



Course Specification

Diploma

Course Title: **Sedimentary Rocks**

Course Code: **APMQ1203**

Program: **Mining and Quarrying**

Department: **Diploma Department**

College: **The Applied College**

Institution: **Umm Al-Qura University**

Version: **1**

Last Revision Date: **20 February 2025**



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A. General information about the course:

1. Course Identification

1. Credit hours: (2)

2. Course type

A. ☐ University ☐ College ☒ Department ☐ Track ☐ Others
B. ☒ Required ☐ Elective

3. Level/year at which this course is offered: (1 St. Level)

4. Course General Description:

1. Course Description

The course gives an introduction to sedimentary rocks, sedimentary processes. The course commences with an overview of weathering processes and their importance in forming sediments and sedimentary rocks. The following topics will subsequently be covered: sediment transport, depositional environments in which these rocks form, sedimentary textures, mineral composition, classification and formation of the most important sediment types, Stratigraphic concepts are introduced with specific reference to the relationship between sedimentary rock units, and sedimentary basins.

The practical part includes focus on the identification of sedimentary rocks and structures in hand specimens, and how to identify their depositional environment.

5. Pre-requirements for this course (if any):

None

6. Co-requisites for this course (if any):

None

7. Course Main Objective(s):

1. Understand the sedimentary rocks in the context of the dynamics of the geological processes:

The ability of rivers, oceans, winds, and rain runoff to carry the eroding particles consists of fragments and minerals “detritus material”.

2. Major types of sedimentary rocks:

Clastic Sedimentary Rocks, Chemical Sedimentary Rocks, Biochemical Sedimentary Rocks, and Organic Sedimentary Rocks.



3. Clastic Sediments and Sedimentary Rocks:

Their classification and formation processes (weathering, erosion, transportation, deposition, lithification).

4. Textures of Clastic Sedimentary Rocks:

How can we use the texture of the resulting deposits to give us clues to the mode of transport and deposition (sorting, Rounding, etc.).

5. Types of Clastic Sedimentary Rocks:

The various types of clastic sedimentary rocks that result from lithification of sediment (Conglomerates and Breccias. Sandstones, Mudrocks).

6. Biochemical and Organic Sediments and Sedimentary Rocks:

Explains how it originated, rock types produced by this process (Biochemical Limestone, Biochemical Chert, Diatomite, and Coal).

7. Chemical Sediments and Sedimentary Rocks:

Explaining how the weathering process dissolved ions released into water and recombined by chemical precipitation to form minerals that can accumulate to become chemical sediments and chemical sedimentary rocks.

8. Sedimentary Structures:

Explain how the different sedimentary structures are formed (Rhythmic Layering, Cross Bedding, Graded Bedding, Non-sorted Sediment, Ripple Marks, Mudcracks, etc.).

9. Sedimentary Environments:

Describe depositional environment, and how each environment has its own energy regime and sediment delivery, transport and depositional conditions that are reflected in the sediment deposited (Terrestrial “Non-marine” environments and Marine environments).

10. Sedimentology and Stratigraphy:

Explaining the methodology of recording and analyzing sedimentary data in the field.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	100%
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> Traditional classroom E-learning 		
4	Distance learning		

3. Contact Hours (based on the academic semester)





No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)	
Total		

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

1.0	Knowledge and understanding			
1.1	Use precise geological terms in describing and discussing sedimentary structures, textures and processes.	K1	Lectures and Interactive Discussions	Written Exams (Mid-Term and Final Exams), Quizzes.
1.2	Identify the main types of sedimentary rocks such as mudstones, sandstones, conglomerates, limestones and evaporites.	K2	Lectures and Interactive Discussions	Written Exams (Mid-Term and Final Exams), Quizzes.
1.3	Interpret sedimentary processes based on the composition of the rock and sedimentary structures.	K3	Lectures and Interactive Discussions	Written Exams (Mid-Term and Final Exams), Quizzes.
2.0	Skills			
2.1	Identify the sedimentary rock types, Physical properties and textures, sedimentary processes and structures,	S1	Interactive Discussions	Written Exams (Mid-Term and Final Exams), Quizzes
2.2	Identify the depositional environment (i.e. continental; shallow and deep marine).	S3	Interactive Discussions	Written Exams (Mid-Term and Final Exams), Quizzes
2.3	Identify sedimentary deposits that are characteristic of various types of sedimentary basins.	S4	Interactive Discussions	Written Exams (Mid-Term and Final Exams),
3.0	Values, autonomy, and responsibility			
3.1	Work cooperatively in a small group environment, Analyze the petrographic data and relate them to their depositional environments.	V1	Individual and Group Presentations	Presentations



C. Course Content

No	List of Topics	Contact Hours
1.	Principles of sedimentary rocks	2
2.	Siliciclastic sedimentary rocks	2
3.	Carbonate sedimentary rocks	2
4.	Chemical/biochemical sedimentary rocks	2
5.	Carbonaceous sedimentary rocks	2
6.	Sedimentary textures and structures	2
7.	Weathering processes, transportation.	2
8.	Depositional environments and sedimentary basins	2
9.	The diagenetic processes are associated with the genesis of the sedimentary rocks.	2
10.	Field sedimentology, facies and environments.	2
11.	Stratigraphy.	2
12.	Paleontology.	2
13.	Sedimentary basins.	2
14.	Interpret geologic maps with sedimentary sequences.	2
15.	Interpretation of sedimentary environments.	2
Total		30

C.2 Experimental Content

No	List of Topics	Contact Hours
1.	explain what a sedimentary basin is.	2
2.	explain the difference between physical and chemical weathering.	2
3.	explain the connection between weathering, erosion and sediment composition.	2
4.	basic knowledge of principles in fluid dynamics relevant for transport and deposition of sediments.	2
5.	explain how the different sedimentary structures are formed.	2
6-	explain how sediments are transformed into sedimentary rocks.	2
7.	explain the difference between how siliciclastic sediments and carbonate sediments are formed.	2
8.	explain why diagenetic processes operate differently in siliciclastic and carbonate deposits.	2
9.	explain the formation of various carbonate deposits.	2





10.	explain the formation of various evaporite deposits.	2
11.	explain the formation of shales, sandstones and conglomerates.	2
Total		24

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	5	10
2.	Mid-Term Exam	8	20
3.	Presentations	12	10
4.	Homework	All weeks	10
5.	Final Exam	16	50

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	<ul style="list-style-type: none"> USGS (United States Geological Survey): https://www.usgs.gov/faqs/what-are-sedimentary-rocks, Free and authoritative source for geological data, maps, and articles. Textbook: Walker, R.G. & James, N.P (1992) Facies Models: Response to Sea Level Change. QE 651 F25 1992. Textbook: Boggs, S. (2012) Principles of Sedimentology and Stratigraphy. QE 571 B66 2012. Textbook: Prothero, D. & Schwab, F.L. (2013) Sedimentary Geology: An Introduction to Sedimentary Rocks and Stratigraphy. QE 571 P77 2013.
Supportive References	
Electronic Materials	<p>Teaching Earth Science: https://opengeology.org/Mineralogy/7-sedimentary-minerals-and-sedimentary-rocks/.</p> <p>Authoritative source (free) of a Collection of Classroom Activities and Lesson Plans, have an information about sedimentary Minerals and Sedimentary Rocks.</p>
Other Learning Materials	

2. Required Facilities and equipment





Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
Technology equipment (projector, smart board, software)	Data show
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Faculty	Direct (project, HW, Quiz, midterm and final exam)
Effectiveness of Students assessment	Students	Indirect (Student Survey)
Quality of learning resources	Program Coordinator	Direct analysis
The extent to which CLOs have been achieved	Program Coordinator	Direct analysis
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Umm Al-Qura University Council
REFERENCE NO.	851110214476/195605
DATE	18/2/1447

