

The University of Jordan
Accreditation & Quality Assurance Center

Course Syllabus

Biogeochemistry (0305451)

1	Course title	Biogeochemistry
2	Course number	0305451
3	Credit hours (theory, practical)	3
	Contact hours (theory, practical)	3
4	Prerequisites/corequisites	Principles of geochemistry 0305351
5	Program title	B.Sc. Program in Environmental and applied Geology
6	Program code	
7	Awarding institution	The university of Jordan
8	Faculty	School of science
9	Department	Geology
10	Level of course	4 th year
11	Year of study and semester (s)	First semester 2017/2018
12	Final Qualification	B.Sc.
13	Other department (s) involved in teaching the course	None
14	Language of Instruction	English
15	Date of production/revision	October 2018

16. Course Coordinator:

Office numbers, office hours, phone numbers, and email addresses should be listed.

Dr. Saber A. Al-Rousan

Tel. +962-6-5355000, Ext. 22253

Mobile:- 0777358655

Office hours:- Sunday, Tuesday 11:00-12:00

Email:- s.rousan@ju.edu.jo

17. Other instructors:

Office numbers, office hours, phone numbers, and email addresses should be listed.

NA

18. Course Description:

An introduction to biogeochemical cycles in the environment. Discusses processes and reactions governing cycles in the atmosphere, lithosphere, terrestrial ecosystems, freshwater wetlands and lakes, river estuaries, and the oceans. Outlines the global cycles of water, carbon, nitrogen, phosphorus, and sulfur. Group discussions will incorporate current topics in anthropogenic alterations of natural cycles that lead to ecosystem degradation.

19. Course aims and outcomes:

<p>Aims: The main aims of this course are: To introduce students to the concepts and important topics in terrestrial biogeochemistry. Students have to understand Earth as a chemical system and to explain and identify the various chemical reactions (in the atmosphere, lithosphere, hydrosphere, and biosphere) that are important in the biogeochemical cycles on the Earth. Students have to develop an interdisciplinary appreciation for how the Earth's chemistry is influenced by physical, biological, and geological processes specially in context of the global climate changes.</p> <p>B- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to ...</p> <ol style="list-style-type: none"> 1. Define the basic terms and concepts related to biogeochemistry. 2. Understand the origin of elements and the evolution of solar system and earth. 3. Describe the origin of life and the evolution of the metabolic pathways. 4. Explain the origin of atmosphere and oceans on earth. 5. Explain the structure and composition of the atmosphere. 6. Identify biogeochemical reaction in the atmosphere. 7. Understand rock weathering and soil formation mechanism. 8. Describe soil chemical reactions and soil development. 9. Describe the major geochemical cycles on Earth (water, carbon, nitrogen, phosphorus, sulphur and mercury). 10. Understand the relationships between the geochemical cycles and the main environments on Earth. 11. Evaluate the impacts of human activities and climate changes on these geochemical cycles.
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20. Topic Outline and Schedule:

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
Introduction: what is biogeochemistry?, understanding the Earth as a chemical system.	1		1		Chapter 1: Schlesinger, W.H. & Bernhardt, E.S. (2013)
Origins: element, solar system and earth, atmosphere and oceans, life and metabolic pathways.	2, 3		1, 2, 3, 4		Chapter 2: Schlesinger, W.H. & Bernhardt, E.S. (2013)
The Atmosphere: structure, circulation and composition, biogeochemical reactions, atmospheric deposition, models of the atmosphere and global climate.	4, 5		1, 4, 5, 6		Chapter 3: Schlesinger, W.H. & Bernhardt, E.S. (2013)
The Lithosphere: rock weathering, soil chemical reactions, soil development and weathering rates.	6, 7		1, 7, 8		Chapter 4: Schlesinger, W.H. & Bernhardt, E.S. (2013)
The biosphere: The carbon cycle of terrestrial ecosystems, photosynthesis, respiration, net primary production, remote sensing of primary production and biomass, soil organic matter, effects of global change.	8, 9		1, 9, 10		Chapter 5 & 6: W.H. Schlesinger & E.S. Bernhardt (2013)
The global water cycle: The global water cycle, models of the					Chapter 10: Schlesinger, W.H. &

hydrologic cycle, the history of the water cycle, the water cycle and climate change.	10, 11		1, 9, 10, 11		Bernhardt, E.S. (2013)
The global carbon cycle: Modern carbon cycle, temporal perspectives of the carbon cycle, atmospheric methane, carbon monoxide, synthesis: linking the carbon and oxygen cycles.	12, 13		1, 9, 10, 11		Chapter 11: Schlesinger, W.H. & Bernhardt, E.S. (2013)
The global cycles of nitrogen and phosphorus: Global nitrogen cycle, temporal variations in the global nitrogen cycle, nitrous oxide, the global phosphorus cycle, linking global biogeochemical cycles.	13, 14		1, 9, 10, 11		Chapter 12: Schlesinger, W.H. & Bernhardt, E.S. (2013)
The global cycles of sulphur and mercury: The global sulphur cycle, the global mercury cycle.	15-16		1, 9, 10, 11		Chapter 13: Schlesinger, W.H. & Bernhardt, E.S. (2013)

21. Teaching Methods and Assignments:

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

22. Evaluation Methods and Course Requirements:

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

First exam
Second exam
Homework's and class participation and
Final exam

23. Course Policies:

Attendance policies:

Attendance is required per UJ regulations (Attendance is compulsory and not to exceed (with acceptable excuse only) 15% of the total lectures, student will automatically be deprived if he exceeds this limit).

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

Failure in attending a course exam other than the final exam will result in zero mark unless the student provides an official acceptable excuse to the instructor who approves a makeup exam.

Failure in attending the final exam will result in zero mark unless the student presents an official acceptable excuse to the Dean of his/her faculty who approves an incomplete exam, normally scheduled to be conducted during the first two weeks of the successive semester.

C- Health and safety procedures:

NA

D- Honesty policy regarding cheating, plagiarism, misbehavior:

Based on the UJ regulations (There will be no leniency or tolerance with regard to cheating and system bypass issues, necessary actions will be taken by department committee).

E- Grading policy:

First exam 20%

Second exam 30%

Homework's and class participation and 10%

Final exam 40%

F- Available university services that support achievement in the course:

Main library, computer rooms with internet access.

24. Required equipment:

Laptop computer

Data show in the classroom

White board in the classroom

25. References:

Required book (s), assigned reading and audio-visuals:

Schlesinger, W.H. and Bernhardt E. S. (2013). *Biogeochemistry: An Analysis of Global Change*. 3rd Edition. Academic Press, New York.

Recommended books, materials, and media:

Karolina J. (2016) *Biogeochemistry*. Syrawood Publishing House, USA.

Bashkin, V.N. (2002). *Modern Biogeochemistry*. Kluiver Academic Publishers, Netherlands.

26. Additional information:

Name of Course Coordinator: -----Signature: ----- Date: -----

----- 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