وزارة التعليم العالي والبحث العلمي
جهاز الإشراف والتقويم العلمي
دائرة ضمان الجودة والاعتماد الأكاديمي
قسم الاعتماد

دليل وصف البرنامج الأكاديمي والمقرر

العام الدراسي

2025-2024

نموذج وصف البرنامج الأكاديمي

اسم الجامعة: جامعة ديالى

الكلية/ المعهد: كلية العلوم

القسم العلمي: قسم جيولوجيا النفط والمعادن

اسم البرنامج الأكاديمي او المهني: جيولوجيا النفط والمعادن

اسم الشهادة النهائية: بكالوريوس في جيولوجيا النفط والمعادن

النظام الدراسي: مسار بولونيا

تاريخ اعداد الوصف: 20-10-2024

تاريخ ملء الملف: 20-1-2025

التوقيع :

اسم رئيس القسم: أ.د. منذر طاهر نصيف

التاريخ : 2025/2/10

التوقيع :

اسم المعاون العلمي: ا.د. منذر حمزة راضي

التاريخ : 2025/2/10

دقق الملف من قبل: ا.م. غسان صبيح محمود

شعبة ضمان الجودة والأداء الجامعي

اسم مدير شعبة ضمان الجودة والأداء الجامعي: ا.م. غسان صبيح محمود

التاريخ 2025/2/10

التوقيع:

مصادقة السيد العميد

ا.د. طه محمد حسن

University of Diyala
جامعة ديالى

First Cycle – Bachelor's Degree (B.Sc.) -Petroleum Geology and Minerals - بكالوريوس جيولوجيا النفط والمعادن

Table of Contents|جدول المحتويات

1. Mission & Vision Statement

Vision Statement

The Department of Petroleum Geology and Mineral at University of Diyala looks forward to being a leading department in the fields of oil and minerals and their various applications with a view to harnessing all available resources to serve society. It also looks forward to making an effective contribution to the achievement of the objectives of the development plans of our country.

Mission Statement

The Petroleum Geology and Minerals academic staff pursues a multifaceted charge at University of Diyala. The Program seeks to prepare qualified cadres with scientific and practical knowledge, concepts and skills that will enable them to perform their functions efficiently and efficiently. It is also committed to keep abreast of new developments in various disciplines in Earth sciences and to participating actively in the service of society within the College plan in this field and in line with local and global quality and academic programs.

2. Program Specification

Program code:	**BSc-Geo**	**ECTS**	**240**
Duration:	**4 levels, 8 Semesters**	**Method of Attendance:**	**Full Time**

The Department of Petroleum Geology and Mineral was introduced in the 2012-2013 school year to be the first specialized department in the fields of oil and minerals to be opened at the science faculties of Iraqi universities. The section examines various theoretical and practical aspects relating to the natural wealth and the ways in which it is discovered, produced and assessed in its reserves and distribution. It examines the types of geological structures, oil deposits, the distribution of minerals, the analysis of satellite images for geological survey purposes, and the application of the latest computer techniques to keep pace with scientific development in the field of oil and minerals. The department has a good relationship with local oil companies and with many institutions that have a relationship with geology, also seeks to build relationships with international oil companies operating in Iraq in order to train students and exchange experiences.

Level 1 exposes students to the fundamentals of Geology, suitable for progression to all programs within the Geology program group like general geology and crystallography and mineralogy. Program-specific core topics are covered at Level 2 preparing for research-led subject specialist modules at Levels 3 and 4.

At Levels 2, 3 and 4 students will take modules that reflect the complexity like stratigraphy, through sedimentology and sedimentary rocks, hydrology, paleontology, microfacies, petroleum geology and reservoirs, to ensure the breadth of knowledge expected of a graduate with a Petroleum Geology degree. This allows students to develop their own wide-ranging interests in petroleum geology. Decisions on what to study are made with input from personal tutors.

The research ethos is developed and fostered from the start via practical's, which are either embedded in lecture modules or taught in dedicated practical modules, research seminars and tutorials. There is a compulsory field course in Level 1, which students must pass in order to progress into Level 2, at Level 4 all students carry out an independent research project, which may be a 50 credit library or data analysis project, or a 50 credit field or laboratory based project.

Academic tutorials are held at Levels 1 and 2 with the same tutor, who is also the personal tutor, providing continuity and progressive guidance. Level 1 and 2 tutorials include a number of workshops to teach skills, e.g., library use and presentation skills, followed by assessed exercises, e.g., essays and talks, as opportunities to practice these skills in a subject-specific context.

International years and Industrial placements are also offered and individual needs are discussed with the appropriate tutor and accommodated wherever possible.

3. Program Objectives

1- To creation and preparation of qualified human capacities capable of exploring and exploiting the natural wealth that God has situated in this blessed land.

2- Preparation of outstanding scientific staff to complete their scientific studies (Master and Ph.D.) as a supplement to the scientific cadres available in the department.

3- Increased interaction and cooperation with institutions and bodies working in the field of earth sciences in general and oil and minerals in particular**.**

4- To develop the applied scientific potential of affiliates and students by opening up to applied scientific institutions and world specialized companies through the conduct of applied training courses outside and within Iraq**.**

5- To provision of advisory services to the public and private sectors in various fields of geological specialization.

4. Student Learning Outcomes

Outcome 1

Identification of Complex Relationships

Graduates will be able to illustrate the structure of earth and relationships of geology with other sciences.

Outcome 2

Oral and Written Communication

Graduates will be able to formally communicate the results of geological investigations using both oral and written communication skills.

Outcome 3

Laboratory and Field Studies

Graduates will be able to perform laboratory experiments and field works, by using scientific equipment and computer technology while observing appropriate safety protocols.

Outcome 4

Scientific Knowledge

Graduates will be able to demonstrate a balanced concept of how scientific knowledge develops, including the historical development of foundational theories and laws and the nature of science.

Outcome 5

Data Analyses

Graduates will be able to demonstrate scientific quantitative skills, such as the ability to conduct simple data analyses.

Outcome 6

Critical Thinking

Graduates will be able to use critical-thinking and problem-solving skills to develop a research project and/or paper.

5. Academic Staff

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6. Credits, Grading and GPA

Credits

Diyala University is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 hrs student workload, including structured and unstructured workload.

Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

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:				
Number 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.				

Calculation of the Cumulative Grade Point Average (CGPA)

1. The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

CGPA of a 4-year B.Sc. degree:

CGPA = [(1st [m]odule score x ECTS) + (2nd [m]odule score x ECTS) + (3rd [m]odule score x ECTS)] + (4th [m]odule score x ECTS) / 240

7. Curriculum/Modules

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
GEO1101	General Geology1	79	121	8.00	C	none
GEO1102	Crystallography	79	121	8.00	C	none
COS1103	Chemistry	64	61	5.00	B	none
COS1104	Mathematics 1	32	43	3.00	B	none
UOD1105	Computer	49	51	4.00	S	none
UOD1106	Arabic language	17	33	2.00	S	none

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
GEO1217	General Geology 2	79	121	8.00	C	GEO-111
GEO1218	Mineralogy	79	121	8.00	C	GEO-112
COS1209	Physics	64	61	5.00	B	
COS12110	Mathematics 2	32	43	3.00	B	SCI--114
UOD12011	Democracy and human rights	17	33	2.00	S	
UOD12012	English Language	47	53	4.00	B	

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
GEO23113	Minerals chemistry	64	61	5.00	C	GEO-122
GEO23014	Igneous rocks	64	61	5.00	C	
GEO23015	Hydrology	64	61	5.00	C	
GEO23016	Geomorphology	64	61	5.00	B	
GEO23017	Paleontology	64	61	5.00	C	
GEO23018	Geophysics	64	61	5.00	C	

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
GEO24119	Optical mineralogy	64	61	5.00	C	
UD22	Arabic Language 2	64	61	2.00	B	12U
GEO24021	Engineering geology	64	61	5.00	C	
UD24	Ba'ath Regime Crimes in Iraq	64	61	2.00	B	
GEO24123	Stratigraphy	64	61	5.00	C	
GEO24024	Sedimentology	64	61	6.00	C	
UD21	English Language 2			2:00	B	UD21
UD23	Computer 2			3:00	B	UD13

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
GEO35025	Geochemistry	64	61	5.00	C	
GEO35026	Petroleum geology	79	46	5.00	C	
GEO35027	Structural geology	79	46	5.00	C	
GEO35128	Sedimentary rocks	64	61	5.00	C	GEO-226
GEO35029	Petroleum and Geologic software	64	61	5.00	C	
GEO35130	Microfossils	79	46	5.00	C	GEO-215

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
GEO36031	Research methodology	47	28	3.00	B	
GEO36032	Field geology	64	86	6.00	C	
GEO36133	Petroleum processes	79	71	6.00	C	GEO-312
GEO36134	Structural geology 2	64	61	5.00	C	GEO-313
GEO36035	Geology of Iraq	32	68	4.00	B	
GEO36136	Microfacies	79	71	6.00	C	GEO-316

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
GEO47037	Refraction method	79	46	5.00	C	
GEO47038	Mining Geology 1	64	61	5.00	C	
GEO47039	Well logging	79	46	5.00	C	
GEO47040	Graduation project 1	49	76	5.00	C	
GEO47041	Environmental geology	49	76	5.00	C	
GEO47042	Ores and Industrial rocks	64	61	5.00	C	

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
GEO48143	Reflection method	79	46	5.00	C	GEO-411
GEO48144	Mineral exploration	79	46	5.00	C	GEO-412
GEO48145	Environmental pollution	64	36	4.00	B	GEO-415
GEO48146	Petroleum reservoirs	79	46	5.00	C	GEO-323
GEO48147	Graduation porject 2	47	78	5.00	C	GEO-414
GEO48148	Field coarse	62	88	6.00	C	GEO-322

8. Contact

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Program Coordinator:
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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	UOD-104				
ECTS Credits	**3**				
SWL (hr/sem)	**100**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Rafid Abdulatif Muen		**e-mail**	**dr.rafidmueen@uodiyala.edu.iq**	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name(if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	10/2/2025		**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	The main objectives of the syllabus are: • to provide material for the students to learn pronunciation of the English sounds, to learn to read, write, and to know the fundamentals of English grammar and vocabulary; • to develop the students' reading skills to enable them to skim an adapted text for main idea, to scan an adapted text for specific information, to interpret an adapted text for inferences; • to develop the students' writing skills to enable them to respond to input applying information to a specified task, to elicit, to select, to summarize information in essays (140-160 words); • to develop the students' listening skills to enable them to understand and apply specific information from the input (within the framework of Breakthrough level); • to develop the students' speaking skills to enable them to use general, social and professional language (within the framework of Breakthrough level); • to develop the students' general capacity to a level that enables them to use English in their professional and academic environment (within the framework of Breakthrough level).
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**Speak English, to some extent, with confidence.** **Use and practice the language in different social situations.** **Get better reading comprehension skills to improve their reading abilities to read clearly and carefully.** **Master the given rules of grammar.** **Do written tasks free from grammatical mistakes.** **Achieve noticeable progress in the 4 English language skills.** **Use and function the English language skills with more confidence.** **Prioritize the first 2 skills while learning the language.**
Indicative Contents المحتويات الإرشادية	English language overlaps computer science discipline as it is the lingua franca for computing. Within the same line of thought, most computer science terminology is loaned from the English language. On account of technical restrictions of computer

	and limitations of International criteria on the Internet, internet users and software engineers along with analysts programmers, not least Computer Science students, and their instructors are required to fully use English keywords when using the network, coding and analyzing a computer program and so forth.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Assessment is by coursework (10%), which integrates the following: • Individual and group oral presentations • Oral interactions (including pair work) • Written tests and tasks of various length (memoranda, notes) • Essays • Listening/ viewing • Communicating the gist of simple reading passages • Translation of simple texts on economics.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	47	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	53	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5
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	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			
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (20)	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 the course Planning a conference
Week 2	Spoken reception, Written reception
Week 3	Spoken production, Written production
Week 4	Spoken interaction, Written interaction
Week 5	Mediating a text
Week 6	Leading group work
Week 7	Building on plurilingual repertoire
Week 8	Mid exam
Week 9	Sociolinguistic appropriateness

Week 10	**Spoken Reception** - ***Watching TV, film and video***
Week 11	**Written Reception** - ***Reading correspondence***
Week 12	**Written Reception - Reading for information and argument**
Week 13	**Written Reception** - ***Reading as a leisure activity***
Week 14	**Spoken Production** - ***Public announcements***
Week 15	**Written Production** - ***Written reports and essays***
Week 16	**Online Interaction** - ***Online conversation and discussion***

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	М.А. Шевелева. English on Economics. М., 1998. Cotton D., Falvey D., Kent S. Market Leader. Intermediate Business English. Longman, 2001.	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	**Computer Science**			**Module Delivery**	
Module Type	**Basic**			☒**Theory** ☐**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**UMI-101**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Iraq Ali Hussein		**e-mail**	IraqAll@uodiyala.edu.iq	
Module Leader's Acad. Title	lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	10/2/2025		**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	This module aims to provide students with a grounding in the operation of a computer, and the interaction between the hardware, the operating system and the software. Students have gained an insight into basic concepts of computer science, working methods and research questi ons and have an appropriate perception of computer science. They can choose a field of study for themselves in Biology science.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Key skills for employability KS1 Written, oral and media communication skills KS2 Leadership, team working and networking skills KS3 Opportunity, creativity and problem solving skills KS4 Information technology skills and digital literacy KS5 Information management skills KS6 Research skills KS7 Intercultural and sustainability skills KS8 Career management skills KS9 Learning to learn (managing personal and professional development, selfmanagement) KS10 Numeracy
Indicative Contents المحتويات الإرشادية	1- Describe the major sub-systems components and operation of a computer. 2- Describe the components of a modern operating system, using real operating systems to provide examples. 3- Discuss the interaction between the hardware, the operating system, the application software and the user of a modern computer system.

	4-Outline typical network architectures, and their operations and protocols using examples from real networks to illustrate the concepts involved.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The delivery of the module will include a range of teaching methods and learning styles. These include lectures, case studies, project work, presentations and tutorials; drawing on the student's experiential learning.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	49	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	51	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5
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**	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 computers, definitions essential
Week 2	Basic language, constants, variables, output
Week 3	Input, output, math equations
Week 4	repetition phrase, terms, nested repetition statements
Week 5	Arrays, Dimension Statement, One-Dimensional Arrays, Applications
Week 6	Two-dimensional arrays, reading and their types
Week 7	Subprograms and internal functions
Week 8	Drawing in a calculator, principle, basic drawing phrases
Week 9	Drawing scale, drawing curves, drawing diagrams
Week 10	Applications on drawing, better straight drawing, curved drawing
Week 11	Computer operating systems, system
Week 12	Programming information gathering devices
Week 13	The use of calculators in laboratories, devices for collecting and reading information
Week 14	Drawing scale, drawing curves, drawing diagrams

Week 15	**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		Yes
Recommended Texts		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	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	**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	**Human rights, freedom and democracy**			**Module Delivery**	
Module Type	**Support**			☒**Theory** ☐**Lecture** ☐**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**UNI-103**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Othman Khlan Frhan		**e-mail**	othaman@uodiyala.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	10/2/2025		**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	1. The course aims to introduce students to human rights, freedom and democracy, its most prominent sources and characteristics, and the historical stages that human rights, freedom and democracy went through. 2. Then get acquainted with the Universal Declaration of Human Rights and the most prominent articles included in the Declaration, international treaties and covenants and the most prominent international organizations. 3. The most important international conventions in the field of human rights, freedom and democracy, and introducing students to human rights in the monotheistic religions (Christian, Islamic religion) and other religions. 4. And then emphasizing democracy and how to practice democracy in a newly democratic society, so that students are the nucleus of the future in building the Iraqi state.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Cognitive goals 1- Know human rights, freedom and democracy. 2- The student mentions the most important human rights in life. 2- The student knows the term human rights, freedom and democracy. 3- The student applies the principles of human rights, freedom and democracy within the university campus. 4- The student discusses human rights, freedom and democracy and their development through ancient civilizations. 5- The student explains the overlap between the democratic system and other systems of government. 6- The student distinguishes between guaranteeing human rights under democratic regimes from other regimes. Skill objectives of the course 1 - The student realizes the importance of human rights, freedom and democracy to preserve the dignity of this person. 2 - The student demonstrates his adherence to all principles that protect human

	rights, freedom and democracy. 3 -. The student draws models that express the demand for human rights, freedom and democracy. 4 - The student uses the theoretically acquired concepts in educating society to preserve human rights, freedom and democracy.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Methods of teaching and learning - The electronic lecture on Google meet using Google Classroom. Explanation and clarification. - Brainstorming

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	17	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	1.1
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	33	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.2
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	1	10% (10)	5	LO #1, #2 and #10, #11
	Assignments	1	10% (10)	10	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)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	The first topic: definition of human rights Concept of human rights, definition of human rights.- definition of right- definition of human being- definition of concept of human rights). The importance of studying human rights, characteristics of human rights.
Week 2	Generations of human rights (the first generation is the generation of civil and political rights, the second generation is the generation of economic, social and cultural rights, and the third generation is the generation of new rights).
Week 3	The second topic: the historical development of human rights Human rights in the civilizations of Mesopotamia (the law of Urkagina and Urnammu, the law of Ishtar, the law of the kingdom of Eshnunna, the law of Hammurabi's law), human rights in other ancient civilizations (the Indian and Chinese civilization, the civilization of Pharaonic Egypt, the Greek

	civilization and the Roman civilization).
Week 4	The third topic: Human rights in Islam (the rights of the child, women, social, economic and political rights). Human rights in the Middle Ages, human rights in divine laws, in Judaism and Christianity, human rights at the level of modern revolutions and legitimacy.
Week 5	The fourth topic: Recognition of human rights at the international level, stages of international recognition of human rights, contemporary regional recognition.
Week 6	The fifth topic: human rights at the European level, the American level, the African level, and the Arab and Islamic level, explaining the paragraphs and articles of the Universal Declaration of Human Rights in 1948.
Week 7	The sixth topic: human rights in international and regional conventions and national legislation, including (the Universal Declaration of Human Rights, human rights in the two international covenants).
Week 8	The seventh topic: the emergence of non-governmental organizations and their role in the field of human rights (the International Committee of the Red Cross, Amnesty International, Human Rights Watch, Arab Organization for Human Rights Watch).
Week 9	The eighth topic: the definition of democracy, the concept of democracy, the advantages of democracy, the historical development of democracy and freedom in ancient historical times (Mesopotamia civilization, the Nile Valley civilization, the Greek civilization, the Roman civilization)
Week 10	The ninth topic: the stages of the democratic system in Iraq, the most important articles of the Iraqi constitution of 2005 AD in the field of democracy and human rights. The relationship between the general rights and freedoms of individuals and democracy, the difference between freedom evaluates the democratic system and the stages of its implementation in Iraq (pros of democracy, negatives of democracy)
Week 11	Topic 10: Types of Democracy (First - Direct Democracy, Second - Indirect Democracy, divided into: A - semi-direct democracy, b - indirect democracy, and its most important advantages and disadvantages (representative democracy (parliamentary), consensual democracy, delegated democracy).
Week 12	Table Eleven: General conditions for the success of the democratic system (respect for human rights, political pluralism, peaceful transfer of power) (political equality, respect for the principle of

	democracy, and the existence of the rule of law).
Week 13	The twelfth topic: the components and pillars of democracy (citizenship, political participation, elections, representatives and responsibility) (contestation, constitutional legitimacy, separation of powers, transparency and accountability).
Week 14	The thirteenth topic: the concept of elections and their legal adaptation (election conditions, concepts specific to elections, electoral administration). (General principles of electoral administration, election systems, majority system and proportional representation).
Week 15	The fourteenth topic: administrative corruption, its concept and definition, types of corruption, causes of corruption, treatments for corruption, some political terms (constitutional court, presidential system, parliamentary system, federal union, secularism, technocracy, aristocracy, liberalism, bureaucracy, imperialism).

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to Agilent VEE and PSPICE
Week 2	Lab 2: Thévenin's / Norton's Theorem and Kirchhoff's Laws
Week 3	Lab 3: First-Order Transient Responses
Week 4	Lab 4: Second-Order Transient Responses
Week 5	Lab 5: Frequency Response of RC Circuits
Week 6	Lab 6: Frequency Response of RLC Circuits
Week 7	Lab 7: Filters

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O	Yes

	Sadiku, McGraw-Hill Education	
Recommended Texts	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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	**Mathematical 1**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code					
ECTS Credits	**8**				
SWL (hr/sem)	**30**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Petroleum geology and minerals		**College**	College of science- university of Diyala	
Module Leader	Asia A. Mohammed		**e-mail**	admin.science@uodiyala.edu.iq	
Module Leader's Acad. Title	Assistant Lecturer		**Module Leader's Qualification**	A. L.	
Module Tutor			**e-mail**	asiaali@uodiyala.edu.iq	
Peer Reviewer Name	Calculus		**e-mail**		
Scientific Committee Approval Date	10/2/2025		**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	This academic curriculum is a basic introduction to learning the basics of calculus, trigonometric, logarithmic and exponential functions. The student will learn methods of solution and application. The module aims to: 1- The objective required of the student in order to successfully pass the requirements of the course is to teach the student to make derivations for all mathematical functions, as well as the methods of drawing them. 2- The student's knowledge of distinguishing between functions and drawing them 3- Developing the student's ability to understand the concept of differentiation and its applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Course Outcomes and Methods of Teaching, Learning and Assessment 1-Giving lectures and using textbooks 2- Solving issues related to scientific material 3- Writing scientific reports and analyzing data 4 method of self-learning A- Cognitive goals A1- Students' ability to distinguish and cognitive perception (to diagnose general theories and principles in the study) A2-Future planning to link what the student has learned to daily life A 3- Practicing different types of mathematical proofs A 4 - self-reliance in the achievement of mathematics B - The soft skills objectives of the course B1 - skills to apply calculus B2 - skill to find limits B3 - skill to draw functions Methods of teaching and learning 1. Lecture, use of the blackboard, and recitation 2. Demos

	3. Interactive discussion 4. Self-learning
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. One of the important themes in mathematic is the analysis of relationship between mathematical quantities .such relationships can be described in terms of graphs ,formulas ,numerical data. Pupil will study properties of some of the most basic functions that occur in calculus and we will examine some familiar ideas involving lines, polynomials and trigonometric functions. 2 Student definition of what is understood limits, algebra limit, continuity. limits Infinite , limits by One and two side Tangent lines and derivation, and calculations derivative of some functions by Using definition. Derivatives of Special functions, Mathematical models, Parametric equations

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be : A1- Students' ability to distinguish and cognitive perception (to diagnose general theories and principles in the study) A2-Future planning to link what the student has learned to daily life A 3- Practicing different types of mathematical proofs A 4 - self-reliance in the achievement of mathematics B - The soft skills objectives of the course B1 - skills to apply calculus B2 - skill to find ends B3 - skill to draw functions

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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	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	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered

Week 1	Integer numbers and real numbers intervals inequalities
Week 2	Properties of functions
Week 3	Domain and rang
Week 4	Graph of functions
Week 5	Limits
Week 6	Limits
Week 7	Continuous of functions
Week 8	Special functions
Week 9	Derivatives
Week 10	Derivatives of Special functions
Week 11	Mathematical models
Week 12	Lines
Week 13	Parametric equations
Week 14	Parametric equations
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Calculus, seven edition :Howard Anton, Irl Bivens, Stephen Davis.	Yes
Recommended Texts	Calculus and Analytic Geometry by Thomas	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	**Mathematical 2**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** **Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code					
ECTS Credits	**5**				
SWL (hr/sem)	**30**				
Module Level		1	**Semester of Delivery**		1
Administering Department		Petroleum geology and minerals	**College**	College of science- university of Diyala	
Module Leader	Asia A. Mohammed		**e-mail**	admin.science@uodiyala.edu.iq	
Module Leader's Acad. Title		Assistant Lecturer	**Module Leader's Qualification**		B. L.
Module Tutor			**e-mail**	asiaali@uodiyala.edu.iq	
Peer Reviewer Name		Calculus	**e-mail**		
Scientific Committee Approval Date		10/2/2025	**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	This academic curriculum is a basic introduction to learning the basics of calculus, trigonometric, logarithmic and exponential functions. The student will learn methods of solution and application. The module aims to: 1- The objective required of the student in order to successfully pass the requirements of the course is to teach the student to make derivations for all mathematical functions, as well as the methods of drawing them. 2- The student's knowledge of distinguishing between functions and drawing them 3- Developing the student's ability to understand the concept of differentiation and its applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Course Outcomes and Methods of Teaching, Learning and Assessment 1-Giving lectures and using textbooks 2- Solving issues related to scientific material 3- Writing scientific reports and analyzing data 4 method of self-learning A- Cognitive goals A1- Students' ability to distinguish and cognitive perception (to diagnose general theories and principles in the study) A2-Future planning to link what the student has learned to daily life A 3- Practicing different types of mathematical proofs A 4 - self-reliance in the achievement of mathematics B - The soft skills objectives of the course B1 - skills to apply calculus B2 - skill to find limits B3 - skill to find derivative and Integration
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Part A / the derivative Tangent lines and calculating the derivative For some functions using the definition , implied derivation and derivatives from higher powers, implied derivation and derivatives from higher powers, Limits, some applications on

	the limits, mean value theorem , Rolle's theorem, L'Hupetal's rule, Part B/ Types of functions increasing functions, decreasing functions and drown curves, Trigonometric functions together basic equivalent, Inverse trigonometric functions with their derivation, Hyperbolic functions with their derivation. Part C/ Integration Inverse of differential(Integration), Fundamental theorem for integration, properties of integration, Some application integration, Integration for Trigonometric functions, Inverse trigonometric, Hyperbolic functions.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be : A1- Students' ability to distinguish and cognitive perception (to diagnose general theories and principles in the study) A2-Future planning to link what the student has learned to daily life A 3- Practicing different types of mathematical proofs A 4 - self-reliance in the achievement of mathematics B - The soft skills objectives of the course B1 - skills to apply calculus B2 - skill to find the derivative B3 - skill to

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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	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	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Tangent lines and calculating the derivative For some functions using the definition .
Week 2	Some derivational forms, rule series, derivation of the power function.
Week 3	increasing functions, decreasing functions and drown curves
Week 4	implied derivation and derivatives from higher powers
Week 5	Limits, some applications on the limits
Week 6	mean value theorem , Rolle's theorem, L'Hupetal's rule
Week 7	mean value theorem , Rolle's theorem, L'Hupetal's rule
Week 8	Trigonometric functions together basic equivalent
Week 9	Inverse trigonometric functions with their derivation
Week 10	Hyperbolic functions with their derivation
Week 11	Inverse of differential(Integration)
Week 12	Fundamental theorem for integration, properties of integration
Week 13	Some application integration
Week 14	Integration for Trigonometric functions, Inverse trigonometric, Hyperbolic functions
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Calculus, seven edition :Howard Anton, Irl Bivens, Stephen Davis.	Yes
Recommended Texts	Calculus and Analytic Geometry by Thomas	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	**Physics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoB12345**				
ECTS Credits	**8**				
SWL (hr/sem)	**100**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title	Assistant lec.		**Module Leader's Qualification**	Msc.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	10/2/2025		**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	**After completing the course**, Students are able: Intended Learning 1- Have the knowledge of fundamental Computing Science that includes basic theory and concept of computer science, Mathematics, and Statistics, Programming Algorithm, Software Engineering and Information System. 2- Able to demonstrate and analyze the basic property of object/matter in the form of physical equation related to particle kinematic, interaction force between particles/matter, harmonic oscillator, the elasticity of the material, static and dynamic fluid, temperature and heat, and thermodynamic. 3- Able to solve physics problems independently and responsibly with complete physical completion method 4- Able to use the basic equations of physics in solving problems with Newton's laws of motion, work and energy, linear momentum, and collisions 5- Able to analyze basic physical property based on mathematical concept and formulation about the elasticity of the material, harmonic oscillator, temperature and heat 6- Able to distinguish the first and second thermodynamic equations and able to analyze 4 thermodynamic processes (K) iso volume, isobaric, isothermal, and adiabatic and Able to design and demonstrate the basic principles of physics in conducting experiments on object motion, temperature and heat, mathematical pendulum motion (K).
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On successful completion of this module the student should be able to: 1.Define a fluid and its basic properties, 2.Apply conservation of mass, energy and momentum to fluid flow, 3.Compute hydraulic gradients and design pipe networks, 4.Analyse flows and pressures for single pipe network using the continuity and steady flow energy equations, 5.Apply well-established techniques to solve engineering problemsin fluid mechanics 6.Evaluate the force on a bend/nozzle due to momentum change.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Students will learn about : 1. Quantity and Unit 2. Particle Kinematics 3. Particle Dynamics 4. Work and Energy 5. Linear momentum and collision 6. Angular Momentum and Inertia 7. Harmonic Oscillator

	8. Material Elasticity 9. Fluid Statistics 10. Fluid Dynamics 11. Temperature and Heat 12. Laws of Thermodynamics

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	69	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	31	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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 الاسبوعي النظري		
	Material Covered	
1–4	Chapter 1: “Introduction.”	• Viscosity and Other Secondary • Properties • Surface Tension
1–4 (continued)	Chapter 2: “Pressure Distribution in a Fluid.”	• Pressure and Pressure Gradient • Equilibrium of a Fluid Element • Hydrostatic Pressure Distributions • Application to Manometry • Hydrostatic Forces on Plane Surfaces • Hydrostatic Forces on Curved Surfaces • Hydrostatic Forces in Layered Fluids • Buoyancy and Stability • Pressure Distribution in a Rigid-Body Motion • Pressure Measurement
5–10	Chapter 3: “Integral Relations for a Control Volume.”	• Basic Physical Laws of Fluid Mechanics • The Reynolds Transport Theorem • Conservation of Mass • The Linear Momentum Equation • Frictionless Flow: The Bernoulli Equation • The Angular Momentum Theorem • The Energy Equations

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: No lab sections meet this week
Week 2	Lab 2 : Introduction to Techniques in physics dep.
Week 3	Lab 3 : explain how to draw curves
Week 4	Lab 4: exam
Week 5	Lab 5: ohms law
Week 6	Lab 6: An investigation of Kirchhoff's law
Week 7	Lab 7: coil self-induction
Week 8	Lab 8: Diffraction of light by holes

Week 9	Lab9:young law
Week 10	Lab 10: No Labs Spring Break
Week 11	Lab 11: pressure measurement
Week 12	Lab 12: payless law
Week 13	Lab 13: surface tension
Week 14	Lab14: Re-run experiments as necessary
Week 15	Lab 15: exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	fluid mechanics fundamental and applications Cengel_Cimbala. Published by McGraw-Hill 2006.	Yes
Recommended Texts	Bruce R. Munson, Donald F. Young, Theodore H. Okiishi, and Wade W. Huebsch, Fundamentals of Fluid Mechanics, John Wiley & Sons, 6th ed., 2009.	No
Websites	Related books and magazines	

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	**اللغة العربية**			**Module Delivery**	
Module Type	**نظري**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**UoB12345**				
ECTS Credits	**2**				
SWL (hr/sem)	**200**				
Module Level	2		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Othman Khlan Farhan		**e-mail**	othaman@uodiyala.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name(if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	10/2/2025		**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	**1- تعريف الطلبة اهم المفاتيح الأساس في التعامل بلغة عربية فصيحة خالية من اي خطأ أو لحنٍ وكيفية التعلم فيما يخص الأدب والنحو والبلاغة والاملاء العربية وكل هذا لغير الاختصاص.** **2- رفع القدرات التعبيرية للطالب، وزيادة ثروتهم اللغوية ، ومساعدتهم على استخدام العبارة المناسبة بشكل دلالي واضح.** **3-تدريب الطلبة على التحدث، والتنظيم المنطقي للأفكار، مع الحرص على التمسك باللغة العربية الفصحى .** **4- رفع الأداء اللغوي العام لدى الطلبة.** **5- تمكين الطلبة من الكتابة والتعبير والحديث بلغة عربية فصيحة وواضحة.** **6- مساعدة الطلبة في التعبير عن افكارهم من خلال المناقشة والحوار بلغة سهلة وفصيحة .** **7- جعل الطلبة قادرين على اكتساب خزين لغوي من الكلمات واللفاظ والتعابير الفصيحة.** **8- تعلم الطلبة الحفاظ على لغة القرآن التراث العربي الاصيل.**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**الاهداف المعرفية والمهارية:** **1- يعرف اساليب اللغة العربية.** **2- يوظف ادوات الترقيم عند الكتابة .** **3- يتدرب على كيفية تحليل النصوص الادبية .** **4- يعرب بعض الامثلة والتمارين عن الجملة الاسمية والفعلية .** **5-يناقش بعض النصوص القرآنية والادبية .** **6- يبين الفرق بين علامات الاعراب الاصلية والفرعية.** **7- يميز بين الافعال والاسماء في الجمل.** **8– يتدرب على القراءة الواضحة والإلقاء .** **9- يتدرب على الكتابة بخط حسن من خلال التعريف بأنواع الخطوط العربية، وكتابة كل حرف، ثم كتاب الجمل والعبارات بخط الرقعة.** **10- يميز بين حمزة القطع وهمزة الوصل عند الكتابة .** **11- يتعلم اساليب التحدث أمام الآخرين مع استعمال التأشير باليد والعين والجسد بما يتناسب مع الكلام .** **12- يميز بين حرفي الضاد والظاء في الكتابة والنطق.**

	13- يميز بين التاء المربوطة والمفتوحة اثناء الكتابة.
Indicative Contents المحتويات الإرشادية	توضيح أهمية اللغة العربية وفوائدها بالنسبة للطالب الجامعي (2 ساعة). اللغة، حفظ وتفسير وتحليل أول عشرة آيات من سورة الكهف مع بيان فضل السور ة وسبب تسميتها واهم الاوجه البلاغية والنحوية . (2 ساعة) اللغة، حفظ وتفسير وتحليل ثلاثة آيات من سورة الحجرات مع بيان فضل السور ة وسبب تسميتها واهم الاوجه البلاغية والنحوية. (2 ساعة) الادب، حفظ وتحليل ثلاثة عشر سطراً من قصيدة سفر ايوب في الشعر الحر للشاعر العراقي بدر شاكر السياب مع حياة الشاعر واهم الاوجه البلاغية والنحوية في القصيدة. (2 ساعة) الادب، حفظ وتحليل ثمانية ابيات في الحماس للشاعر ابي الطيب المتنبي مع حياة الشاعر مع اهم الاوجه البلاغية والنحوية في القصيدة. (2 ساعة) قواعد اللغة العربية وأهميتها معرفة اقسام الكلام(الاسم والفعل والحرف)واهم علاماتها. قواعد اللغة العربية :- النكرة والمعرفة، انواع المعارف(العلم) شرح موضوع (اسم العلم والاسم المركب) مع الأمثلة. (2 ساعة) قواعد اللغة العربية، (الضمائر)شرح موضوع(ضمائر الرفع والنصب والجر) مع الامثلة. (2 ساعة) اللغة، حفظ وتفسير وتحليل سورة الاعلى مع بيان فضل السور ة وسبب تسميتها واهم الاوجه البلاغية والنحوية. الادب، حفظ وتحليل ثمانية ابيات من قصيدة (كن بلسما) للشاعر (ايليا ابي ماضي)مع حياة الشاعر مع اهم الحالات الاعرابية والبلاغية .(2 ساعة) قواعد اللغة العربية، شرح موضوع (اسماء الاشارة) مع الأمثلة وحالات الاعراب، شرح موضوع (المعرف بالإضافة) مع الأمثلة وحالات الاعراب. (2 ساعة) قواعد اللغة العربية، شرح موضوع (الحال)معرفة الحال وصاحبها وما هي انواع الحال مع الأمثلة وحالات الاعراب. (2 ساعة) الأملاء في اللغة العربية، علامات الترقيم واهميتها في اللغة العربية. (2 ساعة) قواعد اللغة العربية، شرح موضوع (العدد)معرفة تميز العدد وماهي اقسام العدد مع الأمثلة وحالات الاعراب.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- **المحاضرة والمشاركة.** - **المناقشة والحوار.**

- العصف الذهني. - كتابة التقارير عن الموضوع. - السؤال والجواب .	

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	30	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	30	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**60**		

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	توضيح أهمية اللغة العربية وفوائدها بالنسبة للطالب الجامعي. اللغة، حفظ وتفسير وتحليل أول عشرة آيات من سورة الكهف مع بيان فضل السور ة وسبب تسميتها واهم الاوجه البلاغية والنحوية.
Week 2	اللغة، حفظ وتفسير وتحليل ثلاثة آيات من سورة الحجرات مع بيان فضل السور ة وسبب تسميتها واهم الاوجه البلاغية والنحوية.
Week 3	الادب، حفظ وتحليل ثلاثة عشر سطراً من قصيدة سفر ايوب في الشعر الحر للشاعر العراقي بدر شاكر السياب مع حياة الشاعر واهم الاوجه البلاغية والنحوية في القصيدة.
Week 4	الادب، حفظ وتحليل ثمانية ابيات في الحماس للشاعر ابي الطيب المتنبي مع حياة الشاعر مع اهم الاوجه البلاغية والنحوية في القصيدة.
Week 5	قواعد اللغة العربية وأهميتها معرفة اقسام الكلام(الاسم والفعل والحرف)واهم علاماتها.
Week 6	قواعد اللغة العربية :- النكرة والمعرفة، انواع المعارف(العلم) شرح موضوع (اسم العلم والاسم المركب) مع الأمثلة.
Week 7	قواعد اللغة العربية، (الضمائر)شرح موضوع(ضمائر الرفع والنصب والجر) مع الامثلة.
Week 8	اللغة، حفظ وتفسير وتحليل سورة الاعلى مع بيان فضل السور ة وسبب تسميتها واهم الاوجه البلاغية والنحوية.
Week 9	الادب، حفظ وتحليل ثمانية ابيات من قصيدة (كن بلسما) للشاعر (ايليا ابي ماضي)مع حياة الشاعر مع اهم الحالات الاعرابية والبلاغية.
Week 10	قواعد اللغة العربية، شرح موضوع (اسماء الاشارة) مع الأمثلة وحالات الاعراب، شرح موضوع (المعرف بالإضافة) مع الأمثلة وحالات الاعراب.
Week 11	قواعد اللغة العربية، شرح موضوع (الحال)معرفة الحال وصاحبها وما هي انواع الحال مع الأمثلة وحالات الاعراب.
Week 12	الأملاء في اللغة العربية، علامات الترقيم واهميتها في اللغة العربية.
Week 13	قواعد اللغة العربية، شرح موضوع (العدد)معرفة تميز العدد وماهي اقسام العدد مع الأمثلة وحالات الاعراب.
Week 14	الأملاء في اللغة العربية، احكام الهمزة(حمزة الوصل، حمزة القطع، كتابة الهمزة في وسط الكلمة).
Week 15	الأملاء في اللغة العربية: احكام كتابة الضاد والظاء
Week 16	الأملاء في اللغة العربية: احكام كتابة التاء المربوطة والمفتوحة والالف الممدودة والمقصورة.

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	1. القرآن الكريم. 2. كتاب البلاغة والتطبيق. 3. كتاب الأملاء الواضح . 4. منهاج اللغة العربية لغير الاختصاص.	Yes
Recommended Texts	1. كتاب شرح ابن عقيل على الفية ابن مالك/ ابن عقيل عبد الله بن عبد الرحمن. 2. كتاب الميسر في اللغة العربية لغير الاختصاص/ الدكتور زياد طارق شولي 3. كتاب الأملاء الواضح/ للدكتور عباس حسن. 4. منهاج اللغة العربية العامة لغير الاختصاص/ عبد القادر حسن امين	Yes
Websites	1- مكتبة المصطفى http://www.al-mostafa.com/index.htm 2- مكتبة مشكاة الإسلام http://www.almeshkat.net/books/index.php 3- الجمعية العلمية للغة العربية http://www.imamu.edu.sa/arabiyah منتديات الكتب المصورة http://pdfbooks.net/vb/login.php	

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 chemistry**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**UoB12345**				
ECTS Credits	**8**				
SWL (hr/sem)	**300**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Science collage	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.SC.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	10/2/2025		**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	1. To develop problem solving skills and understanding of circuit theory through the application of techniques. 2. To understand voltage, current and power from a given circuit. 3. This course deals with the basic concept of electrical circuits. 4. This is the basic subject for all electrical and electronic circuits. 5. To understand Kirchhoff's current and voltage Laws problems. 6. To perform mesh and Nodal 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. Recognize how electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what is meant by a basic electric circuit. 4. Discuss the reaction and involvement of atoms in electric circuits. 5. Describe electrical power, charge, and current. 6. Define Ohm's law. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of sinusoid and phasors in an electric circuit. 9. Discuss the various properties of resistors, capacitors, and inductors. 10. Explain the two Kirchoff's laws used in circuit analysis. 11. Identify the capacitor and inductor phasor relationship with respect to voltage and current.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Circuit Theory

	DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. [15 hrs] AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [15 hrs] AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [10 hrs] RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses). Introduction to second order circuits. [15 hrs] Revision problem classes [6 hrs] <u>Part B - Analogue Electronics</u> Fundamentals Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input resistance, output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. [15 hrs] Components and active devices – Components vs elements and circuit modeling, real and ideal elements. Introduction to sensors and actuators, self-generating vs modulating type sensors, simple circuit interfacing. [7 hrs] Diodes and Diode circuits – Diode characteristics and equations, ideal vs real. Signal conditioning, clamping and clipping, rectification and peak detection, photodiodes, LEDs, Zener diodes, voltage stabilization, voltage reference, power supplies. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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 الاسبوعي النظري

	Material Covered
Week 1	Atom (Constitutes of atom)
Week 2	Lows of electron configration
Week 3	Electronegtivity
Week 4	Hybridization
Week 5	Resonance
Week 6	Chemicals bond
Week 7	Type of reaction
Week 8	Saturated carbohydrate (alkan)
Week 9	Occurrence, nomenclature, Reaction of alkane
Week 10	Unsaturated carbohydrate
Week 11	alkene , , Occurance ,nomenclature
Week 12	Reaction of alkene
Week 13	Alkyne, Occurance, nomenclature
Week 14	Reaction of alkyne
Week 15	Preparation of exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	LaB1: Types of devices in organic chemistry laboratories
Week 2	Lab 2: Types of tools in organic chemistry laboratories
Week 3	Lab 3 :The first aid
Week 4	Lab 4: The Determine the melting point
Week 5	Lab 5: The Determine the boiling point
Week 6	Lab 6: The reCrystallization
Week 7	Lab 7: The distillation
Week 8	Lab 8: The simply distillation
Week 9	Lab 9: The Fractional distillation
Week 10	Lab 10: The sublimation
Week 11	Lab 11: The extraction
Week 12	Lab 12: Cromotographyia
Week 13	Lab 13: Distinguish between an alkane and an alkene
Week 14	Lab 14: preparation gas of methan
Week 15	Lab 15: preparation for exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		Yes
Recommended Texts		No
Websites	https://coappsc.uosamarra.edu.iq/wp-content/uploads/2022/01/%D9%85%D8%AD%D8%A7%D8%B6%D8%B1%D8%A9-1-	

	%D9%83%D9%8A%D9%85%D9%8A%D8%A7%D8%A1- %D8%B9%D8%B6%D9%88%D9%8A%D8%A9.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	**General geology**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**GEO-111**				
ECTS Credits	8				
SWL (hr/sem)	79				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Ibrahim Mustafa Abbas		**e-mail**	ibmgeology@gmail.com	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Ibrahim Mustafa Abbas		**e-mail**	ibmgeology@gmail.com	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	10/2/2025		**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	1. Define selected vocabulary from the assigned chapters and employ them in understanding and explaining topics. 2. Discuss the basic principles of scientific inquiry and apply them to current research and to past discoveries of theories. 3. Differentiate between the three types of plate boundaries by noting common geologic features and processes. Summarize how these boundaries form. 4. Classify common physical properties and differentiate minerals and rocks. 5. Summarize the relationship between the chemical and physical properties of minerals. 6. Classify the igneous, metamorphic, and sedimentary rocks to determine how they formed. 7. Compare how different types of magma form and explain their relationship to the formation of intrusive and volcanic igneous features. 8. Compare and contrast weathering and erosion. 9. Identify strata, faults, and folds and summarize the forces and tectonic settings that lead to their formation. 10. Apply the principles of relative dating to interpret the geologic history of a cross-section. Understand the geologic time scale. 11. Explain what causes earthquakes and earthquake destruction 12. Differentiate the internal structure and composition of the Earth. 13. Understanding the formation of some primary and secondary structures.,. 14. Explain the various parts of the hydrologic cycle including the interaction of surface and groundwater with the solid earth as well as features, and processes associated with streams.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-Explain the structure and composition of the earth, and the fundamental geological processes that have shaped the Earth. 2-Explain key geological terms, definitions and theories (for example minerals, rocks, plate tectonics, weathering) 3-Define, classify and describe sediments, minerals, rocks and their formation 4-Discuss how different earth processes (for example plate tectonics, erosion, sedimentation) work and interact, and how different minerals, rocks and landforms that result from various processes. 5-Discuss the link between cause and effect for different geological processes (for example the forces driving plate tectonics) 6-Explain how hydrological cycle work and what are the stream and river processes. 7-Explain and define the features and structures that form by different geological processes such as volcanoes, stresses. 8-interpret (read and explain) cross sections and figures with geological data. 9-Summarize observations/data/principles graphically. 10-Recognise and discuss different geological structures, landforms and processes

	11-Perform simple searches for relevant Earth Science literature, as well as cite sources correctly. 12-Use a precise geological language to describe and discuss geological processes and events. 13-Demonstrate the ability to function individually, in cooperation and ethically with others. 14-Acknowledge, evaluate and communicate the role of humans in, and our dependency and impact on the Earth system
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students. Students become active participants in a class when they write, discuss, and question the material given to them. Prepare students for successful scientific, technical or management in the geosciences or related fields. Encourage the growth of knowledge-based geology science.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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 الاسبوعي النظري

	Material Covered
Week 1	Introduction to physical geology including general characteristics and origin of the Universe, fundamental laws of stratigraphy: laws of superposition and faunal succession.
Week 2	Historical notes, Absolute and relative time in Geology. Concept of time and geological time scale.
Week 3	Structure of the earth, Mechanical layering of the Earth: lithosphere, asthenosphere, mantle and core.
Week 4	Structure of the earth, Formation of core, mantle, crust, Composition of crust: Continental and Oceanic. Composition of mantle. Composition of core., Geothermal gradient and internal heat of the Earth.
Week 5	Plate tectonic theory and plate boundaries.
Week 6	Minerals of the earth, what are minerals – definition, Composition of common rock-forming minerals – internal atomic structure.
Week 7	Physical properties of minerals.
Week 8	Mineral's classification Chemical classification of minerals. Gems and ore minerals. Composition of common oxides, carbonates, sulphides and sulphates, phosphates
Week 9	Rocks (Rock cycle) Modes of magma generation in the crust and upper mantle. Magma and igneous intrusions, Physical properties of magma - temperature, viscosity, density and volatile content.
Week 10	Types of rocks, modes of emplacement of igneous rocks: volcanic, hypabyssal, plutonic
Week 11	Igneous rocks Texture of Igneous rocks, bases of classification of igneous rocks: mineralogical, textural, chemical.
Week 12	Sedimentary rocks Textural parameters of clastic sediments, Grain size: concept and size scale; particle shape and fabric; sedimentary textures. Sedimentary structures
Week 13	Sedimentary rocks classification of sedimentary rocks based on composition and texture, Siliciclastic rocks: components and classification(s) of conglomerates, sandstones, mudrocks. General introduction to carbonate rocks, evaporites, chert. Components and classifications of limestone, dolomites.
Week 14	Paleontology: Study of fossils showing various modes of preservation Fossilization and fossil record Nature and importance of fossil record; Fossilization processes and modes of preservation
Week 15	Metamorphic rocks Metamorphism: Controls and Types, Definition of metamorphism. Factors controlling metamorphism, Types of metamorphism – contact, regional, fault zone metamorphism, impact metamorphism. Causes of metamorphism, Metamorphic rocks classification

Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to physical geology lab., history of earth and universe
Week 2	Geological time scale
Week 3	Structures of the earth
Week 4	Plate tectonic
Week 5	Crystallography
Week 6	Mineral's identification
Week 7	Minerals identification
Week 8	Minerals identification
Week 9	Igneous rocks
Week 10	Igneous rocks
Week 11	Igneous rocks
Week 12	Sedimentary rocks
Week 13	Sedimentary rocks
Week 14	Fossils
Week 15	Metamorphic rocks
Week 16	**Preparation of final exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	-Physical geology by Steven Earle (2015). -laboratory manual in physical geology by Vincet S. Cronin	No
Recommended Texts	Stephen Marshak - Essentials of Geology-W. W. Norton & Company (2022)	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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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**General geology 2**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**GEO-121**				
ECTS Credits	8				
SWL (hr/sem)	79				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Ibrahim Mustafa Abbas		**e-mail**	ibmgeology@gmail.com	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Ibrahim Mustafa Abbas		**e-mail**	ibmgeology@gmail.com	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	10/2/2025		**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	1. Define selected vocabulary from the assigned chapters and employ them in understanding and explaining topics. 2. Discuss the basic principles of scientific inquiry and apply them to current research and to past discoveries of theories. 3. Differentiate between the three types of plate boundaries by noting common geologic features and processes. Summarize how these boundaries form. 4. Classify common physical properties and differentiate minerals and rocks. 5. Summarize the relationship between the chemical and physical properties of minerals. 6. Classify the igneous, metamorphic, and sedimentary rocks to determine how they formed. 7. Compare how different types of magma form and explain their relationship to the formation of intrusive and volcanic igneous features. 8. Compare and contrast weathering and erosion. 9. Identify strata, faults, and folds and summarize the forces and tectonic settings that lead to their formation. 10. Apply the principles of relative dating to interpret the geologic history of a cross-section. Understand the geologic time scale. 11. Explain what causes earthquakes and earthquake destruction 12. Differentiate the internal structure and composition of the Earth. 13. Understanding the formation of some primary and secondary structures.,. 14. Explain the various parts of the hydrologic cycle including the interaction of surface and groundwater with the solid earth as well as features, and processes associated with streams.
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	11-Perform simple searches for relevant Earth Science literature, as well as cite sources correctly. 12-Use a precise geological language to describe and discuss geological processes and events. 13-Demonstrate the ability to function individually, in cooperation and ethically with others. 14-Acknowledge, evaluate and communicate the role of humans in, and our dependency and impact on the Earth system
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students. Students become active participants in a class when they write, discuss, and question the material given to them. Prepare students for successful scientific, technical or management in the geosciences or related fields. Encourage the growth of knowledge-based geology science.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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 الاسبوعي النظري

	Material Covered
Week 1	Structural geology Basic concept of rock deformation. Concept of Stress. Concept of strain: Homogeneous and inhomogeneous strain, Concept of brittle and ductile deformation
Week 2	Folds Fold morphology; elements of folds
Week 3	Concept of strike and dip, trend and plunge Geometric and genetic classification of folds
Week 4	Fractures and joints Faults, Faults and joints. What is fractures and faults, definition
Week 5	Faults and types of faults Geometric classification of faults, Criteria for recognition of faults
Week 6	Earthquakes Earthquake and earthquake belts: seismic waves
Week 7	Unconformities Unconformity and its types, Recognition of unconformity.
Week 8	Weathering What are weathering, what is the erosion and what different between them.
Week 9	Weathering Weathering and erosion: factors, types and their effects; Types of weathering
Week 10	Mass wasting What are mass wasting and cause
Week 11	Mass wasting Types of mass wasting
Week 12	Hydrology Definition of hydrogeology, Hydrological cycle.
Week 13	Types of streams, stream loads, stream parameters.
Week 14	Aquifers and Groundwater flow
Week 15	Types of aquifers– unconfined, confined and semi-confined.
Week 16	**Preparation of final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Topographic nap
Week 2	Topographic map
Week 3	Cross section
Week 4	Cross section
Week 5	Geological maps
Week 6	Geological map
Week 7	Geological map
Week 8	Drawing of strike
Week 9	Determination of beds dip
Week 10	Determination of bed thickness
Week 11	Drawing of geological column
Week 12	Determination of location on map
Week 13	Hydrological maps
Week 14	Hydrological maps
Week 15	Hydrological maps
Week 16	**Preparation of final exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	-Physical geology by Steven Earle (2015). -laboratory manual in physical geology by Vincet S. Cronin	No
Recommended Texts	Stephen Marshak - Essentials of Geology-W. W. Norton & Company (2022)	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
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	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	**Crystallography**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**GEO-112**			☐ **Lecture**	
ECTS Credits	**8**			☒ **Lab**	
SWL (hr/sem)	**200**			☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Level	1		**Semester of Delivery**	1	
Administering Department	GEO		**College**	Science collage	
Module Leader	Muaiad Tahir Ahmed		**e-mail**	E-mail muaiad.tahir@ uodiyala.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	M.SC.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	10/2/2025		**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	This course focuses on the fundamentals of crystallography. We will start from the External characteristics of crystals, the crystal systems, and the Elements of Crystal Symmetry. This course also covers the principles and applications of stereographic projections and their application to the cubic system, coordination number and Crystal structure. Through lectures and practical exercise, the students will be course enables understand the basic concepts of crystallography.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of this course, students will be able to: 1) Understand the concept of External characteristics of crystals, Elements of Crystal Symmetry, Crystal Form & Habit then will can be Crystal Drawing & Crystal Projection and the general rules of lattice directions and planes. 2) Acquire the ability to handle stereographic projections of the cubic system 3) Zone, Miller index, interplanar distance, coordination number 4) Understand the 32 Crystal spacies, Crystal structure
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Introduction to Crystallography** [5 hrs] crystallography, branch of science that deals with discerning the arrangement and bonding of atoms in crystalline solids and with the geometric structure of crystal lattices. Classically, the optical properties of crystals were of value in mineralogy and chemistry for the identification of substances. **External characteristics of crystals** [15 hrs] Crystals characterized by well-developed crystal faces (external surfaces) are described as euhedral . **Elements of Crystal Symmetry** [20 hrs] The elements of symmetry in a crystal are plane of symmetry, axis of symmetry and center of symmetry. A cubic crystal has maximum symmetry. Plane of symmetry is that imaginary plane which passes through the center of the crystal and divides it into two equal portions (just mirror images of each other). **Crystal Form & Habit** [15 hrs] In mineralogy, crystal habit is the characteristic external shape of an individual crystal or aggregate of crystals. The habit of a crystal is dependent on its crystallographic form and growth conditions, which generally creates irregularities due to limited space in the crystallizing medium (commonly in rocks).

	Crystal systems [30 hrs] A crystal system is a set of axes. In other words, the structure is an ordered array of atoms, ions or molecules. Crystal Structure is obtained by attaching atoms, groups of atoms or molecules. This structure occurs from the intrinsic nature of the constituent particles to produce symmetric patterns. **Twin Crystals** [15 hrs] twin crystal. **A composite of two or more crystal individuals having a definite crystallographic relationship to each other**. **Crystal Drawing & Crystal Projection**_[20 hrs] A Crystal projection is a quantitative method of representing a three dimensional crystal on a two dimensional planar surface. Different projections are used for different purposes but each has its own set of rules so that the projection bears a known and reproducible relationship to the crystal. **Zone, Miller index** [15 hrs] A zone is defined as a group of crystal faces that intersect in parallel edges. Since the edges will all be parallel to a line, we can define that the direction of the line using a notation similar to Miller Indices. This notation is called the zone symbol. **interplanar distance** [15 hrs] The interplanar spacing dhkl between adjacent planes having Miller indices (hkl) is defined as the distance between first such plane from a parallel plane passing through the origin. **coordination number** [15hrs] **coordination number**, the number of atoms, ions, or molecules that a central atom or ion holds as its nearest neighbors in a complex or coordination compound or in a crystal. **32 Crystal spacies** [15 hrs] There are 32 possible combinations of symmetry operations that define the external symmetry of crystals. These 32 possible combinations result in the 32 crystal classes. **Crystal structure** [20 hrs] A crystal structure is defined as the particular repeating arrangement of atoms (molecules or ions) throughout a crystal. Structure refers to the internal arrangement of particles and not the external appearance of the crystal.

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.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	121	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	8

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	3 and 12	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	5 and 8	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	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction to Crystallography**
Week 2	**External characteristics of crystals**
Week 3	**Elements of Crystal Symmetry**
Week 4	**Crystal Form & Habit**
Week 5	**Triclinic sys.**
Week 6	**Monoclinic Sys.**
Week 7	**Orthorhombic Sys.**
Week 8	**Tetragonal Sys.**
Week 9	**Hexagonal & Trigonal Sys.**
Week 10	**Cubic Sys.**
Week 11	**Twin Crystals**
Week 12	**Crystal Drawing & Crystal Projection**
Week 13	**Zone, Miller index, interplanar distance, coordination number**
Week 14	**32 Crystal spacies**
Week 15	**Crystal structure**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Lab	**Material Covered**
Week 1	**Lab 1: Introduction to Crystallography**

Week 2	**Lab 2: Crystal Axes and Axial Angles**
Week 3	**Lab 3: Crystal systems**
Week 4	**Lab 4: Cubic, Tetragonal and Orthorhombic systems**
Week 5	**Lab 5: Hexagonal and Trigonal systems**
Week 6	**Lab 6: Monoclinic and Triclinic systems**
Week 7	**Lab 7: Miller Indices, zone**
Week 8	**Lab 8: Miller's coefficients**
Week 9	**Lab 9: Example for Miller's coefficients**
Week 10	**Lab 10: Drawing crystals by oblique projection method**
Week 11	**Lab 11: Crystal lattice 1D**
Week 12	**Lab 12: Crystal lattice 2D**
Week 13	**Lab 13: Crystal lattice 3D**
Week 14	**Lab 14: Drawing Crystal structure**
Week 15	**Lab 15: Drawing crystals by spherical and stereoscopic projection**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		Yes
Recommended Texts		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	**Core**	☒ **Theory**
Module Code	**GEO-122**	☐ **Lecture**
ECTS Credits	**8**	☒ **Lab**
SWL (hr/sem)	**200**	☐ **Tutorial**

			☐ **Practical** ☒ **Seminar**		
Module Level		1	**Semester of Delivery**		2
Administering Department		GEO	**College**	Science collage	
Module Leader	Muaiad Tahir Ahmed		**e-mail**	E-mail muaiad.tahir@ uodiyala.edu.iq	
Module Leader's Acad. Title		Assistant Professor	**Module Leader's Qualification**		M.SC.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		10/2/2025	**Version Number**	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Crystallography	**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 module provides an introduction to common rock forming minerals and igneous, sedimentary and metamorphic rocks in hand specimen and using a petrological microscope. Students develop the ability to describe these geological materials and their properties at a range of scales and reach informed conclusions about their possible identity and origins.
Module Learning Outcomes مخرجات التعلم للمادة	At the end of this course, students will be able to: 1) Identify minerals and igneous, sedimentary and metamorphic rocks using hand specimens and a petrological microscope. 2) Describe geological materials and their physical and optical properties at a range of scales and reach informed conclusions about their possible identity and origins. 3) Evaluate and interpret the underlying concepts of the terminology, nomenclature and

الدراسية	classification of minerals and rocks.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Introduction to Minerals** [10 hrs] The basic concepts of mineralogy, mineralogy, scientific discipline that is concerned with all aspects of minerals, including their physical properties, chemical composition, internal crystal structure, and occurrence and distribution in nature and their origins in terms of the physicochemical conditions of formation. Crystal Chemistry [20 hrs] **Crystal chemistry** is the study of the principles of chemistry behind crystals and their use in describing structure-property relations in solids. **Physical Properties of minerals** [10 hrs] The physical properties of minerals are determined by the atomic structure and crystal chemistry of the minerals. The most common physical properties are crystal form, color, hardness, cleavage, and specific gravity. One of the best ways to identify a mineral is by examining its crystal form (external shape). **Chemical Formula of minerals [20 hrs]** Chemical mineralogy is the study of chemical formula, percentage contribution of individual elements, and other chemical properties of the minerals. Classification of minerals based on metallic/nonmetallic. **Classification of minerals [10 hrs]** Since the middle of the 19th century, minerals have been classified on the basis of their chemical composition. Under this scheme, they are divided into classes according to their dominant anion or anionic group (e.g., halides, oxides, and sulfides). Several reasons justify use of this criterion as the distinguishing factor at the highest level of mineral classification. First, the similarities in properties of minerals with identical anionic groups are generally more pronounced than those with the same dominant cation. For example, carbonates have stronger resemblance to one another than do copper minerals. Secondly, minerals that have identical dominant anions are likely to be found in the same or similar geologic environments. **Native minerals**[10 hrs] Minerals made from just a single element, bonded to itself. Examples include gold, silver, copper, and diamond, which is a native version of carbon. **Sulfide minerals [10 hrs]**

	sulfide mineral, sulfide also spelled sulphide, any member of a group of compounds of sulfur with one or more metals. Most of the sulfides are simple structurally, exhibit high symmetry in their crystal forms, and have many of the properties of metals, including metallic lustre and electrical conductivity. **Sulfosalts minerals [10 hrs]** Sulfosalt minerals are those that contain sulfur with antimony, arsenic, or bismuth. **Oxide minerals [10 hrs]** The oxide group of minerals include naturally occurring compounds where oxygen is combined with one or more metals such as iron, manganese, aluminum, chromium, titanium and copper. **Hydroxide minerals [10 hrs]** A group of minerals containing metallic elements combined with water (H_2O) or hydroxyl (OH). The hydroxides are a subgroup of the oxides group. Goethite is a Member of the Hydroxides. **Halide minerals [10 hrs]** Halide minerals are a group of naturally occurring inorganic compounds that are salts of the halogen acids and encompass minerals with a dominant halide anion (F^-, Cl^-, Br^-, and I^-). Complex halide minerals can also have polyatomic anions addition to, or that include, halides. **Nitrate minerals [10 hrs]** These minerals are few in number and with the exception of soda niter are of rare occurrence. Normal anhydrous and hydrated nitrates occurring as minerals are soda niter, NaNO3; niter, KNO3; ammonia niter, NH4NO3; nitrobarite, Ba(NO3)2; nitrocalcite, Ca(NO3)2·4H2O; and nitromagnesite, Mg(NO3)2·6H2O. **Phosphate minerals [10 hrs]** phosphate mineral, any of a group of naturally occurring inorganic salts of phosphoric acid, $H_3(PO_4)$. More than 200 species of phosphate minerals are recognized, and structurally they all have isolated (PO_4) tetrahedral units. **Vanadate minerals [10 hrs]** vanadate mineral, any of the many naturally occurring compounds of vanadium (V), oxygen (O), and various metals; most of these minerals are rare, having crystallized under very restricted conditions.

	Carbonate minerals [10 hrs] Carbonate minerals containing Ca, Mg, Fe, and Mn are widespread and found in numerous geological environments. Calcite, dolomite and aragonite are very common in a variety of sedimentary settings and here their formation is often directly or indirectly related to the activity of biological organisms. **Sulfate minerals [10 hrs]** Sulfate minerals. Sulfate minerals are characterized by the essential presence of oxidized sulfur, in the form of SO^{2-}_4 ions. Within the sulfate molecule, four oxygen atoms are covalently bonded to sulfur in a tetrahedral arrangement, to form a discrete anionic species. **Silicate minerals [10 hrs]** Silicate minerals are the most common of Earth's minerals and include quartz, feldspar, mica, amphibole, pyroxene, and olivine. Silica tetrahedra, made up of silicon and oxygen, form chains, sheets, and frameworks, and bond with other cations to form silicate minerals. **Feldspathoids minerals [10 hrs]** The feldspathoid group minerals are sodium, potassium, and calcium aluminosilicates, many of which resemble the feldspars in appearance. Like the feldspars, they have framework structures that consist of silica and alumina tetrahedrons.

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.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	121	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	8

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	3 and 12	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	5 and 8	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	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction to Minerals**

Week 2	**Crystal Chemistry**
Week 3	**Physical Properties of minerals**
Week 4	**Chemical Formula of minerals**
Week 5	**Classification of minerals**
Week 6	**Native minerals**
Week 7	**Sulfide minerals**
Week 8	**Sulfosalts minerals**
Week 9	**Oxide minerals**
Week 10	**Hydroxide & Halide minerals**
Week 11	**Nitrate & Phosphate & Vanadate minerals**
Week 12	**Carbonate minerals**
Week 13	**Sulfate minerals**
Week 14	**Silicate minerals**
Week 15	**Fedspathoids minerals**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Lab	**Material Covered**
Week 1	**Lab 1: Methods of studying Minerals**
Week 2	**Lab 2: Classification of minerals**
Week 3	**Lab 3: Physical properties of minerals**
Week 4	**Lab 4: Calculating specific weight of minerals**
Week 5	**Lab 5: Mohs Scale**

Week 6	**Lab 6: hand specimen of Mohs scale**
Week 7	**Lab 7: hand specimen of other minerals**
Week 8	**Lab 8: hand specimen of other minerals**
Week 9	**Lab 9: hand specimen of other minerals**
Week 10	**Lab 10: Blow pipe & Charcoal**
Week 11	**Lab 11: Bead test**
Week 12	**Lab 12: Flame test**
Week 13	**Lab 13: Calculating Coordination number**
Week 14	**Lab 14: Examples of Coordination number**
Week 15	**Lab 15: Problems for finding the chemical formulas of minerals**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		
Recommended Texts	INTRODUCTION TO MINERALOGY AND PETROLOGY S. K. HALDAR Emeritus Scientist, Dept. of Applied Geology & Environmental System Management, Presidency University, Kolkata-700 073, and IMX Resources Limited, Australia. Formerly, Hindustan Zinc Limited, Hindustan Copper Limited, ESSO INC and BIL Infratech Ltd, India. JOSIP Formerly Professors, Head, Director, President and Dean, Department of Mining, Geology and Petroleum Engineering, University of Zagreb, Croatia	No
Websites	Geology.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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Minerals chemistry**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO23113**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	GEO		**College**	Science collage	
Module Leader	Muaiad Tahir Ahmed		**e-mail**	E-mail muaiad.tahir@ uodiyala.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	M.SC.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	10/2/2025		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	GEO1218	**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	Student Learning Objectives During this module you will: 1. Describe periodicity in the chemical characteristics of elements listed in order of increasing atomic number or mass. 2. Predict element substitutions in minerals using chemical characteristics (electronegativity, ionic size, valence, etc.), and define element substitutions in common solid solution series as simple, coupled, omission, or interstitial. 3. Hypothesize which minerals have similar characteristics (physical and optical properties) on the basis of their chemical formulas, thereby demonstrating understanding the importance of anionic groups. 4. Demonstrate understanding of phase diagrams for any one-component system: anticipate reactions that occur due to a change in temperature or pressure, describe difference between displacive and reconstructive polymorphs, discuss element ordering on atomic sites in the formation of polymorphs. 5. Identify primitive and non-primitive unit cells.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students will • Explain how element combine and pack to form minerals and how different ions can be substituded in crystal latices. • Explain the principle of mineral classification and assign minerals to a mineral group by their chemical formula. • Describe crystal structure, crystal growth, and the types of structural defects that occur in minerals. Use a phase diagram to calculate the crystal composition of a substitutional solid solution in a partial melt at different temperatures. • Classify silicates minerals according structure.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • **Introduction of Minerals chemistry** [5 hrs] • **Interior of the Earth** [7hrs] The interior of the Earth is made up of three parts: crust, mantle, and core. The inner core is found to be in a solid state, and the outer core is in a liquid state. The outermost layer of Earth is called the crust. • **Composition of the Crust Rocks** [8 hrs] About 98% of the total crust is made up of eight elements as oxygen, silicon, aluminium, iron, calcium, sodium, potassium, and magnesium. The rest is constituted by elements like titanium, hydrogen, phosphorous, manganese, sulphur, carbon, nickel and others. • **Genesis of Minerals** [7 hrs] In mineralogy, genesis refers to both primary crystallization and the subsequent history of minerals, which may include structural transitions, changes in texture (e.g., grain coarsening), exsolution processes and chemical reactions (e.g., oxidation). • **The Sedimentary Environment** [8 hrs] The sedimentary environment is the specific depositional setting of a particular sedimentary rock and is unique in terms of physical, chemical, and biological characteristics. The physical

features of a sedimentary environment include water depth and the velocity and persistence of currents.

- **The Igneous & Metamorphic Environment** [10 hrs]

Igneous rocks form as molten rock cools and solidifies. Two environments are distinguished: underground - in which case the melt is called 'magma' and the rock that results from its solidification is described as 'intrusive'.

Metamorphic rocks form when rocks are subjected to high heat, high pressure, hot mineral-rich fluids or, more commonly, some combination of these factors. Conditions like these are found deep within the Earth or where tectonic plates meet.

- **Geochemical classification of elements, valence number, chemical bonds, crystal properties** [10 hrs]

Elements are commonly divided into major, minor and trace elements. Major elements are considered to be primary structural elements in major minerals, typically with concentrations above 0.2–0.4%.

- **Silicate minerals** [8 hrs]

Silicate minerals are the most common of Earth's minerals and include quartz, feldspar, mica, amphibole, pyroxene, and olivine. Silica tetrahedra, made up of silicon and oxygen, form chains, sheets, and frameworks, and bond with other cations to form silicate minerals.

- **Coordination & Coordination Number** [7 hrs]

the number of points of attachment between the ligands and the metal.

- **Crystal Structure** [10 hrs]

A crystal structure is defined as the particular repeating arrangement of atoms (molecules or ions) throughout a crystal. Structure refers to the internal arrangement of particles and not the external appearance of the crystal.

- **Atomic Substitution & Solid Solutions** [8 hrs]

Substitutional solid solutions are those in which the atoms of the minor component (solute) are substituted for the atoms of the major component (solvent) on the lattice positions normally occupied by the solvent atoms.

- **Formation and Growth of Crystals** [8 hrs]

Crystal growth is a major stage of a crystallization process, and consists of the addition of new atoms, ions, or polymer strings into the characteristic arrangement of the crystalline lattice.

- **Crystallization of Solid Solution** [7 hrs]

Crystallization is a process or unit operation of producing crystals or crystalline substances. It can occur from melts, solutions, or vapors. Crystalline solids need not be single crystals. Usually they are composed of an aggregate of crystals, which can be distinguished as separate entities under the microscope.

- **Phase Rule and the Chemical System** [7 hrs]

The phase rule describes the possible number of degrees of freedom in an enclosed system at equilibrium, in terms of the number of separate phases and the number of chemical constituents in the system. It was deduced by J.W Gibbs in the 1870s.

- **Crystal Growth** [8 hrs]

Crystal growth is a major stage of a crystallization process, and consists of the addition of new atoms, ions, or polymer strings into the characteristic arrangement of the crystalline lattice.

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.

Module Evaluation

تقييم المادة الدراسية

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

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction of Minerals chemistry**
Week 2	**Interior of the Earth &Composition of the Crust Rocks**
Week 3	**Genesis of Minerals**
Week 4	**The Igneous Environment**
Week 5	**The Sedimentary Environment**
Week 6	**The Metamorphic Environment**
Week 7	**Geochemical classification of elements, valence number, chemical bonds, crystal properties**
Week 8	**Silicate minerals**
Week 9	**Coordination & Coordination Number**
Week 10	**Crystal Structure**
Week 11	**Atomic Substitution & Solid Solutions**
Week 12	**Formation and Growth of Crystals**
Week 13	**Crystallization of Solid Solution**
Week 14	**Phase Rule and the Chemical System**
Week 15	**Crystal Growth**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Lab	**Material Covered**
Week 1	Lab 1: **Minerals Groups**
Week 2	**Lab 2: Chemical formula of mineral**
Week 3	**Lab 3: Example for chemical Formula of minerals**
Week 4	**Lab 4: Example for chemical Formula of minerals**
Week 5	**Lab 5: Example for chemical Formula of minerals**
Week 6	**Lab 6: Example for chemical Formula of minerals**
Week 7	**Lab 7: Example for chemical Formula of minerals**
Week 8	**Lab 8: Example for chemical Formula of minerals**
Week 9	**Lab : Coordination number**
Week 10	**Lab 10: Drawing crystal structure**
Week 11	**Lab 11: Minerals Test Blow pipe & Charcoal**
Week 12	**Lab 12: Bead test**
Week 13	**Lab 13: Flame test**
Week 14	**Lab** 14: **Spectroscopic Techniques**: XRF
Week 15	**Lab** 15: **Spectroscopic Techniques**: XRD

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		كيمياء المعادن والخامات د.عادل كمال جميل علي فليح عجام

Recommended Texts		
Websites	https://www2.tulane.edu/~sanelson/eens211/crystal_chemistry.htm	

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 Rocks**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO23014**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	GEO		**College**	Science collage	
Module Leader	Muaiad Tahir Ahmed		**e-mail**	E-mail muaiad.tahir@ uodiyala.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	M.SC.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	10/2/2025		**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 student will be able to relate igneous rocks to plate tectonics. understand basic petro genetic processes and he will be able to interpret information derived from thin-section and hand-specimen analysis. Igneous rocks are also very important because their mineral and chemical makeup can be used to learn about the composition, temperature and pressure that exists within the Earth's mantle and much about the tectonic environment, given that they are closely linked to the convection of tectonic plates.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Identify igneous rocks using hand specimens and a petrological microscope. • Define the characteristics of an igneous rock. • Discuss the role of melting and subsequent cooling in the rock cycle. • Identify the tectonic environment
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • **Source Anatomy of the earth** [5 hrs] Magma is extremely hot liquid and semi-liquid rock located under Earth's surface. Earth has a layered structure that consists of the inner core, outer core, mantle, and crust. Much of the planet's mantle consists of magma. This magma can push through holes or cracks in the crust, causing a volcanic eruption. • **Magmatic and Plate tectonics** [10 hrs] Igneous rocks form from magmas, and most magmas are associated with plate tectonics. Mafic (basaltic) and ultramafic magmas form along the divergent mid-oceanic ridges and are major components of new oceanic crust. Physical properties of magma [The properties of magmas include temperature, density, viscosity, gas content and abundance. • **Textures and structures of Igneous rocks** [10 hrs] The texture of an igneous rock (fine-grained vs coarse-grained) is dependent on the rate of cooling of the melt: slow cooling allows large crystals to form, fast cooling yields small crystals. The structure of an igneous rock is normally taken to comprise the mutual relationships of mineral or mineral-glass aggregates that have contrasting textures, along with layering, fractures, and other larger-scale features that transect or bound such aggregates. • **Classification of Igneous rocks** [5 hrs] Igneous rocks can be divided into four categories based on their chemical composition: felsic, intermediate, mafic, and ultramafic. • **MORB and depleted mantle** [5 hrs] The depleted mantle is the part of Earth's mantle from which basaltic melt has been extracted in one or multiple melting events at, for example, mid-ocean ridges, hot spots, or island arcs. • **Evolution of depleted mantle , Evolution of the Enriched mantle** [10 hrs]

The depleted mantle (DM) has undergone a complex geological evolution. Depleted mantle that has formed at mid-ocean ridges, hot spots, or island arcs is transported with the overlying oceanic crust and eventually subducted at convergent plate margins.

Enriched Mantle – region in the mantle that is enriched in incompatible trace elements with respect to a primitive mantle model.

- **Island arc basalts, Concept of Hot spot** [10 hrs]

An island arc forms at a converging plate boundary where one oceanic plate sinks beneath another oceanic plate. A hot spot volcano forms in continental or oceanic crust where magma from the mantle erupts. Hot spot volcanoes often are far from plate boundaries.

- **Mantle Plumes – Theory and structure** [10 hrs]

A mantle plume is posited to exist where super-heated material forms (nucleates) at the core-mantle boundary and rises through the Earth's mantle.

- **Trace element characterization of mantle domains** [5 hrs]

In analytical chemistry, a trace element is one whose average concentration is less than 100 parts per million (ppm) measured in the atomic count or less than 100 micrograms per gram.

- **Phase relations of silicates and silicate melts , Binary and ternary systems** [10 hrs]

The term *phase* refers to any compositionally and physically distinctive substance. Phases may be solids, liquids or gases.

binary forms have two large sections (we hear that B merges with the following A), while ternary forms have three large sections

- A physical-chemical system having three components. [10 hrs]

A system with two components is termed as a Binary system. Binary phase relations can be of different types such as a solid solution, eutectic system, and a eutectic system with a peritectic reaction.

Partial melting, Magmatic differentiation – Crystal fractionation, gravitational settling, flow

Partial melting is the transformation of some fraction of the mass of a solid rock into a liquid as a result of decompression, heat input, or addition of a flux.

Fractional crystallization refers to processes which separate crystals from liquid.
Gravitational settling is one of the most efficient means of separating solids from surrounding liquid.
Flow structures in igneous rocks are formed in the fluid stage.

- **Differentiation, flow crystallization, filter pressing, liquid immiscibility** [10 hrs]

In geology, igneous differentiation, or magmatic differentiation, is an umbrella term for the various processes by which magmas undergo bulk chemical change during the partial melting process, cooling, emplacement, or eruption.

- **Zone melting Contamination** [10 hrs]

Igneous rocks form through the crystallization of magma. There is a considerable range of melting temperatures for different compositions of magma. All the silicates are molten at

	about 1200°C and all are solid when cooled to about 600°C. • **Mixing of magmas** [5 hrs] Magma mixing or mingling is a popular hypothesis, generally proposed in terms of blending between a crustal melt and mafic material from the mantle that caused that melting. • **Role of Volatile components, Pyroclastic rocks** [10 hrs] Water and carbon dioxide are the most abundant volatile components in terrestrial magmas. As they absolve into magmatic vapor, they promote magma buoyancy, accelerating ascent and modulating eruptive dynamics. Pyroclastic rocks have characteristics of both igneous or sedimentary rocks. They are composed exclusively of volcanic materials, yet are made up of fragments and grains like sedimentary rocks, and may be reworked by wind and flowing water.

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.

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	3 and 12	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	5 and 8	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	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Magma definition, Source Anatomy of the earth
Week 2	Magmatic and Plate tectonics, Physical properties of magma – geothermal gradient, heat source, Igneous activity at the present day
Week 3	Textures and structures of Igneous rocks
Week 4	Classification of Igneous rocks
Week 5	MORB and depleted mantle
Week 6	Evolution of depleted mantle , Evolution of the Enriched mantle
Week 7	Island arc basalts , Concept of Hot spot

Week 8	Mantle Plumes – Theory and structure ,
Week 9	Trace element characterization of mantle domains
Week 10	Phase relations of silicates and silicate melts , Binary and ternary systems
Week 11	Partial melting ,Magmatic differentiation – Crystal fractionation, gravitational settling, flow
Week 12	Differentiation, flow crystallization, filter pressing, liquid immiscibility
Week 13	Zone melting Contamination
Week 14	Mixing of magmas
Week 15	Role of Volatile components , Pyroclastic rocks

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Lab	**Material Covered**
Week 1	**Lab 1: Introduction to Igneous rocks**
Week 2	**Lab 2: Classification of igneous rock**
Week 3	**Lab 3: Felsic rocks**
Week 4	**Lab 4:Intermediate rocks**
Week 5	**Lab 5: Mafic rocks Ultra mafic rock**
Week 6	**Lab 6: Ultra mafic rock**
Week 7	**Lab 7: Intrusive igneous rocks**
Week 8	**Lab 8: Extrusive Igneous rocks**
Week 9	**Lab 9: Thin section Felsic rocks**
Week 10	**Lab 10:Thin section intermediate rocks**
Week 11	**Lab 11: Thin section mafic and ultramafic rocks**
Week 12	**Lab 12: CIPW**

Week 13	**Lab 13: CIPW**
Week 14	**Lab 14:CIPW**
Week 15	**Lab 15: CIPW**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		
Recommended Texts	Igneous Rocks and Processes A Practical Guide	
Websites	Geology.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	**Hydrology**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐ **Seminar**	
Module Code	GEO23015				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		UGII	**Semester of Delivery**		3
Administering Department		GEO	**College**	COS	
Module Leader	Asem Ahmed Hassan		**e-mail**	asem.ahmed@uodiyala.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	None		**e-mail**	None	
Peer Reviewer Name		None	**e-mail**	E-mail	
Scientific Committee Approval Date		10/2/2025	**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	To gain knowledge about: 1. The basics of Hydrology as one of the Geology branches. 2. Importance of Hydrology, major aspects of Hydrology, divisions, and applications 3. The basic hydrological processes and terminologies 4. The role and career paths of a hydrogeologist. 5. The water cycle and its components. 6. Estimation of hydrological processes such as precipitation, evaporation, infiltration, Runoff, etc. 7. Flood and flood types and flood management. 8. The basics of groundwater hydrology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Appreciate that water is the most important substance on the earth and is a key factor for human existence and influencing the process of civilization. 2. Define and explain fundamentals about the definition and subjects of hydrology, hydrological cycle, and hydrological processes. 3. Explain basic terms about precipitation and perform data calculation of average precipitation, and how to present the rainfall data 4. Explain basic terms about evaporation and evapotranspiration, how to calculate evaporation, and list the factors which affect evaporation. 5. Explain basic terms about infiltration and analyze them, define infiltration rate and capacity 6. Define infiltration and factors affecting infiltration and how to perform measurement of Infiltration. 7. Define the basics of Flood types, impacts, and Flood control and protection methods. 8. Appreciate the importance of groundwater, define basic terminology about groundwater, types of aquifers, explain basic terminology about groundwater 9. Problem-solving through working on a range of hydrological data. 10. Learning how to estimate the main hydrological processes.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to Hydrology, Hydrologic Cycle, Hydrological Processes, Hydrologic Balance (Budget), Major Aspects of Hydrology, Applications of Hydrology, [15 hrs] Water losses: Precipitation, Forms are Precipitation, Measurement of rainfall,

	Presentation of rainfall data, Average of Rainfall Calculation, [15 hrs] Evaporation, Influencing Factors on Evaporation, Transpiration, Evaporation Measurement, Empirical Evaporation Formulas, [10 hrs] Infiltration, Factors affecting infiltration, Measurement of Infiltration. [15 hrs] Runoff, Factors affecting Runoff, Classification of streams, Stream Order, [10 hrs] Hydrograph, Factors affecting the Hydrograph, Hydrograph Components. [15 hrs] Floods, Types of Floods, Floods Impacts, Flood Design, Flood Control and Protection [15 hrs] Groundwater, Types of Aquifers, Groundwater movement, Darcy's Law, Springs: [30 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students to participate in the lectures and exercises and expand their thinking skills. Students will learn the basic concepts of Hydrology in lectures and apply these concepts in practical classes involving lab experiments and exercises.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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)	3 and 12	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	5 and 8	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 Hydrology
Week 2	Precipitation
Week 3	Measurements of rainfall
Week 4	Average Precipitation calculation methods
Week 5	Evaporation
Week 6	Infiltration
Week 7	Mid-term Exam
Week 8	Runoff

Week 9	Hydrograph
Week 10	Floods
Week 11	Flood control
Week 12	Introduction to groundwater
Week 13	Types of Aquifers
Week 14	Groundwater movements
Week 15	Springs
Week 16	A preparatory week before the Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Hydrological data
Week 2	The mass curve of precipitation
Week 3	Hyetograph
Week 4	Average Precipitation calculation methods
Week 5	Evaporation calculation 1
Week 6	Evaporation calculation 2
Week 7	Infiltration calculation
Week 8	Lab 8: Exam
Week 9	Runoff calculation
Week 10	Hydrograph separation
Week 11	Discharge
Week 12	Floods calculation
Week 13	Groundwater flow 1

Week 14	Groundwater flow2
Week 15	Groundwater velocity
Week 16	Preparation of the final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Hydrology, Principles, Analysis, Design by H. M. Raghunath	No
Recommended Texts	1. Fundamentals of Hydrology by Time Davie 2. Engineering Hydrology by E.M. Wilson 3. Advanced Hydrology by V.T. Chow	No
Websites	https://www.usgs.gov/special-topics/water-science-school/science/what-hydrology#Intro	

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	**GEO23016**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	GEO		**College**	Science collage	
Module Leader	Abdulqader adnan khalaf		**e-mail**	E-mail abdulkader@ uodiyala.edu.iq	
Module Leader's Acad. Title	Assistant Lecture		**Module Leader's Qualification**	M.SC.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	10/2/2025		**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	1- The course provides an overview of landforms, landforming processes, and landscape evolution. 2- In particular, it aims to shed light on various landforming processes and how these depend on climate and tectonic regimes, and time. 3- The course shall further convey an understanding of landforming processes on different temporal and spatial magnitudes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of the course the student should have the following learning outcomes defined in terms of knowledge, skills and general competence: Knowledge The student can explain principal terms, definitions and theories (e.g. conceptual approaches in geomorphology) describe landforms and landforming processes in different climate zones and tectonic regimes explain different theories and models for landscape evolution discuss the development of micro to mega scale landforms and their lifespans assess the mode of formation, age and history for landforms in Norway Skills The student can plan and carry out a geomorphological field investigation (incl. observation, interpretation, report) search and find relevant information to elucidate geomorphological problems evaluate what information that requires citation in own essay texts, as well as apply a relevant tool for handling references compare and discuss the formation of large-scale landforms involving both exogenous and endogenous processes General competence The student can apply a precise geological language to describe and discuss geological processes, phenomena and theories demonstrate the ability to function individually, in cooperation and ethically with others acknowledge, evaluate and communicate the role of humans in, and our dependency and impact on, the Earth system accomplish field work in alignment with GEO¿s/UiB¿s health and safety regulations use field-based techniques to obtain and work with Earth science data use libraries and scientific databases to retrieve relevant information, including the proper

	citation of sources
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Introduction of Geomorphology** is the study of earth surface processes and landforms**.** **[10 hrs]** **Topography** Topography is a term used to describe the Earth‟s surface. Topography includes a variety of different features, collectively referred to as landforms. [10 hrs] **Constructive and Destructive Processes** Constructive processes build landforms through tectonic and depositional processes**.** [5 hrs] **Genetic Landform Classification** The genetic landform classification system groups landforms by the dominant set of geomorphic processes responsible for their formation. This includes the following processes and associated landforms **[5 hrs]** **Orogenesis** Orogenesis is the thickening of the continental crust and the building of mountains over millions of years and it translates from Greek as “birth of mountains”, (oros is the Greek word for mountain). **[5 hrs]** **Fractures and Joints** **Joints occur where a rock breaks but there is no displacement or faulting associated** **with the break ,Fractures are breaks in rocks that are often singular more random features and are not associated with a set of joints** [10 hrs]

	Lava Domes Lava domes are rounded, steep-sided mounds built by very viscous magma that is resistant to flow and builds up forming a dome. **[5 hrs]** . **Volcanic Landforms: Extrusive Igneous** **[7 hrs]** . **Volcanic Landforms: Intrusive Igneous** **[7 hrs]** **River Systems and Fluvial Processes** Rivers are one of the most dominant agents of landscape change because their flowing waters are continually eroding, transporting, and depositing sediments. **[10 hrs]** . **Mountain Streams** Mountain streams are high-gradient, low-order streams sourced from springs, rainfall, or snowmelt. They often contain a v-shaped valley, bedrock stream bottom, rapids, waterfalls, and a very narrow flood plain. **[10 hrs]** **Flood plains** Flood plains are the landform adjacent to the river channel that is influenced by modern river processes. Flood plains are constructive, depositional landforms created by stream flow and sediment deposition. **[10 hrs]** **Karst Landforms** Karst is a term used to describe landscapes that are formed by chemical weathering process controlled by groundwater activity. Karst landscapes are predominantly composed of limestone rock that contains > 70 percent calcium carbonate. **[10 hrs]** .

	Aeolian Landforms Aeolian landforms are formed by the deposition of windblown sediments. The sediments are generally sourced from deserts, glacial deposits, rivers, or coastal shorelines **[10 hrs]** **Coastal Landforms** Coastal landforms include a diverse array of shoreline and near-shoreline features, as well as some coastal plain landforms far removed from the modern ocean by long term sea-level changes. This section will explore both constructive and destructive landforms formed by current coastal processes, as well as marine related landforms that were formed during periods of higher sea level. **[10 hrs]**

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.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**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)	3 and 12	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	5 and 8	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	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction of** Geomorphology

Week 2	**Topography**
Week 3	**Constructive and Destructive Processes**
Week 4	**Genetic Landform Classification**
Week 5	**Orogenesis**
Week 6	**Fractures and Joints**
Week 7	**Volcanic Landforms: Extrusive Igneous**
Week 8	**Lava Domes**
Week 9	**Volcanic Landforms: Intrusive Igneous**
Week 10	**River Systems and Fluvial Processes**
Week 11	**Mountain Streams**
Week 12	**Flood plains**
Week 13	**Karst Landforms**
Week 14	**Aeolian Landforms**
Week 15	**Coastal Landforms**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Lab	**Material Covered**
Week 1	**Lab 1: Methods of studying** Geomorphology
Week 2	**Lab 2: Topography**
Week 3	**Lab 3: Constructive and Destructive Processes**
Week 4	**Lab 4: Genetic Landform Classification**
Week 5	**Lab 5: Orogenesis**

Week 6	**Lab 6: Fractures and Joints**
Week 7	**Lab 7: Volcanic Landforms: Extrusive Igneous**
Week 8	**Lab 8: Lava Domes**
Week 9	**Lab 9: Volcanic Landforms: Intrusive Igneous**
Week 10	**Lab 10: River Systems and Fluvial Processes**
Week 11	**Lab 11: Mountain Streams**
Week 12	**Lab 12: Flood plains**
Week 13	**Lab 13: Karst Landforms**
Week 14	**Lab 14: Aeolian Landforms**
Week 15	**Lab 15: Coastal Landforms**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		
Recommended Texts	INTRODUCTION TO MINERALOGY AND PETROLOGY S. K. HALDAR Emeritus Scientist, Dept. of Applied Geology & Environmental System Management, Presidency University, Kolkata-700 073, and IMX Resources Limited, Australia. Formerly, Hindustan Zinc Limited, Hindustan Copper Limited, ESSO INC and BIL Infratech Ltd, India. JOSIP Formerly Professors, Head, Director, President and Dean, Department of Mining, Geology and Petroleum Engineering, University of Zagreb, Croatia	No
Websites	Geology.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	**Paleontology**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	GEO23017				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	GEO		**College**	COS	
Module Leader	Salah Ali Hussain		**e-mail**	Dr.salah@uodiyala.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	None		**e-mail**	None	
Peer Reviewer Name	Abdelratha M.		**e-mail**	abdalratha.sahaab@uodiyala.edu.iq	
Scientific Committee Approval Date	10/2/2025		**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	9. Students will be able to reconstruct the biological traits of extinct organisms. 10. Students will be able to interpret the modes of life of fossil organisms. 11. Students will be able to reconstruct the taphonomic history of a given fossil or fossil assemblage. 12. Students will be able to use the principles of taphonomy to predict what an "entire" community would have looked like based on preserved fauna. 13. Students will be able to determine evolutionary relationships among a set of organisms. 14. Students will be able to gather and analyze phylogenetic information. 15. Students will be able to design a phylogeny of familiar objects, imaginary fossils, or real organisms.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	16. Recognize, interpret and explain the geological, climatic and environmental processes that have shaped present-day landscapes and habitats. 17. Outline the major phases in the evolution of life on earth and describe key events as preserved in the fossil record. 18. Describe the evolution of major groups of organisms and identify the anatomical links between extinct and living life forms.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Introduction and Paleontology and nature of fossils</u> Paleontology is the study of the remains of animals and plants which existed prior to the present time. [15 hrs] Sponges The sponges are aquatic, dominantly marine invertebrates, which are ranked next above protozoans in classification [15 hrs] Coelenterates The coelenterates are aquatic invertebrates of highly varied form which are the most simply organized animals having well-developed body tissues. [10 hrs] Bryozoans The invertebrates called bryozoans are aquatic animals, of which the great majority live in the sea and only a few kinds inhabit freshwaters. [15 hrs]

	Brachiopods One of the chief divisions of invertebrate fossils consists of the Brachiopoda. [10 hrs] Mollusks The name Mollusca (Mollusca, soft- bodied) are one of the main groups of invertebrates, especially from the standpoint of paleontological study, is the assemblage contained in the phylum Mollusca. [15 hrs] Cephalopods Most of the animals discussed previously are sessile or relatively slow-moving invertebrates, crawling on the bottom or drifting about at the mercy of waves and currents. [15 hrs] Pelecypods The pelecypods are a division of mollusks which stands rather well apart from others in having a skeletal covering that consists of two calcareous valves.. [15 hrs] Arthropods Animals called arthropods (arthro, joint; pod, foot) are invertebrates of highly varied form, distinguished primarily by a segmented organization of the body and the possession of a hardened external covering. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Students will learn the basic concepts in lectures and apply these concepts in practical classes involving maps, seismic sections, and outcrop and subsurface log information. Previous field courses will be made explicit reference to in order to provide linkage from the field to the class.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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)	3 and 12	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	5 and 8	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 paleontology and nature of fossils
Week 2	Type of preservation Unaltered Soft and hard Parts
Week 3	Type of preservation - Altered hard Parts
Week 4	Type of preservation Altered hard Parts
Week 5	Sponge
Week 6	Coelenterates
Week 7	Mid-term Exam
Week 8	Bryozoans
Week 9	Brachiopoda
Week 10	Brachiopoda
Week 11	Gastropoda
Week 12	Pelecypoda
Week 13	Cephalopoda
Week 14	Arthropoda
Week 15	Arthropoda
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to paleontology and nature of fossils

Week 2	Type of preservation Unaltered Soft and hard Parts
Week 3	Type of preservation - Altered hard Parts
Week 4	Type of preservation Altered hard Parts
Week 5	Sponge
Week 6	Coelenterates
Week 7	Mid-term Exam
Week 8	Bryozoans
Week 9	Brachiopoda
Week 10	Brachiopoda
Week 11	Gastropoda
Week 12	Pelecypoda
Week 13	Cephalopoda
Week 14	Arthropoda
Week 15	Arthropoda
Week 16	Preparation of final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Moore R.C., 1979. Treatise on invertebrate paleontology. Geological Society of America. 594 P.	No
Websites	https://biodiversity.ku.edu/invertebrate-paleontology/publications	

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	**Geophysics**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	GEO23016				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	GEO		**College**	COS	
Module Leader	Munther Dhahir Nsaif		**e-mail**	Munther_hnt@uodiyala.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	None		**e-mail**	None	
Peer Reviewer Name	Abdelratha M.		**e-mail**	abdalratha.sahaab@uodiyala.edu.iq	
Scientific Committee Approval Date	10/2/2025		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Physics , geology	**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 course aims to equip the student with fundamental theory, and different geophysical methods that are used currently in different applications 2- The module will equip students with experience in a range of geophysical methods, carrying out surveys and associated data analysis and interpretation. How the various methods can be integrated will also be explored.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of this course, the student will be able to: 1- understand the basic principles of different geophysical methods 2- Gain practical experience and understanding of some geophysical survey techniques in the field. 3-Use of Integrated Geophysical Methods
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. introduction on the theoretical fundamentals of geophysics, overview of the geophysical techniques, definition of sensitivity and resolution and applicability of the methods. Planning of a geophysical survey: Gravimetric method: Introduction on the physical principles of gravity, gravity measurements, ellipsoid and geoid, gravimetric anomalies and main corrections, interpretative methods, regional and local fields, anomalies due to bodies of different geometries, determination of depth and mass, hints to direct and inverse modelling, fields of application and limitations, study examples. Geomagnetic method: Introduction on the physical principles of geomagnetism, magnetic properties of rocks and minerals, Earth's magnetic field and variations, measurement tools and techniques, data processing and interpretation principles, modelling of anomalies due to bodies of different geometries and magnetic properties, determination of body depth, comparison with gravimetric method, fields of application and limitations, study example . [15 lecture]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• lectures are given to transfer the course material to the student in a simple and clear way • discussion will be open at each class to help students express their thoughts and ideas, and to improve theircommunication skills • students will be given group assignments to do team and individual research work to broaden theirknowledge and put into practice the different theories and concepts covered in the lectures.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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)	3 and 12	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	5 and 8	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 geophysics , classification , important and application of geophysical methods.
Week 2	Basic principles of Gravity method. Gravity survey design , Methods of correction gravity data
Week 3	Regional and residual anomaly , methods of separation anomaly ,
Week 4	Density and methods of density determination
Week 5	Methods of interpretation
Week 6	Methods of interpretation
Week 7	Mid-term Exam

Week 8	**Magnetic methods , Basic principles Types of magnetization**
Week 9	**Magnetic field , theories on origin of magnetic field , Geomagnetic Field Elements**
Week 10	**Components of the magnetic field , Temporal variations of magnetic field**
Week 11	**Magnetic survey design , Methods of correction, Factors influence magnetic anomaly shape**
Week 12	**Introduction to electrical methods, Basic principles**
Week 13	**Electrodes Configuration(Electrodes Arrangements).**
Week 14	**Field Techniques of Measurements**
Week 15	**presentation and interpretation of resistivity data**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Units and converting methods
Week 2	International gravity equation
Week 3	Gravity corrections
Week 4	Gravity corrections
Week 5	Bouger anomaly map
Week 6	Regional and residual anomaly
Week 7	Methods of separation anomaly
Week 8	Mid-term Exam
Week 9	Magnetic storms
Week 10	Diurnal corrections
Week 11	Presentation of Horizontal profiling data

Week 12	Qualitative Interpretation
Week 13	Calculation of geometric factor
Week 14	Presentation of VES data (three layer
Week 15	Presentation of VES data (type of resistivity curves)
Week 16	Preparation of final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	- Dobrin and Savit,1988,Introduction to geophysical prospecting - Kearey ,Brook,1984,An Introduction to geophysical prospecting - Parasnis,1986, Principles of applied geophysics - Reynolds , 1997,An introduction to Applied and environmental Geophysics	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

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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	**GEO24119**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	2	
Administering Department	GEO		**College**	Science collage	
Module Leader	Muaiad Tahir Ahmed		**e-mail**	E-mail muaiad.tahir@ uodiyala.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	M.SC.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	10/2/2025		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**GEO1218**	**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	This course is designed to achieve the general objectives in the form of outputs that the student is supposed to acquire after successfully completing the course, as follows: 1. The student learned about the different types of minerals using a polarizing microscope, based on their optical properties resulting from their interaction with light. 2. Identify the types of interference forms and the classification of minerals on their basis. 3. Identify the occurrence of important minerals and their distribution on the three types of rocks and how to differentiate between minerals within the same rock sample. 4. The student learns the systematic methods of studying minerals and their textures using a polarizing microscope.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Through the student's study of the mineral optics course, it is assumed that a number of cognitive, intellectual and practical outputs will be achieved, as follows: A. Knowledge and understanding After studying this course, it is assumed that the student has understood and recognized the basic facts and information related to the optical properties of minerals and their applications, in particular the following: 1 Learn the basics of mineral optics as a basis for the study of minerals and rocks. 2 Learn the techniques of the plane stage in the polarizing microscope in the study of transparent minerals. 3 Learn the petrographic characteristics of rock-forming minerals as a basis for rock petrology. 4 Learn the systematic methods of studying minerals and their textures using a polarizing microscope and linking the relationship between the crystalline and chemical structure with the optical properties of minerals. B. Mental skills By passing this course, the student is supposed to have acquired the following mental skills: 1 Understand the relationship between the internal (crystalline), chemical and optical structure of minerals and their distribution. 2 Understanding and interpreting histological relationships and mineral assemblies under the microscope. 3 Compare the change in the optical properties with the change in the crystal system and the chemical composition. 4 Understand systematic methods for identifying unknown transparent minerals.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • Introduction of Mineral Optics [5 hrs] Optical mineralogy involves studying rocks and minerals by studying their optical properties. Today, most optical mineralogy involves examining thin sections with a petrographic microscope. Petrographic microscopes have polarized light sources that illuminate a thin section. • polarizing microscope [7 hrs]

Polarizing microscopes are also referred to as petrology or geology microscopes. Polarizing light is used with either transmitted and/or reflected light to view chemicals, rocks and minerals. When viewing rocks and minerals thin sections of the sample are mounted on a slide for examination.

- Plane polarized and cross polarized Light-Isotropic [8 hrs]

Without the upper polarizer, we see a sample in plane-polarized light, also called PP light. With the upper polarizer, we see it in cross-polarized light, also called crossed polars or XP light. Grain size, shape, color, cleavage, and other physical properties are best revealed in PP light.

- Anisotropic Minerals Behavior of minerals in cross polarized light [7 hrs]

anisotropic mineral: A mineral with more than one principal refractive index. birefringence: The mathematical difference between the largest and smallest refractive index for an anisotropic mineral. biaxial mineral: A mineral with three principal refractive indices and two optic axes.

- Birefringence - Uniaxial and Biaxial minerals [8 hrs]

Birefringence is the phenomenon exhibited by certain materials in which an incident ray of light is split into two rays, called an ordinary ray and an extraordinary ray, which are plane-(linear) polarized in mutually orthogonal planes, or circular-polarized in opposite directions (left and right).

- Uniaxial Indicatrices - Orientation of indicatrices as per the section [10 hrs]

In uniaxial crystals, the optic indicatrix is an ellipsoid of revolution (with two main axes and a circular horizontal plane). The direction of the optic axis (vertical axis or "c" axis) coincides with the direction of the axis with greatest crystalline symmetry (quaternary axis).

- Biaxial Indicatrices - Orientation of indicatrices as per the section [10 hrs]

The biaxial indicatrix has three principle axes, labeled α, β, and γ. Directions that have refractive indices between α and β, are referred to as α'. Directions with refractive indices between γ and β are referred to as γ'. Note that the β direction also must occur in the plane that includes α and γ.

- Interference of light waves - Passage of light through doubly refracting minerals [8 hrs]

Double refraction, or birefringence, occurs in optical mineralogy when plane-polarized light passes through an anisotropic mineral and emerges as two rays traveling at different speeds, the difference between which is characteristic of a mineral.

- Generation of interference colors [7 hrs]

The interference color is produced when the retardation between the waves of the crystal is equal to a whole number of wavelengths corresponding to its complementary colour.

- Conoscopic or convergent polarized light - Generation of Uniaxial [10 hrs]

Conoscopic interference is generated when crystals are viewed between crossed polarizers with converging monochromatic light.

- interference figures - Forms of interference figures related to sections [8 hrs]

Interference figures are a technique which can be used to help identify minerals using a polarizing light microscope. In this chapter, we explore the practical aspects of obtaining and interpreting interference figures and other related observations.

- Generation of Biaxial interference figures - Forms of interference figures related to sections [8 hrs]

	Biaxial interference figures are most useful for the determination of optic sign and estimation of the 2V angle, both of which are useful diagnostic properties of biaxial minerals. • Optical accessories like mica, gypsum and quartz plates - Determination of Optic sign of uniaxial and biaxial minerals [7 hrs] accessory plate (sensitive tint) In optical microscopy, a plate used to determine the optical properties of minerals. Quartz, mica, and gypsum are the common minerals used to determine the slow and fast vibration directions that relate to the two refractive indices of an anisotropic mineral. • True and apparent optic axial angle, 2V and 2E, - Methods of determination of optic axial angle - Use of Universal stage [7 hrs] The angle between the two optic axes of a biaxial crystal; its symbol is 2V (less than 90 degrees), $2V_{alpha}$, or $2V_{gamma}$, depending on whether the optic direction X or Z is in the acute bisectrix. • Dispersion of light - its effect on interference figures [7 hrs] Interference figures are a technique which can be used to help identify minerals using a polarizing light microscope. • Absorption of light by minerals - Scheme of pleochroism [8 hrs] A pleochroic mineral literally changes color as it is rotated on the microscope stage while viewed using plane-polarized light and is described by the pleochroic scheme.

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.

Module Evaluation تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	3 and 12	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	5 and 8	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	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction of** Mineral Optics
Week 2	**polarizing microscope**
Week 3	Plane polarized and cross polarized Light-Isotropic
Week 4	Anisotropic Minerals Behavior of minerals in cross polarized light
Week 5	Birefringence - Uniaxial and Biaxial minerals
Week 6	Uniaxial Indicatrices - Orientation of indicatrices as per the section
Week 7	Biaxial Indicatrices - Orientation of indicatrices as per the section
Week 8	Interference of light waves - Passage of light through doubly refracting minerals
Week 9	Generation of interference colours
Week 10	Conoscopic or convergent polarized light - Generation of Uniaxial interference figures - Forms of interference figures related to sections
Week 11	Generation of Biaxial interference figures - Forms of interference figures related to sections
Week 12	Optical accessories like mica, gypsum and quartz plates - Determination of Optic sign of uniaxial and biaxial minerals
Week 13	True and apparent optic axial angle, 2V and 2E, - Methods of determination of optic axial angle - Use of Universal stage
Week 14	Dispersion of light - its effect on interference figures
Week 15	Absorption of light by minerals - Scheme of pleochroism

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week Lab	**Material Covered**
Week 1	Lab 1: **Relationships**
Week 2	Lab 2: **Questions in relationships**
Week 3	Lab 3: **Dispersion**
Week 4	Lab 4: **Question in Dispersion**
Week 5	Lab 5: **Polarized light**
Week 6	Lab 6: **Polarizing microscope**
Week 7	Lab 7:**Polarized microscope components**
Week 8	Lab 8: **Light Absorption And Color Transmission**
Week 9	Lab 9:**Study optical properties of minerals under microscope**
Week 10	**Lab 10: Study describing the groups of minerals that form the rocks, which include: ferrous silicate minerals (olivine group - pyroxene group - amphibole group**
Week 11	**Lab 11: A study describing the groups of minerals that form the rocks, including: the mica group - the chlorite group and serpentine) - the ferrous minerals**
Week 12	**Lab 12: A study describing the groups of minerals that form the rocks, including: the metamorphic and additional minerals - the carbonate minerals that form the rocks.**
Week 13	Lab 13: **Thin section of Igneous rocks**
Week 14	Lab 14: **Thin section of Sedimentary rocks**
Week 15	Lab 15: **Thin section of Metamorphic rock**

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	**Metamorphic rocks**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**GEO24120**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	2	
Administering Department	GEO		**College**	Science collage	
Module Leader	Muaiad Tahir Ahmed		**e-mail**	E-mail muaiad.tahir@ uodiyala.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	M.SC.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	10/2/2025		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	GEO23014 Igneous rocks	**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	To give students a broad introduction to and understanding of geological materials and their creation, destruction, and change via the rock cycle. The focus will be to introduce the main rock-forming minerals (silicates and non-silicates), their structures, chemistry, formation and identification. The main rock types will be introduced (igneous, sedimentary, and metamorphic) and explored in the context of their formation and alteration via the rock cycle and associated major Earth processes. The module addresses the science of geological materials at an introductory level and then applies this to mineral and rock-forming processes in the context of plate tectonics. The ability to describe and identify major rock-forming minerals and the major rock types will be a key practical focus of the module.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students will 1. Know of basic plate tectonic environments on the Earth and their relation to the rock types developed 2. Be able to identify and describe a range of common rock-forming minerals using physical and optical properties, and demonstrate how these collectively make up the composition of a variety of rocks; 3. be able to identify and describe the three rock types (igneous, sedimentary and metamorphic) in hand specimen and thin section and understand their modes of formation; 4. Be able to use geological evidence to test hypotheses about the formation of rock units and therefore constrain their associated environments. 5.Define the characteristics of a metamorphic rock. 6. Discuss the effect of heat, pressure and deformation on rocks.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • Metamorphic petrology Concepts and theory [5 hrs] Metamorphic petrology covers the chemical and physical work done in natural systems in response to changing physical conditions. Petrogenetic processes such as recrystallization, continuous and discontinuous reactions, mixed volatile reactions and deformation are addressed. • Types of metamorphism and their controlling factors [10 hrs] The three types of metamorphism are Contact, Regional, and Dynamic metamorphism. Contact Metamorphism occurs when magma comes in contact with an already existing body of rock. When this happens the existing rocks temperature rises and also becomes infiltrated with fluid from the magma. • Common minerals of metamorphic rocks [5 hrs] Some different minerals that are common in metamorphic rocks are: kyanite, garnet, sillimanite, andalusite, and corundum. In addition, metamorphic rocks can contain combinations of minerals that would never be found in ingeous rocks, such as quartz and amphibole. • Field observation, petrographic classification of common metamorphic rocks [10 hrs] There are two main types of metamorphic rocks: those that are foliated because they have formed in an environment with either directed pressure or shear stress, and those that are not foliated because they have formed in an environment without directed pressure or relatively

near the surface with very little pressure at all. Some types of metamorphic rocks, such as quartzite and marble, which also form in directed-pressure situations, do not necessarily exhibit foliation because their minerals (quartz and calcite respectively) do not tend to show alignment .

- Metamorphic facies and facies series [10 hrs]

Metamorphic facies series were defined (Miyashiro, 1994) on the basis of pressure and temperature gradients, both of which are related to the conditions of metamorphism and tectonic setting. Five metamorphic facies series, assigned to three major groups, are recognized.

- Phase diagrams and graphic representation of mineral assemblages [7 hrs]

Phase diagram is a graphical representation of the physical states of a substance under different conditions of temperature and pressure. A typical phase diagram has pressure on the y-axis and temperature on the x-axis. As we cross the lines or curves on the phase diagram, a phase change occurs.

- Pro grade and retrograde metamorphism, Metasomatism [10 hrs]

Prograde metamorphism refers to the changes in a rock that accompany such increasing metamorphic grade. Retrograde refers to decreasing grade as a body of rock cools and recovers from a metamorphic or igneous event, and retrograde metamorphism describes any accompanying changes.

- Deformation textures and textures related to recrystallization [10 hrs]

Textures are often developed during thermomechanical treatments of alloys and classified into two types: one is the deformation texture caused by a severe deformation process such as cold rolling, and the other is the recrystallization texture caused by a subsequent solution (recrystallization) heat treatment.

- Metamorphic reactions, elemental and PT conditions of isograds [10 hrs]

Metamorphic rocks form when rocks are subjected to high heat, high pressure, hot mineral-rich fluids or, more commonly, some combination of these factors. Conditions like these are found deep within the Earth or where tectonic plates meet.

- Regional and thermal metamorphism of pelitic rocks [8 hrs]

A pelite (from Ancient Greek πηλός (pēlós) 'clay, earth') or metapelite is a metamorphosed fine-grained sedimentary rock, i.e. mudstone or siltstone.

- Regional and thermal metamorphism of basic and ultra-basic igneous rocks [7 hrs]

Regional metamorphism is metamorphism that occurs over broad areas of the crust. Most regionally metamorphosed rocks occur in areas that have undergone deformation during an orogenic event resulting in mountain belts that have since been eroded to expose the metamorphic rocks.

- Regional and thermal metamorphism of impure, siliceous carbonate rocks [8 hrs]

Calcsilicates, metacarbonate rocks dominated by silicate minerals, are produced by metasomatism during metamorphism of carbonate sedimentary rocks.

Calcsilicates may be in zoned *skarns* that develop adjacent to or around igneous intrusions.

	• Metamorphism of Granitoides, Charnokites and Migmatites [10 hrs] Typically, granitoids occur where orogeny thickens continental crust either by subduction yielding a continental arc or by convergence yielding continental collisions. Generally, the evolution to granitoid magmas requires a thermal disturbance to ascent though continental crust. The charnockite series originally was assumed to have developed by the fractional crystallization of a silicate magma (molten material). Subsequent studies have shown, however, that many, if not all, of the rocks are metamorphic, formed by recrystallization at high pressures and moderately high temperatures. Migmatites form under extreme temperature and pressure conditions during prograde metamorphism, when partial melting occurs in metamorphic paleosome. Components exsolved by partial melting are called neosome (meaning 'new body'), which may or may not be heterogeneous at the microscopic to macroscopic scale. • Plate tectonic and 4 metamorphic processes [10 hrs] All of the important processes of metamorphism that we are familiar with can be understood in the context of geological processes related to plate tectonics. • Examples of metamorphic rocks in Iraq [5 hrs] The Iraqi territory is covered mainly by sedimentary rocks, Quaternary sediments and very rare igneous and metamorphic rocks.

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.

Module Evaluation تقييم المادة الدراسية				
	Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**

Formative assessment	**Quizzes**	2	10% (10)	3 and 12	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	5 and 8	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	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Metamorphic petrology Concepts and theory
Week 2	**Types of metamorphism and their controlling factors**
Week 3	**Common minerals of metamorphic rocks**
Week 4	**Field observation, petrographic classification of common metamorphic rocks**

Week 5	**Metamorphic facies and facies series**
Week 6	**Phase diagrams and graphic representation of mineral assemblages**
Week 7	**Pro grade and retrograde metamorphism, Metasomatism**
Week 8	**Deformation textures and textures related to recrystallization**
Week 9	**Metamorphic reactions, elemental and PT conditions of isograds**
Week 10	**Regional and thermal metamorphism of politic rocks**
Week 11	**Regional and thermal metamorphism of basic and ultra-basic igneous rocks**
Week 12	**Regional and thermal metamorphism of impure, siliceous carbonate rocks**
Week 13	**Metamorphism of Granitoides, Charnokites and Migmatites**
Week 14	**Plate tectonic and 4 metamorphic processes**
Week 15	**Examples of metamorphic rocks in Iraq**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Lab	**Material Covered**
Week 1	Lab 1: Introduction to Metamorphic rocks
Week 2	Lab 2: Type of Metamorphism
Week 3	Lab 3: Regional Metamorphism rocks
Week 4	Lab 4: Contact Metamorphism rocks
Week 5	Lab 5: Foliated rocks
Week 6	Lab 6: Non-Foliated rocks
Week 7	Lab 7: Metamorphism of sedimentary rocks
Week 8	Lab 8: Metamorphism of mafic and ultramafic
Week 9	Lab 9: Thin section regional metamorphism

Week 10	Lab 10: Thin section contact metamorphism
Week 11	Lab 11: Thin section Foliated rocks
Week 12	Lab 12: Thin section non-foliated rocks
Week 13	Lab 13: ACF *Diagram*
Week 14	Lab 14: AKF *Diagram*
Week 15	Lab 15: AFM Thompson diagram

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		
Recommended Texts		
Websites	Geology.com https://opengeology.org/petrology/13-metamorphism-of-mafic-rocks/	

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	GEO24021				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		2	**Semester of Delivery**		4
Administering Department		GEO	**College**	COS	
Module Leader	Asem Ahmed Hassan		**e-mail**	asem.ahmed@uodiyala.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	None		**e-mail**	None	
Peer Reviewer Name		None	**e-mail**	E-mail	
Scientific Committee Approval Date		10/2/2025	**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	To gain knowledge about: 19. The basics of Engineering as one of the applied branches of Geology 20. Importance of Engineering geology, major aspects of Engineering, and applications, The role and career paths of Engineering geologists. 21. The physical properties of soils and rocks 22. The engineering properties of soils and rocks 23. Stress, Strain, Strength, and Deformations in soils and rocks 24. Physical state and Consistency of soil. 25. The main principles of Site Investigation and soil sampling. 26. Geohazards and engineering problems of soil and rocks.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	11. Define and explain fundamentals about the definition and subjects of Engineering Geology. 12. Appreciate the role of engineering geology in civil engineering works 13. Explain basic terms about the physical and mechanical properties of rocks and soils. 14. Explain basic terms about site investigation and how to perform field site investigation. 15. Learning how to perform soil sampling 16. Define the basics of geohazards, impacts, and mitigation methods 17. Problem-solving through working on a range of geotechnical problems. 18. Learning how to carry out tests to determine the physical and engineering properties of soils and rocks.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to Engineering Geology, The role of Engineering Geologist, Aspects of Engineering Geology and Applications [15 hrs.] Physical Properties of soils, Water content, Density, Unit weight, void ratio, degree of saturation, etc. [15 hrs.] Stress, strain, strength, deformations, Engineering Properties of soils, [10 hrs.] Physical states of soils, Atterberg limits, Consistency of soils. [15 hrs.] Site investigation, Site investigation stages, geotechnical reports [10 hrs.] Soil sampling and boring methods, Geophysical methods for site investigation [15 hrs.] Geohazards, [15 hrs.] Engineering problems of soils [30 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students to participate in the lectures and exercises and expand their thinking skills. Students will learn the basic concepts of Engineering Geology in lectures and apply these concepts in practical classes involving lab experiments and exercises.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.7
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)	3 and 12	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	5 and 8	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 Engineering Geology
Week 2	Physical properties of soils and rocks
Week 3	Engineering properties of soils and rocks 1
Week 4	Engineering properties of soils and rocks 2
Week 5	Soil states and consistency
Week 6	Site investigation
Week 7	**Mid-term Exam**
Week 8	Soil sampling
Week 9	Geophysical Methods in engineering projects 1
Week 10	Geohazards 1
Week 11	Geohazards 2
Week 12	Geohazards 3
Week 13	Slope Stability
Week 14	Engineering problems of soils1
Week 15	Engineering problems of soils2
Week 16	**A preparatory week before the Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab equipment
Week 2	Soil sampling
Week 3	Moisture content
Week 4	Lab Soil density
Week 5	Field soil density
Week 6	Soil compaction
Week 7	Specific gravity
Week 8	**Lab 8: Exam**
Week 9	Liquid limit
Week 10	Plastic limit
Week 11	Shrinkage limit
Week 12	Grain size
Week 13	Soil Classification
Week 14	Consolidation
Week 15	Shear test
Week 16	**Preparation for the final exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Engineering Geology by F. G. Bell	No

Recommended Texts	1. Engineering Geology, Principles and Practice by D. G. Price 2. Engineering Geology by Subinoy Gangopadhyay 3. Practical Engineering Geology by Steve Hencher	No
Websites	https://www.iaeg.info	

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	**Stratigraphy**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**GEO24122**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	GEO		**College**	COS	
Module Leader	Salah Ali Hussain		**e-mail**	Dr.salah@uodiyala.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	None		**e-mail**	None	
Peer Reviewer Name	Abdelratha M.		**e-mail**	E-mail	
Scientific Committee Approval Date	10/2/2025		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	GEO-215	**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	27. To examine controls on stratigraphic organisation of sedimentary strata within a time framework. 28. To examine the means by which a time framework can be established in sedimentary strata 29. To examine differences between lithostratigraphy and chronostratigraphy and to communicate formal stratigraphic nomenclature. 30. To introduce the concepts of sequence stratigraphy 31. To enable students to produce well constrained interpretations of the ways in which controlling processes operate to create stratigraphic organization and architecture.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	32. Appreciate the concept of geological time and the differences between lithostratigraphy and chronostratigraphy. 33. Analyze stratigraphy in terms of space and time and to interpret likely controls on stratal patterns. 34. evaluate the geological controls of stratigraphic development. 35. apply formal stratigraphic nomenclature to the geological record. 36. develop an interpretation of geological history and stratigraphic evolution from a geological map. 37. problem solving through working on a range of data types to produce integrated solutions. 38. Working with others through the sharing of maps and sections in practicals and developing solutions. 39. Learning how to draw a simple to complicate stratigraphic column. 40. Correlate between sections. 41. Draw sub-surface Stratigraphic sections 42. Learning all about cutting and core stratigraphy.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Introduction and Stratigraphic units</u> Stratigraphy from Latin stratum + Greek graphia, is the description of all rock bodies forming the Earth's crust. [15 hrs] <u>Stratigraphic relationships</u> Stratigraphic laws and the effect of tectonic and erosions on starta [15 hrs]

	Lithostratigraphic units - There is a hierarchical framework of terms used for lithostratigraphic units. [10 hrs] APPLICATIONS OF LITHOSTRATIGRAPHY Part of the definition of a formation is that it should be a 'mappable unit', and in practice this usually means that the unit can be represented on a map of a scale of 1:50,000, or 1:100,000. [15 hrs] Biostratigraphy [10 hrs] Magnetostratigraphy: The Earth's magnetic field alternates between periods of normal magnetic polarity, which is the field orientation of the present day, and reversed magnetic polarity. [15 hrs] Subsurface Stratigraphy and Sedimentology - Geologists usually learn the principles of sedimentology and stratigraphy from outcrop relationships in the field, but many will work with subsurface data if they are employed as professional geoscientists. [15 hrs] Borehole stratigraphy Data from these sources can provide some indicators of the lithologies in the subsurface, but a full geological picture can be obtained only by the addition of information on lithology and facies. This can be provided by drilling boreholes through the succession and either taking samples of the rocks. [30 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Students will learn the basic concepts in lectures and apply these concepts in practical classes involving maps, seismic sections, and outcrop and subsurface log information. Previous field courses will be made explicit reference to in order to

	provide linkage from the field to the class.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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)	3 and 12	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	5 and 8	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 stratigraphy and sedimentary rocks
Week 2	Geological time units and Geologic time scale
Week 3	Stratigraphic units
Week 4	Stratigraphic relationships
Week 5	Lithostratigraphic units and facies
Week 6	APPLICATIONS OF LITHOSTRATIGRAPHY
Week 7	Mid-term Exam
Week 8	Biostratigraphy and classification of organisms
Week 9	Magnetostratigraphy
Week 10	Subsurface Stratigraphy
Week 11	Processing of seismic reflection data
Week 12	Interpretation of seismic reflection data:
Week 13	Borehole stratigraphy
Week 14	Borehole cuttings
Week 15	Core
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Stratigraphic units and rock symbols

Week 2	Lab 2: Stratigraphic relationships and unconformities
Week 3	Lab 3: Stratigraphic relationships and included fragments
Week 4	Lab 4: Time-ordering of geologic events
Week 5	Lab 5: Time-ordering of geologic events
Week 6	Lab 6: Drawing a stratigraphic section
Week 7	Lab 7: Drawing a stratigraphic section and correlation
Week 8	Lab 8: Exam
Week 9	Lab 9: LATERAL FACIES CHANGES
Week 10	Lab 10: LATERAL FACIES CHANGES and Walther law
Week 11	Lab 11: LATERAL FACIES CHANGES and Transgression
Week 12	Lab 12: LATERAL FACIES CHANGES and Regression
Week 13	Lab 13: LATERAL FACIES CHANGES and MFS
Week 14	Lab 14: Subsurface section drawing
Week 15	Lab 15: Subsurface section and faults effect
Week 16	Preparation of final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Koutsoukos E.A.M., 2005. Applied Stratigraphy. Springer. 486 P.	Yes
Recommended Texts	Nichols G., 2009. Sedimentology and Stratigraphy. Blackwell Publishing. 432 P.	No
Websites	http://www.agiweb.org/nacsn/code2.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	**Sedimentology**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**GEO24123 GEO24123**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	GEO		**College**	COS	
Module Leader	Kareem Hussein Khwedim		**e-mail**	kkhwedim@uodiyala.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	None		**e-mail**	None	
Peer Reviewer Name	Abdalratha M. Sahaab		**e-mail**	Abdalratha.sahaab@uodiyala.edu.iq	
Scientific Committee Approval Date	10/2/2025		**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**	43. Describe how sediments and sedimentary rocks are formed through transport and deposition, with a basic insight into diagenesis and petroleum geology. 44. Identify the main types of sedimentary rocks, textures, ichnofacies and sedimentary structures, and able to reflect on the implications of their formation. 45. Describe the most important characteristics of continental and marine sedimentary environments. 46. Understand stratigraphic principles such as lithostratigraphy, biostratigraphy, chronostratigraphy and sequence stratigraphy. 47. interpretation of ancient environmental conditions in sediment source areas and depositional sites. 48. Study the constituents, textures, structures, and fossil content of the deposits laid down in different geological environments. By these means the students can differentiate between continental and marine deposits of the geologic record.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1- Understanding how the sediments weathered, transport, and deposited. 2- An appreciation of the way in which Clastic Sedimentology and Petrography relates to other aspects of Petroleum Geosciences and the Earth sciences. 3- Study the types of Clastic sedimentary rocks. 4- Understand theoretical concepts in Clastic Sedimentology and relate these to specific problems or questions. 5- Work safely in the Field and assess related safety issues. 6- Undertake practical experimental work using appropriate equipment and instruments. 7- Apply basic knowledge of practical approaches. 8- Manage and manipulate numerical data from laboratory work and work productively with others in group laboratory experiments.
Indicative Contents **المحتويات الإرشادية**	**Indicative content includes the following:** - Introduction The sedimentary cycle, Biological Weathering and Soil Formation, physical weathering, Chemical Weathering, Physical properties of particles. [15 hrs] - Methods of Particle Analysis

	Interpretation of Particle Size Analyses, Porosity and Permeability, Direct and Indirect methods of porosity measurement, Direct method of permeability measurement. [15 hrs] - Primary or Depositional Porosity Secondary or Postdepositional Porosity, Transportation and Sedimentation, Stokes' law. [10 hrs] - Aqueous processes Unidirectional Traction Currents, Bidirectional Tractional Currents, Sedimentation from High and low-Density Turbidity Currents. [15 hrs] - Eolian processes. [10 hrs] - Glacial processes Gravitational processes, rock fall, slides and slumps, mass flows. [15 hrs] - The sedimentary structures Biogenic sedimentary structures, Primary inorganic sedimentary structures, Predepositional (Interbed) Structures. [15 hrs] - Syndepositional (Intrabed) Structures Massive Bedding, Flat-Bedding, Cross-Bedding, Ripples and Cross-Lamination, Post depositional Sedimentary Structures, Vertical Plastic Deformational Structures, Slumps and Slides, Miscellaneous Structures, Rain Prints, Salt Pseudomorphs, Desiccation Cracks, Synaeresis Cracks, Sand Dikes. [30 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	This module has both theoretical and practical examination which form the summative assessments. Part of the summative assessments (continuous exams) are during the semester and another part is at the end of the semester.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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)	4 and 13	LO #3, #4 and #10, #12
	Assignments	3	10% (10)	2, 6 and 10	LO #2, #5 and #6, #9
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO #4, #8 and #12

Summative assessment	**Midterm Exam**	2hr	10% (10)	8	LO #1 - #6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction
Week 2	The sedimentary cycle
Week 3	Chemical weathering
Week 4	Chemical Weathering
Week 5	Interpretation of Particle Size Analyses
Week 6	Measurements of Porosity and Permeability
Week 7	Secondary or Post depositional Porosity
Week 8	Secondary or Post depositional Porosity
Week 9	Aqueous Processes
Week 10	Sedimentation from Low-Density Turbidity Currents
Week 11	Gravitational Processes
Week 12	Primary Inorganic Sedimentary Structures
Week 13	Syndepositional (Intrabed) Structures
Week 14	Cross-Bedding, Slumps and Slides
Week 15	Miscellaneous Structures
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Lab 1:** Introduction
Week 2	**Lab 2- 5:** Grain size analysis ((Mechanical Analysis) of Terrigenous Clastic sediments), Gravel, sand and mud
Week 3	
Week 4	
Week 5	
Week 6	**Lab 6- 10:** Size analysis of silt and clay by pipette method
Week 7	
Week 8	
Week 9	
Week 10	
Week 11	**Lab 11- 15:** Graphic presentation of size analysis data
Week 12	
Week 13	
Week 14	
Week 15	
Week 16	Preparation of final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	- Selley R.C., 2000, Applied sedimentology, second edition, Academic press, 543p.	Yes
Recommended Texts	- Nichols G., 2009. Sedimentology and Stratigraphy. Blackwell Publishing. 432p.	No
Websites	https://libguides.dickinson.edu/sedstrat/internet	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Baath Party Crimes in Iraq**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☐**Lecture** ☐ **Lab** **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	UD24				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	2		**Semester of Delivery**	2	
Administering Department			**College**		
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**		
Peer Reviewer Name	none		**e-mail**		
Scientific Committee Approval Date	11/08/2024		**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 Aims أهداف المادة الدراسية	ارتكب نظام البعث في العراق إبّان حكمه عدد اً كبير ا مَّن الجرائم المختلفة، واختلافها يلُزم بيان مفاهيم وتعاريف للطالب ليكون على معرفة ودراية بما يمر به مما لها علاقة بمادة المنه ا ج ، كمفهوم الجريمة وأقسامها،والجرائم الدولية التي حُكِ م عليها قيادات وأزلام نظام البعث وف ق قانون المحكمة الجنائية العراقية العلى ا، وعليها سيكون هذا الف صل في مبحثين، المبحث الأول في بيان مفهوم الجرائم وأقسامها، والمبحث الآخر في بيان جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العلى ا لسنة ٢٠٠٥ م.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- تسليط الضوء على جرائم ما ارتكبها نظامٌ جائرٌ في العالمَ ِ ك لهّ على تعاقبُ ِ الأزَمانِ كتلكَ التي ارتكبها)نظامُ البعثِ (على صعيدِ العراقِ خاصة ، والمنطقةِ الإقليميةِ عامة ، والعالمَ ِ كلِهّ شُمولًا. 2- لقد جثمَ نظامُ البعثِ البائدِ على صدرِ العراقِ والعراقيينَ زُهاءَ أرَبعةِ عقودٍ يستقي سياسة تسلطُ ِه من رَضاع عُ تاة الطغاة حِقبَ َ التاريخ ك)قابيلَ ، والنمرودِ ، وفرعَونَ ، وأبَي لهبٍ ، والحجَّاج ، ويزيد ، وهولاكو ، وموسيليني ، وهتلر (بما يتناسبُ ونشأة رأسِه الطاغيةِ وعدوّ الإنسانيةِ) صدام حسين (المقبورِ ؛ فذاقَ وَيلاتِ بطشِ هذا النظامِ كلُّ مَنِ انتهجَ سبيلَ الحقِّ وحُبِّ الوطنِ ؛ فرفض النهجَ البعثيَّ العفَ ِن ، واكتوى بنارِ قمعِه مِن صنوفِ المآسي والمِحَنِ. 3- لقد تحصَّلَ من هذا الواجبِ التربويّ - التعليميّ) الشرعيّ - الرسميّ(ِ أنَ تكُلفَّ َ لجَنة وزارية مختصة تعُنىَ بوضع منهج يوُثِّقُ بعضا من) جرائمَ النظامِ البعثيّ(ِ ؛ ليكونَ مَبصَرَ حقيقةٍ يشُرِفُ به الشبابُ الجامعيُّ الحاليُّ على ما مضَى من حياة عقودٍ مِن حُكمِ العراقِ بيدِ طاغيةٍ شيطانٍ بهيأة إنسانٍ فيستحضرون من اطِّلاعِهم على أفَصُلِه ومضامينِها ما يجعلُهُم على هُدىً يدرؤُون به كلَّ تعَمِيةٍ إعِلاميةٍ تحُاولُ تضليلهَم ؛ فيمَنعوُن به كلَّ عمًى.
Indicative Contents المحتويات الإرشادية	ارتأتِ اللجنة - التي عاش رئيسُها وأعَضاؤُها كافة مُدة الحُكمِ البعثيّ المُجرمِ ، وذاقوُا مِن وَيلاتِ ا بصدقٍ ومصاديقَ - بعد رِحلةِ توثيقيةٍ بطشِه ما يجعلُ هذا المنهجَ المقررَ للمنظومةِ الأكَاديميةِ الجامعيةِ موضوعى حضوريةٍ ، وإلكترونيةٍ أنَ يأتيَ هذا المنهجُ المُقررُ على مقدِمّةٍ هي التي بينَ يديَ الطالبِ الجام عيّ ، والقارئِ يستنيرُ بها للمضمونِ كلِهّ بدواعي تأليفِه ، ومسوّغاتِ إقرارِه ، ودوافع تدريسِه ، ثم أرَبعةِ أفَصُلٍ وُظِّفَ أوَلهُا لتوثيقِ) جرائمِ نظامِ البعثِ وفقَ قانونِ المحكمةِ الجنائيةِ العراقيةِ العلُيا عام ٢٠٠٥ م (، وجُعِل ثانيها لكشفِ) الجرائمِ النفسيةِ والاجتماعيةِ ، وآثارِها ، وأبَرز انتهاكاتِ النظامِ البعثيّ في العراق (، وكُرّس ثالثهُا لتبيين) الجرائمِ البيئيةِ لنظامِ البعثِ في العراق (، أمَّ َا الفصلُ الرابعُ والأخَيرُ فقد خُصِّص ل)جرائمِ المقابرِ الجماعيةِ (،ثم خُتِم المنهجُ بملخَّصٍ شافٍ وافٍ يضَعُ الحقائقَ مواضعهَا مما مرَّ العرضُ له ، والاستدلالُ عليه. لقد تضمن هذا المنهجُ ما جاء مفاتيحَ معرفية بيدِ الطالبِ الجامعيّ يقَوَى بها على كلِّ مُرتجَ حَبكَ َت رواية أكُذوبتهِ أيَادي البعثِ وإعلامُه المزيفِّ ، وباعت ضميرَ ها أنَفسُ ٌ ترى أنَ تبقى إلِى الآنَ ذليلة أسَيرة ، وذيَلًا تابعاً.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	هذا الواجبِ التربويّ - التعليميّ) الشرعيّ - الرسميّ(ِ أنَ تكُلفَّ َ لجَنة وزارية مختصة تعُنىَ بوضع منهج يوُثِّقُ بعضا من) جرائمَ النظامِ البعثيّ(ِ ؛ ليكونَ مَبصَرَ حقيقةٍ يشُرِفُ به الشبابُ الجامعيُّ الحاليُّ على ما مضَى من حياة عقودٍ مِن حُكمِ العراقِ بيدِ طاغيةٍ

شيطانٍ بهيأة إنسانٍ ؛ فيستحضرون من اطِّلاعِهم على أفَضُلِه ومضامينها ما يجعلهُم على هُدىً يدرؤُون به كلَّ تعَمِيةٍ إعِلاميةٍ تحُاولُ تضليلهَم ؛ فيمَنعوُن به كلَّ عمًى.	

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	30	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	1.5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	20	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	المقدمة /جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام ٢٠٠٥ م
Week 2	الفصل الأول:

	١,١ . مفهوم الجرائم وأقسامها ١,١,١ . تعريف الجريمة لغة واصطلاحا
Week 3	.أقسام الجرائم ١,٢. جرائم نظام البعث وفق توثيق قانون المحكمة الجنائية العراقية العليا عام ٢٠٠5 ١,٢,١. أنواع الجرائم الدولية
Week 4	.القرارات الصادرة من المحكمة الجنائية العليا
Week 5	الفصل الثاني الجرائم النفسية والاجتماعية وأثارها، وأبرز انتهاكات النظام البعثي في العراق
Week 6	.الجرائم النفسية ٢,١,١ . آليات الجرائم النفسية. ٢,١,٢ آثار الجرائم النفسية. ٢,٢ الجرائم الاجتماعية. ٢,٢,١ عسكرة المجتمع
Week 7	. موقف النظام البعثي من الدين انتهاكات القوانين العراقية ٢,٣,١ . صور انتهاكات حقوق الإنسان وجرائم السلطة
Week 8	.بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث ٢,٣,٣ . أماكن السجون والاحتجاز لنظام البعث
Week 9	الفصل الثالث الجرائم البيئية لنظام البعث في العراق.
Week 10	٣,١ . التلوث الحربي والإشعاعي وانفجار الالغام
Week 11	٢ . تدمير المدن والقرى) سياسة الأرض المحروقة
Week 12	.تجفيف الأهوار ٣,٤ . تجريف بساتين النخيل والأشجار والمزروعات
Week 13	جرائم المقابر الجماعية
Week 14	جرائم المقابر الجماعية أحداث مقابر الإبادة الجماعيةّ المرتكبة من النظام البعثي في العرا ق
Week 15	**EXAM**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	جرائم حزب البعث في العراق	yes

	النسخة 1 – الطبعة الاولى20023	
Recommended Texts	أرشيف مؤسسة السجناء السياسيين. أرشيف مؤسسة الشهداء. -أرشيف المركز العراقي لتوثيق جرائم التطرف في العتبة العباسية المقدسة. -الموقع الرسمي للأمم المتحدة. -ايمن عبد العزيز سلامة ، ال مسؤولية الدولية عن ارتكاب جريمة الابادة الجماعية ، ط ١، دار العلوم للنشر والتوزيع ، القاهرة ، ٢٠٠٦. -جندي عبد الملك، الموسوعة الجنائية، الجزء الثالث، دار احياء التراث العربي، بيروت، ١٩٩٠ م.	No
Websites	https://iraqicenter-fdec.org/archives/4224	

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.