



**The University of Jordan**

**Accreditation & Quality Assurance Center**

**COURSE Syllabus**

1	Course title	<b>Stratigraphy and Historical Geology</b>
2	Course number	0305201
3	Credit hours (theory, practical)	4 and half Credit hours
	Contact hours (theory, practical)	
4	Prerequisites/corequisites	General Geology (0305101)
5	Program title	Environmental and Applied geology
6	Program code	
7	Awarding institution	
8	Faculty	Faculty of Science
9	Department	Geology
10	Level of course	Bachelor
11	Year of study and semester (s)	Second year, every semester
12	Final Qualification	
13	Other department (s) involved in teaching the course	
14	Language of Instruction	English
15	Date of production/revision	

**16. Course Coordinator:**

Dr. Dr. Abdalla Abu Hamad  
 Office hour: Sunday & Tuesday 10:00-11:00 and Thursday 11:00-12:00 or by appointment.  
 Phone numbers: 962 6 53 555 000, ext. 22255  
 email address: [a.abuhamad@ju.edu.jo](mailto:a.abuhamad@ju.edu.jo)

**17. Other instructors:**

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**18. Course Description:**

Stratigraphy and Historical Geology course is involved directly or indirectly in most aspects of geological studies. This course covers many subjects including the Evolution of stratigraphic classifications; present day classifications; types of lithostratigraphic units; combined successions of strata; sequences: surface outcrops, correlation of strata, unconformities; chronostratigraphic units; Eras and their characteristics: divisions, sediments, fossils; stratigraphy as a tool in: mineral, water, and petroleum exploration; three hours lab each week and field trips are required.

**19. Course aims and outcomes:**

**A- Aims:**

- The course objectives are to provide an overview of Stratigraphy and Historical Geology. The student should have an understanding of the principles of stratigraphic analysis, correlation, and dating methods and how sedimentary facies and fossils are used to recreate past environments and determine the history of life on Earth. In addition, the course will discuss the Structure of the Earth, Continental Drift, and Plate Tectonics. You will study the geologic time scale and their subdivision (Eons, eras and their characteristics: subdivisions, sediments, fossils, climate, and mountain building process). The student will learn how identify; organize; describe; the Stratigraphic units, and Lithostratigic units following international standards. In this course you will describe the general history of the Jordan through geologic time, with focus on orogenic events, sediments, climate, fossils and the rock record.

**B- Intended Learning Outcomes (ILOs):** Upon successful completion of this course students will be able to ...

- Demonstrate an understanding of the following concepts and principles: unconformities, geologic time, dating methods, evolution, extinction, Structure of the Earth, continental drift, plate tectonics, mountain building (Orogeny), sedimentary facies and sequence stratigraphy & Sea level.
- Explain the concept of geologic time
- Describe sedimentary processes and their use in describing Earth history
- Understand stratigraphic units, principles of stratigraphy and their applications.
- Correlate the stratigraphic sections from different locations.
- Date the beds with included fossils and divide them in biozones.
- Know the geologic time scale and understand the background and history of its formation, Eons, eras and their characteristics: subdivisions, sediments, fossils.
- Interpret past depositional environments using sedimentary rocks and fossils.
- Recognize the relationships between life (first life, evolution of life, extinctions) and plate tectonics.
- Use stratum contour to determine the orientation of a geological surface and be able to construct vertical cross section.
- Summarize how Earths continents and ocean evolve over geological time, and relate this to specific evidence preserved in the rock record.
- Describe the general history of the Jordan through geologic time, with focus on orogenic events, sediments, climate, fossils and the rock record.

- 20. Topic Outline and Schedule:

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Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference

Introduction and Principles of Stratigraphy	1	Dr. Abdalla Abu Hamad	Introduction to stratigraphy and historical geology. Stratigraphy and Principles of Stratigraphy		<b>Chapter 4</b> Wicander& Monroe (2010). <b>Chapters 1 and 19</b> , Nichols (2009).
Lithostratigraphy	2		Lithostratigraphy: environments, correlation, and Lithostratigraphic units		Nichols (2009)
Biostratigraphy	3		Biostratigraphy: Fossils, stratigraphy, and correlation, marine and terrestrial fossil groups used in biostratigraphy		<b>Chapter 5</b> Wicander& Monroe (2010).Chapter 20, Nichols (2009)
Chronostratigraphy	4		Chronostratigraphy Dating and Correlation Techniques		Chapter 8, Clarkson, (1998) and Benton & Harper (2009)
Unconformities	5		Unconformity surfaces types and relative dating		Chapter 8, Clarkson, (1998)
Sequence Stratigraphy & Sea level	6		Sedimentary Facies types, transgression and regression		<b>Chapter 6</b> Wicander& Monroe (2010). Chapter 9, Clarkson, (1998). Chapter 23, Nichols (2009)
Structure of the Earth, Plate Tectonics	7		Structure of the Earth, Continental Drift and Plate Tectonics		<b>Chapter 2&amp;3</b> Wicander& Monroe (2010). <b>Chapter 7</b> Prothero & Dott (2004)/ <b>Chapter 12, Chapter 11</b> Clarkson (1998)
Historical geology and Orogeny	8		A Geological History of the Earth: Supercontinents (Rodinia and Pannotia). Mountain building (Orogeny): Caledonian, Hercynian, and Alpine.		Prothero & Dott (2004) .Chapter 7 Prothero & Dott (2004)
Evolution and Extinction	9		The origin of life and major events in the history of life		Chapter 11, Clarkson, (1998), and Benton & Harper (2009). Chapter 6, Armstrong & Brasier. (2005).
Geologic time scale	10		Eons, eras and their characteristics: subdivisions, sediments, fossils, paleoclimate, tectonic events (Paleozoic, and Mesozoic)		<b>Chapters 4&amp; 10-15</b> Wicander& Monroe (2010). Chapters 14-17, Armstrong & Brasier. (2005).
Cenozoic era, Applications of Stratigraphy	11		Life and fossils of Cenozoic. Applications of Stratigraphy:		<b>Chapters 16-19</b> Wicander& Monroe (2010).

			mineral, water, and petroleum exploration;		Chapters 20&21, Armstrong & Brasier. (2005). Benton & Harper (2009) Chapter 20, Nichols (2009)
Introduction to geology of Jordan	12		General description of the Eras and their paleoenvironments, sediments, and fossils contents in Jordan		Bandel, Salameh (2013)& Abed

### 21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

- Lecture by teacher, Use of slides, PowerPoint.
- Class project Presentation by students.
- Problem solving or case studies.
- Use of chalkboard by instructor as aid in teaching.
- Discussion Groups by students.
- Field trips: students reports by individuals or student group reports.
- Use of diagrams, graphs, and charts by instructor in teaching.
- Textbook assignment.
- Laboratory exercise and student construction of diagrams, chart, maps.

### 22. Evaluation Methods and Course Requirements:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

Written exams, assignment, Problem solving, written reports, oral exam (seminar presentation).

### 23. Course Policies:

#### A- Attendance policies:

Class attendance is highly recommended. Each student will be expected to attend all classes (lecture or lab). You will be permitted ONE EXCUSED absence from a lab. If you miss a lecture or lab, you are still responsible for any assignments that were assigned at that time. Absences from lectures or labs must provide a written excuse. I reserve the right to drop any student from the class who has unexcused absences based on University attendance policy.

#### B- Absences from exams and handing in assignments on time:

Attendance is required for both lecture and lab exams. There will be no make-ups for unexcused absences.

Absences from exams will not be excused except for those causes approved by University policy. Only those students excused for these causes will be eligible for a make-up exam.

- Students are strongly encouraged to attend all lectures and laboratory exercises. Lab exercises can be completed only during lab periods and materials may not be available outside these hours. Again, Students who miss an exam must provide a written excuse in order to receive a makeup assignment.

**C- Health and safety procedures:**

**D- Honesty policy regarding cheating, plagiarism, misbehavior:**

I realize it is very tempting and easy to plagiarize assignments. However, I expect that all assignments will be in your own words and when you paraphrase an article, that article will be cited. As easy as it is to plagiarize it is just as easy to catch. Any instances of Plagiarism or cheating will result in a 0 on the assignment or exam and will be reported to the dean's office.

If a student (or students) disrupts the class or disturbs the learning of the other students, he/she will be issued a warning. If the behavior continues, the instructor has the right to talk and write officially to the dean's office.

**E- Grading policy:** I will use a variety of methods to assess your performance in this course. Graded work will include lecture and lab exams, and seminar presentation. Formula for grading will be as follows:

Midterm	30%
Final	50%
Lab Exams & seminar presentation	20%
Total course grads	100 %

**24. Required equipment:**

Lab materials that may be required for some labs are medium pencils, a few coloured pencils, protractor, ruler, calculator, and a few sheets of centimetre-scale graph paper and a few sheets of tracing paper  
Most labs must be handed in at the end of the lab period. Other labs (we will specify) can be handed in at the beginning of the lab session in the following week.

**2. References:**

**A- Required books:**

- The Evolution of the Earth: Donald R. Prothero & Robert H. Dott, Jr., 7<sup>th</sup> ed., 2004, MacGraw-Hill, New York.  
**"This book will be the authorized text book in our Course"**
- Reed Wicander, James S. Monroe, 2010. Historical Geology: Evolution of Earth and Life Through Time, Sixth Edition. USA.

- Nichols, G. 2009. Sedimentology and Stratigraphy. 2nd ed. Wiley-Blackwell.
- D. Miall, A. 2010. The Geology of Stratigraphic Sequences. Springer Heidelberg Dordrecht London, New York.
- Donald R. Prothero & Robert H. Dott, Jr., 7<sup>th</sup> ed., 2004, The Evolution of the Earth: MacGraw-Hill, New York.
- Armstrong, H.A. and Brasier, M.D. 2005. Microfossils, 2<sup>nd</sup> edition, Blackwell Publishing, Oxford, 296 pp. Copestake, P. 1993.
- Bandel, K., Salameh, E. 2013, Geologic Development of Jordan - Evolution of its Rocks and Life. The University of Jordan Press, 276 p.
- Doyle, P. 1994 The key to earth history: an introduction to stratigraphy

**B- Recommended books, materials, and media:**

Recommended books:

- Earth System History. Fourth Edition. by Steven M. Stanley & John A. Luczaj (2015, W.H. Freeman) ISBN-13 978-1429255264
- Levin, H. L. *The Earth Through Time*, 8th ed. New York: Wiley, 2005

**Recommended materials:** Models of sequence stratigraphy, depositional facies, stratifications and other sedimentary structures.

**2. Additional information:**

Name of Course Coordinator: Dr. Abdalla Abu Hamad      Signature: ----- Date: 31 May  
2015

Head of curriculum committee/Department: ----- Signature: -----

Head of Department: ----- Signature: -----

Head of curriculum committee/Faculty: ----- Signature: -----

Dean: ----- -Signature: -----

Copy to:

Head of Department  
Assistant Dean for Quality Assurance  
Course File