 12	Lab 12: Porosity and permeability relationship.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Gluyas J. & Swarbrick R. (2004)** Petroleum Geoscience. Blackwell Publishing, 359 p. **North, F.K. (1985)** Petroleum Geology. Allen & Unwin, 607 p.	No Yes
Recommended Texts	**Selley R.C. (1997)** Elements of Petroleum Geology, 2nd edition. Academic Press, 490 p. Darling, T., 2005. **Hunt, J.M. (1995)** Petroleum Geochemistry and Geology, 2nd edition. W.H. Freeman & Co, 743 p.	No No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Engineering Geology			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	**GEO-47032**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		4	**Semester of Delivery**		7
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Dheyaa Ghawi Salih		**e-mail**	Dhiaaalsultani@uomosul.edu.iq	
Module Leader's Acad. Title		Teacher	**Module Leader's Qualification**		M.Sc.
Module Tutor	Mohammed Sheet Taka		**e-mail**	Dr. mohammedsheettaka@ uomosul.edu.iq	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		04/05/2024	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Structure Geology	**Semester**	5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Clarification of how engineering geology can make significant contributions to a Applied in geosciences. 2. Identify engineering properties of rocks which are useful in building-. 3. This course deals with the basic concept of the most important mechanical properties of rocks and soil aspects of this modular. 4. Learn about the most important scientific terms (engineering geology) and their definitions related to this topic. 5. To understand the impact of these Rocks behavior in Dams, Tunnels, and Constrictions-. 6. To perform different engineering applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. List with description, the Rocks Mechanics, Soil Mechanics. 2. Define the various terms Compressive Strength, slake durability with Mathematical Equations to fined these Terms. 3. Definition of Engineering geology and Civil Engineering then show the importance in geoscience. 4. Summarize what is meant by the physical and mechanical properties of Rocks and Soil. 5. Discuss the types of Dams and involvement of Providing electricity and water for agriculture purposes 6.Define Tunnels, their types, and their importance in reducing traffic 7. Identify the site investigations and the applications to find the sutabile position for any construction. 8. Explain the Velocities tests and how the lithology effect on it. 9- Design and evaluation of surface mines and their importance in increasing the natural resources of raw materials.
Indicative Contents المحتويات الإرشادية	- Introduction to Engineering Geology. -Physical Properties of Rocks 1 (Density, Porosity &Permeability). - Physical properties of Rocks 2 (Ultrasound velocities, slake durability). - Mechanical properties of Rocks (Uniaxial compressive strength, Tensile strength, Triaxial com. Str.). -Outcrop description (orientation, roughness &wall strength). - Site investigations (seepage water (seepage water, block size &persistence). - Rock engineering (major rock mass classification). - Rock quality designation (RQD) index. - Dam geology (needs for dam construction, Dam types. - Subsurface opening (Natural opening, Artificial opening). - Mohr's circles for spatial (3-D) stress analysis. Tunnel geology. (28 hr.).

	-

Practicality approach:
- In situ density-
-Atterberg limits and indices (liquid limit, plastic limit & shrinkage limit).
-Grain size distribution of soil (sieve analysis method, hydrometer method and important of Grab. Siz.Dist.).
-Soil consolidation
- Uniaxial compressive strength test.
- Stress – strain curves in rocks.
-Tensile strength test of rocks.
- Estimation of unconfined shear strength of rocks.
-Triaxial compressive strength test of rocks.
-Dynamic elastic properties of rocks.
-Factors effecting on Dams. Geology and Foundations. - Underground cavities – limestone cavities. (28 hr.).

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The strategy of engineering geology is to enable the student to identify the engineering characteristics of various types of rocks as well as soil, in addition to making engineering maps that help in building and engineering structure on the ground, as well as enabling the engineering geologist to give a final report on the suitability of the rocks under construction to bear large loads depended on mechanical properties of Rocks and Soil.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8

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

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction to Engineering Geology
Week 2	Physical Properties of Rocks 1 (Density, Porosity &Permeability).
Week 3	Physical properties of Rocks 2 (Ultrasound velocities, slake durability).
Week 4	Mechanical properties of Rocks (Uniaxial compressive strength, Tensile strength, Triaxial com. Str.).
Week 5	Outcrop description (orientation, roughness &wall strength).
Week 6	Site investigations (seepage water (seepage water, block size persistence).
Week 7	Rock engineering (major rock mass classification).
Week 8	Rock quality designation (RQD) index.
Week 9	Dam geology (needs for dam construction, Dam types.

Week 10	Subsurface opening (Natural opening, Artificial opening).
Week 11	Mohr's circles for spatial (3-D) stress analysis.
Week 12	Tunnel geology.
Week 13	Mine Geology.
Week 14	Site investigation.
Week 15	Relationships between Engineer and Engineering Geologist.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Index physical properties of soil (weight – volume relationships
Week 2	In situ density.
Week 3	Atterberg limits and indices (liquid limit, plastic limit & shrinkage limit).
Week 4	Grain size distribution of soil (sieve analysis method, hydrometer method and important of Grab. Siz.Dist.).
Week 5	Soil consolidation
Week 6	Uniaxial compressive strength test.
Week 7	Stress – strain curves in rocks.
Week 8	Tensile strength test of rocks.
Week 9	Estimation of unconfined shear strength of rocks.
Week10	Triaxial compressive strength test of rocks.
Week 11	Dynamic elastic properties of rocks.
Week 12	Factors effecting on Dams. Geology and Foundations. Underground cavities – limestone cavities. (28 hr.).

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1- Engineering geology by Christopher Mathewson 1981	Yes

	2- Goodman R.E. (1980). Introduction to Rock Mechanics. Jon Wiley & Sons USA.	Yes
Recommended Texts	3- Franklin J. A. and Dassault M.B. (1989). Rock engineering. 4- Obert&L. Duval WI. (1967). Rock Mechanics and design of structures in rock.	Yes yes
Websites	https://Introduction to Engineering geology.	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C - Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Ore Geology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	GEO-47134				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	**4**		**Semester of Delivery**	**7**	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Oday Mohammed Salih Othman		**e-mail**	odayothman@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.A.	
Module Tutor	Mohammed hameed Ibraheem Ann Abdulsattar Ismail		**e-mail**	mohammed.hamed91@uomosul.edu.iq annabdulsattar@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Clarification of how ores originate in nature which can make significant contributions to a mineral exploration in geosciences. 2. Identify the types of ores in nature which are useful in identifying their location 3. The student will know many types of ore deposits especially metallic ores, their characteristics, shapes, and geneses. 4. Learn about the most important scientific terms (Terminology) and their definitions related to this topic. 5. Using some geological methods to measure the temperatures and pressures at which the ores are formed, in order to determine the areas of their presence
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Defining some important terms related to the ores , such as Ore grade, Cut-off grade ,etc. 2. identify The various processes that have given rise to ore-deposits . 3. How magma and magmatic fluids move . 4. Classify the magmatic ore deposits and what are the minerals and rocks associated with them 5. Explain Factors affecting the formation of Metasomatic Ores . 6. Define the Hydrothermal Ore Deposits and what are the types of hydrothermal fluids 7. Discuss How large volumes of fluid can move around at deep levels in the earth's crust, where rocks are highly compacted and have low permeability? 8. Explain theTypes of alteration and their ore association 9. Explain the Genesis of metamorphic graphite. 10. Define the Placer ore-deposits and what are the Types of them
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction, Economic Geology, Ore geology, Principal steps in the exploitation of ore, Factors affecting the value of cut-off grade, Ore genesis, Magmas and Magmatic fluids, Early and Late magmatic ore-deposits . [*13* hrs] Metasomatism, Stages of Formation of Metasomatic ores, Factors affecting the formation of Metasomatic Ores, Origin (types) of hydrothermal fluids, The Movement of Hydrothermal Fluids, Types of processes of hydrothermal ore deposition. [*10* hrs] Types of alteration and their ore association, Metamorphic ores, Metamorphosed ores, Submarine Exhalative and Volcanogenic oredeposits, Major types of chemical sedimentary ores, evaporates ore deposits, Placer ore-deposits . [*13* hrs] Revision problem classes [3 hrs]

	Part B – Practical labs Physical Properties of Few Common Ore Minerals , Concentration Factor (C.F.), Lazky's Law, Nature of the Ore-bearing hydrothermal fluid and the form in which metals are transported in these fluids [18 hrs] Methods of determination the temperature & pressure. One of these methods is using certain sulfide minerals (Geothermometry and Geobarometry) , Methods of determination the temperature & pressure / Stable isotopes (sulfur isotopes), Methods of determination the temperature & pressure / Stable isotopes (Isotopes of oxygen and hydrogen). [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents it includes that help in Clarification of how ores originate in nature which can make significant contributions to a mineral exploration , In addition to solving some issues related to ores, including knowing the grade of ore for their economic evaluation, as well as estimating the conditions for the formation of ores in nature (temperature and pressure) using some of the methods used for this purpose, through some mathematical problems and laws related to the subject.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Definition and Basic Concepts in Ore Geology
Week 2	Factors affecting the value of cut-off grade
Week 3	Magmatic Ore-deposits
Week 4	Classification of magmatic ore-deposits
Week 5	Contact Metasomatic Ore Deposits
Week 6	Factors affecting the formation of Metasomatic Ores
Week 7	Hydrothermal Ore Deposits
Week 8	Factors affecting fluid flow at a crustal scale
Week 9	Types of alteration and their ore association
Week 10	Ore deposits formed by regional metamorphism and Submarine Exhalative
Week 11	Formation of sedimentary ore deposits by sedimentation and Chemical precipitation from surface waters
Week 12	Formation of sedimentary ore deposits by mechanical weathering (Placer ore-deposits)
Week 13	Formation of sedimentary ore deposits by chemical weathering (Residual sedimentary ore-deposits)
Week 14	Supergene Enrichment (Oxidation and Secondary Supergene Enrichment ores)
Week 15	**Formation of sedimentary ore deposits by evaporation (evaporates ore deposits)**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Physical Properties of Few Common Ore Minerals
Week 2	Concentration Factor (C.F.)
Week 3	Lazky's Law
Week 4,5&6	Nature of the Ore-bearing hydrothermal fluid and the form in which metals are transported in these fluids
Week 7&8	Methods of determination the temperature & pressure. One of these methods is using certain sulfide minerals Geothermometry and Geobarometry
Week 9&10	Methods of determination the temperature & pressure / Stable isotopes (sulfur isotopes)
Week 11&12	Methods of determination the temperature & pressure / Stable isotopes (Isotopes of oxygen and hydrogen)

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Jensen, M.L. and Bateman, A.M., 1981, Economic mineral deposits. The Open University, 1974, Mineral deposits.	Yes Yes
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**ENVIRONMENTAL GEOLOGY**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	**GEO-47035**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	4		**Semester of Delivery**	7	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Sahar A.Qasim		**e-mail**	Saharqasim59@gmail.com	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Roaa Mohammed Hasaan Ann Abdulsattar Ismail		**e-mail**	roaamohmmed@uomosul.edu.iq annabdulsattar@uomosul.edu.iq	
Peer Reviewer Name			**e-mail**	E-mail	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Geochemistry	**Semester**	5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives	1. Clarification of the importance and relationship of the environmental aspects with various facilities of life ,and their relationship with other sciences.-. 2. Collaborate with other disciplines to find solution, especially medical geology. 3. This course deals with the basic concept of the most important environmental hazards ,which directly or indirectly affects the various forms of life on earth 4. Learn about the most important scientific terms (Terminology) and their definitions related to this topic. 5. To understand the impact of these –environmental riskes on human healthand the sustainability of life.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 2. 3. 1. List with description, the –most types of problems ,especially those related to Iraqi environment. 4. 2. Define the various terms related to the topic -- with their connection to-the observed reality of our environment such as dust storms, desertification …….etc. 5. 3.Abrief explanation of the earth origin as well as the evolution of both atmosphere and hydrosphere. 6. 4. put forward some solutions to solve some problems such as building dams and good urban planning to solve the problem of floods.or afforestation to reduce the risk of desertification 7. 5-clarify the risk of exposure to heavy metal poisoning with examples and solutions.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction, definition of environmental terms, types of environmental hazards, The hadean era ,the archian era (development of earth),development of hydrosphere ,development of atmosphere and oxygen, the ozone , drought & desertification ,global warming,earthquakes &volcanoes ,mass movement ,,coastal hazards , Floods, mass extinction ,dust storms, acidic rains ,medical geology ,,vegetation (indicator plants ,botany ,biogeochemical anomalies ….etc.) geozoology Part B – Practical labs A group of practical issues related to theoretical topics ,such as land uses ,classification of environmental hazards ,indicator plants ,the absorption of elements by soil & plants calculation of water PH in various environments ……etc.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	It includes increasing students knowledge of this subject, through adequate definition of the problems that this scientific branch is concerned with or iterestsd,in terms of problems and solutions and its relationship to other sciences.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction(definitions of environment and environmental terms),types of environments
Week 2	Development of earth (hadean and archian eras.

Week 3	Development of hydrosphere and atmosphere ,the development of oxygene.
Week 4	Atmosphere stratifications ,Ozone (how it formed ,its benefits or advantages and disadvantages.
Week 5	Global warming
Week 6	Drought and desertification
Week 7	Dust storms.
Week 8	Floods& torrents ,the lakes
Week 9	Coastal hazards ,tsonamy
Week 10	Volcanoes and earthquakes
Week 11	Mass movements
Week 12	Mass extinctions
Week 13	Soil ,sculpture and sedimentation
Week 14	Medical geology
Week 15	Vegetations cover

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1classification of natural hazards
Week 2	Lab 2: land uses
Week 3	Lab 3: soil
Week 4	Lab 4: distribution of trace elements between soil and plants
Week 5	Lab 5: calculation of PH-Eh of water<calculate PH from soluble gases
Week 6	Lab 6:distribution of metals in lakes
Week 7	Lab 7: mass extictions
Week 8	Lab 8:. The pollution ofsurface water with soluble gases
Week 9	Lab9:.ground water pollution with uranium
Week10	Lab 10: ground water pollution by sulfide ore body
Week 11	Lab 11: distribution of mobile and immobile metal elements in soil size fraction
Week 12	Lab 12: distribution of metals between stream polluted water and sediments.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Environmental geology Carla w. Montgomery Human impact of the natural environment	Yes no
Recommended Texts	Fundamental of geology Carla w. Montgomery	Yes
Websites	https://shop.elsevier.com/books/introduction to environmental	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer Application in Earth science**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-47036**				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level	4		**Semester of Delivery**	7	
Administering Department	GEO		**College**	SCI	
Module Leader	Sanad Abdulelah Mahmood		**e-mail**	drsanadalkhashab@uomosul.edu.iq	
Module Leader's Acad. Title	Lecture		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Adil Murad Awad		**e-mail**	amawad@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Computer	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أ	1. Clarification of how Advanced geological software can make significant contributions to a understanding and applicable for geosciences. 2. Identify three-dimensional geology structures which are useful in interpreting the subsurface structures and target minerals. 3. This course deals with the basic concept of the most important interpretation digital software, next generation of the computer skills that could be important for student when they graduate and starting work in the oil, teaching, and privet companies.
Module Learning Outcomes	After the student successfully complete his module, will have the appropriate Experian to solve the basic and intermediate problem that relevant to geosciences .the student become able to translate the actual problem to digital version and develop the basic models to describe the complex geological structure to the other side .the student will be able to teach and learn others the fundamental of surfer software and ArcGIS , making two dimensional and three dimensional map, analyze data and share the results and introduce them to the deep learning.in addition the collage or education collaboration as well as the assessment of the work market.
Indicative Contents	Indicative content includes the following. Part A – Theoretical lectures Surfer Software Understand the basic concepts of GIS Raster, vector, projections, geoprocessing and analysis Use a GIS for basic skills in: Thematic mapping Importing tabular data and GIS interpolation Basic vector data analysis Finding and using Open Access data Styling and Map Design [*10* hrs] Part A Theoretical lectures ArcGIS Software. Edit Data from the Map Layer, Attribute Table, View Hyperlink, Track all, Group, Ungroup, Points to Polyline, Points to 3D Polyline, Polygon to Polyline, Polygon to 3D Polygon, Polyline to Points, Polyline to Polygon, Polyline to 3D Polyline, Reshape Thin, Smooth, Crop Image, Connect Polylines, Break Polyline, Break Polyline at Intersections, Alpha Shape, Union Polygons, Intersect Polygons, Difference of Polygons, Buffer, Create Intersection Points Triangulation, Thiessen Polygons. [18 hrs

	Part B Practice or Lab: Applying the practical training by building and developing the model by using surfer and ArcGIS map application 18 Hrs.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents it includes that help in using computer and the obtained skills to communicate with geology software in addition to applying the digital learning in the critical condition like natural pandemic or restrictions of social distancing. In addition to the use of different computerized skills in learning. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods for digital learn in and involving some software 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	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8.4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.6
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	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Orientation and Syllabus
Week 2	An introduction of the digital world (surfer , ArcGIS, Logplot)
Week 3	System Requirements for geology software,
Week 4	The main interface description
Week 5	Input and output data
Week 6	Design a model
Week 7	Introduction to ArcGIS
Week 8	Input and output data
Week 9	Design a model by ArcGIS
Week 10	LogPlot Data Editor Introduction
Week 11	Designing Your Logs
Week 12	Entering your Data
Week 13	Compiling Your Logs
Week 14	Viewing and Manipulating Your Logs
Week 15	Report Works and results

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: fundamentals and practice Pre-test.
Week 2	Lab 2: Surfer -input and output interface
Week 3	Lab 3: design first pre-model

Week 4	Lab 4: reporting the results and outcome
Week 5	Lab 5: introduction to ArcGIS.
Week 6	Lab 6: input and output interface
Week 7	Lab 7: design a model by ArcGIS
Week 8	Lab 8. Reporting the results.
Week 9	Lab9: introduction to Log plot
Week10	Lab 10: practicing the input and output.
Week 11	Lab 11: design a model.
Week 12	Lab 12: final practice test

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**A study of two data grid interpolation algorithm based on surfer software.** Shu-Guang Liu; Xi Chen; Shu-Hong Peng; Ying-Lian Ma; Jing Qian	Yes
Recommended Texts	**BOOK] Geographic information systems and science** Longley, P. A., Goodchild, M. F., Maguire, D. J., & Rhind, D. W. (2005). Geographic information systems and science. John Wiley & Sons.	Yes
Websites	https://www.rockware.com/downloads/documentation/logplot/logplot7_manual.pdf https://www.rockware.com/product/logplot/ https://www.learning-gis.com/learning-objectives/	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria

Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**General Geology II**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-1214**				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Omar Ahmed Mawlood		**e-mail**	omarbadrani@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Omar Ahmed Mawlood Eman Nathim Luma Hazim Ahmed Basma Mohammed shareef		**e-mail**	omarbadrani@uomosul.edu.iq lumahazim@uomosul.edu.iq	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Physical Geology	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The study aims to introduce students in the first stage to the science of geology and all its branches and specializations. This is done by giving preliminary introductory lectures in a simplified and in-depth manner to all the disciplines that the student will learn in the coming stages, so that he will be prepared later to delve deeper into those disciplines when he learns them in the future. Students will be taught structural geology, surface and groundwater science. And take an important look at the theory of plate tectonics. Introducing students to historical geology and the most important rules adopted in determining geological time in both its relative and absolute types, the geological time scale and stratigraphy with its main lines. تهدف الدراسة الى تعريف الطلاب بالمرحلة الأولى بعلم الجيولوجيا وكافة فروعه وتخصصاته، ويتم ذلك عن إعطاء محاضرات أولية تعريفية بصورة مبسطة وغير معمقة لكل التخصصات التي سيتعلمها الطالب بالمراحل القادمة ليكون مهيأ فيما بعد للتعمق بتلك التخصصات حين يتعلمها مستقبلا. حيث سيتم تعليم الطلاب على الجيولوجيا التركيبية، وعلم المياه السطحية والجوفية . والقاء نظرة مهمة عن نظرية الصفائح التكتونية. وتعريف الطلبة بالجيولوجيا التأريخية وأهم القواعد المعتمدة في تحديد الزمن الجيولوجي بنوعيه النسبي والمطلق والسلم الزمني الجيولوجي وعلم الطبقات بخطوطه الرئيسية
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- The study of structural geology and its connection with earth movements and mountain-building movements, the formation of folds of all kinds, faults and breaks in their main divisions, and a study of cartography, especially geological maps 2- And he touched on the flow of water, the water cycle in nature, the river, its deposits, and its divisions 3- Study of lakes and seas and their divisions according to geology. 4- Studying the theory of tectonic plates, their types, shapes, and sizes, and their role in the formation of the Earth's surface and the variation in the locations of the continents and seas during geological time. 5- Study of Historical geology and the determination of relative time and the most basic rules in determining it. And compare it to the absolute age and how to determine the absolute age 6- Study of the science of strata (stratigraphy), their types, the boundaries between them, their rock, biological, and Cronos units, and comparison between them. دراسة الجيولوجيا التركيبية وأرتباطها بالحركات الأرضية والحركات البانية للجبال، وتكون الطيات بأنواعها والفوالق والفواصل بتقسيماتها الرئيسية، والتطرق لعلم الخرائط وخصوصا الخرائط الجيولوجية . والتطرق الى غلم المياه ودورة المياه في الطبيعة والنهر وترسباته وأقسامه، دراسة البحيرات والبحار وتقسيماته حسب علم الجيولوجيا. دراسة نظرية الصفائح التكتونية أنواعها وأشكالها وأحجامها ودورها في تشكل سطح الأرض وتغاير مواقع القارات والبحار خلال الزمن الجيولوجي. الجيولوجيا التأريخية وتحديد الزمن النسبي وأهم القواعد الأساسية في تحديده. ومقارنته بالعمر المطلق وكيفية تحديد العمر المطلق. والأشارة الى علم

	الطبقات وأنواعها والحدود بينها وتقسيماتها الصخرية والحياتية والزمنية، والمضاهاة بينها.
Indicative Contents المحتويات الإرشادية	Geologic structure, Introduction, Rock deformation, Dip and Strike, Outcrop, Folds, Types of folds. Faults, Dip-slip fault, Strike-slip fault, Oblique-slip faults, Joints. Geological map, Introduction, Type of Geological map. Hydrogeology, Introduction, The hydrologic cycle, Running water, Stream velocity, Drainage patterns, River erosion. River transportation of sediments, River deposition, The stage of river evolution, Delta, Alluvial fan, Lakes. Groundwater, Source of ground water, Porosity and permeability, The water table. Aquifers, Types of aquifers, Springs, Geysers. Glacier, Introduction, Glacier formation, Type of glacier, Glacial movement, Erosion and transport by glaciers, Glacial deposits. Plate tectonics, Introduction, Continental drift hypothesis, Evidence of continental drift, Seafloor spreading. Plat tectonics theory, Plates boundaries, The driving mechanism of plate tectonic, Mantle plumes and hot spots. Geological Time, Introduction, Geological time and uniformitarianism , Relative geological time, Fossils, The requirements for fossilization. The five Determination of relative ages, Unconformity, Correlation of rock unit, index fossils. The Geological Time Scale Absolute Geologic Time, Radioactivity Decay and Half-lives

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Teach students how to distinguish the types of folds, the types of faults and joints, and the reasons that led to the occurrence of these deformations on rocks. How do students motivate the reason for observing the current rivers, how to distribute their sediments, and the variation in the sizes of these sediments during the river section? The students urged the reason for the accuracy of the observation during their field observations of the succession of rock layers in terms of rock and color variation and lateral and vertical extension. Focusing on searching through the layers for fossils and their effects because they have a role in determining the works of those rock layers. تعليم الطلاب كيفية تمييز أنواع الطيات وأنواع الفوالق والفواصل، والأسباب التي أدت الى حدوث هذه التشوهات على الصخور. كيف يحفز الطلبة علة مراقبة الأنهار الحالية وكيفية توزيع رواسبها وتغاير أحجام هذه الرواسب خلال المقطع النهري. وحث الطلبة علة دقة الملاحظة خلال مشاهداتهم الحقلية لتتابع الطبقات الصخرية من حيث التغاير الصخري واللوني والأمتداد الجانبي والعمودي. والتركيز على البحث خلال الطبقات عن المتحجرات ةأثارها لما لها دور في تحديد أعمال تلك الطبقات الصخرية.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	107	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Geologic structure, Introduction, Rock deformation, Dip and Strike, Outcrop, Folds, Types of folds. Faults, Dip-slip fault, Strike-slip fault, Oblique-slip faults, Joints..
Week 2	Geological map, Introduction, Type of Geological map.
Week 3	Hydrogeology, Introduction, The hydrologic cycle, Running water, Stream velocity, Drainage patterns, River erosion.
Week 4	River transportation of sediments, River deposition, The stage of river evolution, Delta, Alluvial fan,

	Lakes.
Week 5	Groundwater, Source of ground water, Porosity and permeability, The water table. Aquifers, Types of aquifers, Springs, Geysers.
Week 6	Glacier, Introduction, Glacier formation, Type of glacier, Glacial movement, Erosion and transport by glaciers, Glacial deposits.
Week 7	Plate tectonics, Introduction, Continental drift hypothesis, Evidence of continental drift, Seafloor spreading.
Week 8	Plat tectonics theory, Plates boundaries, The driving mechanism of plate tectonic, Mantle plumes and hot spots.
Week 9	**Geological Time, Introduction, Geological time and uniformitarianism.**
Week 10	**Relative geological time, Fossils, The requirements for fossilization**.
Week 11	**The five Determination of relative ages, Unconformity, Correlation of rock unit, index fossils.**
Week 12	**The Geological Time Scale**
Week 13	**Absolute Geologic Time, Radioactivity Decay and Half-lives**
Week 14	Summary.
Week 15	**Field trip**.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Lab 1:** Introduction and definition of cartography
Week 2	**Lab 2:** Contents and types of maps
Week 3	**Lab 3:** Topographic and contour maps
Week 4	**Lab 4:** How to create a contour map
Week 5	**Lab 5:** Contour mapping
Week 6	**Lab 6:** Identify the major and minor terrain features from contour maps
Week 7	**Lab 7:** How to draw topographic sections from contour maps (profile)
Week 8	**Lab 8:** An introduction to how to identify the position of the layers from the map
Week 9	**Lab9:** Horizontal layers
Week10	**Lab 10:** Vertical layers
Week 11	**Lab 11:** Oblique layers

Week 12	**Lab 12:** How to project bedding attitudes on a geological section

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**AL-Dabbagh. T.H. (2017) The Earth_/… An Introduction to Physical geology First edition. 366P.**	Yes Yes
Recommended Texts	Thompson Graham R, Turk Jonathen, 2011. Earth, what inside, Student Edition, Brookes/ Cole, cengage learing	Yes No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Mineralogy**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-1205**				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level	1		**Semester of Delivery**	TWO	
Administering Department	Geology science		**College**	science	
Module Leader	Flyah Hassan Abbas		**e-mail**	flyahabas@uomosul.edu.iq	
Module Leader's Acad. Title	lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Flyah Hassan Abbas Shareef Thamoud Shareef		**e-mail**	flyahabas@uomosul.edu.iq	
Scientific Committee Approval Date	03/03/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	Crystallography	**Semester**	1

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Clarification of how studying this course can make significant contributions to the mineralogy field. 2. Identify the principles of mineralogy and the study of the chemical and physical properties of minerals . 3. This course deals with Environments of Minerals Formation. 4. Learn about the most important scientific terms (Terminology) and their definitions related to this topic 5. To understand the classification of minerals and importance of each type. 6. This course employs how to deal with minerals, their locations and methods of diagnosis through their physical and chemical properties.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Define mineralogy and describe its tool types. 2. Definitions of main terms and methods of mineralogy 3. Description the environments of minerals formation.. 4. Summarize what is meant Polymorphism, Pseudomorphism, Coordination of Ions. 5. Discuss the Classification of Minerals. 6. Explanation of the silicate minerals. 7. Interpretation the classification of Silicate Minerals. 8. Define Silicate Minerals and describe its types. 9. Explanation of Non Silicate Minerals. 10. Discuss the importance each type of silicate and non silicate mineral..
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction , Composition of the Earth's crust, Physical Properties of Minerals, Crystal form and habit, Color, Streak, Luster, Transparency, Hardness, Cleavage, Fracture, Specific gravity, Environments of Minerals Formation, The Magmatic Environment, The Sedimentary Environment, The Metamorphic Environment. [10 hrs] Polymorphism, Pseudomorphism, Coordination of Ions, Silicate Minerals, Classification of Silicate Minerals,. [8 hrs] Nesosilicates, Sorosilicates, Cyclosilicates, Inosilicates, Phyllosilicates, Tectosilicates, Non Silicates, [10 hrs] Non Silicates, Native Elements, Sulfides (including arsenides and sulfarsenides), Oxides, Hydroxides, Halides, Carbonates, Sulfates, Phosphates . [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs An introduction to mineralogy, Physical properties of minerals, Properties of Silicate Minerals, Diagnosis and characteristics of Nesosilicates and Sorosilicates, Diagnosis and characteristics of Cyclosilicates and Inosilicates, Diagnosis and characteristics

	of Phyllosilicates, Tectosilicates. [18 hrs] Properties of Non Silicate Minerals, Diagnosis and characteristics of Native Elements, Diagnosis and characteristics of Sulfides group and Sulphates group, Diagnosis and characteristics of Oxides group and Hydroxides group, Diagnosis and characteristics of Carbonates group , Halides group and Phosphates group . [18 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The course includes the principles of mineralogy and the study of the chemical and physical properties of minerals, the study of mineral deposition environments as well as classification of minerals. The course also includes learning about the importance of minerals, how to diagnose minerals, how to examine them and their properties, and thus identify them.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	107	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	An introduction to mineralogy.
Week 2	physical and chemical properties of minerals .
Week 3	Environments of Minerals Formation.
Week 4	Polymorphism, Pseudomorphism, Coordination of Ions.
Week 5	Silicate Minerals.
Week 6	Classification of Silicate Minerals.
Week 7	Nesosilicates, Sorosilicates.
Week 8	Cyclosilicates, Inosilicates.
Week 9	Phyllosilicates, Tectosilicates.
Week 10	Non Silicates.
Week 11	Native Elements.
Week 12	Sulfides group, Sulphates group.
Week 13	Oxides group , Hydroxides group.
Week 14	Carbonates group , Halides group , Phosphates group.
Week 15	General review.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: An introduction to mineralogy.
Week 2	Lab 2: Physical properties of minerals .
Week 3	Lab 3: Properties of Silicate Minerals.
Week 4	Lab 4: Diagnosis and characteristics of Nesosilicates and Sorosilicates.
Week 5	Lab 5: Diagnosis and characteristics of Cyclosilicates and Inosilicates.
Week 6	Lab 6: Diagnosis and characteristics of Phyllosilicates, Tectosilicates.
Week 7	Lab 7: Properties of Non Silicate Minerals.
Week 8	Lab 8: Diagnosis and characteristics of Native Elements.
Week 9	Lab9 : Diagnosis and characteristics of Sulfides group and Sulphates group.

Week10	Lab 10: Diagnosis and characteristics of Oxides group and Hydroxides group.
Week 11	Lab 11: : Diagnosis and characteristics of Carbonates group , Halides group and Phosphates group.
Week 12	Lab 12: General review.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**John, J (2015):** Introducing mineralogy. Dunedin Academic, 126p. **Nesse, W. D. (2018) :** Introduction to Mineralogy : Oxford University, 514p.	Yes Yes
Recommended Texts	**Haldar, S.K. and Josip, T. (2014) :** Introduction to Mineralogy and Peetrology: Elsevier Inc , 338P.	No
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Physics			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒**Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	Geo-1206				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Kheder Ali Salah		**e-mail**	khederali@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Kheder Ali Salah		**e-mail**	khederali@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1- Introduce students to the importance of general principles in physics by explaining (The SI Units, Quantities, Displacement, Distance, Scalar & Vector Quantities, Motion, Velocity, Speed, Acceleration, Kinematic equations, a Freely Falling Body, Projectile Motion, laws of Newton's of motion, and Friction, nature of light, physical optics, reflection and refraction). 2- Enabling students to distinguish between Vectors quantities and Scalar quantities and the motion of the body at constant Velocity and constant Acceleration with Kinematic equations, Freely falling body, Projectile Motion, Newton's Laws of Motion, and Friction and light laws. 3- Develop students' knowledge about the most important mechanics in (Scalar & Vector quantities, Displacement, Distance, Velocity, Acceleration, Kinematic equation, the Freely Falling body, Projectile motion, Newton's Laws of Motion, and Friction). 4- Accustom students to linking the theoretical side of the module with the daily practical life of the student, by giving him examples related to ordinary life. 5- Study the (Scalar quantities & Vector quantities) properties by studying the sum, subtract, Scalar product & Vector product. 6- Study the Displacement, and (Motion of the body) at constant Velocity & acceleration, and the Kinematic equations. 7-Enabling the student to know the basic concepts of a Freely Falling body, Projectile Motion, Newton's Laws of Motion, and Friction. 8- Overall, the aim of a module is to provide students with powerful tools for understanding and analyzing Classical Mechanics properties.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-Properties of Mechanics: Mechanics are classified into Two important essential branches which are namely kinematics and Dynamics. 2- Kinematic: This is the branch of mechanics that studies the motion of a body without regard to the cause of that motion. which include the study of average velocity and a constant velocity of a moving body, average acceleration and constant acceleration of a moving body, Instantaneous velocity, and instantaneous acceleration of a moving body. 3- The Three Kinematic equations of motion which describe the motion of body with initial velocity and final velocity, instant of time (t), displacement, and acceleration of a moving body. 4- The Freely Falling Body: which describe the body that is moving freely under the influence of gravity, where it is assumed that the effect of air is negligible. 5- Projectile Motion: which describe of an object is simple to analyze if we make two assumption: (1) the free-fall acceleration is constant over the range of motion and is directed downward, and (2) the effect of air resistance is negligible, and study Horizontal Range, Maximum Height of Projectile and time of flight of the projectile. 6- Dynamic: is the branch of mechanics concerned with the forces that change or produce the motion of bodies. the foundation of dynamics is Newton's Laws of motion (First, Second and Third Law). Another type of Dynamic is the Friction which is divided in two type the first is (Force of Static Friction) and the second is the (Force of Kinetic Friction).

	7- Introduction to properties of light. 8- Types of reflection: External reflection: This happens when it is (n>1), that is, when the light falls from the medium of the lowest light density to the medium of the highest light density (for example, "when light falls from the air towards the water). Internal reflection: This happens when it is (n<1), that is, when light falls from the medium with the highest light density to the medium with the lowest light density (from glass to the air).
Indicative Contents المحتويات الإرشادية	This course introduces the use of Chemical, physical methods in the study of biological systems: Scope of Biophysics, Fundamentals of Biophysics, interaction of light With matter, ChemicalForces, Diffusion and Brownian motion, Viscosity, Light Scattering Small - Molecule Solutes:hydrophiles, hydrophobes, large Hydrophobic Solutes and Surfacec, Aqueous Environment of theCell, State of Water in bio-structures & its significance, phsico Chemical Techniques to StudyBiophsics (Introduction, Physical Aspects, of Hearing) (The Ear, Elementary acoustics, Theories ofhearing), Optical defects of the eye, Neural aspects of Vision, Chemical equilibriums in biologicalsystems, Bioenergy

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Conceptual Understanding: Start by providing an overview of nature of the light, and Help students understand how this principles and methods are used to analyze and interpret data in these areas. Use real-world examples and case studies to illustrate the significance of optics techniques. Problem-Solving Practice: Include problem-solving activities and assignments that require students to apply this theory to practical scenarios. Present them with real or simulated data and challenge them to analyze and interpret the information using appropriate optics techniques. This will develop their problem-solving skills and reinforce their understanding of the subject matter. Supplemental Resources: Recommend supplementary resources such as textbooks, research articles. Encourage students to explore these resources to gain a deeper understanding of the subject matter. Provide a curated list of recommended readings and online tools to support their learning. Assessment and Feedback: Regularly assess students' understanding through quizzes, tests, or projects. Provide constructive feedback to guide their learning and address any misconceptions. Consider incorporating formative assessments to gauge understanding before major evaluations, allowing for timely intervention and support. Collaboration and Discussion: Foster collaboration among students by organizing group discussions, case studies, or problem-solving sessions. Encourage them to share their perspectives, ideas, and experiences related to nature of the light. This collaborative environment promotes active learning, critical thinking, and knowledge sharing.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	4, 10 and 15	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Scope of Biophysics, Fundamentals of Biophysics.
Week 2	Interaction of light With matter.
Week 3	Chemical Forces.

Week 4	Discussion and Quiz
Week 5	Diffusion and Brownian motion, Viscosity.
Week 6	Light Scattering Small - Molecule Solutes:hydrophiles, hydrophobes, large Hydrophobic Solutes and Surfacec.
Week 7	Aqueous Environment of theCell, State of Water in bio-structures & its significance.
Week 8	phsico Chemical Techniques to StudyBiophsics (Introduction, Physical Aspects, of Hearing).
Week 9	The Ear, Elementary acoustics, Theories ofhearing.
Week 10	Discussion and Quiz
Week 11	Optical defects of the eye.
Week 12	Neural aspects of Vision.
Week 13	Chemical equilibriums in biological systems.
Week 14	Bioenergy.
Week 15	Discussion and Quiz

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	The acceleration of free fall by means of the simple pendulum.
Week 2	The velocity of sound.
Week 3	Ohms law.
Week 4	The focal length of mirrors.
Week 5	The refraction of light.
Week 6	The focal length of lenses.
Week 7	The coefficient of 1)static and 2)dynamic friction for wood on wood.
Week 8	The specific weight of solid body and liquid
Week 9	Determined the frequency of a tuning fork by means of a sonometer
Week10	Quiz
Week 11	
Week 12	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Physics for Scientists and Engineers with modern physics/ Douglas C. Giancoli (2009). 2. Physics for Scientists and Engineers with modern physics/ Raymond A. Serway and John W. Jewett, Jr. (2016). 3. Physics part 1/ Jearl Walker. (2010). 4. Practical physics in (SI) BY E.Armitage.	
Recommended Texts	1. **fundamentals of Physics, 8th edition, by** Jearl Walker . 2. Fundamentals of College Physics Updated Fifth Edition Volume I: Mechanics, Vibratory Motion, Wave Motion, Fluids, and Thermodynamics Dr. Peter J. Nolan. 3. College physics by serway.	
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**مبادئ الإحصاء**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-1207**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	**1**		**Semester of Delivery**	2	
Administering Department	**OR110**		**College**	**Type College Code** رمز الكلية	
Module Leader	Mazin Mohammed Ghanim		**e-mail**	azinalanaz@uomosul.edu.iq	
Module Leader's Acad. Title	**Lecture**		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	11/06/2023 تاريخ موافقة اللجنة العلمية		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives	١- تعريف الطالب بموضوع الإحصاء وعلاقته بباقي المواضيع ٢- تعريف الطالب على المفاهيم الأساسية مثل الوسط الحسابي والوسيط والمنوال والعلاقة بينهم وعيوب ومزايا كل منها ٣- تعريف الطالب بالوسط الهندسي والتوافقي والتربيعي والعلاقة بينهم ٤- تعريف الطالب بالتباين والانحراف المعياري ومعامل الاختلاف ٥- تعليم الطالب تكوين الجداول الإحصائية وحساب المفاهيم أعلاه لها ٦- تعليم الطالب تمثيل البيانات وأيضا تعريف الطالب بمفهوم التباديل والتوافيق
Module Learning Outcomes	هام: اكتب ٦ مخرجات تعليمية على الأقل ، ومن الأفضل أن تكون مساوية لعدد أسابيع الدراسة. ١- تعليم الطالب التعامل مع البيانات ووضعها في جداول إحصائية ٢- يكون الطالب قادرا على إيجاد المقاييس الإحصائية مثل المعدل والتباين والوسط الهندسي والتوافقي والتربيعي للبيانات المبوبة وغير المبوبة ٣- يكون الطالب قادرا على إيجاد الوسيط والمنوال ٤- يكون الطالب قادرا على تمثيل البيانات باستخدام الاشكال البيانية مثل المدرج التكراري والمضلع التكراري والدائرة البيانية ٥- يكون الطالب قادرا على قراءة النتائج التي توصل اليها من خلال حساب الوسط الحسابي، التباين الخ ٦- يكون الطالب قادرا على فهم التوافيق والتباديل والعلاقة بينهما
Indicative Contents	يتضمن المحتوى الإرشادي ما يلي. الفصل الأول. المقدمة. نشوء وتطور علم الإحصاء. تعريف علم الإحصاء ومجالات تطبيقه. الطريقة الإحصائية في البحث العلمي وأسلوب تصميم البحوث [٠٨ساعة] الفصل الثاني. جمع وتصنيف وتبويب البيانات . ساليب جمع البيانات (التسجيل الشامل، العينات). وسائل جمع البيانات (الجمع المباشر، الاستبيان) [٠٨ ساعة] تصنيف وتبويب البيانات. اختيار العينات [٠٦ ساعة]

الفصل الثالث. التوزيعات التكرارية وأساليب عرض البيانات. المتغيرات العشوائية (المتقطعة والمستمرة)- (النوعية والكمية) . العرض الجدولي للبيانات (التوزيع التكراري/ التوزيع التكراري النسبي)[١٠ ساعة] التوزيع التكراري المزدوج/ التوزيعات التكرارية المتجمعه . العرض الهندسي (الأشرطة البيانية/ المستطيل البياني/الدائرة البيانية/ الخط البياني) (المدرج التكراري. المضلع التكراري) (المنحنيات التكرارية المتجمعه) اشكال التوزيعات التكرارية (المتماثلة وغير المتماثلة) [١٢ ساعة] الفصل الرابع. مقاييس النزعة المركزية. رمزا الجمع والضرب. مفهوم المتوسطات والهدف من احتسابها . الوسط الحساب . الوسط الهندسي. الوسط التوفيقي. الوسط التربيعي والعلاقة بينهم . الوسيط والمنوال. (عيوب ومميزات الأوساط والوسيط والمنوال). اختيار مقياس النزعة المركزية المناسب [١٢ ساعة] الفصل الخامس . مقاييس التشتت . مفهوم التشتت والهدف من احتسابه. حساب التباين . حساب الانحراف المعياري (للبيانات غير المبوبة والمبوبة) . التباين المشترك . معامل الاختلاف [١٢ ساعة] معاملات التشتت النسبي . التباديل . التوافيق . العلاقة بين التباديل والتوافيق . [٦ ساعة]	

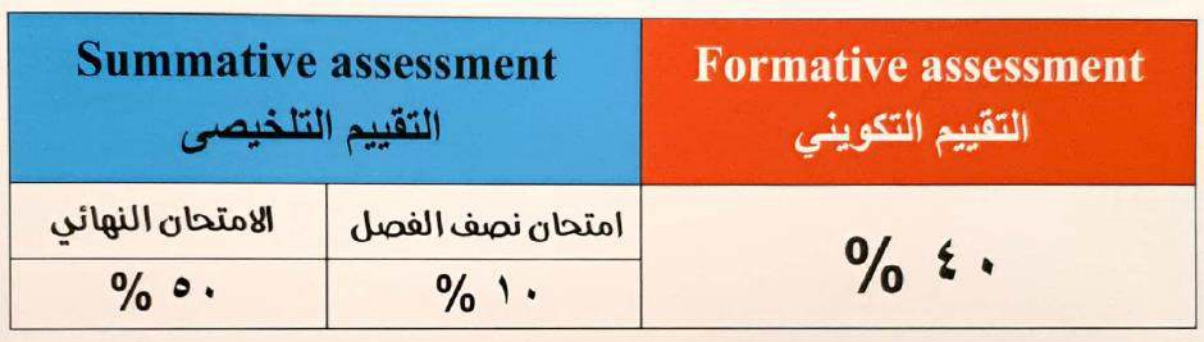
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	الإستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه الوحدة هي تشجيع الطلاب على المشاركة في التمارين ، مع تحسين مهارات التفكير النقدي وتوسيعها في نفس الوقت. سيتم تحقيق ذلك من خلال الفصول والبرامج التعليمية التفاعلية

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.4
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 التقييم التكويني	**Quizzes**	3	15% (15)	6,8 and 12	LO #1, #2 and #5, #6
	Assignments	3	15% (15)	4, 8 and 12	LO #3, #4 and #6, #
	Projects / Lab.				
	Report	1	10% (10)	14	LO #3, #4 and #5
Summative assessment التقييم التلخيصي	**Midterm Exam**	2hr	10% (10)	9	LO #3 - #4-#6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	الفصل الأول. المقدمة. نشوء وتطور علم الإحصاء. تعريف علم الإحصاء ومجالات تطبيقه
Week 2	الطريقة الإحصائية في البحث العلمي وأسلوب تصميم البحوث
Week 3	الفصل الثاني. جمع وتصنيف وتبويب البيانات. أساليب جمع البيانات (التسجيل الشامل/ العينات)وسائل جمع البيانات (الجمع المباشر/ الاستبيان) تصنيف وتبويب البيانات. اختيار العينات

Week 4	الفصل الثالث. التوزيعات التكرارية وأساليب عرض البيانات. المتغيرات العشوائية (المتقطعه والمستمرة). (النوعية ،الكمية) . العرض الجدولي للبيانات (التوزيع التكراري/ التوزيع التكراري النسبي)
Week 5	التوزيع التكراري المزدوج / التوزيعات (التكرارية المتجمعه) .العرض الهندسي (الأشرطة البيانية/ المستطيل البياني/ الدائرة البيانية / الخط البياني)(المدرج التكراري. المضلع التكراري)
Week 6	المنحنيات التكرارية المتجمعه. اشكال التوزيعات التكرارية (المتماثلة وغير المتماثلة)
Week 7	الفصل الرابع. مقاييس النزعة المركزية . رمزا الجمع والضرب . مفهوم المتوسطات والغرض من احتسابها . الوسط الحسابي . طريقة حسابه للمتغيرات غير المبوبة والمبوبة . العيوب . المزايا
Week 8	والمزاياالوسط الهندسي. الوسط التوافقي . الوسط التربيعي. طرق حساب هذه المتوسطات . العيوب والمزايا . العلاقة بين هذه المتوسطات فيما بينها وعلاقتها مع الوسط الحسابي
Week 9	الوسيط . المنوال . طريقة الاحتساب. العيوب. المزايا. العلاقة مع الوسط الحسابي. اختيار مقياس النزعة المركزية المناسب
Week 10	الفصل الخامس. مقاييس التشتت. مفهوم التشتت. الهدف من احتسابه .
Week 11	التباين. الانحراف المعياري. طريقة الحساب . العيوب. المزايا. التباين المشترك
Week 12	معاملات التشتت النسبي. معامل الاختلاف. الدرجة المعيارية
Week 13	حساب التباين للبيانات المبوبة . حساب الانحراف المعياري للبيانات المبوبة
Week 14	معاملات التشتت النسبي
Week 15	التباديل. التوافيق. العلاقة بين التباديل والتوافيق .
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts النصوص المطلوبة	الإحصاء/د. محمود حسن المشهداني/امير حنا هرمز /جامعه بغداد ٢- المدخل إلى الإحصاء/د. خاشع الراوي/ جامعه الموصل 3- Allan G. Bluman/2012 /Elementary	yes
Recommended Texts	١- مبادئ الإحصاء. احمد عبد السميع،دار اليازوري العلمية للنشر، ٢٠٠٨ ٢- مبادئ الإحصاء. الدكتور طه حسين الزبيدي، دار غيداء للنشر، ٢٠١٢	No
Websites	https://books-library.net/c-Statistics-download	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performanceأداء مذهل
	B - Very Good	جيد جدا	80 - 89	Above average with some errors فوق المتوسط مع بعض الأخطاء
	C - Good	جيد	70 - 79	Sound work with notable errors العمل السليم مع أخطاء ملحوظة
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings عادل ولكن مع نواقص كبيرة
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria العمل يلبي الحد الأدنى من المعايير
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded مطلوب المزيد من العمل ولكن الائتمان الممنوح
	F – Fail	راسب	(0-44)	Considerable amount of work required قدر كبير من العمل المطلوب

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، في حين سيتم تقريب علامة ٥٤.٤ إلى ٥٤. لدى الجامعة سياسة عدم التغاضي عن "فشل التمريرة القريبة" وبالتالي فإن التعديل الوحيد للعلامات الممنوحة بواسطة العلامة (العلامات) الأصلية سيكون التقريب التلقائي الموضح أعلاه

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM-103**				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level	1		**Semester of Delivery**	2	
Administering Department	GEO		**College**	SCI	
Module Leader	Adil Murad Awad		**e-mail**	amawad@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Sanad Abdulelah Mahmood Adil Murad Awad		**e-mail**	drsanadalkhashab@uomosul.edu.iq amawad@uomosul.edu.iq	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This program is meant for those students who have low-level literacy in computer use and only partial understanding of the functions of a computer. And so, the students are introduced to this program to improve computer literacy. The students must apply their knowledge to use office skills before use the advanced geology software. – Describe why computers are important. – Explain how computers work. – Explain the difference between computer hardware and computer software. – Describe what an operating system is. – Identify the operating system you have on your own computer and phone. – Explain office productivity and communications software. – Start up and shut down computers properly. – Use the mouse and keyboard to complete tasks on the computer. – Identify the different groups of keys on the computer. – Create, open, save, and manage files and folders
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	– Understand basic computer terminology. – Identify components of a computer and peripheral devices. – Perform the basic computer functions by using a desktop or a laptop. – Develop an understanding of word processing capabilities of a computer. – Understand the concept and usage of the Internet and e-mails. – Use the acquired skills to pursue employment opportunities. – Enhance their computer literacy to be ready for advanced geology softwa Describe why computers are important. – Explain how computers work. – Explain the difference between computer hardware and computer software. – Describe what an operating system is. – Identify the operating system you have on your own computer and phone. – Explain office productivity and communications software. – Start up and shut down computers properly. – Use the mouse and keyboard to complete tasks on the computer. – Identify the different groups of keys on the computer. – Create, open, save, and manage files and folders .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction, Computer Basics Presentation • Mouse Training Presentation • Keyboarding Presentation • File Management Presentation • Mouse Practice Spreadsheet.

	Introduction to the world of Computers, Computer and Word Processing, Using the Internet, Using E-mail, Application of Microsoft office, Word, Excel, PowerPoint, Access. [*18* hrs] Part B –lab Work: Student applied and do practice all the lectures and according to sequences of lectures. . [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategie	Expanding students' perceptions about this science and its contents it includes that help in using computer and the obtained skills to communicate with geology software in addition to applying the digital learning in the critical condition like natural pandemic or restrictions of social distancing. In addition to the use of different computerized skills in learning. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods for digital learn in and involving some software 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	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8.4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.6
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Orientation, Syllabus
Week 2	Introduction of Computer World.
Week 3	Using the computer and Managing Files using Windows O. S
Week 4	Concept of information and Communication technology
Week 5	hardware components
Week 6	Office Software
Week 7	Word (interface language)
Week 8	Word (files and editing)
Week 9	Word (format features)
Week 10	Word (table and outcome)
Week 11	Power point (interface language)
Week 12	Power point (menus and slide design)
Week 13	Power point (animation effects)
Week 14	Excel (interface language)
Week 15	Access (basic practice)

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1. Managing Files using Windows O. S
Week 2	Lab 2. Communication technology Web design and browsering
Week 3	Lab 3. Word (interface language)
Week 4	Lab 4. Word (files and editing)
Week 5	Lab 5. Word (format features)
Week 6	Lab 6. Word (table and outcome)
Week 7	Lab 7: Power point (interface language)
Week 8	Lab 8. Power point (menus and slide design)
Week 9	Lab9: Power point (animation effects)
Week10	Lab 10: Excel (interface language)
Week 11	Lab 11: Access (basic practice)
Week 12	Lab 12: Project Work

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Computer Basics for Beginners with Pictures and Stories (IT's Story) Paperback – December 26, 2021** **by Hena Kim (Author)ICDL Excel: A step-by-step guide to spreadsheets using Microsoft Excel**	Yes Yes
Recommended Texts	**Windows 11 for Seniors: The Most Complete Easy-to-Follow Guide to Master Your New PC. Unlock All Their Features with Step-by-Step Illustrated Instructions and Useful Tips and Tricks Paperback – July 22, 2022** https://www.youtube.com/watch?v=z2r-p7xc7c4	Yes No
Websites	https://icdl.ie/app/uploads/2021/04/ICDL-References.pdf https://www.keyhero.com/typing-practice/ https://www.speedtypingonline.com/user/hero.o/test-stats	

Grading Scheme مخطط الدرجات				
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**General Geology I**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-1101**				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Rafee Ibrahim Al-Humidi		**e-mail**	Rafeegro66@uomosul.com	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Rafee Ibrahim Al-Humidi Falah abd Mohammed Azawi Safwan Fathi Hameed Oday Mohammed Saleh Mohammed Muafaq Yahya		**e-mail**	Rafeegro66@uomosul.com falahabed@uomosul.edu.iq safwanfathi@uomosul.edu.iq Odayothman@uomosul.edu.iq mohmed.m.m@uomosul.edu.iq	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The study aims to introduce students in the first stage to the science of geology and all its branches and specializations. This is done by giving preliminary introductory lectures in a simplified and in-depth manner to all the disciplines that the student will learn in the coming stages, so that he will be prepared later to delve deeper into those disciplines when he learns them in the future.Where students will be taught about the types of rocks and minerals and the methods of their formation, and then the natural physical, chemical and biological processes that affect them and that work to break them down.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Studying the earth and the creation of the universe, and the divisions of the earth and its parts. Identifying the main elements of the earth's crust, studying minerals and their types, and methods of diagnosing them. And then the study of igneous rocks and the method of their origin and divisions. Sedimentary rocks, their types, characteristics, methods of formation, and areas of formation (depositional environments). As well as metamorphic rocks, methods of transformation, conditions of transformation and their divisions. Identify the factors affecting the weathering of rocks and methods of transporting sediments, their aggregation and cohesion.
Indicative Contents المحتويات الإرشادية	Introduction to geology, What is geology?, What do geologists do?, Solar system , New hypothesis. Structure of the earth. Crust, Mantle, Core, The rock cycle, Group of rocks. Minerals, Introduction, Natural occurring, inorganic materials, Crystal structure, Chemical composition of minerals, Physical properties of minerals. Minerals groups, Silicate minerals t, Clay minerals, Nonsilicate minerals. Minerals identification, Color, Luster…etc, How minerals form, Cooling magma, Crystallize from hot water, Chemical weathering processes, Metamorphism, The rock forming minerals. Igneous rocks, Introduction, magma and lava, Composition of magma, How magma originates and changes Bowen's reaction series, Characteristics of igneous rocks, Igneous rocks textures, Chemical composition of igneous rocks. Classification of igneous rocks, Volcanism, Sills and dikes, Batholiths and stocks. Sedimentary rocks, Introduction, Formation of sedimentary rocks, Occurrence of sedimentary rocks, Sedimentary depositional environments. Sediments and sedimentary rocks, Types of sedimentary rocks, Detrital sedimentary rocks, Chemical and biochemical sedimentary rocks. Sedimentary facies, Strata or beds, Sedimentary structures, Fossils, Formation, Petroleum and natural gas. Metamorphic rocks, Introduction, The agents of metamorphism, Types of metamorphism. The classification of metamorphic rocks, Foliated & Nonfoliated metamorphic rocks. Weathering, erosion and soil formation, Introduction, Types of weathering, Mechanical weathering, Chemical weathering, Climate and chemical weathering, Particle size and rate of chemical weathering,

	Parent material. Soil, The soil profile, Factors controlling soil formation.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Teaching students how to identify minerals and their properties, and thus how to identify the types of rocks by nature and distinguish them easily in the field, and stimulate them to understand the ways of their formation and predict the regions and methods of their formation. Methods of distinguishing natural factors affecting rocks

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	107	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction to geology, What is geology? What do geologists do?, Solar system , New hypothesis.
Week 2	Structure of the earth. Crust, Mantle, Core, The rock cycle, Group of rocks.
Week 3	Minerals, Introduction, Natural occurring, inorganic materials, Crystal structure, Chemical composition of minerals, Physical properties of minerals.
Week 4	Igneous rocks, Introduction, magma and lava, Composition of magma, How magma originates and changes
Week 5	Sedimentary rocks, Introduction, Formation of sedimentary rocks, Occurrence of sedimentary rocks, Sedimentary depositional environments.
Week 6	Sediments and sedimentary rocks, Types of sedimentary rocks, Detrital sedimentary rocks, Chemical and biochemical sedimentary rocks.
Week 7	Sedimentary facies, Strata or beds, Sedimentary structures, Fossils, Formation, Petroleum and natural gas.
Week 8	Metamorphic rocks, Introduction, The agents of metamorphism, Types of metamorphism.
Week 9	The classification of metamorphic rocks, Foliated & Nonfoliated metamorphic rocks..
Week 10	Weathering, erosion and soil formation, Introduction, Types of weathering, Mechanical weathering, Chemical weathering,
Week 11	Climate and chemical weathering, Particle size and rate of chemical weathering, Parent material.
Week 12	Soil, The soil profile, Factors controlling soil formation.
Week 13	Bowen's reaction series, Characteristics of igneous rocks, Igneous rocks textures. Classification of igneous rocks, Volcanism, Sills and dikes, Batholiths and stocks.
Week 14	Summary. of the lectures
Week 15	Field trip

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**AL-Dabbagh. T.H. (2017) The Earth_/… An Introduction to Physical geology First edition. 366P.**	Yes Yes
Recommended Texts	**Thompson Graham R, Turk Jonathen, 2011. Earth, what inside, Student Edition, Brookes/ Cole, cengage learing**	Yes No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Crystalography**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-1102**				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Omar Saif Aldeen Dawood Al-Taweel		**e-mail**	omarsaif@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Omar Saif Aldeen Dawood Flyah Hassan Abbas Oday Mohammed Saleh		**e-mail**	omarsaif@uomosul.edu.iq flyahabas@uomosul.edu.iq Odayothman@uomosul.edu.iq	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mineralogy	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Clarification of how Crystallography can make significant contributions to a useful in geosciences. 2. Identify element which are useful in mineralogy. 3. This course deals with the basic concept of the most important factors that specify metals aspects of this modulare. 4. Learn about the most important scientific terms (Terminology) and their definitions related to this topic. 5. To understand the impact of these physical & chemical factors in crystal structure. 6. To perform different of crystal structure applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The student will study and classify the crystal structure of minerals in terms of the external shape and internal structure of the crystal and the identification of minerals as well as knowledge of the internal structure of the crystals and the study of its parts, which in turn determines the crystalline system
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures an introduction Definition of crystal and metal Amorphous and amorphous materials crystal systems properties of extrinsic crystals [12 hrs] crystal parts, crystal axes Symmetry elements Axial Ratios and Crystal Intersections Miller's coefficients Crystal shape and body [16 hrs] Drawing crystals and crystal projection crystal projection spherical projection Stratographic projection wolf network [12 hrs] Thirty-two crystal types Names and symbols used for crystal species [12 hrs] Distinctive symmetry of crystal systems crystal structure crystal zone Types of twins [12 hrs] Part B – Practical labs Introduction Crystal parts. Crystal Systems.

	Work on samples to determine the crystalline system Symmetry in Crystals [12 hrs] Description of Symmetry in Crystals Crystal Forms Description of Crystal Forms [12 hrs] Miller Indices Measurement the Miller Indices [6 hrs] Stereographic projection Symbols used in Stereographic projection Plotting of symmetry elements on the Stereographic projection [10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	It is a science specialized in the study and classification of the crystal structure of minerals in terms of the external shape and internal structure of the crystal and the identification of minerals it contains as well as knowledge of the internal structure of crystals and the study of its parts, which in turn determines the crystal system of the mineral and the reflection of this system on the external general shape and the structural properties of the metal.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	107	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	93	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	an introduction Definition of crystal and metal Amorphous and amorphous materials
Week 2	crystal systems properties of extrinsic crystals
Week 3	crystal parts crystal axes Symmetry elements
Week 4	Axial Ratios and Crystal Intersections
Week 5	Miller's coefficients
Week 6	Crystal shape and body
Week 7	Drawing crystals and crystal projection
Week 8	crystal projection
Week 9	spherical projection

Week 10	Stratographic projection wolf network
Week 11	Thirty-two crystal types
Week 12	Names and symbols used for crystal species
Week 13	Distinctive symmetry of crystal systems crystal zone
Week 14	Types of twins
Week 15	crystal structure

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction
Week 2	Crystal parts.
Week 3	Crystal Systems.
Week 4	Work on samples to determine the crystalline system
Week 5	Symmetry in Crystals
Week 6	Description of Symmetry in Crystals
Week 7	**Crystal Forms**
Week 8	Description of Crystal Forms
Week 9	Miller Indices
Week10	Measurement the Miller Indices
Week 11	ereographic projection
Week 12	Symbols used in Stereographic projection
Week 13	Plotting of symmetry elements on the Stereographic projection

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	علم البلورات Crystallography An Introduction Walter Borchardt-Ott	Yes
Recommended Texts	Introduction to Crystallography Frank Hoffmann https://link.springer.com/book/10.1007/978-3-030-35110-6#author-0-0	Yes
Websites	https://youtu.be/tINc5VSK_iY?feature=shared https://ocw.mit.edu/courses/3-60-symmetry-structure-and-tensor-properties-of-materials-fall-2005/resources/introduction-to-crystallography-part-1/	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	English Language			**Module Delivery**	
Module Type	S			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	UOIM -12011				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Medical Physics		**College**	Science	
Module Leader	Younis Hamad Ahmed		**e-mail**	younis.h81@uomosul.edu.iq	
Module Leader's Acad. Title	Teaching Assistant		**Module Leader's Qualification**	MA	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Familiarizing students with the basics of the English language. Also, breaking the barrier of shyness and increasing their confidence inside and outside the classroom. There is a big chance to get them engaged in short discussions where they can write or verbally express themselves. In addition to these above, the course will improve their reading, writing, listening and speaking skills as students where English language is the main medium of communication throughout their courses.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Creating full awareness of correct usage of English grammar in writing and speaking. 2- Realizing the importance of the English language inside and outside of university life. 3- Students will improve their speaking ability in English both in terms of fluency and comprehensibility. 4- Students will review the grammatical forms of English and the use of these forms in specific communicative contexts, which include: class activities, homework assignments, reading of texts and writing. 5- Increasing their reading speed and comprehension of academic articles. 6- Students will improve their reading fluency skills through extensive reading. 7- Students will enlarge their vocabulary by keeping a vocabulary journal. 8- Students will strengthen their ability to write short paragraphs and summaries using the process approach.
Indicative Contents المحتويات الإرشادية	Part A – Theoretical lectures Introduction about communication in general and especially the English language, with an introduction on the word classes (parts of speech) in the English language [4 hrs]. Explaining every part of speech in the English language such as nouns, pronouns, verbs, adjectives, adverbs, prepositions, conjunctions and interjections [16 hrs]. Moving on to Vocabulary teaching where students will study some strategies and learn new methods of memorizing any set of vocabulary [4 hrs]. Main skills in learning the English language: speaking, listening, reading and writing are also delivered gradually during the last weeks [6 hrs]. The last part is dedicated to some error correction and feedback sessions [2 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Encourage Learners to 'Stretch' Their Styles. This is a very important point as learners are not 100 percent one type or another. For example, of the analytical/global learning styles. Analytical learners work more effectively alone and at their own pace. Global learners, on the other hand, work more effectively in groups. 2. Do Not Privilege Any One Style Over Another. The general consensus is that while styles differ, one is not necessarily superior to the other. In other words, learners who prefer to study alone will not necessarily be better learners than those who prefer to learn by listening. According to this view, analytical learners should be given the opportunity to spend more time studying alone than in groups, but they should also be given the chance to work in groups. 3. Be Aware of the Relationship Between Learning Styles and Teaching Styles. The reason is that if your style as a teacher is at odds with the learning styles of some of your students, then the effectiveness of your teaching may be limited. If you have a collaborative teaching style, then the way you run your classroom may not suit authority-oriented learners who want the teacher to tell them what to do. If your teaching style is authoritative, even authoritarian, then you may not be suited to students who value autonomous learning.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.5
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	3	15% (15)	2, 5, and 9	LO #2, #5, #8
	Assignments	2	10% (10)	4 and 8	LO #4 and #8
	Projects / Lab.				
	Report	3	15% (15)	3, 6 and 7	LO #3, #6 and #7
Summative assessment	Midterm Exam	2hr	10% (10)	7	ALL
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	**An introduction on communication and English language.**
Week 2	**Parts of Speech (word classes).**
Week 3	**Nouns & their types.**
Week 4	**Pronouns in English language.**
Week 5	**Verbs in the English language.**
Week 6	**Adjectives and their types.**
Week 7	**Adverbs and their uses.**
Week 8	**Prepositions in English language.**
Week 9	**Conjunctions in English Sentences.**
Week 10	**Interjections in English Sentences.**
Week 11	**Vocabulary Improving Skills.**
Week 12	**Basic Speaking Skills.**
Week 13	**Basic Reading Skills.**
Week 14	**Basic Writing Skills**
Week 15	**Basic Listening Skills**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered

Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Murphy, R. (1985). *English Grammar In Use*. CUP.**	Yes
Recommended Texts	**Sullivan, N. (2015). *Essential Grammar*. Routledge.**	No
Websites	https://www.pdfdrive.com/essential-grammar-for-todays-writers-students-and-teachers-e165838835.html	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria

Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Chemistry**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-1103**				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level		1	**Semester of Delivery**		1
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Doha Neithal Saad		**e-mail**	doha.neithal@uomosul.edu.iq	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		02/06/2023	**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To understand the basic concepts of Periodic Table (P.T) 2. To study about chemical and physical properties and behavior of elements.. 3. In order to study transition metals to understand the trends in properties and reactivity of the d-block elements. 4. To explain the typical physical and chemical properties of the transition metals. To identify simple classes for transition metals and describe their chemical properties.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To understand the key elemnts of Periodic Table (P.T) 2. To be able to write electronic configuration of given atomic number. 3. To be able to use Crystal Field Theory to understand the magnetic properties (and in simple terms the colour) of coordination compounds. 4. To be able to describe the stability of metal complexes by the use of formation constants and to calculate thermodynamic parameters from them. 5. To be able to recognize the types of isomers in coordination compounds. 6. To be able to calculate bond order of different molecules.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> **1.** Transition elements, definition, physical properties, characteristic properties. [2hr] **2.** Group (1) and group 2,3,4,5,6 and d-block elements, f-block ele,coordination chemistry, important of complexes. [6hr] **3.** Chain theory ,Werner's theory ,type of ligands, classification of metal complexes. [4hr] **4.** Nomenclature of coordination compounds, Bonding theories for coordination compounds, and isomerism. [4hr] **5.** EAN rules, valence bond theory [4hr] **6.** Crystal field theory. [4hr] **7.** CFSE for octahedral ,tetrahedral, and square planer. [4hr] Exp.6 Acetylaceton Complexes (Part 1 and 2) [6hr]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Reviewing and recalling key terms, Effective Questioning Techniques, Using a visual image, using a model, using a periodic table.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	107	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Periodic Table (P.T)
Week 2	Blocks of periodic table (P.T)
Week 3	Complete of
Week 4	First Quiz
Week 5	Electronic configuration of elements
Week 6	1. Ionization potential (T.P) of Periodic properties, 2- Electron affinity (E.A) ,3- Atomic size
Week 7	Shielding
Week 8	Electronegativity
Week 9	Acid and Base chemistry

Week 10	2.Lewis Acid and Base, Hard base and soft base and hard acid
Week 11	2. Lewis structures 2. Valence bond theory 3. Molecular orbital theory (MOT
Week 12	Ts he MOT of Heteronuclear diatomic molecules
Week 13	Werner theory Chelate ligand VBT of coordination compounds
Week 14	1 st course Mid Term Examination
Week 15	Crystal field theory Factor influence the ligand field splitting

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction of analytical chemistry
Week 2	the identification of the glassware used in the laboratory
Week 3	Exp1. Analysis of Group I
Week 4	Exp 2. Systematic Separation
Week 5	detection of Group II
Week 6	Exp 3. Separation of Group IIA and IIB
Week 7	Analysis of Group (IIA)
Week 8	Separation of Group IIA and IIB ,
Week 9	Analysis of Group (IIA)
Week10	Exp. 4 Separation of Group IIA , IIB
Week 11	Analysis of Group (IIB)cat ion
Week 12	Quiz

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	David W. Ball, 2011, Introductory Chemistry, Saylor Foundation, 855 P.	
Recommended Texts		
Websites	https://resources.saylor.org/wwwresources/archived/site/textbooks/Introductory%20Chemistry.pdf	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Mathematic**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Sci-101**				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level		1	**Semester of Delivery**		1
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	**Farah Hazem Mohammed**		**e-mail**	farahalkadoo@uomosul.edu.iq	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		02/07/2023	**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	١–تعرف الطالب على الاعداد الحقيقية ٢–كيفية استخدام الغايات في الاشتقاق ٣–تعرف الطالب على الاشتقاق والتكامل وقواعدهما ٤–تعرف الطالب على الدوال المتسامية واشتقاقها وتكاملاتها ٥–تعرف الطالب على الدوال المثلثية والدوال العكسية
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١-فهم وتطبيق مجموعة متنوعة من الاساليب الرياضية: يتعلم الطالب مجموعة متنوعة من الطرق والاساليب الرياضية المختلفة التي يمكن استخدامها لحل المسائل الرياضية المعقدة ٢–تطوير مهارات التفكير النقدي: يتم تعزيز مهارات التحليل والتركيب والتفكير النقدي عندما يتعلم الطلاب طرقا رياضية . يتم تشجيع الطلاب على التفكير بشكل منهجي والتحليل العميق للمسائل الرياضية ٣–القدرة على حل المسائل الرياضية المعقدة: يتعلم الطلاب كيفية تحليل وفهم المسائل الرياضية المعقدة وتطبيق الاساليب والتقنيات الرياضية المناسبة لحلها بشكل صحيح. ٤–التفكير الابداعي والابتكار: يشجع تعلم طرق رياضية على التفكير الابداعي والابتكار في مجال حل المسائل الرياضية. يتعلم الطلاب كيفية تطوير حلول جديدة وفريدة باستخدام الاساليب الرياضية
Indicative Contents المحتويات الإرشادية	1-التعرف على الاعداد الحقيقية (١٥ساعة) 2–استخدام الغايات(١٥ساعة) 3–الاشتقاق والتكامل وقواعدهما(١٥ساعة) 4–الدوال المتسامية(١٥ساعة) 5–الدوال المثلثية والدوال العكسية(١٥ساعة)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	الإستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه الوحدة هي تشجيع الطلاب في التمارين، وفي الوقت نفسه تقوم بتحسين وتوسيع مهارات التفكير الناقد. سيتم تحقيق ذلك من خلال الفصول الدراسية، والدروس التفاعلية، ومن خلال النظر في نوع التجارب البسيطة التي تنطوي على بعض انشطة اخذ العينات المثيرة للاهتمام للطلاب

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	6.6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.4
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	مقدمة في الاعداد الحقيقية
Week 2	القيمة المطلقة والمبرهنات المتعلقة بها
Week 3	الغايات
Week 4	امتحان يومي
Week 5	تعريف المشتقة باستخدام الغاية
Week 6	الاشتقاق وقواعده
Week 7	التكاملات والامثلة عليها
Week 8	دالة اللوغاريتم الطبيعي

Week 9	الدالة الاسية
Week 10	امتحان يومي
Week 11	الدالة الاسية العامة
Week 12	الدالة اللوغاريتمية العامة
Week 13	الدوال المثلثية
Week 14	الدوال العكسية
Week 15	امتحان نهائي الكورس الاول

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Thomas Calculus Early Transcendentals Single Variable 13th c2014 solutions ISM, P883.	
Recommended Texts		
Websites	https://www.mediafire.com/file/bb5u6bu2amt93ud/Tho-mas+Calc-ulus.rar	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
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Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	حقوق الانسان والديمقراطية Democracy and Human Right			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM-104**				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	jasim Mohamad Taha		**e-mail**	jasim1967b@Uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	02/08/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	أ -المعرفة والفهم) الاهداف المعرفية(أ -1ان يكون الطالب ملماً بمفاهيم حقوق الانسان والديمقراطية ويكتسب الوعي والثقافة السياسية. أ -2يستطيع ان يميز بين المصطلحات والمفاهيم المختلفة مثل (حقوق الانسان، الدمقرطة، الديمقراطية، الانتقال الديمقراطي، العدالة الانتقالية.(أ -3القدرة على تحليل تطورات حقوق الانسان والمراحل التي مرت بها. أ -4ان يكون قادرا على ادراك واستيعاب الاعلانات والمواثيق الدولية لحقوق الانسان مثل الاعلان العالمي لحقوق الانسان. أ -5ان يكون قادرا على التعبير عن راية بخصوص واحترام اراء الاخرين . أ -6ان تكون لدية القدرة على تحليل اي مشكلة ووصفها والتنبأ بمستقبل الظاهرة السياسية . أ٧- ان يتعرف على انواع الديمقراطية والتمييز فيما بينها داخل النظم السياسية المعاصرة. ب - المهارات الخاصة بالموضوع) الاهداف المهاراتية الخاصة بالمقرر(ب – 1اكتساب الطالب لمهارات التفاوض والتواصل وتبادل الاراء مع الاخرين. ب – 2 اكتساب الطالب مهارات الحوار البناء الهادف . ب – 3 اكتساب الطالب مهارات مواجهة اي موقف والتعبير عن الراي بكل شجاعة وثقة بالنفس. ج- مهارات التفكير ج١- مهارات التحليل. ج٢- مهارات التوظيف للمفردات التي تعلمها في الواقع العملي من خلال دراسة مشكلات محددة من الواقع. ج٣- مهارات التنبؤ والدراسات المستقبلية للنظم الديمقراطية. د - المهارات العامة والمنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي). د1- القدرة على العمل كفريق. د2- التفاعل مع فريق العمل لتحقيق المهارات المطلوبة. د3- القدرة على القيام بعرض نظري لبعض الموضوعات ذات العلاقة بمفردات المادة. د4- اكتساب مهارات التحليل العلمي لاي ظاهرة سياسية تتعلق بحقوق الانسان.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	.1عرف المفاهيم الاتية: حقوق الانسان، الشرعة الدولية، الديمقراطية، الدمقرطة، التحول الديمقراطي. ٢. وضح اهمية الحقوق السياسية والمدنية. ٣. اذكر اهم ما جاء في المواثيق الدولية لحقوق الانسان فيما يخص حق الحياة. 4. تكلم باختصار عن انواع الحقوق الاقتصادية والاجتماعية والثقافية. .5ناقش ما جاء في الدستور العراقي لعام ٢٠٠٥ النافذ من ضمانات فيما يخص حقوق الانسان. .6حدد اهم خصائص النظام الديمقراطي .8اشرح انواع الديمقراطية ثم بين اهم الانواع القابلة للتطبيق العملي. .9عدد مع الشرح انواع النظم الانتخابية. .10ناقش الاطار الوظيفي للسلطة التشريعية ضمن مؤسسات النظام السياسي العراقي وفق ما جاء في دستور عام ٢٠٠٥. .11حدد الاطار البنيوي للمؤسسة التنفيذية في النظام السياسي العراقي وفق دستور ٢٠٠٥. .12تكلم عن اختصاصات مجلس النواب في اطار المؤسسة التشريعية. ١٣. ناقش شروط انتخاب رئيس الجمهورية وفق الدستور العراقي لعام ٢٠٠٥.
Indicative Contents المحتويات الإرشادية	يتضمن المحتوى الإرشادي ما يلي. مفهوم حقوق الانسان وتطور الحقوق تاريخياً يتناول تعريف الحق وتعريف الانسان، تعريفاً لغوياً واصطلاحياً واجرائياً، خصائص حقوق الانسان، ثم التطور التاريخي لحقوق الانسان، من العصور القديمة مروراً بالعصور الوسطى والحديثة، ومن ثم حقوق الانسان المعاصرة، وما انبثق منها من اشكال واجيال لحقوق الانسان، وانواع ومصادر حقوق الانسان ومن ضمنها الحقوق المدنية والسياسية والحقوق الاقتصادية والاجتماعية والثقافية، وحقوق الانسان في المواثيق الدولية والتشريعات الوطنية، والتحديات العالمية لحقوق الانسان ومن ضمنها التحديات الثقافية مثل العولمة والتطور التكنولوجي، والتحديات السياسية مثل الارهاب والحروب اللامتماثلة والحروب بين الدول. (٥ ساعات) حقوق الانسان والحريات العامة في الدستور العراقي

يتناول ما تضمنه الدستور العراقي من ضمانات قانونية لحماية حقوق الانسان وحرياته العامة، وانواع تلك الضمانات. (ساعتان). الحريات العامة والديمقراطية يتناول التطور التاريخي للديمقراطية، في الحضارات القديمة لاسيما في دول المدن اليونانية، مروراً بالديمقراطية عند المفكرين الغربيين امثال توماس هوبز ومونتسكيو وجان جاك روسو، ثم النماذج التقليدية للديمقراطية (انواع الديمقراطية)، المباشرة وغير المباشرة وشبه المباشرة، وخصائص وشروط النظام الديمقراطي، وانواع النظم الانتخابية في الانظمة الديمقراطية. (٣ ساعات). الديمقراطية في نظام الحكم العراقي وفق دستور ٢٠٠٥ يتناول الاطار البنيوي لمؤسسات النظام السياسي العراقي، بنية المؤسسة التشريعية المكونة من مجلس النواب ومجلس الاتحاد، وبنية المؤسسة التنفيذية المكونة من رئيس الجمهورية ومجلس الوزراء، وبنية المؤسسة القضائية المكونة من مجلس القضاء الاعلى والمحكمة الاتحادية العليا، محكمة التمييز الاتحادية، وجهاز الادعاء العام، وهيئة الاشراف القضائي، والمحاكم الاتحادية الاخرى، ثم الاطار الوظيفي واختصاصات مؤسسات النظام السياسي العراقي (التشريعية، التنفيذية، القضائية)، واخيراً العلاقة بين السلطات (التوازن والتعاون، والفصل بين السلطات). (٤ ساعات).	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. المحاضرة المصحوبة بالشرح والتحليل. 2. الحلقة النقاشية. 3. التقارير والبحوث. 4. عرض المادة عبر شرائح (بوربوينت) . 5. الاسئلة والاجوبة. 6. المشاركة الصفية .

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.4
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	مفهوم حقوق الانسان
Week 2	التطور التاريخي لحقوق الانسان
Week 3	اشكال واجيال حقوق الانسان
Week 4	حقوق الانسان في المواثيق الدولية
Week 5	التحديات العالمية لحقوق الانسان
Week 6	الحقوق المدنية والسياسية والاقتصادية
Week 7	حقوق الانسان والحريات العامة في الدستور العراقي
Week 8	الحريات العامة والديمقراطية
Week 9	التطور التاريخي للديمقراطية
Week 10	النماذج التقليدية للديمقراطية (انواع الديمقراطية)
Week 11	خصائص وشروط النظام الديمقراطي
Week 12	الديمقراطية في نظام الحكم العراقي وفق دستور ٢٠٠٥
Week 13	الاطار البنيوي لمؤسسات النظام السياسي العراقي (التشريعية، التنفيذية، القضائية)
Week 14	الاطار الوظيفي واختصاصات مؤسسات النظام السياسي العراقي (التشريعية، التنفيذية، القضائية)
Week 15	اختبار

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر		
	Material Covered	لا يوجد
Week 1	Lab 1:	
Week 2	Lab 2:	
Week 3	Lab 3:	
Week 4	Lab 4:	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	١. حافظ علوان حمادي الدليمي، حقوق الانسان، وزارة التعليم العالي والبحث العلمي، جامعة بغداد، ٢٠١٣. ٢. محمد سليم محمد، نظرات حول الديمقراطية، دار وائل للطباعة، عمان، ٢٠٠٠.	Yes Yes
Recommended Texts	١. بهاء الدين ابراهيم واخرون، حقوق الانسان بين التشريع والتطبيق، دار الجامعة الجديدة، الاسكندرية، ٢٠٠٨. ٢. الدستور العراقي الدائم لعام ٢٠٠٥، الامانة العامة لمجلس الوزراء، بغداد، ٢٠٠٦.	Yes Yes
Websites	https://www.coe.int/en/web/compass/democracy.	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Arabic**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM- 101**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Marwa Fawzi Muhammed Saleh		**e-mail**	Marwa.fawzi@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	٧ يهدف المُقرر إلى أَنَّ يكون الطالب مُلِماً بمفاهيم اللغة العربية والتعرف على مبادئ أساسيات الكلام والجملة ٧ تقديم فهم علمي متوازن لأسُس اللغة العربية بطريقة مُبسطة ومفهومة لأغلب المُفردات والمواضيع التي تهم الطالب والتي تدخل ضمن تخصُصات مرحلة الأولية الجامعية في العلوم الإنسانية ساعين لفهم وإدراك أفضل للمقومات والمبادئ الأولية للدراسات الانسانية ٠ ٧ السعي لبلورة التفكير الإبداعي لدى الطالب والتي تركز على القدرة على استِدعاء معلومات أو خبرات تكون مُخزنة بعقله وطرح بدائل سريعة، وكذلك السعي لبلورة التفكير المعرفي لديه. ٧ أَنَّ يكون مُتمكِناً مِن تشخيص كُل مُفردة أو مادة علمية وتوظيفها في دِراسته أو مجال عمله مُستقبلاً. ٧ تنمية مهارات الطالب في التحليل الاجتماعي٠ ٧ التقريب ما بين الدراسة النظرية والواقع الراهن. ٧ توسيع مدارك طالب العلوم الانسانية ٠
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**أ- المعرفة والفهم** ١- أَنَّ يكون الطالب مُلِماً بمفاهيم ومُصطلحات العلوم الأنسانية٠ ٢- أَنَّ يكون قادِراً على تحليل مُفردات العلوم الأنسانية باستخدام المناهج المُتخصصة. ٣- أَنَّ يكون قادراً على تمييز ماهية العوامل التي تؤَثر في سياسات الدولة داخلياً وخارجياً. ٤- أَنَّ يكون قادراً على تحديد ماهية المفاهيم والمُصطلحات السياسية ومعرفة العلاقة الترابطية بين حقوق الانسان ببقية العلوم الاخرى. ٥- أَنَّ يكون مُتمكِناً مِن تشخيص كُل مُفردة أَو مادة علمية وتوظيفها في دِراسته أَو مجال عمله مُستقبلاً. ٦- أَنَّ يتمكن من فهم أَسُس حقوق الانسان. ب - المهارات الخاصة بالموضوع ١– اكتساب الطالب لمهارات وقدرات التحليل المنطقي للتفاعُلات والمُتغيرات السياسية والاجتماعية الداخلية واثرها على سياسة الدولة. ٢– اكتساب الطالب لمهارات االتحليل العلمي. ٣– القدرة على الجمع بين الذكاء والدِراسة والمُمارسة بغية الوصول إلى الأكاديمي المُتخصص الذي يملك معرفة في العلوم السياسية، جنباً إلى جنب مع المعرفة بالمؤثرات الاجتماعية والاقتصادية والثقافية التي تؤثر في اتجاهات ومواقف الدولة والمجتمع
Indicative Contents المحتويات الإرشادية	١. المُحاضرات المصحوبة بالشرح والتوضيح. ٢. المُناقشة والعصف الذهني. ٣. المحاضرات الفيديوية. ٤. استِخدام الأمثلة التوضيحية والتطبيقية لإثراء المادة العلمية. ٥. الحلقات النقاشية والمجاميع البحثية. ٦. المُسابقات العلمية. ٧. البحوث والتقارير النظرية والتحليلية ومُناقشتها وتقييمها. ٨. عرض المادة بوربوينت. ٩. استخدام التعليم حضوري + مدمج عبر برنامج Google Classroom ج- مهارات التفكير ١- التذكر : السعي لبلورة التفكير الابداعي لدى الطالب والتي تُركز على القدرة على استدعاء معلومات أو خبرات تكون مُخزنة بعقله وطرح بدائل سريعة، والقدرة على طرح افكار متنوعة تتغير مع تغير الموضوع. ٢- الاستنتاج والتقييم : السعي لبلورة التفكير الناقد لدى الطالب والذي يُركز على التحليل والتقييم للحلول المعروضة أمامه وفق معايير مُتفق عليها. ٣- الملاحظة . طرائق التقييم ١ إجراء اختبارات شفوية (يومية – أسبوعية). ٢ إجراء اختبارات تحريرية (شهرية – نصف سنوية- سنوية) ٣ التقارير حضوري + مدمجة التي سيتم تكليفهم بها وغيرها مِن أنشطة الكترونية. ٤ خلق دافعية المُشاركة داخل الصف وإثارة الأسئلة. ٥ المُشاركات الصفية. ٦ تقييم التقارير والبحوث. ٧ اعتماد الأسئلة الفكرية والتحليلية وتقديم الأجوبة النموذجية للقسم العلمي فيما يخص أسئلة الاختبارات الدورية. د - المهارات العامة والمنقولة (المهارات الأخرى المُتعلِقة بقابلية التوظيف والتطور الشخصي). ١- تنمية مهارات التحليل السياسي. ٢- التقريب ما بين الدراسة النظرية والواقع الراهن مِن خِلال الاستعانة بالأمثلة التطبيقية التوضيحية المُعاصِرة. ٣- القدرة على العمل كفريق نظامي والتفاعُل مع الفريق لإنجاز المُهمات المطلوبة.

٤- القدرة على توظيف ما تعلمهُ الطالب في ميادين العمل المُختلفة.	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	١ .المحاضرة المصحوبة بالشرح والتحليل . ٢ .الحلقة النقاشية . ٣ .التقارير والبحوث . ٤ .عرض المادة عبر شرائح (بوربوينت). ٥ .الاسئلة والاجوبة. المشاركة الصفية.

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	3.4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.6
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	اقسام الكلام العربي
Week 2	علامات الاعراب الأصلية والفرعية
Week 3	زمن الأفعال في العربية
Week 4	الفاعل
Week 5	نائب الفاعل
Week 6	قواعد العدد والمعدود في العربية
Week 7	المثلثات اللغوية
Week 8	المشترك اللفظي
Week 9	الألفاظ المترادفة
Week 10	قواعد كتابة الهمزة
Week 11	التاء المربوطة والتاء المفتوحة
Week 12	أغلاط شائعة
Week 13	نص شعري قديم
Week 14	نص شعري حديث
Week 15	تحليل نص قرآني

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**AL-Dabbagh. T.H. (2017) The Earth_/… An Introduction to Physical geology First edition. 366P.**	Yes Yes
Recommended Texts	**Thompson Graham R, Turk Jonathen, 2011. Earth, what inside, Student Edition, Brookes/ Cole, cengage learing**	Yes No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Structural Geology II**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-36125**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Rabeea Kh. Znad		**e-mail**	rabeeazinad@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr.Saddam Essa Mustufa Mahmood Abdulhaq Alsumaidai		**e-mail**	saddammostafa@uomosul.edu.iq mahmodabdhaq@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Structural Geology I	**Semester**	5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. The course includes the essential information on geological brittle failure structures including joints,Fault,viens and balance cross section.. 2. complete description and analysis of the course vocabulary. 3. Study the modes of rocks deformation responses. 4. The theoretical information is supported by practical work for three hours a week using Stereographic technique (Schmidt and Polar Nets) to resolve various structural exercises.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1.Students will learn joints definition, importance in geology . 2. Learn the joints types and modes formations. 3.Aable to classify joints according to different parameters. 4.Distingwish between tension and shear joints 5.learn to measure the attitude if joints in the field. 6.Define the relationship between joints and folds. 7.Students will lean faults definition,impotance in geology. 8. Learn the faults terminology and types. 9. Able to identify faults in the field. 10.Define the relationship between faults types and stresses axes. 11. Making balance cross section and calculate the shortening ratio. 12. The student will be able to deduce the orientations of paleostresses that generated these structures. And applications in geology and engineering programs.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Theoretical lectures. Introduction to geological structures, genetic and geometric classification of joints. Attitude of joints , joints in the field, academic and economic importance of joints, faults types and various classifications modes, field criteria of faults, faults and it relation with principal stress axes. Balance cross section concept and measure of shortening ratio. Part B – practical labs. Fundamentals and idea of stereographic projection . how are the equal area and equal angles nets construct and the difference between them. procedure of precise methods for plotting planar and linear structures, analyses of fractures and folds using stereographic projection, rotation data about various lines dipping ,restoration of tilt of beds, geotechnical application(rock slope stability)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	Expanding students' perceptions about this science and its contents it includes that help in structural geological, , and paleostress analyses. In addition to the use of different field methods in distinguishing the types of joints ,faults and viens in order to evaluate site investigations for slope stability and other purpes. This will be achieved through lectures, labs, field trips and interactive tutorials .

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered

Week 1	Introduction to brittle failure fractures. definition and importance.
Week 2	Types of joints ,attitude of joints, joints classifications-geometrical and genetic.
Week 3	Fractures(joints) from experimental data.
Week 4	Relation of joints with folds.
Week 5	Faults, general characteristics, parts of fault, faults types.
Week 6	Faults classification according top various parameters.
Week 7	Principals stresses axes and faults types, faulting critera.
Week 8	Geomorphic criteria of faults,
Week 9	Types of faults systems and lithospheric plates boundaries, normal fault plane system according to profile apperances. Normal faults and sedimentation.
Week 10	Reverse fault systems, thrust systems leading ,trailing and duplex thrust structures.
Week 11	Strike slip fault system- Left-hand (sinistral)- Right-hand (dextral)- En-echelon pattern of strike slip faults- Left en-echelon- Right en-echelon-Compressional tectonic environment- Left hand shear- Right hand en-echelon- Extensional tectonic environment- Left hand shear- Left hand en-echelon-
Week 12	Transpression and Transtension- Left hand shear- Right hand bend- Left hand shear- Left hand bend- Right stepping right lateral fault- Transtension- Pull apart basin- Negative (Normal) flower structure- Left stepping right lateral fault- Transpression- Push(uplift)- Positive (Reverse) flower structure
Week 13	Balance cross section ,conditions for viable cross section,calculate shortenting ratio.
Week 14	Unconformities types and primary structures.
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction of stereographic technique. Theoretical basis. Schmidt or lambert equal-area net.Stereographic or wallf net.
Week 2	Geological structres of planar type Geological structures of linear type. Precise method of Plotting steps of line and planes on equal area net

Week3	Plotting a line that lies in a plane.
Week 4	Determining the between two lines. Line of intersection of two plane
Week 5	True strike and dip from two apparent dips. True dip from strike and apparent dip Attitude of intersection of two planes.
Week 6	Determining the angles between two planes. Pole of plane.
Week 7	Determining the angles between a line and a plane. Bisecting the angles between two lines.
Week 8	Bisecting the angles between two planes .determining the orthographic projection of a line on a plane.
Week 9	Use of equal are net involving rotation. Rotation of line. Projection of cone.
Week 10	Small circle rotation of planes. . Two tilt problems.
Week 11	Rotation of drill-core data. Using the data from the three drill holes shown below, determine the attitude of bedding.
Week 12	Stereographic analyses of folded rocks. Beta and Pi diagrams
Week 13	Stereographic analyses and classification of fractures .paleostress analyses.
Week 14	Preparatory week before the final Exam.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Ramsay, J. G., 1967.** Folding and Fracturing of rocks. McGraw-Hill book Co., New York, 568p. **Billings, M.P., 1972.** Structural Geology, 3rd ed. Prentice-Hall, USA.606p. **Ragan, D.M.,1983.** Structural Geology:An Introduction to geometricalTechniques, JohnWiley&Sons,New York,393p. **Van der Pluijm, B.A. and Marshak, S., 2004**. Earth structure: An Introduction to Structural Geology and Tectonics. WCB/McGraw Hill, USA, 495p. **Davis G. H. and Reynolds S. J., Kluth F.Charles., 2006**. Structural Geology of Rocks and Regions **Stephan M. Rowland.2007.**Structural Analyses and Synthesis .third edition .	Yes

	Ricard J. Lisle and Peter R. Leyshon.2004.Stereographic Projection Techniques for Geologists and Civil Engineers.	
Recommended Texts	**Twiss, R. J. and Moores, E. M., 2007.**Structural Geology. W.H. Freeman, USA, 717p. **Fossen Hakkon (2010), Structural Geology,** Cambridge University Press.480p. **Ramsay, J. G and Huber, M. I., 1987**. The Techniques of Modern Structural Geology. V.2, Folds and Fractures. Academic press, London, 700p.	yes
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Field geology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-36026**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	**Saddam Essa Mostafa Al-khatony**		**e-mail**	saddammostafa@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr.Mahmood Abdulhaq Alsumaidai Dr.Rabeea kH. Znad Madyan Raad Ghazal		**e-mail**	mahmodabdhaq@uomosul.edu.iq rabeeazinad@uomosul.edu.iq midian680@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Petrology Structural geology Stratigraphy	**Semester** **Semester** **semester**	4 5 5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Clarification of how Field geology can make significant contributions to a vary disciplines in geosciences. 2. Identify Field methods which are useful in Geological Survey. 3. This course deals with the basic concept of the most important Geological Field work with complete and Analysis of the course Vocabulary. 4. Learn about the most important scientific terms (Terminology) and their definitions related to this topic. 5. To understand the impact of these material course in Structural geology, Stratigraphy and Petrology. 6. To perform different improving students' skills in performing their field tests.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. List with description, the geological formation. 2. Define the two types of geological compass (Silva and Brunton) 3. Define the various terms geological field work. 4. Definition of geological map terms and cross section. 5. Determine the map orientation and different procedures for precise location on the map. 6. Summarize what is meant by travers lines and dip and strike for beds site location. 7. Discuss the geological history and involvement of sequential events in the studied area reginal northern of Iraq. 8. Explain the different ways for true thickness measurement bedding plane or formations. 1. List and describe the different type of rocks and formations.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Theoretical lectures. Introduction to field geology. Outline and Approach of Field Behavior. Relation with other geosciences. Types of Geological maps and Base Maps. Methods of Position Finding on Maps. Methods of geological mapping. Traversing types-controlling traverse. Description rocks in the field. Determination of top of beds by sedimentary structures. Descriptive fold elements in the field, Part B – practical labs. Introduction - using of compass (Silva and Brunton). Fundamentals of geological mapping. Geological Maps and draw of geological cross section. Find of strike and true dip from two apparent dip. Speculation the attitude of the strike and dip from figures and diagrams. Determine and draw attitude of the strike and dip on the figures and diagrams. Find slope and gradient for strata. three-point problem.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents it includes that help in Field work, Structural geology, historical of study area and methods analysis. In addition to the use of different of the ways in distinguishing the types of Geological maps through observations in the field and laboratory. This will be achieved through lectures, labs, and interactive tutorials and by types of practical determine methods for measure of true thickness. In the laboratory, students are trained to read and interpret geological maps, as well as drawing cross sections. In the theoretical and scientific aspects, illustrations and computer programs are used to communicate ideas clearly. For the purpose of students acquiring field skills, several geological trips are required in addition to the summer application in which students practice geological survey methods and field descriptions of geological formations and geomorphological and structural features.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction - Outline and Approach of Field Behavior . Field Equipment-- Hammers and Chisels, Compasses and Clinometers, Handlenses, and Other Instruments. Safety requirements
Week 2	Geological Maps and Base Maps I-Types of Geological Map II-Topographic Base Maps
Week 3	Geologic Cross-Sections III- Methods of Position Finding On Maps. Magnetic declination
Week 4	Methods of geological mapping -Traversing types-controlling traverse -following contact -Structures contour map. And other types of geological maps.
Week 5	Description rocks in the field -Sedimentary –Metamorphic and Igneous rocks.
Week 6	Determination of top of beds by sedimentary structures.
Week 7	Syn- sedimentary folds and faults (field characteristics)
Week 8	Thickness beds determination.
Week 9	Find true thickness
Week 10	Unconformities types.
Week 11	Use of primary geological structures in determine way up direction
Week 12	Division of Geological Structures
Week 13	Surfaces and lines
Week 14	Guidelines For Reports
Week 15	Review and prepare for an exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1& week2	Introduction - using of compass (Silva and Brunton).

	Horizontal and vertical strata. Determine the boundary of strata.
Week3	Geological Maps and draw of geological cross section
Week 4	Find of strike and true dip from two apparent dip
Week 5	Speculation the attitude of the strike and dip from figures and diagrams
Week 6	Determine and draw attitude of the strike and dip on the figures and diagrams
Week 7	Find slope and gradient for strata
Week 8	Three-point problem
Week 9	Transfer map measure from linear to digital and contrarily.
Week 10	Find of the true Thickness beds determination.
Week 11	Unconformities types. Field reports writing.
Week 12	training on the theodolite and level stage
Week 13	Preparatory week before the final Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**John W. Barnes and Richard J. Lisle, 2004. Basic Geological Mapping, John Wiley& Sons , Ltd, 198pp.** **Angela L. Coe, Tom W. Argles, David A. Rotheryand Robert A. Spicer, 2010 . Geological Field Techniques, A John Wiley & Sons, Ltd., Publication, 337pp.** **McClay, K. (2003) The Mapping of Geological Structures. 2nd edn, The Geological Field Guide Series. Chichester, Wiley.161p.** **Tucker, M. (2003) Sedimentary Rocks in the Field. 2nd edn, Chichester,Wiley.** **And other internet website .**	Yes
Recommended Texts	Physical geology. — Fifteenth edition / Charles C. Plummer, Emeritus of California State University at Sacramento, Diane H. Carlson, California State University at Sacramento, Lisa Hammersley, California State University at Sacramento. 2016. Rowland, S.M., Duebendorfer, E.M. and Schiefelbein, I.M. (2007) Structural Analysis and Synthesis; A Laboratory Course in Structural Geology, Blackwell, Oxford. Geologists' Association (2000) Geological Fieldwork Code, Leaflet, http://www. geolsoc.org.uk/gsl/site/GSL/lang/en/page2542.html.	yes
Websites	https://www.soest.hawaii.edu/martel/Courses/GG303/	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Basin analysis and sequence stratigraphy**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-36027**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		3	**Semester of Delivery**		6
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Mohammed Ahmed AL-Haj		**e-mail**	mohamedalhaj@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Dr. Ahmed Natheer Thanoon		**e-mail**	anf1277@uomosul.edu.iq	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		٢٢/٠٤/٢٠٢٤	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	sedimentology ,Geotectonic, Sedimentary environments, Paleontology, stratigraphy	**Semester**	5,6,4,5,3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The aims is to learn the following 1- What are the sedimentary basins and the Mechanisms of basins formation. 2- The Basin plains and basin axis and the Control factors on sedimentation. 3- Tectonic setting classification of sedimentary basins. 4- Introduce sequence stratigraphy concept in earth science. 5- understanding the application of sequence stratigraphy in sedimentology, paleontology and basin analyses including dividing stratigraphic column into system tracts.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1- Developing the student's skills to imagine from large scale view the geological processes in sedimentary basins. 2- Relate the sedimentological results or phenomena with the main causes factors of Geo-events. 3- knowing how these factors operating regionally and globally. 4- Developing the student's skills to imagine subsurface and surface vertical stacking pattern and lateral facies trend. 5- Use various types of data sets (Sedimentology, well log, Seismic, Paleontology) in sequence stratigraphic analysis. 6- Division the stratigraphic column into system tracts.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures (1 hour for each)</u> 1- Preface and introduction, Aims of basins analysis study, Sedimentary basin concept. 2- Mechanisms of basin formation, Basin plains, Vertical and horizontal basin zonation 3- Controls on sediment accumulation, Tectonic setting classification of sedimentary basins 4- basins related to lithospheric extension (divergent) 5- basins related to subduction (convergent) 6- basins related to strike slip tectonics. 7- basins related to crustal loading, complex and hybrid basins, the record of tectonics in stratigraphy. 8- Concepts and principles of sequence stratigraphy 9- Basin- margin concepts 10- Definitions of sea- level, Accommodation, sediment supply, Orders of cyclicity 11- Basin architecture (Progragation, Retrogradation, aggradation) 12- sequence boundaries and their correlative conformities 13- Systems tract definition and types. 14- Sequence stratigraphy of wireline logs

	Part B – Practical labs (2 hours for each) 1- Basins analysis methods 2- Tectonics and sedimentation 3- Properties of Iraq sedimentary basin 4- Divergent basins 5- Convergent basins 6- Sedimentary basins classification 7- Different scenarios of eustatic rises and falls in relative sea level . 8- How eustatic sea-level rise/ fall and subsidence / uplift can create / destroy accommodation. 9- Microfacies evidence for Sequence Startigraphic Analysis of an outcrop. 10- Stacking pattern of sedimentary tracts and draw sketch diagram showing facies. 11- Indicate the sedimentary tract, SB and MFS. and draw sketch diagram showing facies distribution. 12- Sequence Startigraphic , the impact of biofacies, sedimentation dilution and fossils dissolution on planktonic fossils distribution and abundance . 13- Rates of sea- level change and sediment supply.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Draw the student's attention to what basins are, how they control sedimentation, how all geological branches cooperate in analyzing the history of basin tectonics and its sediments, and how to benefit from the sedimentary basin resources. understand the application of sequence stratigraphy in basin analyses according to stacking pattern including dividing stratigraphic column into system tracts and sequence to reconstruct the basin develop.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
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 and 10	All
	Assignments	2	10% (10)	2 and 12	All
	Projects / Lab.	2	10% (10)	Continuous	All
	Report	1	10% (10)	15	All
Summative assessment	Midterm Exam	2*1 hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Preface and introduction, Aims of basins analysis study, Sedimentary basin concept.
Week 2	Mechanisms of basin formation, Basin plains, Vertical and horizontal basin zonation
Week 3	Controls on sediment accumulation, Tectonic setting classification of sedimentary basins
Week 4	basins related to lithospheric extension (divergent)
Week 5	basins related to subduction (convergent)
Week 6	basins related to strike slip tectonics basins related to crustal loading.
Week 7	complex and hybrid basins, the record of tectonics in stratigraphy.
Week 8	principles of sequence stratigraphy
Week 9	Methods of Sequence Stratigraphic Analysis
Week 10	Relation between relative sea level, eustasy and tectonic
Week 11	The concept of accommodation Sediment supply
Week 12	Basin –Margin concepts
Week 13	Orders of sequences and Basin architecture
Week 14	Sequence boundary, System tract, Falling- stage system tract (FSST), Lowstand System Tract (LST)
Week 15	Transgressive Systems Tract (TST) and Highstant Systems Tract (HST)

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Basins analysis methods
Week 2	Tectonics and sedimentation
Week 3	Properties of Iraq sedimentary basin
Week 4	Divergent basins
Week 5	Convergent basins
Week 6	Sedimentary basins classification
Week 7	Different scenarios of eustatic rises and falls in relative sea level .
Week 8	Cases showing how eustatic sea-level rise/ fall and subsidence / uplift can create / destroy accommodation.
Week 9	Microfacies Evidence for Sequence Startigraphic Analysis of an outcrop (Sinjar Area –Avanah – Jaddala Formation)
Week10	Stacking pattern of sedimentary tracts and draw sketch diagram showing facies distribution , system tract and relation of sedimentary environment with sea level changes .
Week 11	Indicate the sedimentary tract, SB and MFS. and draw sketch diagram showing facies distribution
Week 12	Sequence Startigraphic , the impact of biofacies, sedimentation dilution and fossils dissolution on planktonic fossils distribution and abundance .

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	-Bogges(2006) Sedimentology and Stratigraphy - Nichols(2009) Sedimentology and Stratigraphy - Flugel(2010) Microfacies of carbonate rocks - Selley(2000)Applied sedimentology - Catuneanu(2006) Principle of sequence stratigraphy - Schlager (2002) Sedimentology and sequence stratigraphy of carbonate rocks	yes
Recommended Texts	Allen and Allen (2013): Basin Analysis: Principles and Application to Petroleum Play Assessment Posamentier, et al (1993): Sequence Stratigraphy and Facies Associations	

Websites	1- https://www.slideshare.net/SILENTANGEL6666/sedimentary-basins 2- https://www.slideshare.net/ShahadatSaimon/sedimentary-basins-243980430 3-

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Sedimentary Environments**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-36028**				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Rafee Ibrahim Al-Humidi		**e-mail**	Rafeegeo66@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Falah Abed AL-Miamary		**e-mail**	falahabed@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Sedimentary Petrology	**Semester**	4
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The study aims to employ sedimentary, biological and chemical evidence to infer the ancient sedimentary environment of the rock aggregates. With the aim of accurate estimation of water and hydrocarbon reservoirs, as well as areas of concentration of important ores and minerals as raw materials for mining industries.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-Study of sedimentary evidence in petrographic which includes grain size, sorting, roundness and maturity, 2- As well as grains components, matrix and cementing material. 3-It is also interested in sedimentary structures, their diversity, and the method of their formation, 4-In addition to the biological content that is very important to know the place of their living, the depth of water, salinity, temperature, 5- The abundance of oxygen during their biological living period, 6-And thus collecting these evidences in order to know the sedimentary environment.
Indicative Contents المحتويات الإرشادية	Introduction to sedimentary environments - Classification of sedimentary environments Facies and Facies models, marine or nonmarine?, marine fossils, carbonate rocks, red beds, evaporite chemistry. Continental or terrestrial environments, Introduction, Fluvial systems, Alluvial fans, Sedimentary processes on fans. River systems, Channel form, Sediment Transport Processes in River, Floodplain Deposition, Characteristis of Fluvial Deposits, Palaeosols, How do you know it's Fluvial? Eolian Desert systems, Introduction, Global wind patterns, desert environment, Life in deserts, Characteristics of Aeolian deposits Lakes Environments, Introduction, Lake formation, Lake hydrology, freshwater Laks, Deep lake facies. Saline lakes, Life in Lakes, Characteristics of lake deposits. The Marine Realm: Morphology and Processes, Introduction, Divisions of the marine realm, Deltas Environment, Introduction, Classification of deltas, Fluvial-Dominated Deltas, Tide-Dominated Deltas, Wave-Dominated Deltas, Fan Deltas, Delta Cycles, Characteristics of deltaic deposits. Tidal flats Environment, Introduction, Tidal cycles, Depositional Setting, Sedimentary Processes and Sediment Characteristics of Tidal-Flats. Submarine fan Environment, Introduction, Channels and levees, Submarine fan systems, Gravel-rich systems, Sand-rich systems, Muddy systems Carbonate and Evaporite Environments; Carbonate, Introduction, Evaporite. Carbonate shelf (non reef) Environments, Depositional Setting,

	Sedimentation Processes Organic Reef Environment. Introduction, Depositional Setting, Reef Organisms. Reef Deposits, Low-Energy Reef Facies, high-Energy Reef Facies Lagoon Environment. Introduction, siliciclastic sediments& carbonate deposits, evaporites deposits, Life in lagoon, Characteristics of lagoon deposits. Skeletal grains (bioclasts), Microcrystalline carbonate (lime mud), Sparry calcite Carbonate Tidal flats Environment, Introduction, Tidal flats zones, subtidal zone, intertidal zone Supratidal zone, sabkha, Characteristics of Carbonate Tidal flats deposits. Pelagic Environment, Distribution of pelagic deposits, Calcite Compensation Depth (CCD). Dolomite Compensation Depth (DCD). Hemipelagic deposits, Characteristics of Pelagic deposits. Glacial Environment, Distribution of glacial environments, Glacial ice, Continental glacial deposition. Marine glacial environments, Distribution of glacial deposits, Ice, climate and tectonics, Summary of glacial environments.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Training students on how to invest all the information obtained from the previous academic stages, especially those related to sedimentary studies, And then collecting and linking them with the aim of reaching the sedimentary environment through sedimentary, biological, chemical, structural and geophysical evidence, both field and laboratory. Thus, the student is prepared to work in the state departments related to the geologist, how to deal with work requirements, confront problems and find solutions to them in the government and private sectors.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	56	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.7
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	٣hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction to sedimentary environments - Classification of sedimentary environments Facies and Faciec models, marine or nonmarine?,
Week 2	Continental or terrestrial environments, Introduction, Fluvial systems, Alluvial fans, Sedimentary processes on fans. River systems, Channel form, Sediment Transport Processes in River, Floodplain Deposition, Characteristis of Fluvial Deposits, Palaeosols, How do you know it's Fluvial?.
Week 3	Eolian Desert systems, Introduction, Global wind patterns, desert environment, Life in deserts, Characteristics of Aeolian deposits
Week 4	Lakes Environments, Introduction, Lake formation, Lake hydrology, freshwater Laks, Saline lakes, Life in Lakes, Characteristics of lake deposits.
Week 5	The Marine Realm: Morphology and Processes, Introduction, Divisions of the marine realm, Deltas Environment, Introduction, Classification of deltas, Fluvial-Dominated Deltas, Tide-Dominated Deltas, Wave-Dominated Deltas, Fan Deltas, Delta Cycles, Characteristics of deltaic deposits.
Week 6	Tidal flats Environment, Introduction, Tidal cycles, Depositional Setting, Sedimentary Processes and Sediment Characteristics of Tidal-Flats.
Week 7	Carbonate and Evaporite Environments; Carbonate, Introduction, Evaporite. Carbonate shelf (non reef) Environments, Depositional Setting, Sedimentation Processes
Week 8	Organic Reef Environment. Introduction, Depositional Setting, Reef Organisms. Reef Deposits

Week 9	Lagoon Environment. Introduction, siliciclastic sediments& carbonate deposits, evaporites deposits, Life in lagoon, Characteristics of lagoon deposits..
Week 10	Carbonate Tidal flats Environment, Introduction, Tidal flats zones, sabkha, Characteristics of Carbonate Tidal flats deposits..
Week 11	Pelagic Environment, Distribution of pelagic deposits, Calcite Compensation Depth (CCD). Dolomite Compensation Depth (DCD). Hemipelagic deposits, Characteristics of Pelagic deposits.
Week 12	Glaclal Environment, Distribution of glacial environments, Glacial ice, Continental glacial deposition.
Week 13	Marine glacial environments, Distribution of glacial deposits, Ice, climate and tectonics, Summary of glacial environments.
Week 14	Submarine fan Environment, Introduction, Channels and levees, Submarine fan systems,
Week 15	Summary.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Draw a sedimentary log.
Week 2	Lab 2: Alluvial fan environment.
Week 3	Lab 3: Fluvial environment.
Week 4	Lab 4: Desert environment.
Week 5	Lab 5: Transitional environment.
Week 6	Lab 6: Delta environment.
Week 7	Lab 7: Clastic Tidal flats environment.
Week 8	Lab 8: Carbonate Tidal flats environment.
Week 9	Lab9: Continental Shelf environment.
Week10	Lab 10: Submarine fan environment.
Week 11	Lab 11: Pelagic environment.
Week 12	Lab 12: Reef environment

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Nichols, G.,2009: Sedimentology and Stratigraphy, 2ed., Wiley Black well, 419P.**	Yes

	Boggs, S. Jr. 2006. Principles of Sedimentology and Stratigraphy, (4th ed.), Pearson Prentice-Hall, 662.P.	Yes
Recommended Texts	**Boggs, S. Jr. 2009. PETROLOGY OF SEDIMENTARY ROCKS, (2nd ed.), Cambridge University Press, New York, 612P.**	Yes No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Geology of Iraq**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-36029**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		**3**	**Semester of Delivery**		6
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Mahfoudh Abdulla Ali		**e-mail**	mahfoudhali@uomosul.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Mahfoudh Abdulla Ali		**e-mail**	mahfoudhali@uomosul.edu.iq	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		23/04/2024	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Stratigraphy	**Semester**	5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Clarification the tectonic position of Iraq and its relationship with Middle East. 2. Explain the effected of plate tectonic in Iraqi stratigraphic succession , tectonic division and its geological history . 3. Study the tectonic division of Iraq. 4. Study lithological facies and formations distribution from the stratigraphic succession of Iraq. 5. Explain the vertical and horizontal relationships among sedimentations and formation in Iraq. 6. Learn about economic importance from Iraqi sedimentations successions
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	number of study weeks. 1. List with description, the tectonic division of Iraq. 2. Define the various terms associated with geology of Iraq. 3. What is TMS? Definition, and what importance in geology of Iraq. 4. Explain the relationships between plate tectonic and stratigraphic succession in Iraq. 5. List and Describe the Ecology and distribution of formations in Iraq. 6.Define active margin, passive margin, Wilson cycle. 7. Discus the relationships between passive margin and hydrocarbon accumulation. 8. List the formations have economic importance in Iraq. 9. Terminology.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction, Some Basic Information on the Position and Structure of Iraq, boundaries of Arabian plate, Tectonic Divisions of Iraq according to Jassim and Goff (2006), Stable shelf Units, Unstable shelf Units, Zagros suture Units, Development of Arabian Plate, Margins of Arabian plate, Tectonostratigraphic megasequence: TMS, TMS Ap1, TMS Ap2, TMS Ap3, paleogeography in Early Paleozoic, TMS Ap4, TMS Ap5, Active Margin And Back-Arc Basin, TMS Ap6, [10 hrs]. Opening of the Neo-Tethys, first Passive Margin, stratigraphy and paleogeography, TMS Ap7, Opening of the Mediterranean Basin, created the 2nd passive margin, sedimentation, TMS Ap8 of Pre-Ophiolite Obduction, Third Passive Margin, TMS Ap9, ophiolite obduction, unconformity between Mesozoic and Cenozoic, onset of the foreland basin, [8 hrs]. TMS Ap10, closure of Neo-Tethys, Development of the foreland basin, TMS Ap11, Arabia/Eurasia collision, stratigraphy and Paleogeography, The upper boundary is the present topographic surface. [3 hrs] <u>Part B – Practical labs</u> Explain the sedimentary environment and sedimentary cycles, Stratigraphic

	succession from Paleozoic in Iraq, Stratigraphic succession from Triassic in Iraq, Stratigraphic succession from Jurassic in Iraq, Stratigraphic succession from L. Cretaceous in Iraq, Stratigraphic succession from U. Cretaceous in Iraq, Stratigraphic succession from Paleogene in Iraq, Stratigraphic succession from Neugene in Iraq, Stratigraphic succession from Quaternary in Iraq. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about the tectonic position of Iraq and its relationship with Middle East and the plate tectonic from the world. In addition to the learn the stratigraphic distribution and paleoenvironmental condition of Iraqi formations through geological history. This will be achieved through lectures, labs, and interactive tutorials and by types of practical exercise and field work trips by student to the Surface successions of formations in country.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	**Some Basic Information on the Position and Structure of Iraq.**
Week 2	**Jassim and Goff (2006) classification of Tectonic position of Iraq.**
Week 3	**Geology of Iraq During the Geologic time TMS AP1.**
Week 4	**Geology of Iraq During the Geologic time TMS AP2.**
Week 5	**Geology of Iraq During the Geologic time TMS AP3.**
Week 6	**Geology of Iraq During the Geologic time TMS AP4.**
Week 7	**Geology of Iraq During the Geologic time TMS AP5.**
Week 8	**Geology of Iraq During the Geologic time TMS AP6.**
Week 9	**Geology of Iraq During the Geologic time TMS AP6 and TMS AP7.**
Week 10	**Geology of Iraq During the Geologic time TMS AP7.**
Week 11	**Geology of Iraq During the Geologic time TMS AP8.**
Week 12	**Geology of Iraq During the Geologic time TMS AP9.** .
Week 13	**Geology of Iraq During the Geologic time TMS AP10.**
Week 14	**Geology of Iraq During the Geologic time TMS AP11.**
Week 15	**Oil distribution in Iraqi formations.**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Explain the sedimentary environment and sedimentary cycles.
Week 2	Lab 2: Stratigraphic succession from Paleozoic in Iraq.
Week 3	Lab 3: Stratigraphic succession from Paleozoic in Iraq.
Week 4	Lab 4: Stratigraphic succession from Triassic in Iraq.
Week 5	Lab 5: Stratigraphic succession from Triassic in Iraq.
Week 6	Lab 6: Stratigraphic succession from Jurassic in Iraq.
Week 7	Lab 7: Stratigraphic succession from Triassic in Iraq.
Week 8	Lab 8:. Stratigraphic succession from L. Cretaceous in Iraq.
Week 9	Lab9: Stratigraphic succession from U. Cretaceous in Iraq.
Week10	Lab 10: Stratigraphic succession from Paleogene in Iraq.
Week 11	Lab 11: Stratigraphic succession from Neogene in Iraq.

Week 12	Lab 12: Stratigraphic succession from Quaternary in Iraq.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Jassim, SZ. and Goff, JC.(2006)**. *Geology of Iraq. Czech Republic, Dolin, Prague and Moravian Museum, Brno*, 341p. **Bellen, R.C. van, Dunnington, H.V., Wetzel, R. and Morton, D.(1959).** *Lexique Stratigraphique International. Asie, Iraq, Fasc. 10a, Paris*, 333p. **Sharland, P.R., Archer, R., Casey, D.M.,Davies, R.B., Hall, S.H., Heward, A.P., Horbury, A.D. and Simmons, M.D.(2001**). *ARABIAN PLATE SEQUENCE STRATIGRAPHY, GeoArabia Special Publication 2, Gulf Petro Link, Bahrain, 372p.*	Yes Yes
Recommended Texts	**Aqrawi, A.A.M., Goff, J.C., Horbury, A.D., and Sadooni, F.N. (2010). The petroleum Geology of Iraq, Scientific press Ltd. 424p.**	Yes yes
Websites	Iraqi Academic Scientific Journals: https://www.iasj.net/	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Methodology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	**GEO-36030**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives	This module is designed to introduce postgraduate students to research methods and statistical analysis. Theoretical, historical and statistical concepts are taught in lectures with hands on practical lab sessions using both quantitative and qualitative techniques that allow students to put theory into practice.
Module Learning Outcomes	By the end of this module the student should be able to: 1. Critically review current knowledge in a specified area, and establish its status and limitations 2. Identify, conceptualize and define a research question(s) and justify its relevance to practice and its significance as a potential contribution to existing knowledge. 3. Select and justify a research methodology to meet specified research aims and objectives. 4. Critically analyze and interpret primary/secondary research data (quantitative and/ or qualitative), testing for validity and reliability of the results.
Indicative Contents	1 Introduction to Research The nature and purpose of research; different types of research (quantitative qualitative, mixed methods, developmental, practice based) and their mapping within different philosophical paradigms (positivism, interpretivism, pragmatism); strengths and weaknesses. 2 Dealing with Practical Issues, Ethics The research process; identifying a research topic and setting research objectives; developing a research strategy; characteristics of a good research project; ethical issues in conducting research. 3 Searching and Reviewing the Literature The purposes and main steps of a literature review; searching, evaluating, organizing and synthesizing the relevant literature; and, writing a literature review and managing bibliographic records. In addition, developing research questions for qualitative and quantitative research; and identifying characteristics/attributes 4 Data Collection and Analysis Approaches to data collection and analysis (quantitative, qualitative, mixed-methods, iterative); questionnaire design; populations, samples, and sampling methods; data Mining. 5 Writing your Research Proposal Identifying a research problem or issue, the purpose of the research and the

	main research question(s); choosing the research strategy and methods; writing a research proposal. In addition: discussing findings, formulating conclusions, making recommendations, and reporting; planning, executing, writing up, and submitting a dissertation. 6 Descriptive Statistics for Quantitative and Qualitative D Summarizing and visualizing data sets; finding trends in data and formulating a research hypothesis. 7 Introduction to Probability and Statistical Inference Basic concepts of probability and probability distribution; discrete and continuous random variables; basic probability distributions; introduction to the hypothesis testing procedure. 8 The Hypothesis Testing Procedure Parametric and non-parametric tests; Chi-squared Test for Association; Independent Sample t-Test; One and Two Way Analysis of Variance ANOVA; power calculation and sample size estimation. 9 Correlation and Regression Relationship between two numeric variables, dependent and independent variable; Pearsons Correlation Coefficient; Simple Linear Regression. 10 Multiple Regression Multiple Regression Analysis and introduction to the General Linear Model.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The aim of this module is to provide the student with a critical understanding of theories, concepts and principles of research methodology and the range of methods used in conducting research in different disciplines; and, to give the student the skills and knowledge necessary to undertake an original in-depth investigation in those fields

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.6
Total SWL (h/sem)	**75**		

الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	principles of research methodology
Week 2	define a research question(s)
Week 3	Writing your Research Proposal
Week 4	Testing Procedure
Week 5	practice based
Week 6	calculation and sample size estimation
Week 7	discussing findings
Week 8	reporting
Week 9	formulating conclusions
Week 10	quantitative techniques
Week 11	qualitative techniques
Week 12	statistical concepts
Week 13	interpret primary/secondary research data
Week 14	Correlation Coefficient
Week 15	Multiple Regression Analysis

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**structural geology I**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-35019**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	3		**Semester of Delivery**	5	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Rabeea Kh. Znad		**e-mail**	rabeeazinad@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Rabeea Kh. Znad Dr.Mahmood Abdulhaq Alsumaidai Dr.Saddam Essa Mostafa Mudian Rahad Ghazal		**e-mail**	rabeeazinad@uomosul.edu.iq mahmodabdhaq@uomosul.edu.iq saddammostafa@uomosul.edu.iq	
Scientific Committee Approval Date	23/04/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	
Co-requisites module	Petrology	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of structural geology through the application of techniques. 2. To understand properties of rocks material. 3. This course deals with the basic concept of stress,strain. 4. Study the behavior of rocks material under stress . 5. Study the modes of rocks deformation responses. 6. Study folds stuctures (in details)and folding as manner of ductile deformation.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1.Students will learn mechanical, force, stress, and deformation bases. 2. Define the brittle and ductile behavior of rocks and resulting structures under different physical factors. 3.learn the differences between deformation and strain. 4. Construct the moher circle for stress and calculate normal and shear stress. 5.Discus the moher circle for stress and determine the different state of Stability of site constructions. 6.Explain the strain path and finite strain . 7.Identifying the folds structures and its economic importance. 8. Provide experience with mapping, interpreting maps. 9. Drawing geological cross-sections. Determine the general attitude (strike and dip or dip direction) of the plane. This module is designed to help the students to become comfortable with the basics—to help him make the transition from naive curiosity to perceptive self-confidence.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Theoretical lectures. Introduction to structural geology, relation with other geosciences. force and stress components .derivative normal and shear stress by triangularly and by moher circle for stress. factor controlling behavior of materials. Brittle and ductile deformation. Stress ellipsoid .example of stress in rocks. strain and strain ellipsoids. Inhomogeneous strain. Coaxial and Non Coaxial strain. progressive strain. strain path. descriptive fold elements in the field, Part B – practical labs. Fundamentals of geological mapping, maps of horizontal ,inclined and vertical beds, training to draw the geological cross sections, mapping of folded strata (simple and overturned)with complete labeling, map view of faulted strata by normal ,reverse and strike slip types and vertical side view(cross section). Angular unconformity maps interpretation. complex geological map (fold ,fault, unconformity)with explanation of sequential events .

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The strategy adopted in delivering the material to the students is to expand their horizons of thinking and deduction through participation and dialogue, as well as giving realistic examples during the presentation of the unit materials. In the laboratory, students are trained to read and interpret geological maps, as well as drawing cross sections. In the theoretical and scientific aspects, illustrations and computer programs are used to communicate ideas clearly. For the purpose of students acquiring field skills, several geological trips are required in addition to the summer application in which students practice geological survey methods and field descriptions of geological formations and geomorphological and structural features.

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

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Structural Geology – objective of structural geology-scope of structural geology.
Week 2	Mechanical Principles-(force, stress -concept- resolution-and their types).strain and deformation.
Week 3	Three stages of deformation- (stress-strain diagrams)-brittle and ductile deformation structures.
Week 4	Factors controlling behavior of materials-temperature-confining pressure-time-solution-pore pressure-anisotropy and inhomogeneity.
Week 5	Relation of rupture to stress-properties of stress axes-stress ellipsoid- stress on surface and on a point-derivative of normal and shear stress.
Week 6	Moher circle for stress-derivative of normal and shear stress using Moher circle-mean stress and deviatoric stress-stress tensor.
Week 7	Relation rupture to strain- strain ellipse -use of strain ellipse on structural problems-strain path-homogeneous and inhomogeneous strain-
Week 8	Coaxial and Non-Coaxial Strain Accumulation-pure shear -simple shear-Graphic Representation of Finite Strain Ellipse in Two Dimension- strain field diagram-geological structures associated.
Week 9	Folds and folding-parts of fold-fold symmetry condition-folds types in true profile-
Week 10	Fold veregency-Refolded folds-Multilayers folds-harmonic fold -disharmonic fold-polyharmonic fold-
Week 11	Aspects of Geometrical classification of folds-ramsay classification of folds-dip isogons classification.
Week 12	Mechanisms folds formation-(flexure-shear and flow folding)-Nontectonic folds
Week 13	Faults folds relationships(fault related folds)
Week 14	Minor folds(types-locations and structural significance)
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1& week2	**Introduction of structural geology.**Topographic mapping .Review of geological maps and structures**. Concept of dip and strike; Outcrop patterns of different structures.** Horizontal and vertical strata. Determine the boundary of strata. Calculate thickness .drawing cross section. Vertical exaggeration effect.
Week3	Dipping strata. (two maps at least). Relationship between dip and gradient . deduce the direction of dip of the beds from the fact that there outcrops V down the valley.
Week 4	Construction of structure contour and calculate dip amount, direction. True and apparent dip. Construction cross section with scale.
Week 5	Calculate true and vertical thickness. Width of outcrop and topography. Inlier and outlier structures.
Week 6	Reading of Folding strata maps (anticline and syncline)(two maps at least)
Week 7	Symmetrical and asymmetrical folds. determine fold axes and Limbs .Axial plane .symbols of fold parts on the map .drawing cross section.
Week 8	Overturned folds maps. Deduce the overlimb direction from strike line value. determine strike direction and dip amount.
Week 9	Faults parts, classification, and the effect of faulting on outcrops. Deduce the fault type (normal or reverse) from the Strike line of fault plane. calculate the fault throw on the map.
Week 10	Cross section of the faulted area .located the fault trcae.calculate the heave and throw of the fault. determine the hanging wall and footwall. True and vertical beds thickness.
Week 11	Faulted folds. Plunging and non-plunging folds. Calculate plunge angle. The effect of faulting on fold structures outcrops.
Week 12	More folds and faulted folds. Complete outcrop beyond fault line.
Week 13	Unconformities maps (two maps at least). Angular unconformities ,top and bottom sets attitudes.
Week 14	Complex structures maps .
Week 15	Preparatory week before the final Exam.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Ramsay, J. G., 1967.** Folding and Fracturing of Rocks. McGraw-Hill book Co., New York, 568p. **Billings, M.P., 1972.** Structural Geology, 3rd ed. Prentice-Hall, USA.606p. **Ragan, D.M.,1983.** Structural Geology:An Introduction to Geometrical Techniques, JohnWiley&Sons,New York,393p. **Van der Pluijm, B.A. and Marshak, S., 2004**. Earth structure: An Introduction to Structural Geology and Tectonics. WCB/McGraw Hill, USA, 495p. **Davis G. H. and Reynolds S. J., Kluth F.Charles., 2006**. Structural Geology of rock . **Bennison G**.M. An Introduction to Geologucal Structures and Maps.1975. Third edition .Edward Arnold(publisher) ltd.london.	Yes
Recommended Texts	**Twiss, R. J. and Moores, E. M., 2007.** Structural geology. W.H. Freeman, USA, 717p. **Fossen Hakkon (2010), Structural Geology,** Cambridge University Press.480p. **Ramsay, J. G and Huber, M. I., 1987**. The techniques of modern structural geology. V.1Strain Analyses,. Academic press, London, 700p.	yes
Websites	https://www.soest.hawaii.edu/martel/Courses/GG303/	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Remote sensing**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-35020**				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		2	**Semester of Delivery**		5
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Msr. Moamin Mohammed Yuons		**M**	mmymmb91@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Geomorphology	**Semester**	5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Delivering remote sensing principles to undergraduate students. Make a significant contribution geological sciences. Addressing useful techniques in remote sensing and GIS. Aiming into basic concept of the most important factors that specify remote sensing applications in geological studies . Learn about the most important scientific terms (Terminology) and their definitions related to this topic. To understand the impact of remote sensing techniques and data in modern studies and projects.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The student will study and classify the principles of the remote sensing and its applications in geological studies, and GIS techniques as well due to the importance of these techniques nowadays. Moreover, to obtain adequate knowledge of using remote sensing data in the study and researching. As a result, graduated geologists with satisfactory background of remote sensing and GIS techniques.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction to remote sensing Principles of remote sensing [8 hrs] Electromagnetic wavelength and spectral signature [8 hrs] Aerial photography Visual interpretation [8 hrs] Remote sensing satellites [8 hrs] Image processing and Interpretation [8 hrs] Geographical Information System [6 hrs] Part B – Practical labs Introduction to remote sensing. Visual interpretation elements. Instruments of remote sensing. Mirror stereoscope and Stereoscopic. [12 hrs] Practical work [10 hrs] Global mapper technique [10 hrs] Mapping by using classic and digital interpretation[10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The goal of learning teaching remote sensing is to foster and disseminate experiences and findings about what improves the learning and teaching of remote sensing in higher education and in the interdisciplinary context of geological sciences, and that shall support and inspire other educators in the field to successfully design their courses and train the next generation.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7.8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	22	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.2
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	**Fundamentals of Remote Sensing**
Week 2	**What is Remote Sensing?**
Week 3	**What is Remote Sensing?**
Week 4	**What is Remote Sensing?**
Week 5	**The Basic Components of Remote Sensing**

Week 6	**The Basic Components of Remote Sensing**
Week 7	**Advantages of Remote Sensing Technology**
Week 8	**Applications of Remote Sensing Technology**
Week 9	**Electromagnetic Radiation (EMR) Properties**
Week 10	**Characteristics of Electromagnetic Radiation**
Week 11	**The Electromagnetic Spectrum (EMS) Properties**
Week 12	**Types of Remote Sensing Systems Based on Region of Electromagnetic Spectrum**
Week 13	**Spectral Signature –Vegetation Intraction of Electromagnetic radiation with particles in the atmosphere(Spectral Signature –Vegetation)**
Week 14	**Spectral Reflectance Signature**
Week 15	**Sensors and Platforms used in Remote Sensing process and Application of geographical Information system**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to remote sensing.
Week 2	Visual interpretation elements.
Week 3	Instruments of remote sensing.
Week 4	Mirror stereoscope and Stereoscopic.
Week 5	Program of Remote sensing
Week 6	Introduction Program Arc GIS Pro
Week 7	Arc GIS Pro technique
Week 8	Arc GIS Pro technique
Week 9	Arc GIS Pro technique
Week10	Practical work
Week 11	Practical work

Week 12	Practical work
Week 13	Practical work
Week 14	Application of Arc GIS Pro
Week 15	Delivering reports

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**A Canada Centre for Remote Sensing Remote Sensing Tutorial.** http://pcmas1.ccrs.nrcan.gc.ca/fundam/chapter1/chapter1_1_e.htm	Yes
Recommended Texts	**George Joseph, Fundamentals of remote sensing, Universities Press, Hyderabad, 2005.**	Yes
Websites	https://www.nasa.gov/	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Gravity and magnetic method**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-35127**				
ECTS Credits	5				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	5	
Administering Department	GEO		**College**	SCI	
Module Leader	Adil Murad Awad		**e-mail**	amawad@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Bashar Mahmood Aziz		**e-mail**	basharaziz@uomosul.edu.iq	
Peer Reviewer Name	Zainab Musadaq Shashal		**e-mail**	Zainabmosadq@uomosul.edu.iq	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Structure Geology	**Semester**	5
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives	1. Clarification of how geophysics methods can make significant contributions to a theoretical and practical knowledge in geosciences. 2. Identify Gravity and magnetic methods which are useful in geophysical interpretation. 3. This course deals with the basic concepts of the most important geophysical methods aspects of this module. 4. Learn about the most important scientific terms (Terminology) and their definitions related to this topic. 5. To understand the impact of these geophysical methods in exploration and interpretation of structural geology and detecting on the natural resources and disasters, to perform different geophysical applications.
Module Learning Outcomes	6. After completing this module, the student will be able to: Understand the physical principles and elements of data acquisition and interpretation for gravity and magnetic methods. Understand and explain how they are applied to aid the understanding of geological problems at a variety of scales. Will have acquired subject knowledge and understanding of Earth's natural resources and the techniques used to locate and exploit them. Will have acquired subject knowledge and understanding of the role of the geoscientist in society regarding economic development and sustainability. Be able to suggest appropriate methods for the exploration of given geological targets. Will have acquired intellectual and practical skills necessary to plan, conduct and report on mix of laboratory and field projects. apply geophysical principles and methodologies to the solution of familiar and unfamiliar problems. test concepts and hypotheses, synthesize information/data from a variety of sources and analyze, evaluate/interpret geophysical data. 7.
Indicative Contents المحتويات الإرشادية	8. Indicative content includes the following. 9. 10. Part A – gravity 11. Introduction, Geophysics definition, types of Geophysics methods, Gravity definition , important of gravity method in our life , general characteristic of gravity methods and the basic theoretical principles of gravity method, importance of gravity interpretation, Units of gravity, geological feature affecting to density of rock, measuring gravity, gravity method technique, gravity data corrections ,local and regional anomaly, the ambiguity of sub-surface gravity anomaly, interpretation of gravity data [15 hrs] 12. Part B- Magnetic method 13. Introduction of magnetic methods, basic principles of magnetic method and theoretical principles, Units and earth magnetic field, rock magnetism measure of magnetic field, magnetic survey, correction of magnetic observation, magnetic anomaly, magnetic data interpretation. [15 hrs] 14. Revision problem classes [3 hrs] 15. Part C – Practical labs 16. 17. Theoretical lab problem, calibration factor of gravimeter, drift correction, bouguer correction, free air correction, latitude correction, train correction, bouguer anomaly correction, splitting regional anomaly, interpretation of

	geological models ,distributing of magnetic data, interpretation of magnetic data. [30 hrs] 18.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding student's perceptions about this science and its contents it includes that help in gravity and magnetic interpretation methods, data corrections, and analysis. In addition to the use of different techniques in distinguishing the types of geophysical methods through observations of the external and internal geological structures and their data diagnosis. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods 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	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
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	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11

assessment	**Assignments**	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	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	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Orientation, syllabus,
Week 2	Introduction to Geophysics, Gravity, and SI units
Week 3	Gravitational potential energy and kinetic energy
Week 4	The theoretical concepts of gravity methods “Geoid and Spheroid”
Week 5	Measurements of Gravity method
Week 6	Bouguer Anomaly and Gravity Data Corrections
Week 7	Gravity interpretation
Week 8	Midterm Exam
Week 9	The ambiguity of sub-surface gravity anomaly
Week 10	Introduction of magnetic method
Week 11	Earth magnetic features
Week 12	Measurement of magnetic field
Week 13	Magnetic survey
Week 14	Magnetic anomaly
Week 15	Magnetic data interpretation

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Orientation, Syllabus, and Fundamental particles

Week 2	Lab 2: calibration of gravimeter.
Week 3	Lab 3: Draft Correction
Week 4	Lab 4: Bouguer anomaly correction
Week 5	Lab 5: Free air correction
Week 6	Lab 6: Latitude correction
Week 7	Lab 7: bouguer correction
Week 8	Lab 8: terrain correction
Week 9	Lab9: Splitting bouguer anomaly techniques
Week10	Lab 10: magnetic daily distribution.
Week 11	Lab 11: Magnetic distribution of earth.
Week 12	Lab 12: interpretation of magnetic data.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Gravity and Magnetic Exploration: Principles, Practices, and Applications 1st Edition by William J. Hinze (Author), Ralph R. B. von Frese (Author), Afif H. Saad (Author)	yes
Recommended Texts	Geophysics for the Mineral Exploration Geoscientist 1st Edition by Michael Dentith (Author), Stephen T. Mudge (Author)	yes
Websites	https://assets.cambridge.org/97805218/71013/frontmatter/9780521871013_frontmatter.pdf. https://iopscience.iop.org/book/mono/978-1-6817-4700-2 https://www.academia.edu/5146061/Potential_Theory_in_Gravity_and_Magnetic_Applications_Richard_J_Blakely	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group	**A -** Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	**B -** Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Geochemistry**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-35022**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		3	**Semester of Delivery**		5
Administering Department		Geology science	**College**	science	
Module Leader	Flyah Hassan Abba		**e-mail**	flyahabas@uomosul.edu.iq	
Module Leader's Acad. Title		lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Flyah Hassan Abba Sahar A.Qasim Ahed Younos Abdulla Ann Abdulsattar Ismail Oday Mohammed Saleh Mohammed Hamed Abraheem		**e-mail**	flyahabas@uomosul.edu.iq Saharqasim59@gmail.com drahedalmallah@uomosul.edu.iq annabdulsattar@uomosul.edu.iq Odayothman@uomosul.edu.iq mohammed.hamed91@uomosul.edu.iq	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		02/06/2023	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Exploration geochemistry &isotope geology	**Semester**	9
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Clarification of how studying this course can make significant contributions to the geochemistry field. 2. Identify the principles of geochemistry and the study of the chemical components of the various internal parts of the earth . 3. This course deals with the behavior of elements during the stages of magmatic crystallization, chemical weathering processes and the laws that control them. 4. Learn about the most important scientific terms (Terminology) and their definitions related to this topic 5. To understand the factors controlling the behavior of elements in sedimentary environments. 6. This course employs how to deal with behavior of the elements during the chemical weathering processes that occur on the surface of the earth, and Description the clay minerals.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Define geochemistry and describe its tool types. 2. Definitions of main terms and methods of geochemistry 3. Description the composition of the earth interior by using Seismic data. 4. Summarize what is meant the rocks of deep origin and how using to estimate the composition of earth's interior . 5. Discuss the chemical composition of the Earth Crust. 6. Explanation of the nature of mantle Material , Outer Core and Inner Core,. 7. Interpretation the Geochemistry of supergene and Hypogene environments. 8. Define Weathering and describe its types. 9. Explanation of factors controlling the behavior of elements in sedimentary environments. 10. Discuss the Colloids and colloidal systems . 11. Identify the Clay Minerals. 12. Description the classification of clay minerals.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction , construction of the earth , Earth's Interior , Seismic data on the earth's interior , Density Distribution , Heat and Pressure Distribution , Material of earth interior , Rocks of Deep Origin : Ophiolite Complexes , Diamond bearing Kimberlite Pipes , Xenolith . , Experimental Studies , Earth Crust , The chemical composition of the Earth Crust. [10 hrs] Material of The Mantle , Material of the Upper Mantle , Transition Zone of Earth Mantle, Lower Mantle Material , Outer Core , Inner Core, Meteorite , Geochemical Classification of Elements . [8 hrs]

	Geochemistry of supergene environment , Hypogene Environment , Geochemistry of Sediment and Sedimentary Rocks , Weathering , Physical weathering , Chemical weathering , Chemical weathering reactions, Weathering products , Factors controlling the behavior of elements in sedimentary environments , Ionic potential for elements , Power (Potential) of hydrogen (pH) , Oxidation-reduction (redox) potential . [10 hrs] Eh -pH Relationships, Colloids and colloidal systems : Mechanisms for the formation of colloidal systems , Types of colloids , The reasons for the presence of charges on colloidal particles , The important of colloidal systems , Clay Minerals : Class of two layer minerals , Class of three layer minerals , Mixing layers clay minerals , Palygorskite – Sepiolite Group. [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs Element distribution in igneous rocks (evaluation of Goldsmidt rules), The origin relationship of igneous rock from the chemical analysis, distribution of Cr and Ni in basic volcanic rocks, distribution of Zr and Hf in acidic igneous rocks, Aragonite stabilization in ancient limestone, Using the geochemical data as a stratigraphical correlation. [18 hrs] The geochemistry of phosphorites, calculation of the salt chemical formula in the lakes, geochemistry of lakes, oil migration, Eh-pH diagram, distribution of iron phases on Eh-pH diagram. [18 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The course includes the principles of geochemistry and the study of the chemical components of the various internal parts of the earth, as well as the study of the behavior of elements during the stages of magmatic crystallization, chemical weathering processes and the laws that control them, as well as the factors controlling the behavior of elements in sedimentary environments. The course also contains an understanding of the geochemistry of clay minerals and their classification.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem)	**125**		

الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	An introduction to geochemistry, Seismic data on the earth's interior ,
Week 2	Density, Heat and Pressure Distribution .
Week 3	Material of earth interior , Rocks of Deep Origin ,Experimental Studies .
Week 4	Earth Crust , The chemical composition of the Earth Crust .
Week 5	Material of the Upper Mantle of Earth.
Week 6	Material of the Transition Zone and lower Mantle of Earth .
Week 7	Material of the Outer Core and Inner Core.
Week 8	Meteorite , Geochemical Classification of Elements .
Week 9	Hypogene Environment , Supergene Environment , Geochemistry of Sediment and Sedimentary Rocks .
Week 10	Weathering , Physical weathering , Chemical weathering .
Week 11	Chemical weathering reactions , Weathering products.
Week 12	Factors controlling the behavior of elements in sedimentary environments : Ionic potential for elements , Power (Potential) of hydrogen (pH) .
Week 13	Oxidation-reduction (redox) potential , Eh -pH Relationships .
Week 14	Colloids and colloidal systems , Mechanisms for the formation of colloidal systems , Types of colloids, The reasons for the presence of charges on colloidal particles , The important of colloidal

	systems .
Week 15	Clay Minerals : Class of two layer minerals , Class of three layer minerals , Mixing layers clay minerals , Palygorskite – Sepiolite Group.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Element distribution in igneous rocks (evaluation of Goldsmidt rules).
Week 2	Lab 2: The origin relationship of igneous rock from the chemical analysis.
Week 3	Lab 3: Distribution of Cr and Ni in basic volcanic rocks.
Week 4	Lab 4: Distribution of Zr and Hf in acidic igneous rocks.
Week 5	Lab 5: Aragonite stabilization in ancient limestone.
Week 6	Lab 6: Using the geochemical data as a stratigraphical correlation. . [18 hrs .
Week 7	Lab 7: The geochemistry of phosphorites.
Week 8	Lab 8:. Calculation of the salt chemical formula in the lakes.
Week 9	Lab9: Geochemistry of lakes.
Week10	Lab 10: Oil migration.
Week 11	Lab 11: Eh-pH diagram.
Week 12	Lab 12: Distribution of iron phases on Eh-pH diagram.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**White, W.M. (2001):** Geochemistry: An On-line textbook, John-Hopkins University press, 700p. **Mason, B. (1966):** Principle of Geochemistry, 3rd edition John Wiley and Sons Inc. 329p.	Yes Yes
Recommended Texts	**Misra K. M. (2012) :** Introduction to Geochemistry: Principles and Applications : Wiley-Blackwell , 452P. **White, W.M. (2018):** Encyclopedia of Geochemistry : Springer International Publishing, 1574p	No No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Stratigraphy**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-35023**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	3		**Semester of Delivery**	5	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Maha Abdule Hameed Al-Hasson		**e-mail**	drmahamustafa@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Abdullah Sultan shihab		**e-mail**	abdhadidi65@uomosul.edu.iq	
Peer Reviewer Name	Alaa Mhmood Saad		**e-mail**	alaawazan@uomosul.edu.iq	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module		**Semester**	
Co-requisites module	General Geology 2	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1-sratigraphy (definition,relation with sedimentology,principles&historical review) 2-Organization of stratigraphic column,Evolution of Stratigraphic classification Code of stratigraphic Nomenclature. 4-Types of formal stratigraphic unit,Lithostratigraphic units. 5- Biostratigraphic units,chronostratigraphic units,chronologic units. 6-magnetostratigraphic units ,other units& informal units. 7-Lithosomes,Biosomes,geometrical classification of Lithosomes. 8-Stratigraphic relationships among Lithosomes. 9-Types of Stratigraphic relationships among Lithosomes. 10-Principle of correlation, Introduction. 11- Correlation of lithostratigraphy. 12-Parastratigraphic Units, Marker bed. 13-Methods of rocks units correlation. 14-Biostratigraphic units. 15-Indification sedimentary Environments.
Module Learning Outcomes	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. List with description, methods of rocks units correlation. 2. Define the various terms marker bed with drawing them. 3. Definition of parastratigraphic units and drawing them. and mention importance in geoscience. 4.mention Summarize the continental of sedimentary. 5-Dicuss the marine environment with drawing them. 6-Define marker bed, Correlation, lagoonal env. Swampenv. 7-principles of stratigraphy ,definitions . 9-How organized the stratigraphic column&stratigraphic classification 10-define stratigraphic units , Lithostratigraphic units,Biostratigraphicm other formal&informal stratigraphic units. 11- define& sketch Lithosomes,Biosomes,Give geometrical classification of Lithosomes 12 Explain& sketch stratigraphic boundaries among lithosomes 13-Give differences between conformable& uncoformable relationships among Lithosomes.
Indicative Contents	Indicative content includes the following. Part A – Theoretical lectures Introduction, principle of correlation. Correlation of Stratigraphy, methods of rock correlation, biostratigraphy units, time Stratigraphy units, element and FACTORS, classification of sedimentary Environments, continental env. Terrestrial env., aquous env. Marine env. (18hrs).

	-sratigraphy (definition,relation with sedimentology,principles&historical review) ,Organization of stratigraphic column,Evolution of Stratigraphic classification Code of stratigraphic Nomenclature. Types of formal stratigraphic units(Lithostratigraphic units., Biostratigraphic units,chronostratigraphic units,chronologic units.,magnetostratigraphic units ,other units)& informal units. -Lithosomes,Biosomes,geometrical classification of Lithosomes. Stratigraphic relationships among Lithosomes.,Types of Stratigraphic relationships among Lithosomes(conformable:vertical&lateral),unconformable,compound relationships. Part B – Practical labs

Learning and Teaching Strategies

Strategies	Expanding students' perceptions about this science and its contents it includes that help in principle of correlation. Lithostratigraphic units, parastig. Units. Marker bed, methods of rocks units, sedimentary env.

Student Workload (SWL)

Structured SWL (h/sem) ا	63	**Structured SWL (h/w)** ا	5
Unstructured SWL (h/sem)	62	**Unstructured SWL (h/w)** ا	5
Total SWL (h/sem)	**125**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All

	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	-sratigraphy (definition,relation with sedimentology,principles&historical review)
Week 2	Organization of stratigraphic column
Week 3	Code of stratigraphic Nomenclature.
Week 4	. Types of formal stratigraphic unit,Lithostratigraphic units. Biostratigraphic units,chronostratigraphic units,chronologic units.
Week 5	6-magnetostratigraphic units ,other units& informal units(Parastratigraphic,cyclostratigraphic, paleoclimatic units relative&Absolute age determination..
Week 6	-Lithosomes,Biosomes,geometrical classification of Lithosomes. 8-Stratigraphic relationships among Lithosomes.
Week 7	Types of Stratigraphic relationships among Lithosomes.
Week 8	Conpound relation ships, Hiatus m unconformity ,Regional& Local unconformity.
Week 9	correlation, correlation of lith stratigraphicby marker bed. .
Week 10	Methods of rocks unitsby position in stratigraphic section .
Week 11	Biostratigraphic units.
Week 12	Classification of sedimentary env.
Week 13	Continental Env. Terrestrial env. Aquous env.
Week 14	Transitional env.
Week 15	Marine env.

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Stratigraphic,principles,Geologic Time Scale ,Stratigraphic symboles& types of stratigraphic scales.
Week 2	Lithostratigraphic correlation
Week 3	. Panel diagram(Fence)correlation
Week 4	. Compound type section & lithocorrelation among several sections in outcrops
Week 5	lithocorrelation among several sections in in wells(subsurface sections)
Week 6	. Determination of Biozones& range chart
Week 7	Lihofacies mapss
Week 8	Biofacies maps
Week 9	Stratigraphic maps
Week10	π *diagram*
Week 11	Reafal limestone resorvior layer &countoring maps from subsurface sections.
Week 12	Clastic/non-clastic ratio map&physical/chemical sediments ratio map.

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Armstrong, H. and Brasier, M. (2005). Microfossils Black well publishing , p. 296. Boggs,Sam.,(2004):principles of Sedimentology & Stratigraphy.4edition.Mervvil publishing company, United States of America.	Yes Yes
Recommended Texts	Stratigraphy by Al-Omari et. el., 1992,.	Yes No
Websites	https://www.youtube.com/watch?v=6w_TJS5j01M&ab_channel=UNCarchaeology	

Group	Grade	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	90 - 100	Outstanding Performance
	B - Very Good	80 - 89	Above average with some errors
	C – Good	70 - 79	Sound work with notable errors
	D - Satisfactory	60 - 69	Fair but with major shortcomings
	E - Sufficient	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	(45-49)	More work required but credit awarded
	F – Fail	(0-44)	Considerable amount of work required

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Micropaleontology II**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-35124**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	3		**Semester of Delivery**	5	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Ibrahim Younis Ahmad		**e-mail**	ibrahimshareefi@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Omar Ahmed Mawlood		**e-mail**	omarbadrani@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Micropaleontology I	**Semester**	4
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Clarification of how micropaleontology can make significant contributions to a wide range of scientific problems in geosciences. 2. Identify two microfossil groups (ostracode and calcareous nannofossil) which are useful in Geosciences. 3. This course deals with the basic concept of the most important and discriminatory morphological characters, anatomical, and taxonomic aspects of each fossil group. 4. Learn about the most important scientific terms (Terminology) and their definitions related to this topic. 5. To understand and comprehend the impact of these groups on stratigraphy, distribution, Paleoclimate and, paleoecology. 6. To perform different micropaleontology applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. List with description, the different groups of organisms and the kingdoms that belong to them. 2. Define the various terms associated with micropaleontology. 3. What is ostracode? Definition, measurement of valves, orientation and importance in geoscience. 4. Summarize what is meant by external and internal features and structures of ostracode. 5. Discuss the reaction and involvement of ostracode in paleoecology, distribution, paleoclimat and stratigraphy. 6. Define Coccoliths, coccolithophores and Coccolithophores and the Biosphere. 7. Identify the Coccoliths and Coccolithogenesis. 8. Explain the Coccolith morphology and formation. 9. List and Describe the Ecology and distribution of Coccolithophores. 10. Discuss the functions of coccoliths. 11. Identify the relation of coccolith with climate changes. 12. Terminology.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction, organisms groups , types of microfossils, taxonomic position , general characteristic of ostracoda, importance of ostracoda study (as microfossils), morphology of ostracoda, calcareous parts , outer lamella, inner lamella, description of margins, features and structures used for the orientation of the carapace, external feature, internal features, ornamentation, terminology of ostracode, dimorphism. [*10* hrs] Ecology, distribution of marine ostracoda, factors controlled of the distribution of ostracoda, distribution of environments according to the salinity levels, Paleoecology. [*10* hrs] Primary producers in the sea, primary Production, coccolithophores, coccolithophores and the biosphere coccoliths and coccolithogenesis, nannofossils,

	nannoplankton, coccolith morphology and formation, heterococcoliths, holococcoliths, nannoliths. [*10* hrs] Ecology of coccolithophores, coccoliths and sedimentology, functions of coccoliths, geologic distribution, effect of global climate change on distribution, evolutionary responses, terminology of calcareous nannofossils. [8 hrs] Revision problem classes [5 hrs] <u>Part B – Practical labs</u> Shape, Overlap, measurements of carapace and valves, orientation, external features, external structures, internal features, internal structures, inner lamella, outer lamella, Hinge line, ornamentation, description of some index species. [18 hrs] coccolith shape, coccoliths orientation, Coccolith size, ultrastructure, types of ultrastructural component, element arrangement , structures spanning central-area, orientation in plan view, structures closing central-area, crystallography, systematic paleontology, description of some index species. [18 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents it includes that help in stratigraphic, paleoecologic, and paleoclimatic analysis. In addition to the use of different microscopes in distinguishing the types of microfossils through observations of the external and internal structures and their diagnosis. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods for microfossils and 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	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Groups and kingdoms of organisms and types of microfossils.
Week 2	An introduction to ostracode, its definition, taxonomic status and, importance.
Week 3	General characteristics of ostracode, morphology, soft and calcareous parts.
Week 4	The features and structures used in the orientation of carapace and valves.
Week 5	External features and structures.
Week 6	Internal features and structures.
Week 7	Important terms (terminology).
Week 8	Ecology and palaeoenvironment of ostracode.
Week 9	Distribution of marine ostracode.
Week 10	Introduction to limestone nannofossils.
Week 11	Terminology related to the cocosphere, terminology related to coccoliths.
Week 12	Coccolithophore environment.
Week 13	Coccolith and sedimentation.
Week 14	Coccolith function.
Week 15	Systematic paleontology.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Shape, measurements of carapace and valves.
Week 2	Lab 2: Orientation of carapace and valves.
Week 3	Lab 3: External features, external structures.
Week 4	Lab 4: Internal features, internal structures.
Week 5	Lab 5: Inner lamella, outer lamella.
Week 6	Lab 6: Hinge line.
Week 7	Lab 7: Description of some index ostracode species.
Week 8	Lab 8: Preparing of Calcareous nannofossils slides.
Week 9	Lab9: Coccoliths shape description.
Week10	Lab 10: Coccoliths orientation.
Week 11	Lab 11: Element arrangement.
Week 12	Lab 12: Description of some index nannofossils species

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Armstrong, H. and Brasier, M. (2005**). Microfossils Black well publishing, p. 296. **Young, J. R. and Bown , P. R. (1997)**. Cenozoic calcareous nannoplankton classification. Journal of Plankton Researches, 19, 36-47.	Yes Yes
Recommended Texts	**Haq, B.U., Boersma, A., (1978)**. Introduction to marine micropaleontology. micropaleontology, Elsevier, New York, 376 p. **Perch-Nielsen, K. (1977)**. Albian to Pleistocene calcareous nannofossils from the western South Atlantic. Initial Rep. Deep Sea drill. Proj., Vol. 39, pp. 699-823.	Yes No
Websites	https://shop.elsevier.com/books/introduction-to-marine-micropaleontology/haq/978-0-444-82672-5 https://www.ucl.ac.uk/GeolSci/micropal/ostracod.html	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Sedimentary Petrology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-24015**				
ECTS Credits	4				
SWL (hr/sem)	**100**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Rafee Ibrahim Al-Humidi Noor Talal		**e-mail**	Rafeegeo66@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Rafee Ibrahim Al-Humidi Salim Hamed Hussein Safwan Fathi Noor Talal Ameen Satam		**e-mail**	Rafeegeo66@uomosul.edu.iq hassainsalim@uomosul.edu.iq safwanfathi@uomosul.edu.iq noortalal@uomosul.edu.iq ameen.alnajem@uomosul.edu.iq	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Sedimentary Petrology	**Semester**	4

Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The aim of studying this course is to introduce the student to the various types of sediments and sedimentary rocks that exist in nature and to show the importance of studying sedimentary rocks and sediments from a purely scientific and applied perspective.
Module Learning Outcomes	Study of the different types of sedimentary rocks such as: conglomerate, breccia, sandstone, mudstone, limestone, dolomite, chert, iron-rich rocks, phosphate rocks, and evaporite rocks. diagenesis processes in clastic and carbonate rocks.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction, Particle composition . Major Minerals, Quartz, Feldspars, Coarse Mica, Clay minerals, Heavy minerals, Rock fragments, Mineral Cements, Matrix Minerals, sandstones maturity, Classification of sandstones, Classification of epiclastic sandstone, Petrography and chemistry of sandstones, Quartz arenites, Feldspathic arenites, Lithic arenites. Other sandstones. [*10* hrs] Gravels, Conglomerates, and Breccias, Composition of framework clasts, Composition of matrix and cements, Sedimentary structures in conglomerates, classification of conglomerates, General statement, Classification by relative clast stability, Classification by clast lithology, Classification by clast size, extraformational (terrigenous gravel) conglomerates and breccias, Orthoconglomerates, Paraconglomerates (Conglomeratic Mudstone), Intraformational Conglomerates and Breccias . [*8* hrs] Shale (Mudstone), composition, chemical composition, classification, origin of shale, diagenesis of siliciclastic sedimentary rocks, eogenesis, mesogenesis, telogenesis. [*10* hrs]. Siliceous sedimentary rocks (cherts) , Mineralogy and texture, Principal kinds of cherts, Bedded and nodular chert, Deposition of chert , Precipitation of chert from seawater, Biogenic removal of silica, Nonbiogenic cherts, Replacement chert. Carbonate sedimentary rocks, Limestone, Introduction, Mineralogy Major components of limestones, Identification of carbonate minerals, Noncarbonate components Carbonate grains, Peloids, coated grains, Lithoclasts, Skeletal grains (bioclasts), Microcrystalline carbonate (lime mud), Sparry calcite Classification of carbonate rocks, Folk's classification (1962), Dunham's classification (1962).\ Nonmarine carbonates, Lacustrine carbonates, Carbonates in rivers, streams, and

	springs, Caliche (calcrete) carbonates, Dolomites, Introduction, Mineralogy of dolomites, Dolomite textures, Origin of dolomite. Diagenesis of carbonate rocks, Introduction, Biogenic Alteration, Cementation, Dissolution, Neomorphism, Replacement Evaporites, Introduction, Gypsum and Anhydrite, Nodular anhydrites, Laminated anhydrites, Massive anhydrite, Halite. Origin of Evaporite Deposits, Depositional Models for Evaporites. Phosphates, Introduction, Precipitation of Phosphates Part B – Practical labs -Carbonates rocks petrographical components -Carbonate classification - Carbonate diagenesis -Sandstones rocks petrographical components - Quartz types -Textural components -Sandstones classification - Sandstones diagenesis -evaporites petrography . [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expand students' perceptions about this science and its contents that help in understanding the types of sedimentary rocks (clastic and carbonate), and their relationship in facies analysis, inferring the ancient environment, and determining the ancient climate. This is achieved through theoretical lectures, practical laboratories, and the use of interactive and video educational programs. Different microscopes are also used to distinguish the types of minerals that make up different rocks.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7.8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	22	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.2
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction, Particle composition . Major Minerals, Quartz, Feldspars, Coarse Mica, Clay minerals, Heavy minerals, Rock fragments.
Week 2	Mineral Cements, Matrix Minerals, sandstones maturity, Classification of sandstones, Classification of epiclastic sandstone, Petrography and chemistry of sandstones
Week 3	Quartz arenites, Feldspathic arenites, Lithic arenites. Other sandstones.
Week 4	Gravels, Conglomerates, and Breccias, Composition of framework clasts, Composition of matrix and cements, Sedimentary structures in conglomerates, classification of conglomerates, General statement, Classification by relative clast stability, Classification by clast lithology
Week 5	Classification by clast size, extraformational (terrigenous gravel) conglomerates and breccias, Orthoconglomerates, Paraconglomerates (Conglomeratic Mudstone), Intraformational Conglomerates and Breccias
Week 6	Shale (Mudstone), composition, chemical composition, classification, origin of shale, diagenesis of siliciclastic sedimentary rocks, eogenesis, mesogenesis, telogenesis.
Week 7	Siliceous sedimentary rocks (cherts) , Mineralogy and texture, Principal kinds of cherts, Bedded and nodular chert, Deposition of chert , Precipitation of chert from seawater,

	Biogenic removal of silica, Nonbiogenic cherts, Replacement chert.
Week 8	**Carbonate sedimentary rocks, Limestone，Introduction, Mineralogy**
Week 9	**Major components of limestones, Identification of carbonate minerals, Noncarbonate components**
Week 10	**Carbonate grains, Peloids, coated grains, Lithoclasts,** **Skeletal grains (bioclasts), Microcrystalline carbonate (lime mud), Sparry calcite**
Week 11	**Classification of carbonate rocks, Folk's classification (1962), Dunham's classification (1962).** **Nonmarine carbonates, Lacustrine carbonates, Carbonates in rivers, streams, and springs, Caliche (calcrete) carbonates,**
Week 12	**Dolomites, Introduction, Mineralogy of dolomites, Dolomite textures, Origin of dolomite.**
Week 13	**Diagenesis of carbonate rocks, Introduction, Biogenic Alteration, Cementation, Dissolution, Neomorphism, Replacement**
Week 14	**Evaporites, Introduction, Gypsum and Anhydrite, Nodular anhydrites, Laminated anhydrites, Massive anhydrite, Halite.** **Origin of Evaporite Deposits, Depositional Models for Evaporites.**
Week 15	**Phosphates, Introduction, Precipitation of Phosphates**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: -Carbonates rocks petrographical components
Week 2	Lab 2: -Carbonate classification
Week 3	Lab 3: - Carbonate diagenesis
Week 4	Lab 4: -Sandstones rocks petrographical components
Week 5	Lab 5: - Quartz types
Week 6	Lab 6: -Textural components
Week 7	Lab 7: -Sandstones classification
Week 8	Lab 8:. - Sandstones diagenesis
Week 9	Lab9: -evaporites petrography
Week10	Lab 10:
Week 11	Lab 11:
Week 12	Lab 12:

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Boggs, S. Jr. 2009. PETROLOGY OF SEDIMENTARY ROCKS, (2nd ed.), Cambridge University Press, New York, 612P. Boggs, S. Jr. 2006. Principles of Sedimentology and Stratigraphy, (4th ed.), Pearson Prentice-Hall, 662.P.	Yes Yes
Recommended Texts	Pettijohn, F. J., 1975, Sedimentary Rocks, 3rd ed.: Harper and Row, New York, NY.	Yes
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Metamorphic petrology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-24016**				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Omar Saif Aldeen Dawood Zahraa Jarjes Aljubory		**e-mail**	omarsaif@uomosul.edu.iq Zahraa1981@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	MS.C.	
Module Tutor	Omar Saif Aldeen Dawood Zahraa Jarjes Aljubory Mohammed A. Suliman		**e-mail**	omarsaif@uomosul.edu.iq Zahraa1981@uomosul.edu.iq masuliman@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Optical Mineralogy	**Semester**	3
Co-requisites module	Petrology	**Semester**	4

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Clarification of how the metamorphic rocks can make significant contributions to a useful in geosciences. 2. Identify the rocks which are useful in industry. 3. This course deals with the basic concept of the most important metamorphic factors and there effect aspects of this modular. 4. Learn about the most important scientific terms (Terminology) and their definitions related to this topic. 5. To understand the impact of these rocks in geological averment, . 6. To perform different applications in mineralogy.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. List with description, the metamorphic rock and there important. 2. Define the various terms of rocks . 3. Definition of metamorphic, and factors of metamorphisim that importance in geoscience. 4. Summarize what is meant by external and internal texture and structures of Study rocks. 5.Define the main effect of metamorphic rocks on industry , 6. Identify the averment of study rocks. 7. Terminology.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction , Metamorphism Factors of metamorphism Geothermal gradient Prograde metamorphism Retrograde metamorphism 18hrs Type of metamorphism Local metamorphism Regional metamorphism Grade of metamorphism Index minerals Isograds 18hrs, Phase rule Univariant system Bivariant System Mineral assemblage Types of metamorphism reactions 18hrs Triangular diagrams Metamorphic facies 12hrs Part B – Practical labs Introduction of Metamorphic rocks METAMORPHIC MINERALS. 3hrs CONTACT (THERMAL) METAMORPHISM. Description of the rock slides for contact metamorphic rocks First Quiz 6hrs

	DYNAMIC METAMORPHISM Description of the rock slides for dynamic metamorphic rocks 6hrs REGIONAL METAMORPHISM (BARROVIAN-TYPE) Description of the rock slides for regional metamorphic rocks Second Quiz 12hrs Trigonometric forms of the chemical classification of rocks 6hrs ACF Digram for Escolaa 3hrs AFM Digram for Thombson Third Quiz 6hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The student will understand the physical factors controlling the transformation and classifying them chemically and histologically and by types of practical diagnostic methods for metamorphic rocks sampling activities that are interesting to the students. The study of metamorphic rocks Lab for (3) hrs/week, It specializes in studying the metamorphic rocks and classifying them chemically and histologically, the conditions of formation of these rocks from an environmental point of view, and the physical factors controlling the transformation.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7.8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	22	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.2
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Metamorphism
Week 2	Factors of metamorphism
Week 3	Geothermal gradient
Week 4	Retrograde metamorphism
Week 5	Prograde metamorphism
Week 6	Type of metamorphism Local metamorphism Regional metamorphism
Week 7	Index minerals
Week 8	Grade of metamorphism Isograds
Week 9	Phase rule
Week 10	Univariant system
Week 11	Bivariant System
Week 12	Mineral assemblage
Week 13	Types of metamorphism reactions

Week 14	Triangular diagrams
Week 15	Metamorphic facies

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction of Metamorphic rocks METAMORPHIC MINERALS.
Week 2	Lab 2: CONTACT (THERMAL) METAMORPHISM. .
Week 3	Lab 3: Description of the rock slides for contact metamorphic rocks .
Week 4	Lab 4: DYNAMIC METAMORPHISM
Week 5	Lab 5: Description of the rock slides for dynamic metamorphic rocks .
Week 6	Lab 6: REGIONAL METAMORPHISM (BARROVIAN-TYPE) .
Week 7	Lab 7: Description of the slate & Phyllite rock slides.
Week 8	Lab 8: Description of the schist rock slides .
Week 9	Lab9: Description of the gneiss rock slides.
Week10	Lab 10: Description of the eglogite rock slides.
Week 11	Lab 11: ACF Digram for Escolaa.
Week 12	Lab 12: AFM Digram for Thombson

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	علم الصخور المتحولة Petrogenesis of Metamorphic Rocks Kurt Bucher **Metamorphic Rocks** Rebecca Pettiford	Yes
Recommended Texts	**Jassim, S. Z. and Goff, J. C., 2006,** Geology of Iraq, Published by Dolin, Prague and Moravian	Yes

	Museum, Brno, Czech Republic.	
Websites	https://www.geokniga.org/bookfiles/geokniga-petrogenesis-metamorphic-rocks.pdf https://raregeologybooks.files.wordpress.com/2014/10/petrogenesis-of-metamorphic-rocks-by-k-bucher-and-m-frey.pdf	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Invertebrates paleontology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-24117**				
ECTS Credits	**4**				
SWL (hr/sem)	100				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Omar Ahmed Mawlood **Nisreen M.Aziz**		**e-mail**	omarbadrani@uomosul.edu.iq Nesreenaziz@uomosul.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Omar Ahmed Mawlood **Nisreen M.Aziz** Maha Abdule Hameed Abdulla Sultan Shahab Ibrahim Younis Mahfoudh Abdullah Luma Hazim Rana Abdullelah Eman Nathim Basma Mohameed		**e-mail**	omarbadrani@uomosul.edu.iq Nesreenaziz@uomosul.edu.iq drmahamustafa@uomosul.edu.iq abdhadidi65@uomosul.edu.iq Ibrahimshareefi@uomosul.edu.iq mahfoudhali@uomosul.edu.iq lumahazim@uomosul.edu.iq Rana.Abdulelah@uomosul.edu.iq	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	General Geology	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أ	1. This course includes the essential themes and principal of macropaleontology which deals with descriptive and systematic study for the invertebrate descriptive and systematic study for the features of structure fossils , phylums and important features of structure classification reproduction and growth stages , evolutionary trends, characters of main divisions, geologic range and distribution and paleoecology for 2 hrs . week supported by 2 hrs. week to applied systematic classification of invertebrate fossils.in geosciences.
Module Learning Outcomes	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. List with description, the main group of fossils invertebrate . 2. Define the various terms deals with invertebrate paleontology general characters. 3. Summarize what is meant by external and internal features and structures of 2. these invertebrate fossils. 3. Discuss the nature of fossils and type of preservation. 4. Classification and diversity of fossils. 5. Taxonomic position and diagnostic feature of these phylum. 6. 7.Concepts of species and genus (scientific names) 7. 8-Geological distribution and evolution of animals. 8. 9- principle divisions of animals.
Indicative Contents	Indicative content includes the following. Part A – Theoretical lectures Introduction, organisms groups , types of macrofossils, taxonomic position , general characteristic of these phylum, importance of the fossils study (as macrofossils), morphology ofshell calcareous parts , outer lamella, inner lamella, description of diagnostic features and structures used for the orientation of the carapace, external feature, internal features. [10 hrs]

	,Ecology, distribution of marine invertebrate fossils, factors controlled of the distribution of these organism , environments according to the salinity levels, Paleoecology. [8 hrs] Classification study for the invertebrate fossils, descriptive and systematic study for the diagnostic features of structure fossils , phylums and important features of structure classification reproduction and growth stages , evolutionary trends, characters of main divisions, geologic time scale. [10 hrs] Ecology and geologic distribution, effect of global climate change on distribution, evolutionary responses, terminology of calcareous shell . [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs Shape, Overlap, measurements of carapace and valves, orientation, external features, external structures, internal features, internal structures, inner lamella, outer lamella, Hinge line, ornamentation, description of some index species. [18 hrs] Systematic of invertebrate paleontology fossils , phylum description of some index species. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents it includes that help in stratigraphic, paleoecologic, and paleoclimatic analysis. In addition to the use the diagnostic feature to distinguishing the types of macrofossils through observations of the external and internal structures and their diagnosis. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods for macrofossils and 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	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.7
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	**Groups and kingdoms of organisms and types of inveratebrate paleontology macrofossils.**
Week 2	**Introduction of invertebrate phylum Nature of fossils , preservation and definition of paleontollgy, animal kingdom, General specially invertebrate fossils.**
Week 3	**Phylum Porifera: General characters and classification upto classes: Canal system in Sponges; integumentary system in sponges**
Week 4	**Phylum Brachiopoda, Introduction, general Morphology ,type of shell, lainds of growth wall**
Week 5	**External features and structures Classification , Articulat , Inarticulate distribution, Paleoecology, Geological history.**
Week 6	**Phylum Coelenterata , General characters and classification up to classes, Internal features and structures**
Week 7	**Phylum Bryozoa General characters and classification up to classes Important terms (terminology).**
Week 8	**Phylum Mollusca: characters and classification up to classes; Torsion in gastropoda Ecology and palaeoenvironment.**

Week 9	**Distribution and evolutionary trends of gastropoda ,diagnostic feature, geological time.**
Week 10	**Pelecypoda ,anatomical features ,classification , Introduction and diagnostic feature.**
Week 11	**Cephalopoda Terminology related to the shell,classification,geological importane, function and develop ment of shell.**
Week 12	**geological importane and history of Ammonids**
Week 13	**Evolutonary trend of Ammonids**
Week 14	**Function of the belemnoid shell and Evolutonary trend**
Week 15	**Phylum Graptolites, preservation classification , Morphology, development of sicula, classification.**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Lab 1: Type of preservation, method ,altered and un altered hard part.**
Week 2	**Lab 2 Shape, measurements and Orientation of carapace.**
Week 3	**Lab 3: Phylum Sponges ,External features.**
Week 4	**Lab 4: complete sponges sample.**
Week 5	**Lab 5: Phylum Coelenterate general description .**
Week 6	**Lab 6: Coelenterate sample/ complete.**
Week 7	**Lab 7: Phylum Brachiopoda ,Description of some index genus.**
Week 8	**Lab 8:. Brachiopoda sample/ complete.**
Week 9	**Lab9: Phylum Bryozoa ,shape description.**
Week10	**Lab 10: : Phylum Pelecepoda sample.**
Week 11	**Lab 11: : Phylum Gastropoda sample.**
Week 12	**Lab 12: : Phylum Cephalopoda sample.**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Janet Moore (2006). An Introduction to the Invertebrates, Cambridge University**	Yes Yes
Recommended Texts	**Barnes, R.D. (1982). Invertebrate Zoology, V Edition** **Jan Pechenik (2014). Biology of the Invertebrates, McGraw-**	Yes

	Hill Science, 2014 **4 Kotpal Volumes Protozoa through Echinodermata, Rastogi Publications** **5 Jordan & Verma (revised editions) Invertebrate Zoology, S. Chand and Co. Ltd., New Delhi.**	No
Websites	https://shop.elsevier.com/books/introduction-to-marine-macropaleontology/haq/978-0-444-82672-5 https://www.ucl.ac.uk/GeolSci/macropal/ostracod.html	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Geotectonics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-24018**				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		2	**Semester of Delivery**		4
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Saddam Essa Mostafa Al-khatony		**e-mail**	saddammostafa@uomosul.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**	mahmodabdhaq@uomosul.edu.iq myasar.sameer@uomosul.edu.iq	
Peer Reviewer Name	Saddam Essa Mostafa Myasar Samer Al-siraj Hadeer Gazi Mohammed		**e-mail**	saddammostafa@uomosul.edu.iq myasar.sameer@uomosul.edu.iq hadeeradeeb@uomosul.edu.iq	
Scientific Committee Approval Date		02/02/2025	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	General geology	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Clarification of how Geotectonics can make significant contributions to a vary branches in geosciences. 2. Identify theory of plate tectonic which are useful in study of geotectonics. 3. This course deals with the basic concept of the most important geotectonics, and plate tectonics aspects of this modulare. 4. Learn about the most important scientific terms (Terminology) and their definitions related to this topic. 5. To understand the impact of these material course in Structural geology, Stratigraphy and neotectonics. 6. To perform different improving students' skills in interpretation events of tectonic.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. List with description, the Geotectonics 2. Define the various terms continental drift with sea floor spreading 3. Definition of the plate tectonic and type of continents and importance in geoscience. 4. Summarize what is meant by external and internal features and structures of Processes or earth. 5. Discuss the composition of interior of earth and involvement of sequential events in margin of north and northeastern of Iraq. 6. Define three boundaries of plates with their characteristics 7. Identify major and minor tectonic plates of the earth's crust 8. Explain the plates motion and the forces behind 9. They will be understanding: Wilson cycle, Supper Continent cycle, Orogeny
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction, Historical development of Geotectonic- Introduction- Relation of Geotectonic with other geosciences. Expansion theory- Contraction theory- Geosyncline Theory- Plate Tectonic Theory [6 hrs.]. Continental Drift Theory- Evidences of Theory. Sea Floor Spreading- Evidences of Sea Floor Spreading. Paleomagnetism- Earth's Magnetic Field- Earth's Magnetic Reversal [6 hrs.]. Plate Tectonics (Major & minor plates)- Tectonic Plates boundaries (Divergent, Convergent, Transform). Plate Tectonics and Magmatism [6 hrs.]. Plate Kinematics-Absolute Plate Velocity (hot-spot tracks). Triple Junctions. Ridge Push - Slab Pull- Basal drag - Mantle resistance - Friction forces [6 hrs.]. Orogeny (Mountain Building). Continental Margins. Oceanic Ridge Systems [6 hrs.]. Part B – Practical labs Tectonic plates: Types and definition. Theory of continental drift: Evidence for continental drift. definition. plate boundaries. Magnetic strips with a problem to calculate the rate of sea floor spreading. Definition of Transform Fault. Tectonic elements of the Arabian plate. Hawaii Hotspot: problem to calculate crustal plate

	movement. Isostasy: density and isostatic equilibrium. Velocity diagram: definition with examples [36 hrs.]
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Students will be able to know evidences of continental drift and sea floor spreading. They will be capable to identify major and minor tectonic plates of the earth's crust, the three boundaries of plates with their characteristics, plates motion and the forces behind. They will be understanding: Wilson cycle, Supper Continent cycle, Orogeny.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.7
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Historical development of Geotectonic- Introduction- Relation of Geotectonic with other geosciences- References
Week 2	Expansion theory- Contraction theory- Geosyncline Theory- Plate Tectonic Theory
Week 3	Continental Drift Theory- Evidences of Theory: 1-Outline similarities of Continents (Jigsaw Puzzle) 2-Paleoclimate (Evidence of glacial deposits, Evidence of warmer climates) 3-Fossil distribution evidence 4-Continuation of Mountain Chains across the oceans. Objections and retardants confronted Wegner's Continental Drift Theory
Week 4	Sea Floor Spreading- Evidences of Sea Floor Spreading: 1- Age of ocean floor 2- Magnetic Strips distribution
Week 5	Earth's Interior Structure- Information sources (Meteorites, Seismic wave's analysis (Compression P waves, Shear S waves)) – Crust (Continental crust, Oceanic crust, Moho discontinuity)- Mantle (Upper Mantle, Lithosphere, Low Velocity Zone (Asthenosphere)- Transition zone)- Outer Core (Seismic shadow zones)- Inner Core
Week 6	Paleomagnetism- Earth's Magnetic Field- Earth's Magnetic Reversal- Magnetism in Rocks (Curie temperature)- Normally magnetized rocks- Reversely magnetized rocks- Polar Wandering (Polar Wandering curves)
Week 7	Plate Tectonics (Major & minor plates)- Tectonic Plates boundaries (Divergent, Convergent, Transform)- Divergent boundaries- Continental Rifting- Divergent boundaries characteristics- Convergent Plate boundaries: Continental – Oceanic Convergence boundary, Oceanic – Oceanic Convergence boundary, Continent - Continent Convergence boundary-
Week 8	Convergent boundaries characteristics:1-Seismicity (Benioff zone) 2-Volcanism 3-Gravity 4-Nature of Sediments and Rocks at Trenches (Mélange) 5-Accretionary prism 6-Abnormal low heat flow over trenches 7- Paired Metamorphic belts. Transform boundaries (San Andreas transform Fault, Dead Sea Transform fault)-Transform boundaries characteristics
Week 9	Plate Tectonics and Magmatism: Divergent boundaries Magmatism - Convergent boundaries Magmatism - Intra plate (Hot Spots) Magmatism - Plate Tectonics and Rock Cycle
Week 10	Plate Kinematics-Absolute Plate Velocity (hot-spot tracks)-Relative Plate Velocity (Euler pole: instantaneous Euler pole, finite Euler pole)-Using Vectors to Describe Relative Plate Velocity-linear velocity-vector circuit-Global positioning system

Week 11	Triple Junctions (stable triple junction, unstable triple junction) – Aulacogen
Week 12	Plate Tectonic Engine (Driving Forces): Mantle Drag (convection cell models)
Week 13	Ridge Push - Slab Pull- Basal drag - Mantle resistance - Friction forces
Week 14	Orogeny (Mountain Building) – Cratons – Shields –Reversal of subduction direction
Week 15	Continental Margins (Active margins - Passive margins) -Plate Tectonic interpretation of Continental margins

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Tectonic plates: Types and definition, plates in the world with a problem shows the rate of plates movement according to the data of satellite stations and geological data.
Week 2	Theory of continental drift: Evidence for continental drift, types and examples. Sea Floor Spreading: definition with activities.
Week 3	Plate Tectonics: definition. plate boundaries: Types and Features, with activities.
Week 4	Magnetic strips with a problem to calculate the rate of sea floor spreading
Week 5	Definition of Transform Fault, and Calculating the rate of sea floor spreading in North Atlantic.
Week 6	Tectonic elements of the Arabian plate:
Week 7	Hawaii Hotspot: problem to calculate crustal plate movement
Week 8	Isostasy: density and isostatic equilibrium
Week 9	Velocity diagram: definition with examples.
Week10	Velocity diagram: problem 1
Week 11	Velocity diagram: problem 2
Week 12	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Montgomery, Carla.W. 1997: Fundamentals of Geology, 3rd ed. WM.C. Brown publisher. Conte, Thompson and Moses, 1997: Earth Science, 2nd ed. WM.C. Brown publisher. Kent, C. Condic. 1997: Plate tectonics and Crustal evolution. Plant A Tree publisher. Uyedo, 1971: The New View of the Earth. Freeman Company Allan Cox and Robert Brian Hart, 1986: Plate Tectonics, How It Works. Blackwell Scientific Publications, Inc. Davis G. H. and Reynolds S. J., Kluth F. Charles., 2006. Structural Geology of rocks and Regions, second edition, John Wiley & Sons, Inc. 839p. Twiss, R. J. and Moores, E. M., 2007. Structural geology. W.H. Freeman, USA, 717p. Haakon Fossen (2010), Structural Geology, Cambridge University Press.480p.	Yes Yes
Recommended Texts	Park, R. G.; 1997: Foundations of Structural Geology, 3rd ed., Chapman & Hall Company. Van der Pluijm, B.A. and Marshak, S., 1997: Earth structure: An introduction to structural geology and tectonics. WCB/McGraw Hill, USA, 495p.	Yes No
Websites	https://www.merriam-webster.com/dictionary/geotectonic https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwim4qyy8Lr_AhVmSfEDHZEIAd8QFnoECB4QAQ&url=https%3A%2F%2Fwww.jiscmail.ac.uk%2Flists%2Fgeo-tectonics.html&usg=AOvVaw0e9w8Wnp4ue2bpCfFQieR7	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer Science||**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM-2032**				
ECTS Credits	**3**				
SWL (hr/sem)	**100**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	**Bio.**		**College**	**Science**	
Module Leader	Omar Qusay Alshebly		**e-mail**	omarqusay@uomosul.edu.iq	
Module Leader's Acad. Title	lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Mohammed Ibrahim Othman		**e-mail**	mohammed.mardini@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Computer Science|	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Improved Communication: Fast communication can help increase productivity, allow for better business decisions and facilitate company expansion into new regions or countries. The movement of information within organizations or companies has become instantaneous. Employees can easily transfer data across departments without any interruption. Tools such as email, electronic fax, mobile phones, and text messages enhance the movement of information data between employees, customers, and business partners or suppliers, allowing for greater connectivity across internal and external structures. 2. Work: Streamlined workflow systems, shared storage, and collaborative workspaces can increase business efficiency and allow employees to process a greater level of work in a shorter period of time. Information technology systems can be used to automate routine tasks, to facilitate data analysis and to store data in a way that can be easily retrieved for future use. Technology can also be used to answer customer questions through email, in a real-time chat session, or through a phone routing system that connects the customer to an available customer service agent. 3. Cost Reduction and Economic Efficiency: Communication technology and social technology have made business promotion and product launch affordable. Many small businesses have found ways to use social technology to increase their brand awareness and get more customers for less. In business, factors such as operating cost play an important role in business development and growth. So when companies use information technology to reduce operating costs, the return on investment will increase, which will lead to business growth.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Enhancing the ability of information technology to adapt and respond to the multiple, renewable and constantly changing needs of all parties benefiting from the outputs of the information system, especially the university leaders in the researched university, and thus enables information technology to carry out its work efficiently and effectively. Predicting the studied phenomenon in the future by means of Box-Jenkins model. 2. Employing information technologies in the axes of the educational process worked to build a bridge of vital communication between faculty members and all sources of the educational process, and this necessarily means facilitating the teacher's task in delivering information to the student within an interactive technical environment, and information technologies provide multiple sources in order to obtain information Whether it is from sources within the university or from the Internet and the educational technologies it contains.
Indicative Contents	Although the information technology specialization is one of the most demanded fields currently in all global markets, some specializations range from stagnant to saturated

المحتويات الإرشادية	and required, so you should study the market well before choosing a specialization. But if you are looking for the best majors that have a future in the field of information technology, then they are as follows: Network security major in programming - software engineering - 3D printing - data science major - Artificial Intelligence - Computer Science - Aerospace Engineering

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 by Using appropriate teaching strategies and methods and teaching aids to develop thinking skills.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.7
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 and 10	All
	Assignments	2	10% (10)	2 and 12	All
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	All
Summative assessment	Midterm Exam	2hr	٢0% (١٠)	7	All
	Final Exam	٣	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Security and Networking: What is a network? Types of networks. Basic network components.
Week 2	Security and Networking (Cont.): Network Security Basics. Understanding network threats.
Week 3	E-Commerce: Concepts of Electronic banking services this include online banking: ATM and debit card services, Phone banking, SMS banking, electronic alert, Mobile banking
Week 4	Computer Troubleshooting: Identifying and solving common hardware and software problems that computer users encounter.
Week 5	Computer Troubleshooting (Cont.): Basic troubleshooting techniques and tools for diagnosing and resolving issues.
Week 6	Introduction to Al: Definition of Al, History of Al, Al Techniques and Approaches.
Week 7	Introduction to Al(Cont.): Key Characteristics of Al, Benefits of Al, Challenges and Ethical considerations.

Week 8	The Role of Al in Modern Smartphones: Al-Driven Mobile Technologies, Virtual Assistants (Siri, Google Assistant, Alexa).
Week 9	The Role of Al in Modern Smartphones (Cont.): Adaptive Learning, Real-Time Translation Services.
Week 10	Applications and Tools of Al: Overview of Al Applications in Various Industries, Education and Healthcare.
Week 11	Applications and Tools of Al (Cont.); Transportation, Marketing and Advertising.
Week 12	Applications and Tools of AI(Cont.): Finance, Robotics and Automation Technologies.
Week 13	Al and Society: How Al affects social, Al and international relations, Al and the future of humanity.
Week 14	Ethical Challenges in Al: Al ethics, privacy and surveillance, the impact of Al on the job market.
Week 15	The Future of Al: Future trends in Al, recent research and emerging technologies.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Lab 1	Applications of Security
Lab 2	Applications of Security cont.
Lab 3	Applications on Networking (1)
Lab4	Applications on Networking (2)
Lab 5	Applications of E-Commerce (1)
Lab 6	Applications of E-Commerce (cont.):-ATM and debit card services
Lab 7	Applications on Computer Troubleshooting.
Lab 8	Applications on Artificial Intelligence AI (1)
Lab 9	Applications on AI :-Al-Driven Mobile Technologies
Lab 10	Applications on AI :-Virtual Assistants (Siri, Google Assistant, Alexa).
Lab 11	Applications on AI:- Chat gpt.
Lab 12	Applications on Artificial Intelligence:-Applications in Various Industries, Education and Healthcare.

Lab 13	Applications on Artificial Intelligence:-Transportation, Marketing and Advertising.
Lab 14	Applications on Artificial Intelligence:- Finance, Robotics and Automation Technologies.
Lab 15	Applications on some Artificial Intelligence Tools.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Graham Brown, David Watson, "Cambridge IGCSE Information and Communication Technology", 3rd Edition (2020)	Yes
Recommended Texts	Ahmed Banafa, "Introduction to Artificial Intelligence (AI)", I st Edition (2024).	Yes
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**English Language**			**Module Delivery**	
Module Type	**S**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM-2022**				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Geology		**College**	Science	
Module Leader	Younis Hamad Ahmed		**e-mail**	younis.h81@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Lecturer		**Module Leader's Qualification**	MA	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	????		**Version Number**	2.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Familiarizing students with the basics of the English language. Also, breaking the barrier of shyness and increasing their confidence inside and outside the classroom. There is a big chance to get them engaged in short discussions where they can write or verbally express themselves. In addition to these above, the course will improve their reading, writing, listening and speaking skills as students where English language is the main medium of communication throughout their courses.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Creating full awareness of correct usage of English grammar in writing and speaking. 2- Realizing the importance of the English language inside and outside of university life. 3- Students will improve their speaking ability in English both in terms of fluency and comprehensibility. 4- Students will review the grammatical forms of English and the use of these forms in specific communicative contexts, which include: class activities, homework assignments, reading of texts and writing. 5- Increasing their reading speed and comprehension of academic articles. 6- Students will improve their reading fluency skills through extensive reading. 7- Students will enlarge their vocabulary by keeping a vocabulary journal. 8- Students will strengthen their ability to write short paragraphs and summaries using the process approach.
Indicative Contents المحتويات الإرشادية	<u>Part A – Theoretical lectures</u> Introduction about communication in general and especially the English language, with an introduction on the word classes (parts of speech) in the English language [4 hrs]. Explaining every part of speech in the English language such as nouns, pronouns, verbs, adjectives, adverbs, prepositions, conjunctions and interjections [16 hrs]. Moving on to Vocabulary teaching where students will study some strategies and learn new methods of memorizing any set of vocabulary [4 hrs]. Main skills in learning the English language: speaking, listening, reading and writing are also delivered gradually during the last weeks [6 hrs]. The last part is dedicated to some error correction and feedback sessions [2 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Encourage Learners to 'Stretch' Their Styles. This is a very important point as learners are not 100 percent one type or another. For example, of the analytical/global learning styles. Analytical learners work more effectively alone and at their own pace. Global learners, on the other hand, work more effectively in groups. 2. Do Not Privilege Any One Style Over Another. The general consensus is that while styles differ, one is not necessarily superior to the other. In other words, learners who prefer to study alone will not necessarily be better learners than those who prefer to learn by listening. According to this view, analytical learners should be given the opportunity to spend more time studying alone than in groups, but they should also be given the chance to work in groups. 3. Be Aware of the Relationship Between Learning Styles and Teaching Styles. The reason is that if your style as a teacher is at odds with the learning styles of some of your students, then the effectiveness of your teaching may be limited. If you have a collaborative teaching style, then the way you run your classroom may not suit authority-oriented learners who want the teacher to tell them what to do. If your teaching style is authoritative, even authoritarian, then you may not be suited to students who value autonomous 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	6.6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.4
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	3	15% (15)	2, 5, and 9	LO #2, #5, #8
	Assignments	2	10% (10)	4 and 8	LO #4 and #8
	Projects / Lab.				
	Report	3	15% (15)	3, 6 and 7	LO #3, #6 and #7
Summative assessment	Midterm Exam	2hr	10% (10)	7	ALL
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	An introduction on communication and English language.
Week 2	Parts of Speech (word classes).
Week 3	Nouns & their types.
Week 4	Pronouns in English language.
Week 5	Verbs in the English language.
Week 6	Adjectives and their types.
Week 7	Adverbs and their uses.
Week 8	Prepositions in English language.
Week 9	Conjunctions in English Sentences.
Week 10	Interjections in English Sentences.
Week 11	Vocabulary Improving Skills.
Week 12	Basic Speaking Skills.
Week 13	Basic Reading Skills.
Week 14	Basic Writing Skills
Week 15	Basic Listening Skills

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered

Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Murphy, R. (1985). *English Grammar In Use*. CUP.**	Yes
Recommended Texts	**Sullivan, N. (2015). *Essential Grammar*. Routledge.**	No
Websites	https://www.pdfdrive.com/essential-grammar-for-todays-writers-students-and-teachers-e165838835.html	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria

Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Optical mineralogy**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-2318**				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	2		**Semester of Delivery**	3	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Sahar A.Qasim		**e-mail**	Saharqasim59@gmail.com	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Roaa Mohammed Hassan Sahar A.Qasim Mohammed Ahmed Mohammed Salim Hamed Hussein Zahraa Jarjees Mohammed		**e-mail**	roaamohmmed@uomosul.edu.iq Saharqasim59@gmail.com mohamedalhaj@uomosul.edu.iq hassainsalim@uomosul.edu.iq Zahraa1981@uomosul.edu.iq	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mineralogy	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Learn about the different optical phenomena and how to benefit from them in the study of minerals like like reflection, refraction, interference etc. 2. Studying the optical properties of different minerals (color, color change, cleavage, shape and form, extinguishing, overlapping colors, etc.)---. 3. This course deals with the basic concept of the most important optical properties of different minerals 4. Facilitate the study of the optical properties of minerals and how to benefit from them in minerals and benefit from them in detailed studies, as well as the study of the petrography of different rocks. Minerals were divided into three groups, each with distinctive properties.. 5. Learn about the most important scientific terms (Terminology) and their definitions Studying the optical properties of different minerals related to this topic. 6. To understand the impact of This branch of science on the other sciences such as agriculture and industry
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. -Definition of all terms related to light and the most important hypotheses that explained the different light phenomena. 2. Explain the difference between the types of light (polarized, normal, monochromatic, etc.).and how to obtain each one of them. 3. Summarize what is meant by uniaxial indecatrix ,biaxial indecatrix and isotropic indecatrix . 4-. Discus & Explain the process of double refraction in detail and how to benefit from it practically, and how refractive index 5---Explain the parts of the polarizing microscope, its working mechanism, and how to make maximum use of it in the study of minerals and rocks.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction , nature of light (properties and theories) , definition of scientific terms releated to light (especially wave theory), The isotropic &un isotropic substances, Refraction &reflection of light ,velocity of light ,optical classification of minerals, . [10hrs] Critical angle , Snells law, R.I. The relief (apparent and real) and the different methods of measuring,(like the immersion method), Monochromatic light ,the relationship between the ray deviation &R.,, Methods to obtain polarized light . Reflection &refraction, selective absorption(10 hr) double refraction, nicol prism, Isotropic indecarix,, Interference of light,, Calculation of retardation,,, Factors affecting light transmission through the analyze,,interference color (10 hr) Part B – Practical labs

	Parts of the polarizing microscope ,general view of all mineral optical properties ,then And then study the optical properties of minerals aggregates in detail e.g. the isotropic minerals, the uniaxial ,the biaxial,,, and study the interference figure etc.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	It includes studying the light and optical properties of different minerals, and employing this information to benefit from it in the study of lithology or petrography of different types of rocks and soils.And to learn how to measure the R.I.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	**The light, nature of light** , Some definitions in wave theory
Week 2	**The isotropic &un isotropic substances**
Week 3	. Refraction &reflection of light ,velocity of light
Week 4	Critical angle , Snells law, R.I.
Week 5	Monochromatic light ,the relationship between the ray deviation &R.I.
Week 6	Methods to obtain polarized light .
Week 7	Reflection &refraction,selective absorption
Week 8	. double refraction and Nicol prism .
Week 9	Isotropic indecarix ,relief
Week 10	Measurement of R.I.,immersion methods
Week 11	Interference of light,, **Calculation of retardation**
Week 12	**Factors affecting light transmission through the analyze**
Week 13	. **Interference colors,, Un isotropic indecatrix**
Week 14	Uniaxial minerals,&biaxial minerals.
Week 15	Accessory plates ,,Interference figure

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: part of the polarized microscope
Week 2	Lab 2: general explanation of the optic properties of minerals.
Week 3	Lab 3: general explanation of the optic properties of minerals.
Week 4	Lab 4: isotropic minerals.(garnet ,fluorite, spinel ,neosean,…….)
Week 5	Lab 5: un axial minerals(quartz, apatite ,zircon,
Week 6	Lab 6: uni axial minerals9tuormaline ,calcite ……..)
Week 7	Lab 7: bi axial minerals
Week 8	Lab 8:. bi axial minerals , metamorphic minerals
Week 9	Lab9: sign of elongation and optic sign
Week10	Lab 10: determine the slow and fast vibration direction

Week 11	Lab 11: interference figure of uni axial minerals
Week 12	Lab 12: interference figure of bi axial minerals.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**optical mineralogy by Zeki Aljubouri ,1989**	Yes
Recommended Texts	**optical mineralogy by** Kerr	Yes
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Paleontology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-2309**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	2		**Semester of Delivery**	3	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Nisreen Malallah Aziz		**e-mail**	nesreenaziz@uomosul.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Nisreen Malallah Aziz Alaa Mahmood Saad Abdullah Sultan Shahab Maha Abdulhameed Mustafa Mahfoudh Abdullah Ali Luma Hazim Ahmed Rana Abdulelah Mahmood		**e-mail**	nesreenaziz@uomosul.edu.iq alaawazan@uomosul.edu.iq abdhadidi65@uomosul.edu.Iq drmahamustafa@uomosul.edu.iq mahfoudhali@uomosul.edu.iq lumahazim@uomosul.edu.iq Rana.Abdulelah@uomosul.edu.iq	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى

Prerequisite module	General Geology	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Clarification of how paleontology can make significant contributions to a wide range of scientific problems in geosciences. Identify two fossil groups (Trilobite and Echiniod) which are useful in Geosciences. This course deals with the basic concept of the most important and discriminatory morphological characters, anatomical, and taxonomic aspects of each fossil group. Learn about the most important scientific terms (Terminology) and their definitions related to this topic. To understand and comprehend the impact of these groups on ecology, distribution, and paleoecology. 6. To perform different micropaleontology applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. List with description, the different groups of organisms and the kingdoms that belong to them. 2. Define the various terms associated with paleontology. 3. What is trilobite? Definition, measurement of shell, orientation and importance in geoscience. 4. Summarize what is meant by external and internal features and structures of ostracode. 5. Discuss the reaction and involvement of trilobite in paleoecology, distribution, paleoclimat and stratigraphy. 6.Define Echiniod. 7. Identify the Echiniod and graptolite. 8. Explain the Echiniod morphology and formation. 9. List and Describe the Ecology and distribution of Echiniod. 10. Discuss the Functions of parts of Echiniod. 11. Identify the relation of Echiniod with climate changes. 12. Terminology.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction, organisms groups , types of fossils, taxonomic position , general characteristic of ostracoda, importance of ostracoda study (as fossils), morphology of Echiniod, Echiniod parts , description of margins, features and structures used for the orientation of the shell, external feature, internal features, terminology of Echiniod, dimorphism. [10 hrs] ,Ecology, distribution of marine Echiniod, factors controlled of the distribution of Echiniod, distribution of environments according to the salinity levels, Paleoecology.

	[8 hrs] coccolithophores, trilobite , graptolite morphology and formation. [10 hrs] Ecology of Echiniod, functions of shell, geologic distribution, effect of marine change on distribution, evolutionary responses, terminology of Echiniod. [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs Shape, measurements of shell and parts, orientation, features, external structures, internal structures, ornamentation, description of some index species. [18 hrs] graptolite shape, Echiniod orientation, Echiniod size, ultrastructural component, element arrangement , orientation in plan view, crystallography, systematic paleontology, description of some index species. [18 hrs
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents it includes that help in stratigraphic, paleoecologic, and paleoclimatic analysis. In addition to the use of distinguishing the types of fossils through observations of the shape and structures and their diagnosis. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods for fossils and 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	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Groups and kingdoms of organisms and types of fossils.
Week 2	An introduction to trilobite, its definition, taxonomic status and importance.
Week 3	General characteristics of trilobite, morphology, soft and calcareous parts.
Week 4	Features and structures used in directing shields and shells.
Week 5	features and structures.
Week 6	features and structures.
Week 7	Important terms (terminology).
Week 8	Ecology and palaeoenvironment of trilobite.
Week 9	Distribution of marine trilobite.
Week 10	Introduction to Echiniod.
Week 11	Terminology related to the Echiniod, Terminology related to Echiniod.
Week 12	Echiniod environment.
Week 13	Echiniod and sedimentation.
Week 14	Echiniod function.
Week 15	systematic paleontology.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Shape, measurements of shapes.
Week 2	Lab 2: Orientation of shell.

Week 3	Lab 3: features, structures.
Week 4	Lab 4: features, structures.
Week 5	Lab 5:.
Week 6	Lab 6:.
Week 7	Lab 7: Description of some index Echiniod species.
Week 8	Lab 8:.Preparing of Echiniod slides.
Week 9	Lab9: Echiniod shape description.
Week10	Lab 10: Echiniod orientation.
Week 11	Lab 11: element arrangement.
Week 12	Lab 12: Description of some index Echiniod species

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Microfossels, Bignot 1985 Micropaleontology, Brasier 1980 علم المتحجرات الدقيقة ، طارق العباوي، عامر نادر داؤود، صالح خضر.خلف ١٩٩٢ Invertebrates Paleontolgy, Moor	Yes Yes
Recommended Texts		Yes No
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria

Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Sedimentology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-23010**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	2		**Semester of Delivery**	3	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Falah Abed Al-Miamary Ahmed N. Thanon		**e-mail**	falahabed@uomosul.edu.iq anf1277@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Falah Abed Al-Miamary hmed N. Thanon Salim Ahmed Hussein		**e-mail**	falahabed@uomosul.edu.iq anf1277@uomosul.edu.iq hassainsalim@uomosul.edu.iq	
Scientific Committee Approval Date	22/04/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Crystallography Mineralogy	**Semester**	1 2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. The student gains knowledge and comprehension of the earth's crust and its covers. 2. The students will be able to describe the diversity of rock types based on observation form and hand specimen. 3. The students will be able to interpret the geological history of different rock types based on minerals assemblage, and textures using hand samples. 4. The students will be able to identify different types of igneous, sedimentary and metamorphic rocks and their features. 5. The students will be able to classify different rock types. 6. The students will be able to designate the different igneous, sedimentary and metamorphic characteristics based on minerals grain size, shape, origin, and texture. 7. The students will be able to describe their different occurrence processes and their field exposures.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. What are the Principal subdivisions of the earth's interior? 2. What is the relationship between the three types of rocks in a rock cycle? 3. Defining igneous rocks and defining the types of igneous rock classifications. 4. Discuss the Bowen 's reaction series and description of the most common rocks. 5. Introduction and definition of metamorphic rocks and metamorphic factors. 6. Identify the Types of Metamorphism. 7. Types of Metamorphic facies. 8. Textures of metamorphic rocks. 9. What are advantages of sedimentary rocks and General classification of sedimentary rocks 10. Identify the Clastic rocks/ Sandstones, Conglomerate and Shale. 11. Identify the Chemical –Biochemical Rocks/ Carbonate rocks, Evaporate rocks. 12. Discuss the Other Chemical –Biochemical Rocks/ chert rocks, phosphorites, organic rocks ,others.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures The Principal Subdivisions of the Earth's Interior, Types of rocks, rock cycle, Igneous rocks, Classifications of igneous rocks, Chemical Composition of Igneous Rocks, Chemical Effect on the Mineral Composition, Mineralogical classifications, Grain Size and Occurrence, Discuss the Bowen 's reaction series and description of the most common rocks. [*12* hrs] Metamorphism, Factors Controlling Metamorphism, Types of Metamorphism, Grade

	of Metamorphism, Metamorphic Zones, Mineral assemblage, Metamorphic facies. [*12* hrs] Advantages of sedimentary rocks, General classification of sedimentary rocks, Clastic rocks/ Sandstones, Conglomerate and shale, Chemical–Biochemical Rocks/ Carbonate rocks, Evaporites rocks, Other Chemical–Biochemical Rocks/ chert rocks, phosphorites, organic rocks ,others. [*12* hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Igneous Rocks (Introduction), Acidic Igneous Rocks, Intermediate Igneous Rocks, Basic Igneous Rocks, Ultrabasic Igneous Rocks. [12 hrs] Metamorphic Rocks (Introduction), Metamorphic Rocks (Non-foliated rocks), Metamorphic Rocks (Foliated rocks). [12 hrs]. Clastic rocks/Sandstones, Clastic rocks/Conglomerate and shale, Chemical–Biochemical Rocks/Carbonate rocks, Chemical –Biochemical Rocks/Evaporites rocks, Other Chemical –Biochemical Rocks/ chert rocks, phosphorites, organic rocks, others. [12 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Extending students' perceptions of this science and its contents, which aid in the definition of basic concepts related to Petrology evolution, characteristics, and processes. Explain and interpret concepts, theories, and observational findings or phenomena related to the initiation processes of igneous, metamorphic, and sedimentary rocks as they relate to the student's knowledge emphasis. This will be accomplished through lectures, labs, and interactive tutorials, as well as various practical diagnostic methods for hand specimens and sampling activities that are of interest to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Principal subdivisions of the Earth's interior, The Rock Cycle.
Week 2	Igneous Rocks, Classification and Nomenclature of Igneous Rocks; Chemical Composition.
Week 3	Chemical Effect on the Mineral Composition.
Week 4	Mineralogical classifications, Grain Size and Occurrence.
Week 5	Bowen 's reaction series and description of the most common rocks.
Week 6	Metamorphism, Factors Controlling Metamorphism.
Week 7	Types of Metamorphism, Contact Metamorphism, Regional Metamorphism, Dynamic Metamorphism.
Week 8	Grade of Metamorphism, Metamorphic Zones, Mineral assemblage .
Week 9	Metamorphic facies, Regional metamorphic facies.
Week 10	Metamorphic facies, Contact metamorphic facies.
Week 11	Advantages of sedimentary rocks.
Week 12	General classification of sedimentary rocks, Clastic rocks/ Sandstones.
Week 13	Clastic rocks/ Conglomerate and Shale.
Week 14	Chemical–Biochemical Rocks/ Carbonate rocks, Evaporites rocks.

Week 15	Other Chemical–Biochemical Rocks/ chert rocks, Phosphorites, Organic rocks ,others.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Igneous Rocks (Introduction).
Week 2	Lab 2: Acidic Igneous Rocks.
Week 3	Lab 3: Intermediate Igneous Rocks.
Week 4	Lab 4: Basic Igneous Rocks, Ultrabasic Igneous Rocks.
Week 5	Lab 5: Metamorphic Rocks (Introduction).
Week 6	Lab 6: Metamorphic Rocks (Non-foliated rocks).
Week 7	Lab 7: Metamorphic Rocks (Foliated rocks).
Week 8	Lab 8: Metamorphic Rocks (Foliated rocks).
Week 9	Lab9: Clastic rocks/Sandstones.
Week10	Lab 10: Clastic rocks/Conglomerate and Shale.
Week 11	Lab 11: Chemical–Biochemical Rocks/Carbonate rocks, Evaporites rocks.
Week 12	Lab 12: Other Chemical –Biochemical Rocks/ chert rocks, phosphorites, organic rocks, others.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Best, M.G. (2003):** Igneous Metamorphic Petrology. Blackwell Science Ltd, 715. **Carmichael, I.S.E., Turner, F.J. and Verhoogen, J. (1974):** Igneous petrology. McGraw Hill Company, New York. **Bogges (2006):** Sedimentology and Stratigraphy.	Yes Yes
Recommended Texts	**Bowen, N.L. (1928):** The evolution of igneous rocks, Princeton University Press, Princeton, N.L, 332. **Gill, R. (2010):** Igneous Rocks and Processes. WILEY-BLACKWELL, UK, 428. **Nichols (2009):** Sedimentology and Stratigraphy	Yes No
Websites	https://opengeology.org/petrology/01-introduction-to-petrology/ https://link.springer.com/journal/11495	

	https://academic.oup.com/petrology

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
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Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Crimes of the defunct Baath party			**Module Delivery**	
Module Type	BASIC			☒ **Theory** ☐**Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	UOM-2025				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level	2		**Semester of Delivery**	3	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Mohamed Ahmed Faisal		**e-mail**	Mohamed.faisal@uomosul.edu.iq	
Module Leader's Acad. Title	assistant teacher		**Module Leader's Qualification**	Master's	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	١- يهدف المَقرر بأنَّ يكون الطالب مُلِماً بمفاهيم الجريمة والتعرف على مبادئ علم الإجرام ٢- تقديم فهم علمي متوازن لأسُس الجريمة بطريقة مُبسطة ومفهومة لأغلب المُفردات والمواضيع التي تهم الطالب والتي تدخل ضمن تخصُصات مرحلة الأولية الجامعية في العلوم السياسية، ساعين لفهم وإدراك أفضل للمقومات والمبادئ الأولية للدِراسات القانونية في إطار النظرية القانونية. ٣- السعي لبلورة التفكير الإبداعي لدى الطالب والتي تركز على القدرة على استِدعاء معلومات أو خبرات تكون مُخزنة بعقله وطرح بدائل سريعة، وكذلك السعي لبلورة التفكير المعرفي لديه. ٤- أنَّ يكون مُتمكِناً مِن تشخيص كُل مُفردة أو مادة علمية وتوظيفها في دِراسته أو مجال عمله مُستقبلاً. ٥- تنمية مهارات الطالب في التحليل الاجتماعي والقانوني. ٦- التقريب ما بين الدِراسة النظرية والواقع الراهن. ٧- توسيع مدارك طالب العلوم السياسية في التفريق بين المفاهيم السياسية.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	ا- المعرفة والفهم ١- أنَّ يكون الطالب مُلِماً بالمفاهيم والمُصطلحات القانونية. ٢- أنَّ يكون قادِراً على تحليل مُفردات العلوم السياسية باستخدام المناهج المُتخصِصة. ٣- أنَّ يكون قادراً على تمييز ماهية العوامل التي تؤثر في سياسات الدولة داخلياً وخارجياً. ٤- أنَّ يكون قادراً على تحديد ماهية المفاهيم والمُصطلحات السياسية ومعرفة العلاقة الترابطية بين القوانين التي تدين الجرم ببقية العلوم الاخرى. ٥- أنَّ يكون مُتمكِناً مِن تشخيص كُل مُفردة أو مادة علمية وتوظيفها في دِراسته أو مجال عمله مُستقبلاً. ٦- أنَّ يتمكن من فهم أسُس الجريمة واثارها. ب - المهارات الخاصة بالموضوع 7– اكتساب الطالب لمهارات وقدرات التحليل المنطقي للتفاعُلات والمُتغيرات السياسية والاجتماعية الداخلية واثرها على سياسة الدولة. 8– اكتساب الطالب لمهارات االتحليل العلمي. 9– القدرة على الجمع بين الذكاء والدِراسة والمُمارسة بغية الوصول إلى الأكاديمي المُتخصص الذي يملك معرفة في العلوم القانونية، جنباً إلى جنب مع المعرفة بالمؤثرات الاجتماعية والاقتصادية والثقافية التي تؤثر في اتجاهات ومواقف الدولة والمجتمع
Indicative Contents المحتويات الإرشادية	- التذكر : السعي لبلورة التفكير الابداعي لدى الطالب والتي تُركز على القدرة على استدعاء معلومات أو خبرات تكون مُخزنة بعقله وطرح بدائل سريعة، والقدرة على طرح افكار متنوعة تتغير مع تغير الموضوع. ٢- الاستنتاج والتقييم : السعي لبلورة التفكير الناقد لدى الطالب والذي يُركز على

التحليل والتقييم للحلول المعروضة أمامه وفق معايير مُتفق عليها. ٣- الملاحظة.	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	١. المُحاضرات المصحوبة بالشرح والتوضيح. ٢. المُناقشة والعصف الذهني. ٣. المحاضرات الفيديوية. ٤. استِخدام الأمثلة التوضيحية والتطبيقية لإثراء المادة العلمية. ٥. الحلقات النقاشية والمجاميع البحثية. ٦. المُسابقات العلمية. ٧. البحوث والتقارير النظرية والتحليلية ومُناقشتها وتقييمها. ٨. عرض المادة بوربوينت. ٩. استخدام التعليم حضوري+مدمج عبر برنامج Google Classroom

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	6.6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.4
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10

Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	مفهوم الجريمة وتعريفاتها
Week 2	إنتهاك الحقوق والحريات
Week 3	نبذة وصفية عن الأنظمة السياسية في العراق (١٩٢١-٢٠٠٣)
Week 4	انتهاكات النظام البعثي للحقوق والحريات العامة
Week 5	اثر سلوكيات النظام البعثي في المجتمع
Week 6	اثر المرحلة الانتقالية في محاربة السياسة الاستبدادية
Week 7	انتهاك القانون الدولي
Week 8	الحصار الدولي على العراق بسبب غزو الكويت
Week 9	انتهاك حرية الرأي
Week 10	الثقافة والاعلام وعسكرة المجتمع
Week 11	اثر الحروب على البيئة والسكان
Week 12	سياسة الأرض المحروقة
Week 13	تجفيف الاهوار والهجرة القسرية
Week 14	تدمير البيئة الزراعية والحيوانية والتلوث الاشعاعي
Week 15	المقابر الجماعية

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	

Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	كتاب منهاج جرائم حزب البعث تأليف وزارة التعليم العالي والبحث العلمي	Yes
Recommended Texts		No
Websites	https\\:nur.uobasrah.edu.iq https\\:uomustansiriyah.edu.iq	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Petrology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-23011**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	2		**Semester of Delivery**	3	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Mohammed Ahmed sulaiman Safwan Fathi Al-Lhaebi		**e-mail**	saharqasim59@gmail.com safwanfathi@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Mohammed A. Suliman Omar Saif aldeen Ahmed N. Danoon Omar Khalouq Mohammed		**e-mail**	masuliman@uomosul.edu.iq omarsaif@uomosul.edu.iq anf1277@uomosul.edu.iq o.k.mohammed-sajed@uomosul.edu.iq	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Crystallography Mineralogy	**Semester**	1 2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. The student gains knowledge and comprehension of the earth's crust and its covers. 2. The students will be able to describe the diversity of rock types based on observation form and hand specimen. 3. The students will be able to interpret the geological history of different rock types based on minerals assemblage, and textures using hand samples. 4. The students will be able to identify different types of igneous, sedimentary and metamorphic rocks and their features. 5. The students will be able to classify different rock types. 6. The students will be able to designate the different igneous, sedimentary and metamorphic characteristics based on minerals grain size, shape, origin, and texture. 7. The students will be able to describe their different occurrence processes and their field exposures.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. What are the Principal subdivisions of the earth's interior? 2. What is the relationship between the three types of rocks in a rock cycle? 3. Defining igneous rocks and defining the types of igneous rock classifications. 4. Discuss the Bowen 's reaction series and description of the most common rocks. 5. Introduction and definition of metamorphic rocks and metamorphic factors. 6. Identify the Types of Metamorphism. 7. Types of Metamorphic facies. 8. Textures of metamorphic rocks. 9. What are advantages of sedimentary rocks and General classification of sedimentary rocks 10. Identify the Clastic rocks/ Sandstones, Conglomerate and Shale. 11. Identify the Chemical –Biochemical Rocks/ Carbonate rocks, Evaporate rocks. 12. Discuss the Other Chemical –Biochemical Rocks/ chert rocks, phosphorites, organic rocks ,others.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures The Principal Subdivisions of the Earth's Interior, Types of rocks, rock cycle, Igneous rocks, Classifications of igneous rocks, Chemical Composition of Igneous Rocks, Chemical Effect on the Mineral Composition, Mineralogical classifications, Grain Size and Occurrence, Discuss the Bowen 's reaction series and description of the most

	common rocks. [*12* hrs] Metamorphism, Factors Controlling Metamorphism, Types of Metamorphism, Grade of Metamorphism, Metamorphic Zones, Mineral assemblage, Metamorphic facies. [*12* hrs] Advantages of sedimentary rocks, General classification of sedimentary rocks, Clastic rocks/ Sandstones, Conglomerate and shale, Chemical–Biochemical Rocks/ Carbonate rocks, Evaporites rocks, Other Chemical–Biochemical Rocks/ chert rocks, phosphorites, organic rocks ,others. [*12* hrs] Revision problem classes [3 hrs] Part B – Practical labs Igneous Rocks (Introduction), Acidic Igneous Rocks, Intermediate Igneous Rocks, Basic Igneous Rocks, Ultrabasic Igneous Rocks. [12 hrs] Metamorphic Rocks (Introduction), Metamorphic Rocks (Non-foliated rocks), Metamorphic Rocks (Foliated rocks). [12 hrs]. Clastic rocks/Sandstones, Clastic rocks/Conglomerate and shale, Chemical–Biochemical Rocks/Carbonate rocks, Chemical –Biochemical Rocks/Evaporites rocks, Other Chemical –Biochemical Rocks/ chert rocks, phosphorites, organic rocks, others. [12 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Extending students' perceptions of this science and its contents, which aid in the definition of basic concepts related to Petrology evolution, characteristics, and processes. Explain and interpret concepts, theories, and observational findings or phenomena related to the initiation processes of igneous, metamorphic, and sedimentary rocks as they relate to the student's knowledge emphasis. This will be accomplished through lectures, labs, and interactive tutorials, as well as various practical diagnostic methods for hand specimens and sampling activities that are of interest to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem)	**125**		

الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	Principal subdivisions of the Earth's interior, The Rock Cycle.
Week 2	Igneous Rocks, Classification and Nomenclature of Igneous Rocks; Chemical Composition.
Week 3	Chemical Effect on the Mineral Composition.
Week 4	Mineralogical classifications, Grain Size and Occurrence.
Week 5	Bowen 's reaction series and description of the most common rocks.
Week 6	Metamorphism, Factors Controlling Metamorphism.
Week 7	Types of Metamorphism, Contact Metamorphism, Regional Metamorphism, Dynamic Metamorphism.
Week 8	Grade of Metamorphism, Metamorphic Zones, Mineral assemblage .
Week 9	Metamorphic facies, Regional metamorphic facies.
Week 10	Metamorphic facies, Contact metamorphic facies.
Week 11	Advantages of sedimentary rocks.
Week 12	General classification of sedimentary rocks, Clastic rocks/ Sandstones.

Week 13	Clastic rocks/ Conglomerate and Shale.
Week 14	Chemical–Biochemical Rocks/ Carbonate rocks, Evaporites rocks.
Week 15	Other Chemical–Biochemical Rocks/ chert rocks, Phosphorites, Organic rocks ,others.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Igneous Rocks (Introduction).
Week 2	Lab 2: Acidic Igneous Rocks.
Week 3	Lab 3: Intermediate Igneous Rocks.
Week 4	Lab 4: Basic Igneous Rocks, Ultrabasic Igneous Rocks.
Week 5	Lab 5: Metamorphic Rocks (Introduction).
Week 6	Lab 6: Metamorphic Rocks (Non-foliated rocks).
Week 7	Lab 7: Metamorphic Rocks (Foliated rocks).
Week 8	Lab 8: Metamorphic Rocks (Foliated rocks).
Week 9	Lab9: Clastic rocks/Sandstones.
Week10	Lab 10: Clastic rocks/Conglomerate and Shale.
Week 11	Lab 11: Chemical–Biochemical Rocks/Carbonate rocks, Evaporites rocks.
Week 12	Lab 12: Other Chemical –Biochemical Rocks/ chert rocks, phosphorites, organic rocks, others.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Best, M.G. (2003):** Igneous Metamorphic Petrology. Blackwell Science Ltd, 715. **Carmichael, I.S.E., Turner, F.J. and Verhoogen, J. (1974):** Igneous petrology. McGraw Hill Company, New York. **Bogges (2006):** Sedimentology and Stratigraphy.	Yes Yes
Recommended Texts	**Bowen, N.L. (1928):** The evolution of igneous rocks, Princeton University Press, Princeton, N.L, 332. **Gill, R. (2010):** Igneous Rocks and Processes. WILEY-BLACKWELL, UK, 428. **Nichols (2009):** Sedimentology and Stratigraphy	Yes No

Websites	https://opengeology.org/petrology/01-introduction-to-petrology/ https://link.springer.com/journal/11495 https://academic.oup.com/petrology

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Geomorphology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-23012**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		2	**Semester of Delivery**		3
Administering Department		Type Dept. Code	**College**	Remote Sensing Center	
Module Leader	Myasar Samir Mahmoud		**e-mail**	myasaralsiraj@gmail.com	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Myasar Samir Mahmoud		**e-mail**	myasar.sameer@uomosul.edu.iq	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		16/06/2023	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Remote Sensing	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1-Identification of the geomorphology science and understanding some fundamental concepts in geomorphology which they will aid in the evaluationof much that follows in the subject “geomorphology”. 2-Identification of the geomorphic processes and agents which are modify the earth surface. 3-Knowledge about the physical and chemical processes that effect on the rock mass at or near the earth surface. 4- Identification of the different types of mass-wasting. 5- Identification of those landforms which are produced by aggradation. 6- Knowledge the role of endogenetic processes in the formation of landforms. 7- The influence of climate upon topography. 8-Identification of the soil, its horizons and characteristics of each horizon, Identification of different soil groups and identification of climatic and vegetative condition required in the formation of each group. 9- Identification of the valley and the processes that they are leading in the development of valley. 10- Identification of different valleys according to the stage of valley, depending on the relationship between the direction of stream flow anddip direction of rock strata, also classification depending on the type of geologic structure which have controlled their development. 11- Understanding the effect of dip angle of rock strata in the formation of different topographic features. 12- Identification of those complexities that are encountered in the fluvial cycle. 13- Identification of those landforms which are resulted from solution (Karst). 14- Identification of that topography (landforms) that are formed on folded structure.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The student learns about the landforms and landscape, their classifications, methods of inferring them, and how to draw their maps (Geomorphological maps)

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Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> an introduction Definition of geomorphology and the related concepts [16 hrs] Physical and chemical weathering in detail [12 hrs] Geomorphological processes [12 hrs] Details about geomorphological classification [12 hrs] Geomorphological mapping [12 hrs] <u>Part B – Practical labs</u> Introduction Topography General view. Topography and topo-cross sections in geomorphology [12 hrs] Morphometric analysis and their importance in geomorphology (Part1) (12 hrs) Morphometric analysis and their importance in geomorphology (Part2) [12 hrs] Longitudinal profile analysis [6 hrs] Geomorphological mapping drawing by GIS [10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Geomorphology is necessary and essential for understanding the geological setting of any region. In this context, the investigation of the origin of the landforms and landscape and their classification enables the student to consolidate his understanding of the rocks forming and developing as well as the factors affecting them and gives important explanations

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	00% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Principles of geomorphology 1. Identification of the geomorphology science. 2. Definition of geomorphology. 3. Importance of geomorphology. 4. Some fundamental concepts in geomorphology.
Week 2	Geomorphic processes and agent –Physical weathering in detail 1. Identification of the geomorphic processes and agents which modify the earth surface. 2. Distinguishing between different geomorphic processes and agents. 3. Identification of the physical weathering, and its effects on the disintegration of rocks.
Week 3	Erosion, Aggradation and Endogenetic processes 1. Knowledge the role of erosion in the wearing away of the earth surface. Identification of those landforms which are produced by aggradation. 3. Knowledge the role of endogenetic processes in the formation of landforms.

	4. Identification of those landforms which are produced by extraterrestrial processes. 5. Knowledge the effects of organisms on topography
Week 4	Tectonic (Structural) landforms 1. Knowledge the structural land form. 2. Outcrop Patterns and Landforms On Geologic Maps 3. Landforms developed on folded/ tilted strata
Week 5	Fluvial landforms 1. Identification of the runoff waters which are the dominant geomorphic 2. Understanding the role of runoff waters in the erosion of land surface. 3. Identification of the valley and the processes that they are leading in the development of valley.
Week 6	Drainage texture, stream meandering & lateral erosion 1. Understanding the effects of lithology, structure, climate, topography and permeability (infiltration capacity) on the drainage texture. 2. Understanding the effect of lateral erosion in the development of stream meandering. 3. Understanding the effect of dip angle of rock strata in the formation of different topographic features. 4. Knowledge or identification of the characteristics of the fluvial cycles.
Week 7	valleys and drainage patterns 1. Identification of different valleys according to the stage of valley, 2. depending on the relationship between the direction of stream flow and 3. dip direction of rock strata, also classification depending on the type of 4. geologic structure which have controlled their development. 5. Identification of different drainage patterns and understanding effects of lithology and structure in the development of each type.
Week 8	Mass-wasting 1. Knowledge about the slope stability. 2. Identification of the different types of mass-wasting. 3. Knowledge the lithology (soil or rock) and structure which each type 4. of mass-wasting needed. 5. Knowledge the factors that cause mass-wasting. 6.

Week 9	Karst topography & Topography on domal structure 1. Identification of those landforms which are resulted from solution. 2. Identification of domal structure.
Week 9	
Week 10	Soil 1. Identification of the soil, its horizons and characteristics of each horizon. 2. Identification and knowing factors which have controlled the 3. development of soil. 4. Understanding the stages which are required in the soil development 5. and differentiation of soil horizons.
Week 11	Climatic geomorphology 1. Identification of the arid region. 2. Distinguishing between arid and humid regions. 3. Identification of the major landforms that are developed in arid region.
Week 12	Glacial geolorphology 1. Ice mechanics 2. Climate history, cycles of glaciation 3. Explanations for glacial cycles (climate change) 4. Glacial influences on the landscape
Week 13	Geomorphology landscape 1
Week 14	Geomorphology landscape 2
Week 15	Geomorphology landscape 3

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction
Week 2	Topographic analysis
Week 3	Topo Cross section in geomorphology
Week 4	Using GIS to extract drainage network and basins

Week 5	Morphometric analysis part-1
Week 6	Morphometric analysis part-2
Week 7	Longitudinal profile analysis
Week 8	Interpretation of morphometry in geomorphology
Week 9	Geomorphological mapping by GIS –part1
Week10	Geomorphological mapping by GIS –part2
Week 11	Geomorphological mapping by GIS –part3
Week 12	Exercise geomorphology 1
Week 13	Exercise geomorphology 2
Week 14	Exercise geomorphology 3
Week 15	Exercise geomorphology 4

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	- 1Thornbury, W. D., 1969. Principles of geomorphology (2nd ed.). John Wiley & Sons, Inc., New York, 594p. - 2Bloom, A. L., 2002. Geomorphology- A systematic analysis of Late Cenozoic landforms (3rd ed.). Prentice-Hall of India Private Limited, New Delhi, 482p. - 3Ritter, D. F., 1986. Process geomorphology (2nd ed.). Wm. C. Brown Publishers, lowa, USA, 579p. - 4Spark, B. W., 1972. Geomorphology (2nd ed.). Longman Group Ltd, London, 530p. - 5Strahler, A & Strahler, A., 2002. Physical geography (2nd	Yes

	ed.). John Wiley & Sons, Inc, USA, 748p.\ - 6 Fundamentals of Geomorphology. Second Edition. Richard John Huggett. Taylor & Francis e-Library, 2007.483P 7- A.S. Goudie., 2004, Encyclopedia of Geomorphology, Volume 1 A–I, International Association of Geomorphologists, 1123p.	
Recommended Texts	Thanoun Hamid Al-Dabbagh, 2014, Physical Geology, College of Science, University of Mosul, 554 pages (in Arabic)	Yes
Websites	Lectures by Dr. Mahmoud Fadel Al-Jumaili, Tikrit University (in Arabic) https://www.researchgate.net/profile/Mahmood-Abed	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Arabic Language 2**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM-2012**				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level		2	**Semester of Delivery**		3
Administering Department		GEO	**College**	SCI	
Module Leader	د٠ حسام مشعل محمد		**e-mail**	husam.mishaal.m@uomosul.edu.iq	
Module Leader's Acad. Title		Lecture	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Arabic Language 2	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أ	يهدف المَقرر إلى أنَّ يكون الطالب مُلِماً بمفاهيم اللغة العربية والتعرف على مبادئ أساسيات الكلام والجملة تقديم فهم علمي متوازن لأسُس اللغة العربية بطريقة مُبسطة ومفهومة لأَغلب المُفردات والمواضيع التي تهم الطالب والتي تدخل ضمن تخصُصات مرحلة الأَولية الجامعية في العلوم الإنسانية ساعين لفهم وإدراك أَفضل للمقومات والمبادئ الأَولية للدِراسات الانسانية ٠ السعي لبلورة التفكير الإبداعي لدى الطالب والتي تركز على القدرة على استِدعاء معلومات أو خبرات تكون مُخزنة بعقله وطرح بدائل سريعة، وكذلك السعي لبلورة التفكير المعرفي لديه. أَنَّ يكون مُتمكِناً مِن تشخيص كُل مُفردة أَو مادة علمية وتوظيفها في دِراسته أَو مجال عمله مُستقبلاً. تنمية مهارات الطالب في التحليل الاجتماعي٠ التقريب ما بين الدِراسة النظرية والواقع الراهن. توسيع مدارك طالب العلوم الانسانية ٠
Module Learning Outcomes	١. المُحاضرات المصحوبة بالشرح والتوضيح. ٢. المُناقشة والعصف الذهني. ٣. المحاضرات الفيديوية. ٤. استِخدام الأمثلة التوضيحية والتطبيقية لإثراء المادة العلمية. ٥. الحلقات النقاشية والمجاميع البحثية. ٦. المُسابقات العلمية. ٧. البحوث والتقارير النظرية والتحليلية ومُناقشتها وتقييمها. ٨. عرض المادة بوربوينت. استخدام التعليم حضوري + مدمج عبر برنامج Google Classroom
Indicative Contents	١- التذكر : السعي لبلورة التفكير الابداعي لدى الطالب والتي تُركز على القدرة على استدعاء معلومات أو خبرات تكون مُخزنة بعقله وطرح بدائل سريعة، والقدرة على طرح افكار متنوعة تتغير مع تغير الموضوع. ٢- الاستنتاج والتقييم : السعي لبلورة التفكير الناقد لدى الطالب والذي يُركز على التحليل والتقييم للحلول المعروضة أَمامه وفق معايير مُتفق عليها. ٣- الملاحظة .

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	١ إجراء اختبارات شفوية (يومية – أسبوعية). ٢ إجراء اختبارات تحريرية (شهرية – نصف سنوية- سنوية) ٣ التقارير حضوري + مدمجة التي سيتم تكليفهم بها وغيرها مِن أنشطة الكترونية. ٤ خلق دافعية المُشاركة داخل الصف وإثارة الأَسئلة.

٥ المُشاركات الصفية. ٦ تقييم التقارير والبحوث. ٧ اعتماد الأسئلة الفكرية والتحليلية وتقديم الأجوبة النموذجية للقسم العلمي فيما يخص أسئلة الاختبارات الدورية.	
د - المهارات العامة والمنقولة (المهارات الأخرى المُتعلِقة بقابلية التوظيف والتطور الشخصي). ١- تنمية مهارات التحليل السياسي. ٢- التقريب ما بين الدِراسة النظرية والواقع الراهن مِن خِلال الاستعانة بالأمثلة التطبيقية التوضيحية المُعاصِرة. ٣- القدرة على العمل كفريق نظامي والتفاعُل مع الفريق لإنجاز المُهمات المطلوبة. ٤- القدرة على توظيف ما تعلمهُ الطالب في ميادين العمل المُختلفة.	

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	6.6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.4
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	اقسام الأفعال في اللغة العربية
Week 2	بناء الأفعال
Week 3	علامات الجزم وأدواتها
Week 4	علامات النصب وأدواتها
Week 5	كتابة الأعداد المفردة والمركبة
Week 6	كتابة ألفاظ العقود
Week 7	كتابة أعداد (مائة/ ألف/ مليون/ مليار)
Week 8	الفرق بين الضاد والظاء
Week 9	المفعول فيه
Week 10	المفعول معه
Week 11	تصحيح الأخطاء النحوية
Week 12	الأخطاء اللغوية وتصويبها
Week 13	تصحيح الأخطاء الصرفية في الكلمات
Week 14	تحليل أدبي لنص نثري
Week 15	تحليل لغوي لنص شعري

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	

Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	يوجد كتاب منهجي مُحدد، وهو كتاب العربية الجامعية لغير المختصين تأليف (د. عبدة الراجحي) ولكن يتم الاعتماد على مصادر عديدة اخرى ذات صلة بالمقرر ومِن أهمها: ١. القواعد الأساسية للغة العربية، أحمد الهاشمي، ٢٠٠٩، دار الكتب العلمية، ٢٨٩ ص. جامع الدروس العربية، موسوعة في ثلاثة اجزاء، الجزء الاول، الشيخ مصطفى الغلاييني، مراجعة الدكتور عبد المنعم خفاجة، المكتبة العصرية، بيروت،١٩٠٠، ٩٠٥ ص.	Yes
Recommended Texts		Yes
Websites		

Grading Scheme

مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Igneous Petrology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-24013**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Mohammed A. Suliman		e-mail	mohmed.m.m@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	MSc	
Module Tutor			**e-mail**		
Peer Reviewer Name	Mohammed A. Suliman Ruaa Mohammed Hassan		**e-mail**	masuliman@uomosul.edu.iq roaamohmmed@uomosul.edu.iq	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Crystallography Mineralogy Petrology Optical Mineralogy	**Semester**	1 2 3 3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. The student will gain knowledge about the three Principal Subdivisions of the Earth's interior: the crust, mantle, and core. 2. The student will be studying the Forms and Structures of Intrusive Rocks such as Dykes, Sills, Batholiths, and Ophiolite Complexes. 3. Identifying igneous rock classifications, where the student is acquainted with chemical, mineral, and texture classifications. 4. Studying the various textures of igneous rocks, such as phaneritic, aphanitic, porphyritic, graphic, myrmekitic, and others.. 5. Learn about the history of magma crystallization and how minerals crystallize by studying mono, binary, and ternary systems and applying the phase rule to them. 6. Petrographic study of the acidic, intermediate, basic, and ultrabasic igneous rocks under a polarizing microscope.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. What are the Principal subdivisions of the earth's interior? 2. Identify the Forms and Structures of Intrusive Rocks. 3. Defining the types of igneous rock classifications. 4. Magmatic Differentiation. 5. Definition of Partial Melting 6. Discuss the Bowen 's reaction series. 7. Explain the Petrogenesis 8. Discuss the Magma Generation. 9. Tectonic Setting and Conclusions of Basaltic and Granitic Rocks. 10. Physical Chemistry. 11. Defining Phase Rule. 12. Phase diagram
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction, The Principal Subdivisions of the Earth's Interior, crust, mantle, core, Pyrolite Model, Forms and Structures of Intrusive Rocks such as Dykes, Sills, Batholiths, and Ophiolite Complexes, Tectonite peridotite rocks, Cumulated Rocks, Classification of Igneous Rocks, Chemical Classification, Chemical Effect on the Mineral Composition, Mineralogical classifications, textural classification. [*10* hrs] Magmatic Differentiation, Partial Melting, Bowen's Reaction Series, Crystal fractionation, Petrogenesis, Magma Generation, Mechanism of melting, Generation of Basaltic Magma, Generation of Granitic Magma, . [*8* hrs]

	Tectonic Setting and Conclusions of Basaltic and Granitic Rocks, Plate Tectonics, Plate boundaries or margins, Tectonic Environments, Oceanic Igneous Rocks. [*10* hrs] Physical Chemistry and Physical Properties of the Synthetic Magmas, Phase Rule, Phase diagram, One Component (Unary) Systems, Two Components (Binary) Systems, Three Components (Ternary) Systems, Four Components (Quaternary) Systems . [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs Introduction of Igneous Rocks, Diagnostic features of igneous minerals by the microscope, Textures of Igneous Rocks, Classification of Igneous Rocks, Acidic Igneous, Types of Acidic Igneous Rocks. [18 hrs] Intermediate Igneous Rocks, Types of Intermediate Igneous Rocks, Basic Igneous Rocks, Types of Basic Igneous Rocks, Ultrabasic Igneous Rocks, Types of Ultrabasic Igneous Rocks. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents it includes that help in stratigraphic, paleoecologic, and paleoclimatic analysis. In addition to the use of different microscopes in distinguishing the types of microfossils through observations of the external and internal structures and their diagnosis. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods for microfossils and 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	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Principal subdivisions of the Earth's interior : crust, and the upper mantel.
Week 2	Diagnostic physical and petrological evidences, transition zone, lower mantle, and the core.
Week 3	Forms and structures of intrusive igneous rocks, introduction, basic intrusion into continental crust, and ophiolite complexes.
Week 4	Classification of igneous rocks: Introduction, chemical classification, and the effects of chemical composition of igneous rocks on its mineralogy.
Week 5	Mineralogical classification and textural classification.
Week 6	Magmatic differentiation, Partial melting, Bowen’s Reaction Series crystal fractionation.
Week 7	Petrogenesis, Magma Generation, Mechanism of melting, Generation of Basaltic Magma, Generation of Granitic Magma.
Week 8	Bowen’s Reaction Series crystal fractionation, Petrogenesis, Magma Generation,
Week 9	Tectonic Setting and Conclusions of Basaltic and Granitic Rocks, Plate Tectonics, Plate boundaries or margins.
Week 10	Tectonic Environments, Oceanic Igneous Rocks..
Week 11	Physical Chemistry and Physical Properties of the Synthetic Magmas, Phase Rule, Phase diagram,.
Week 12	One Component (Unary) Systems.
Week 13	Two Components (Binary) Systems.
Week 14	Three Components (Ternary) Systems.
Week 15	Four Components (Quaternary) Systems..

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction of Igneous Rocks.
Week 2	Lab 2: Diagnostic features of igneous minerals by the microscope.
Week 3	Lab 3: Textures of Igneous Rocks and their minerals.
Week 4	Lab 4: Classification of Igneous Rocks.
Week 5	Lab 5: Acidic Igneous.
Week 6	Lab 6: Types of Acidic Igneous Rocks.
Week 7	Lab 7: Intermediate Igneous Rocks.
Week 8	Lab 8:. Types of Intermediate Igneous Rocks.
Week 9	Lab9: Basic Igneous Rocks.
Week10	Lab 10: Types of Basic Igneous Rocks.
Week 11	Lab 11: Ultrabasic Igneous Rocks.
Week 12	Lab 12: Types of Ultrabasic Igneous Rocks.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Best, M .G. (1982):** Igneous and Metamorphic Petrology. W.H. Freeman and company, New York, 630. **Best, M.G. (2003):** Igneous Metamorphic Petrology. Blackwell Science Ltd, 715. **Boulder, F. and Coleman, R.G. (1981):** Cross section through the peridotite in the semail ophiolite, South eastern Oman mountains. J. Geophys Res., 86: 93-2573. **Carmichael, I.S.E., Turner, F.J. and Verhoogen, J. (1974):** Igneous petrology. McGraw Hill Company, New York.	Yes Yes
Recommended Texts	**Gill, R. (2010):** Igneous Rocks and Processes. WILEY-BLACKWELL, UK, 428. **Klein, C. and Harlbut, J.C.S. (1993):** Manual of Mineralogy. John Wiley and Sons, New York: 681. **Wilson, M. (2007):** Igneous Petrogenesis. Chapman and Hall, Springer, 466.	Yes No
Websites	https://geologyscience.com/geology-branches/petrology/igneous-petrology/	

	https://opengeology.org/petrology/02-igneous-rocks/ https://www.britannica.com/science/igneous-rock/Classification-of-volcanic-and-hypabyssal-rocks#ref80226

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Micropaleontology I**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO-24014**				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Abdullah sultan shihab		**e-mail**	abdhididi65@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Maha Abdule Hameed Luma Hazim Basma Mohameed		**e-mail**	drmahamustafa@uomosul.edu.iq lumahazim@uomosul.edu.iq	
Scientific Committee Approval Date	02/06/2023		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module		**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1.The general concept of fossils& branches of paleontology 2.identification of the living animal foraminifera. 3-learn about the life cycle and reproduction of foraminifera. 4-Describe the general appearance of the foraminifera shell shape. 5-Taxonmic study of foraminifera. 6-Astudy of geological history ,paleoenvironment and application of the foraminifera. 7-Modes of life of Microorganisms. 8-Organic Microfossils,Diefinition,types, applications. 9- spores&pollengrains(definition ,life cycle,life cycle, affinity, production, morphological characters,wall composition,classification,Distribution,Evolutionary trends & Historical geology). 10-Acritarch group: morphology,affinity,classification,historical geology,ecology. 11-Chitinozoa group: morphology, ,life cycle, affinity,classification,historical geology,ecology. 12-Dionflagellatesgroup: morphology, ,life cycle affinity,classification,historical geology,ecology.
Module Learning Outcomes	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1-Enumerate of kingdom of life. 2-Explain the life cyclic of the foraminifera. 3-define terms procayotic, genus, species……..end. 4-Determine the geological age by the Globorotalia*, Globigerna,*……end. 5-Discuss the geological application of foraminifera. 6-Mention the main point in describing the shell the foraminifera. 7-Modes of life of Microorganisms. 8- define the Organic Microfossils. 9- definition ,affinity, production, morphological characters,wall composition,classification,Distribution,Evolutionary trends & Historical geology of spores&pollengrains . 10- Whats the morphology characters ,affinity,classification,historical geology,ecology of Acritarch group. 11- - Whats the morphology characters ,affinity,classification,historical geology,ecology of Chitinozoa group. 12- Whats the morphological characters ,affinity,classification,historical geology,ecology of Dinoflagellates group. ……
Indicative Contents	Indicative content includes the following. <u>Part A – Theoretical lectures</u>

	Introduction,Micropaleontology,scientific terms,Binomial Nomencluture,the kingdom of live, living foraminifera ,life cycle of foraminifera,the description the test of foraminifera,classification ,(10hrs). Geological history foraminifera, Ecology of foraminifera,Application of foraminifera. 8-Organic Microfossils,Diefinition,types, applications. 9- spores&pollengrains(definition ,life cycle,life cycle, affinity, production, morphological characters,wall composition,classification,Distribution,Evolutionary trends & Historical geology).(8hrs) 10-Acritarch group: morphology,affinity,classification,historical geology,ecology 11-Chitinozoa group: morphology, ,life cycle, affinity,classification,historical geology,ecology.(10hrs) 12-Dionflagellatesgroup: morphology, ,life cycle affinity,classification,historical geology,ecology.(8hrs) Indicative content includes the following. Revision problem classes(3hrs) Part B – Practical labs Composition and microstructure of the wall,chabers test shape and chamber arrangement,aperture,suture line,ornamentation,periphery of test,umbilical characters.(18hrs). Spores &pollen grains (,types,morphology,symmetry, wall types,laesurae types,ornamentation,classification) Acritarchs (,types,morphology, y, wall types,pylome types,classification) Chitinozoa (morphology, , wall types,basal margin structure types,classification) (81hrs)

Learning and Teaching Strategies	
Strategies	Expanding students' perceptions about this science and its contents it includes that help in Description, Classification, History geological, paleoecologic, and Application. In addition to the use of different microscopes in distinguishing the types of microfossils through observations of the shape of test.

Student Workload (SWL)			
Structured SWL (h/sem)	78	**Structured SWL (h/w)**	7.8
Unstructured SWL (h/sem)ل	22	**Unstructured SWL (h/w)**	2.2
Total SWL (h/sem)	**100**		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Foraminifera, scientific terms,general terms,the kingdom of live,group microfossils.
Week 2	Living foraminifera,general organization life cyclic of foraminifera.
Week 3	Description of foraminifera.
Week 4,5	Classification of foraminifera.
Week 6	Geological history foraminifera,ecology.
Week 7	Application of foraminifera.
Week 8	Organic microfossils:Introduction definition,types,applications
Week 9	Spores & pollen grains morphology,life cycl(reproduction) ,morphology.
Week10	Spores&pollen evolution, classification& historical geology.
Week 11	Chitinozoans morphology,life cycl(reproduction) ,morphology, evolution, classification& historical geology.
Week 12	Acritarchs morphology,life cycl(reproduction) ,morphology.
Week 13	Acritarchs, evolution, classification& historical geology.
Week 14	Dinoflagellates morphology,life cycl(reproduction) ,morphology.
Week 15	**Dinoflagellates evolution, classification& historical geology.,**

Module Evaluation

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

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Lab 1: composition and microstructure of the wall.
Week 2	Lab 2: chambers shape and chamber arrangement.
Week 3	Lab 3: aperture.
Week 4	Lab 4: suture line.
Week 5	Lab 5: periphery of test, : ornamentation and umbilical characters.
Week 6	Lab 6 spores :morphological characters(shapes,wall,aperture,ornamentation)
Week 7	Lab 7: pollen grains:morphological characters(shapes,wall,aperture,ornamentation)
Week 8	Lab 8:
Week 9	Lab9:
Week10	Lab 10: spores&pollen classification
Week 11	Lab 11: Acritarchs Group(shapes,wall,aperture,ornamentation)
Week 12	Lab 12: Chtinozoans(shapes,wall,aperture,ornamentation)

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	**Armstrong, H. and Brasier, M. (2005**). Microfossils Black well publishing , p. 296.**.** **Abawie et.al.,(1992),Micropaleontology.**	Yes Yes
Recommended Texts	**Haq, B.U., Boersma, A., (1978)**. Introduction to marine micropaleontology. micropaleontology, Elsevier, New York, 376 p. Al-haq ,Bilal&Boersma,Anne(1998):Introduction to marine Micropaleontology.Elsevier,AMSTERDAM,SINGAPORE.	Yes
Websites	https://www.youtube.com/watch?v=GPD6RXllrXQ&ab_channel=GEOGIRL	

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