مواصفات مقرر: الصخور الفتاتية

Course Specification of : Clastic Rocks

General information about the course المعلومات العامة عن المقرر						
.1	اسم المقرر Course Title	Clastic Rocks الصخور الفتاتية				
.2	رمز المقرر ورقمه Course Code and Number	GEOS472				
.3	الساعات المعتمدة للمقرر Credit Hours	Credit Hours الساعات المعتمدة				الإجمالي Total
		محاضرات Lecture	عملي Practical	سمنار/تمارين Seminar/Tutorial	تدريب Training	
		2	1	NA	NA	3
.4	المستوى والفصل الدراسي Study Level and Semester	4^{th} level, 1^{st} semester				
.5	المتطلبات السابقة المقرر (إن وجدت) Pre-requisites (if any)	PNR212				
.6	المتطلبات المصاحبة (إن وجدت) Co-requisites (if any)	NA				
.7	البرنامج الذي يدرس له المقرر Program (s) in which the course is offered	Geosciences				
.8	لغة تدريس المقرر Language of teaching the course	English/Arabic				
.9	نظام الدراسة Study System	Semesters				
.10	مكان تدريس المقرر Location of teaching the course	Faculty of Petroleum and Natural Resources Buildings Sana'a University				
.11	اسم معد(و) مواصفات المقرر Prepared by	Prof. Abdulkarim Al-Subbary				
.12	تاريخ اعتماد مجلس الجامعة Date of Approval	2020				

Course Description وصف المقرر	
وصف المقرر بالإنجليزية	وصف المقرر بالعربية

Prepared by	Quality Assurance Unit	Dean of the Faculty	Dean of the Development & Quality Assurance Center
Assoc.Prof. Adel Al-Matary	Assoc.Prof. Adel Al-Matary	Assoc.Prof. Bassim AlKhirbash	Assoc.Prof. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al Qaseem Mohammed Abas

This course introduces the study of the origin of clastic sedimentary rocks and the various depositional environments in which they form. Classification and mineralogical composition, Petrographic features and diagenetic processes for different types of clastic rocks. The course begin by covering the basic principles of sediment transport and the formation of sedimentary structures, and then examines specific depositional settings and their associated deposits including fluvial, deltaic, coastal and deep marine environments. The course will conclude with a consideration of larger-scale stratigraphic concepts associated with filling of sedimentary basins. Laboratories focus on the identification of sedimentary rocks and structures in hand specimen.	يقدم هذا المقرر دراسة عن أصل الصخور الرسوبية الفتاتية وبيئات الترسيب المختلفة التي تتكون فيها، وكذا التصنيف والتركيب المعدني، الخصائص البتروغرافية والعمليات التحويرية لأنواع مختلفة من الصخور الفتاتية. يبدأ المقرر بتغطية المبادئ الأساسية لنقل الرواسب وتشكيل البنيات الرسوبية. ثم يفحص إعدادات الترسيب المحددة والرواسب المرتبطة بها بما في ذلك البيئات النهرية والدلتا والساحلية والعميقة. يختتم المقرر بمفاهيم طباقية واسعة النطاق مرتبطة بملء الأحواض الرسوبية. تركز المختبرات على تحديد الصخور والبنيات الرسوبية في عينات يدوية.

Course Intended Learning Outcomes (CILOs) مخرجات تعلم المقرر

After completing the course, the student will be able to:		بعد الانتهاء من دراسة المقرر سوف يكون الطالب قادرا على أن:	
a1.	Categorize the different types of clastic rocks and recognize its general properties and relation to the source materials.	يصنف الأنواع المختلفة للصخور الفتاتية ويعرف خصائصها العامة وعلاقتها بمواد المصدر.	a1 -
a2.	Explain the features of rocks formed in clastic sedimentary environments, in order to recognize the features and environments of the rock record.	يشرح ملامح الصخور في البيئات الرسوبية الفتاتية، من أجل التعرف على سمات وبيئات سجل الصخور.	a2–
b1.	Analyze and Evaluate the origin and physical properties of clastic sedimentary rocks which form the majority of reservoirs and aquifers	يحلل ويقيم منشأ الصخور الرسوبية الفتاتية التي تشكل غالبية الخزانات ومستودعات المياه الجوفية وتقييمها	b1–
b2.	Identify common clastic textures and structures formed in different depositional environments;	يحدد النسيج والبنيات الرسوبية الفتاتية الأساسية التي تكونت في بيئات ترسيبية مختلفة	b2 -
c1.	Rrecognize from the available data of outcrops and well logs, the depositional architectures and to reconstruct the depositional scenarios in time and space	يتعرف من خلال البيانات المتوفرة في المكاشف وسجلات الآبار، على بنيات الترسيب وإعادة بناء سيناريوهات الترسيب في الزمان والمكان	c1 -
c2.	Conduct practical description, illustration, analysis and interpretation of facies successions observed in the field.	يقوم بالوصف العملي، والتوضيح، والتحليل، وتفسير تعاقب السحنات التي تمت ملاحظتها في الحقل.	c2 -
d1.	Transfer information appropriately, verbally, graphically and in writing, using modern information and communication technologies.	ينقل المعلومات بشكل مناسب، شفهياً وبيانياً وكتابة، باستخدام تكنولوجيات المعلومات والاتصالات الحديثة.	d1 -
d2.	working with others through group design and Write a report of the different types of clastic rock and their economic importance.	يعمل مع الآخرين من خلال تصميم المجموعة وكتابة تقرير للأنواع المختلفة من الصخور الفتاتية وأهميتها الاقتصادية.	d2 -

مواءمة مخرجات تعلم المقرر مع مخرجات التعلم للبرنامج:

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

مخرجات التعلم المقصودة من المقرر (Course Intended Learning Outcomes)	مخرجات التعلم المقصودة من البرنامج (Program Intended Learning Outcomes)

Prepared by
Assoc.Prof. Adel Al-Matary

Quality Assurance Unit
Assoc.Prof. Adel Al-Matary

Dean of the Faculty
Assoc.Prof. Bassim AlKhirbash

Dean of the Development & Quality Assurance Center
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		(تكتب جميع مخرجات البرنامج كما هي رمزا ونصا)	
a1	Categorize the different types of clastic rocks and recognize its general properties and relation to the source materials.	A1	Express knowledge and understanding of geological-specific theories, paradigms, concepts and principles, in addition to general literature and basic science.
a2	Explain the features of rocks formed in clastic sedimentary environments, in order to recognize the features and environments of the rock record.	A2	Explain fundamental geological principles and concepts in theoretical, practical and vocational situations and the possibility of applying them.
b1	Analyze and Evaluate the origin and physical properties of clastic sedimentary rocks which form the majority of reservoirs and aquifers	B1	Integrate synthesized geological data on a range of spatial and temporal scales to allow for scientific interpretations.
b2	Identify common clastic textures and structures formed in different depositional environments;	B2	Explore knowledge and skills in solving geological and environmental problems logically and professionally.
c1	Rrecognize from the available data of outcrops and well logs, the depositional architectures and to reconstruct the depositional scenarios in time and space	C1	Demonstrate the ability to identify rocks, minerals, and different structure in the field and in the lab.
c2	Conduct practical description, illustration, analysis and interpretation of facies successions observed in the field.	C2	Apply new and established technologies with efficiency to collect and interpret geological data, recognizing their strengths and limitations.
d1	Transfer information appropriately, verbally, graphically and in writing, using modern information and communication technologies.	D2	Elucidate the necessary skills of practicing responsible and personal characteristics with discipline, and ability in making decision.
d2	working with others through group design and Write a report of the different types of clastic rock and their economic importance.	D1	Adjust to new environment, and function in diverse learning and working environments.

مواءمة مخرجات التعلم باستراتيجيات التعليم والتعلم والتقويم
Alignment of CILOs to Teaching and Assessment Strategies

أولا: مواءمة مخرجات تعلم المقرر (المعارف والفهم) بإستراتيجية التعليم والتعلم والتقويم:
First: Alignment of Knowledge and Understanding CILOs

مخرجات المقرر/ المعرفة والفهم Knowledge and Understanding CILOs		إستراتيجية التعليم والتعلم Teaching Strategies	إستراتيجية التقويم Assessment Strategies
a1-	Categorize the different types of clastic rocks and recognize its general properties and relation to the source materials.	- Lectures - Power point presentation - Class discussion	- Quiz - Exam - Oral question

a2 -	Explain the features of rocks formed in clastic sedimentary environments, in order to recognize the features and environments of the rock record.	- Brainstorming - Directed self-study - Practical applications	- Oral presentations - Reports - Practical tests

ثانيا:مواءمة مخرجات تعلم المقرر(المهارات الذهنية) بإستراتيجية التدريس والتقويم:

Second: Alignment of Intellectual Skills CILOs

مخرجات المقرر/ المهارات الذهنية Intellectual Skills CILOs		إستراتيجية التعليم والتعلم Teaching Strategies	إستراتيجية التقويم Assessment Strategies
b1 -	Analyze and Evaluate the origin and physical properties of clastic sedimentary rocks which form the majority of reservoirs and aquifers	- Class Discussion - Tutorial - Lecture	- Homework - Oral question - Quiz - Exam
b2 -	Identify common clastic textures and structures formed in different depositional environments;		

ثالثا:مواءمة مخرجات تعلم المقرر(المهارات المهنية والعملية)بإستراتيجية التدريس والتقويم:

Third: Alignment of Professional and Practical Skills CILOs

مخرجات المقرر/ المهارات المهنية والعملية Professional and Practical Skills CILOs		إستراتيجية التعليم والتعلم Teaching Strategies	إستراتيجية التقويم Assessment Strategies
c1-	Rrecognize from the available data of outcrops and well logs, the depositional architectures and to reconstruct the depositional scenarios in time and space	- Lectures - Class Discussion - Lab Experiments - Field training - Tutorial	- Short essays - Evaluation of Lab Experiments - Exam - Oral question - Reports
c2-	Conduct practical description, illustration, analysis and interpretation of facies successions observed in the field.		

رابعا: مواءمة مخرجات تعلم المقرر(المهارات العامة) بإستراتيجية التدريس والتقويم:

Fourth: Alignment of Transferable (General) Skills CILOs

مخرجات المقرر Transferable (General) Skills CILOs		إستراتيجية التعليم والتعلم Teaching Strategies	إستراتيجية التقويم Assessment strategies
d1-	Transfer information appropriately, verbally, graphically and in writing, using modern information and communication technologies.	- Brainstorming - Directed self-study	- Reports - Oral presentations
d2-	working with others through group design and Write a report of the different types of clastic rock and their economic importance.	- Group assignment - Lab Experiments - Presentation - Project - Seminar	- Oral question - Project report evaluation - Evaluation of Group assignment - Evaluation of lab report

Course Content **محتوى المقرر**

Theoretical Aspect		موضوعات الجانب النظري			
الرقم Order	الموضوعات الرئيسة/ الوحدات Topic List / Units	الموضوعات الفرعية Sub Topics List	عدد الأسابيع Number of Weeks	الساعات الفعلية Contact Hours	رموز مخرجات التعلم للمقرر (CILOs)
1	Introduction to Clastic Sedimentology	Introduction - General plan of the course - Definitions of clastic rock. - Weathering and clastic Textures	1	2	a1, a2, , b2
2	Classification, Interpreting of Siliciclastic Sedimentary Rocks	Siliciclastic rocks: Conglomerates, sandstones, mudrocks; clay mineralogy	1	2	a1, a2, b2
3	Processes of Transportation and Sedimentation	• Transport media • The behavior of fluids and particles in fluids • Flows, sediment and bed forms • Waves	1	2	a1, a2, b1, b2
4	Features of Clastic Rocks	- Concept of grain size analysis. - Textural parameters and their significance. - Particle morphology; shape forms, sphericity, roundness, surface textures and their significance. - Grain fabric: orientation of grains, - Mineralogical and textural maturity	1	2	a1, a2, b1, b2, c1,c2
5	Diagenesis of Clastic Rocks	- Concepts of diagenesis - Stages of diagenesis - Burial, Lithification and Diagenesis. - Compaction and cementation	1	2	a1, a2, b1, b2, c1,c2
6	Heavy Mineral and their Uses	- Introduction to Heavy Minerals - Heavy Mineral Separation - Heavy Mineral Assemblage	1	2	a1, a2, b1, b2, c1, c2, d1
7	Processes of Sedimentary Structures	- Sedimentary structures and their significance. - Primary and Secondary sedimentary structures. .	1	2	a1, a2, b1, b2, c1, c2, d1
		Basic concepts of Paleocurrent analysis (Paleocurrent indicators, Measuring Paleocurrent from cross-stratification, Presentation and analysis of directional data)	1	2	a1, a2, b1, b2, c1, c2, d1
8	Sedimentary Environments of Clastic Rocks	• Terrestrial Depositional Environments	1	2	a1, b1, c1, c2
		• Transitional Depositional Environments	1	2	a1, b1, c1, c2
		• Marine Depositional Environments	1	2	a1, b1,

					c1, c2
9	Facies concept and Processes	- (Physical, chemical, & biological) operating in the depositional environment. - lithological variations that characterize clastic reservoir facies	**1**	**2**	a1, a2, b1, b2, c1, c2, d1
10	Volcaniclastic Sediments	Composition, classification and Diagenesis	**1**	**2**	All
11	Review and Summary to the Course	- Clastic reservoir characterization - Revision and Economic Importance of Clastic Rocks	**1**	**2**	All
عدد الأسابيع والساعات الفعلية **Number of Weeks /and Contact Hours Per Semester**			**14**	28	

Practical Aspect (if any) الموضوعات العملية (إن وجدت)

الرقم Order	التجارب العملية/ التمارين / تدريبات Practical / Exercises/Tutorials topics	عدد الأسابيع Number of Weeks	الساعات الفعلية Contact Hours	رموز مخرجات التعلم Course ILOs
1	- Classification and Nomenclature of Clastic Rocks (Looking to Hand Specimen Samples)	2	**4**	a1,a2, b1,b2, c2
2	Description of Textures in Clastic Rocks {Clasts and Matrix, Sorting, Clast Roundness, Clast Sphericity & Fabric}	2	**4**	a1,a2, b1,b2, c2
3	Granulometric and Clast Shape Analysis {Techniques In Granulometric Analysis & Use of Granulometric Analysis Results}	2	**4**	b2, c2
4	Heavy Mineral Analysis { Heavy Mineral Separation & Use of the Analysis Results}	2	**4**	a2, b1,d1
5	One day field practice observation of Clastic outcrops	1	**2**	All
6	- Measuring Paleocurrent from cross-stratification - Presentation and analysis of directional data	1	**2**	a1, a2, c2, d1
7	- Petrography of clastic rocks in thin sections under the Microscope	2	**4**	All
اجمالي الأسابيع والساعات الفعلية **Number of Weeks /and Contact Hours Per Semester**		**12**	**24**	

Teaching Strategies استراتيجيات التعليم والتعلم

- Lectures
- Class discussion
- Brain storm
- Directed self-study

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- Group assignment
- Lab experiments
- Project and Seminar

Tasks and Assignments الأنشطة والتكليفات

م No	التكليف/ الواجب Assignments/ Tasks	نوع التكليف (فردي/تعاوني)	الدرجة المستحقة Mark	أسبوع التنفيذ Week Due	مخرجات التعلم CILOs (symbols)
	NA	-	-	-	-
	Total Score إجمالي الدرجة		NA		

Learning Assessment تقييم التعلم

الرقم No.	أنشطة التقييم Assessment Tasks	أسبوع التقييم Week due	الدرجة Mark	نسبة الدرجة إلى الدرجة النهائية Proportion of Final Assessment	مخرجات التعلم CILOs (symbols)
1	Lecture attendance and class discussion (theoretical)	Weekly	5	**3.3%**	all
2	Quizzes (theoretical)	Bi-weekly basis	5	**3.3%**	a1,a2,b1,b2,c1,c2
3	Mid-Term written exam (theoretical)	Week 7	15	**10%**	a1,a2,b1,b2,c1,c2
4	Project and Report (theoretical)	Week 10	5	**3.3%**	all
5	Final Exam (theoretical)	Week 16	70	**46.7%**	all
6	Lab attendance and class activities	Weekly	5	**3.3%**	all
7	Exercises and report (practical)	Bi-weekly basis	5	**3.3%**	a1,a2,b1,b2,c1,c2
8	Mid-Term Exam (practical)	Week 6	10	**6.6%**	a1,a2,b1,b2,c1,c2
9	Final Exam (practical)	Week 14	30	**20%**	all
Total الإجمالي			**150**	**%100**	**%100**

Learning Resources مصادر التعلم

توثق المراجع حسب نظام APA (اسم المؤلف، سنة النشر، اسم الكتاب، دار النشر، بلد النشر).

Required Textbook(s) المراجع الرئيسة(لا تزيد عن مرجعين)

1. Prothero, D. R., and Schwab, F., 2013, Sedimentary Geology (3rd Edition), Freeman Publishers.
2. Hakuyu Okada, Alec Kenyon-Smith, Jr. Robert Dott, and Alex Kenyon-Smith, 2005; The Evolution of Clastic Sedimentology, Dunedin Academic Press Ltd, **ISBN-10:** 1903765498, 252p

Essential References المراجع المساندة

1. Tucker, M.E. (2017). Sedimentary Petrology. An Introduction to the Origin of Sedimentary Rocks. Blackwell Sci. Publs., 3rd Ed., 262 pp.
2. Boggs, S. Jr. (2009). Petrology of sedimentary rocks. Cambridge University Press, 2nd Edition, 600 p.
3. Guilford, C., MacKenzie, W.S. & Adams, A. E..;(2017) Atlas of sedimentary rocks under the

microscope, Longman, Harlow, London eBook Published
4. Stow, D., 2005, Sedimentary Rocks in the Field, Academic Press, MA, Mason Publishing ISBN-10: 0-12-369451-5

Electronic Materials and Web Sites *etc.* **المصادر الإلكترونية ومواقع الإنترنت**

https://en.wikipedia.org/wiki

Course Policies الضوابط والسياسات المتبعة في المقرر

1	**Class Attendance** حضور الفعاليات التعليمية	- Attendance is compulsory at all scheduled lectures and practical sessions. A student should attend not less than 75 % of total hours of the subject; otherwise he/she will not be able to take the exam and will be considered as exam failure and will be required to retake the course again.
2	**Tardy** الحضور المتأخر	For late in attending the class, the student will be initially notified. If he repeated lateness in attending class, he/she will be considered as absent.
3	**Exam Attendance/Punctuality** ضوابط الامتحان	The student should attend the exam on time. He/she is allowed to attend the exam within half an hour from the beginning of the exam, after that if late he/she will not be permitted to take the exam and will be considered as absent.
4	**Assignments & Projects** التعيينات والمشاريع	Student has to submit all the assignments/reports for checking on time, mostly one week after given the assignment.
5	**Cheating** الغش	- In the case of cheating on the exam, the student is considered a failure. It will be referred to a disciplinary council to apply the penalties as stipulated in the Student Affairs Regulations
6	**Plagiarism** الانتحال	- If the examination committee proofed a plagiarism of a student, It will be referred to a disciplinary council to apply the penalties as stipulated in the Student Affairs Regulation. The Student will be disengaged from the Faculty according to the university roles, and this should be confirmed from the Student Council Affair of the university.
7	**Other policies** سياسات أخرى	- Mobile phones are not allowed to use during a class lecture. It must be closed; otherwise the student will be asked to leave the lecture room. - Mobile phones are not allowed in hall during the examination.

قسم/ برنامج: العلوم الجيولوجية / جيولوجيا البترول

العام الجامعي: 2019-2020م

خطة مقرر: الصخور الفتاتية

Course Plan (Syllabus): Clastic Rocks

Prepared by	Quality Assurance Unit	Dean of the Faculty	Dean of the Development & Quality Assurance Center
Assoc.Prof. Adel Al-Matary	Assoc.Prof. Adel Al-Matary	Assoc.Prof. Bassim AlKhirbash	Assoc.Prof. Huda Al-Emad

Rector of Sana'a University
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Information about Faculty Member Responsible for the Course معلومات عن أستاذ المقرر							
الاسم Name	Prof. AbdulKarim Al-Subbary	الساعات المكتبية (أسبوعيا) Office Hours					
المكان ورقم الهاتف Location &Telephone No.	Sana'a University +967 733 63 68 31	السبت SAT	الأحد SUN	الاثنين MON	الثلاثاء TUE	الأربعاء WED	الخميس THU
البريد الإلكتروني E-mail	aalsubbari@yahoo.com						

General information about the course معلومات عامة عن المقرر						
.1	اسم المقرر Course Title	الصخور الفتاتية Clastic Rocks				
.2	رمز المقرر ورقمه Course Code and Number	GEOS472				
.3	الساعات المعتمدة للمقرر Credit Hours	Credit Hours الساعات المعتمدة				الإجمالي Total
		محاضرات Lecture	عملي Practical	سمنار/تمارين Seminar/Tutorial	تدريب Training	
		2	1	0	0	3
.4	المستوى والفصل الدراسي Study Level and Semester	4th level – 1st Semester				
.5	المتطلبات السابقة للمقرر Pre-requisites	PNR212				
.6	المتطلبات المصاحبة (إن وجدت) Co –requisite	—				
.7	البرنامج الذي يدرس له المقرر Program (s) in which the course is offered	Geosciences				
.8	لغة تدريس المقرر Language of teaching the course	English/ Arabic				
.9	مكان تدريس المقرر Location of teaching the course	Faculty of Petroleum and Natural Resources Buildings				

Course Description وصف المقرر

This course introduces the study of the origin of clastic sedimentary rocks and the various depositional environments in which they form. Classification and mineralogical composition, Petrographic features and diagenetic processes for different types of clastic rocks. The course begin by covering the basic principles of sediment transport and the formation of sedimentary structures, and then examines specific depositional settings and their associated deposits including fluvial, deltaic, coastal and deep marine environments. The course will conclude with a consideration of larger-scale stratigraphic concepts associated with filling of sedimentary basins.
Laboratories focus on the identification of sedimentary rocks and structures in hand specimen.

يقدم هذا المقرر دراسة عن أصل الصخور الرسوبية الفتاتية وبيئات الترسيب المختلفة التي تتكون فيها، وكذا التصنيف والتركيب المعدني، الخصائص البتروغرافية والعمليات التحويرية لأنواع مختلفة من الصخور الفتاتية. يبدأ المقرر بتغطية المبادئ الأساسية لنقل الرواسب وتشكيل البنيات الرسوبية. ثم يفحص إعدادات الترسيب المحددة والرواسب المرتبطة بها بما في ذلك البيئات النهرية والدلتا والساحلية والعميقة. يختتم المقرر بمفاهيم طباقية واسعة النطاق مرتبطة بملء الأحواض الرسوبية. تركز المختبرات على تحديد الصخور والبنيات الرسوبية في عينات يدوية.

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Course Intended Learning Outcomes (CILOs)	مخرجات تعلم المقرر
After completing the course, the student will be able to:	بعد الانتهاء من دراسة المقرر سوف يكون الطالب قادرا على أن:
a1. Categorize the different types of clastic rocks and recognize its general properties and relation to the source materials.	a1 - يصنف الأنواع المختلفة للصخور الفتاتية ويعرف خصائصها العامة وعلاقتها بمواد المصدر.
a2. Explain the features of rocks formed in clastic sedimentary environments, in order to recognize the features and environments of the rock record.	a2 – يشرح ملامح الصخور في البيئات الرسوبية الفتاتية، من أجل التعرف على سمات وبيئات سجل الصخور.
b1. Analyze and Evaluate the origin and physical properties of clastic sedimentary rocks which form the majority of reservoirs and aquifers	b1 – يحلل ويقيم منشأ الصخور الرسوبية الفتاتية التي تشكل غالبية الخزانات ومستودعات المياه الجوفية وتقييمها
b2. Identify common clastic textures and structures formed in different depositional environments;	b2 - يحدد النسيج والبنيات الرسوبية الفتاتية الأساسية التي تكونت في بيئات ترسيبية مختلفة
c1. Rrecognize from the available data of outcrops and well logs, the depositional architectures and to reconstruct the depositional scenarios in time and space	c1 - يستخدم الخاصية الفريدة للصخور الرسوبية لتحديد وتصنيف ووصف كيفية تشكل الصخور الرسوبية وهياكلها.
c2. Conduct practical description, illustration, analysis and interpretation of facies successions observed in the field.	c2 - يقوم بالوصف العملي، والتوضيح، والتحليل، وتفسير تعاقب السحنات التي تمت ملاحظتها في الحقل.
d1. Transfer information appropriately, verbally, graphically and in writing, using modern information and communication technologies.	d1- ينقل المعلومات بشكل مناسب، شفهياً وبيانياً وكتابة، باستخدام تكنولوجيات المعلومات والاتصالات الحديثة.
d2. working with others through group design, and Write a report of the different types of clastic rock and their economic importance.	d2 - يعمل مع الآخرين من خلال تصميم المجموعة وكتابة تقرير للأنواع المختلفة من الصخور الفتاتية وأهميتها الاقتصادية.

Course Content محتوى المقرر

Theoretical Aspect خطة تنفيذ الموضوعات النظرية

الرقم Order	الوحدات (الموضوعات الرئيسة) Units	الموضوعات التفصيلية Sub Topics	الأسبوع Week Due	الساعات الفعلية Con. H
1	Introduction to Clastic Sedimentology	Introduction - General plan of the course - Definitions of clastic rock. - Weathering and clastic Textures	Week 1	2
2	Classification, Interpreting of Siliciclastic Sedimentary Rocks	Siliciclastic rocks: Conglomerates, sandstones, mudrocks; clay mineralogy	Week 2	2
3	Processes of Transportation and Sedimentation	• Transport media • The behavior of fluids and particles in fluids • Flows, sediment and bed forms • Waves	Week 3	2

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4	Features of Clastic Rocks	- Concept of grain size analysis. - Textural parameters and their significance. - Particle morphology; shape forms, sphericity, roundness, surface textures and their significance. - Grain fabric: orientation of grains, - Mineralogical and textural maturity	**Week 4**	**2**
5	Diagenesis of Clastic Rocks	- Concepts of diagenesis - Stages of diagenesis - Burial, Lithification and Diagenesis. - Compaction and cementation	**Week 5**	**2**
6	Heavy Mineral and their Uses	- Introduction to Heavy Minerals - Heavy Mineral Separation - Heavy Mineral Assemblage	**Week** 6	2
7	**Mid Term Exam**	Written exam	**Week** 7	2
8	Processes of Sedimentary Structures	- Sedimentary structures and their significance. - Primary and Secondary sedimentary structures. .	**Week** 8	2
		Basic concepts of Paleocurrent analysis (Paleocurrent indicators, Measuring Paleocurrent from • Cross-stratification, Presentation and analysis of directional data)	**Week 9**	2
9	Sedimentary Environments of Clastic Rocks	• Terrestrial Depositional Environments	**Week 10**	2
		• Transitional Depositional Environments	**Week 11**	2
		• Marine Depositional Environments	**Week 12**	2
10	Facies concept and Processes	- (Physical, chemical, & biological) operating in the depositional environment. - lithological variations that characterize clastic reservoir facies	**Week 13**	2
11	Volcaniclastic Sediments	Composition, classification and Diagenesis	**Week 14**	2
12	Review and Summary to the Course	- Clastic reservoir characterization - Revision and Economic Importance of Clastic Rocks	**Week 15**	2
13	Final Exam	Written exam	**Week 16**	2
عدد الأسابيع والساعات الفعلية			**16**	**32**

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Number of Weeks /and Contact Hours Per Semester		

Practical / Training/ Tutorials/ Exercises Aspects — خطة تنفيذ موضوعات الجانب العملي

الرقم Order	موضوعات العملي/ المهام / التمارين Practical/Tutorials/ Exercises Aspects	الأسبوع Week Due	الساعات الفعلية Cont. H
1	NA	-	-
إجمالي الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester		NA	NA

خطة تنفيذ موضوعات الجانب العملي Practical / Training/ Tutorials/ Exercises Aspects

الرقم Order	موضوعات العملي/ المهام / التمارين Practical/Tutorials/ Exercises Aspects	الأسبوع Week Due	الساعات الفعلية Cont. H
1	- Classification and Nomenclature of Clastic Rocks (Looking to Hand Specimen Samples)	Week 1, 2	4
2	- Description of Textures in Clastic Rocks (Clasts and Matrix, Sorting, Clast Roundness, Clast Sphericity & Fabric}	Week 3, 4	4
3	- Granulometric and Clast Shape Analysis {Techniques In Granulometric Analysis & Use of Granulometric Analysis Results}	Week 5, 6	4
4	Practical Mid Term Exam	Week 7	2
5	- Heavy Mineral Analysis { Heavy Mineral Separation & Use of the Analysis Results}	Week 8, 9	4
6	One day field practice observation of Clastic outcrops	Week 10	2
7	- Measuring Paleocurrent from cross-stratification - Presentation and analysis of directional data	Week 11	2
8	- Petrography of clastic rocks in thin sections under the Microscope	Week 12, 13	4
9	Practical Final Exam	Week 14	2
إجمالي الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester		14	28

Teaching Strategies — استراتيجيات التعليم والتعلم

- 1 Lectures
- Class discussion
- Brain storm
- Directed self-study
- Group assignment
- Lab experiments
- Project and Seminar

Tasks and Assignments — الأنشطة والتكليفات

م	التكليف/ الواجب Assignments	نوع التكليف (فردي/ تعاوني)	الدرجة المستحقة Mark	أسبوع التنفيذ Week Due

No				
1	NA	-	-	-
	إجمالي الدرجة Total Score		NA	

Learning Assessment تقويم التعلم

م No	أساليب التقويم Assessment Method	موعد(أسبوع) التقويم Week Due	الدرجة Mark	الوزن النسبي% Proportion of Final Assessment
1	Lecture attendance and class discussion (theoretical)	Weekly	5	3.3%
2	Quizzes (theoretical)	Bi-weekly basis	5	3.3%
3	Mid-Term written exam (theoretical)	Week 7	15	10%
4	Project and Report (theoretical)	Week 10	5	3.3%
5	Final Exam (theoretical)	Week 16	70	46.7%
6	Lab attendance and class activities	Weekly	5	3.3%
7	Exercises and report (practical)	Bi-weekly basis	5	3.3%
8	Mid-Term Exam (practical)	Week 6	10	6.6%
9	Final Exam (practical)	Week 14	30	20%
	Total المجموع		150	100 %

Learning Resources مصادر التعلم

توثق المراجع حسب نظام APA (اسم المؤلف، سنة النشر، اسم الكتاب، دار النشر، بلد النشر).

Required Textbook(s) المراجع الرئيسة(لا تزيد عن مرجعين)

1. Prothero, D. R., and Schwab, F., 2013, Sedimentary Geology (3rd Edition), Freeman Publishers.
2. Hakuyu Okada, Alec Kenyon-Smith, Jr. Robert Dott, and Alex Kenyon-Smith, 2005; The Evolution of Clastic Sedimentology, Dunedin Academic Press Ltd, **ISBN-10:** 1903765498, 252p

Essential References المراجع المساندة

1. Tucker, M.E. (2017). Sedimentary Petrology. An Introduction to the Origin of Sedimentary Rocks. Blackwell Sci. Publs., 3rd Ed., 262 pp.
2. Boggs, S. Jr. (2009). Petrology of sedimentary rocks. Cambridge University Press, 2nd Edition, 600 p.
3. Guilford, C., MacKenzie, W.S. & Adams, A. E..;(2017) Atlas of sedimentary rocks under the microscope, Longman, Harlow, London eBook Published
4. Stow, D., 2005, Sedimentary Rocks in the Field, Academic Press, MA, Mason Publishing ISBN-10: 0-12-369451-5

Electronic Materials and Web Sites *etc.* المصادر الإلكترونية ومواقع الإنترنت

https://en.wikipedia.org/wiki

Course Policies الضوابط والسياسات المتبعة في المقرر

1 Class Attendance حضور الفعاليات التعليمية

- Attendance is compulsory at all scheduled lectures and practical sessions. A student should attend not less than 75 % of total hours of the subject; otherwise he/she will not be able to take the exam and will be considered as exam failure and will be required to retake the course again.

2 Tardy الحضور المتأخر

- For late in attending the class, the student will be initially notified. If he repeated lateness in attending class, he/she will be considered as absent.

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3	**Exam Attendance/Punctuality** ضوابط الامتحان - The student should attend the exam on time. He/she is allowed to attend the exam within half an hour from the beginning of the exam, after that if late he/she will not be permitted to take the exam and will be considered as absent.
4	**Assignments & Projects** التعيينات والمشاريع - Student has to submit all the assignments/reports for checking on time, mostly one week after given the assignment.
5	**Cheating** الغش - In the case of cheating on the exam, the student is considered a failure. It will be referred to a disciplinary council to apply the penalties as stipulated in the Student Affairs Regulations
6	**Plagiarism** الانتحال - If the examination committee proofed a plagiarism of a student, It will be referred to a disciplinary council to apply the penalties as stipulated in the Student Affairs Regulation. The Student will be disengaged from the Faculty according to the university roles, and this should be confirmed from the Student Council Affair of the university.
7	**Other policies** سياسات أخرى - Mobile phones are not allowed to use during a class lecture. It must be closed; otherwise the student will be asked to leave the lecture room. - Mobile phones are not allowed in hall during the examination.