Form: Course Syllabus	Form Number	EXC-01-02-02A
	Issue Number and Date	2/3/24/2022/2963 05/12/2022
	Number and Date of Revision or Modification	2023/10/15
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	Number of Pages	07

1.	**Course Title**	**Subsurface Geology**
2.	**Course Number**	**0305911**
3.	**Credit Hours(Theory, Practical)**	**3**
	Contact Hours (Theory, Practical)	**3 theoretical**
4.	**Prerequisites/Corequisites**	-
5.	**Program Title**	**PhD in Geology**
6.	**Program Code**	**0305**
7.	**School/ Center**	**Science**
8.	**Department**	**Geology**
9.	**Course Level**	
10.	**Year of Study and Semester (s)**	
11.	**Other Department(s) Involved in Teaching the Course**	None
12.	**Main Learning Language**	English
13.	**Learning Types**	**X☐Face to face** learning☐Blended ☐Fully online
14.	**Online Platforms(s)**	☐Moodle ☐Microsoft Teams
15.	**Issuing Date**	2025/7/2
16.	**Revision Date**	

17. Course Coordinator:

Name: **Omar Rimawi** Contact hours:
Office number: **102**Phone number: **00962 799010003**
Email: **rimawiom@ju.edu.jo**

18. Other Instructors:

None

19. Course Description:

As stated in the approved study plan. **Subsurface geological investigations for petroleum, water, minerals and constructions, techniques for exploration well and supervision, combining of subsurface and structural data, laboratory and practical applications, quantitative analysis for some electrical well logs and their use in drilling deep oil and water wells.**

20.ProgramStudent Outcomes (SO's):(To be used in designing the matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program)

1. Students will show advanced expertise of geological standards, theories, and analytical techniques, equipping them to clear up complicated geological problems.
2. Students will develop the capability to design, conduct, and critically examine geological research, using quantitative and qualitative information evaluation to draw significant conclusions applicable to enterprise and academia.
3. Students will gain arms-on enjoy in fieldwork settings, applying advanced geological techniques and tools to investigate geological phenomena and conduct resource assessments.
4. Students will be able to really and efficaciously communicate complex geological data in written, oral, and visual formats to various audiences, which includes technical and non-technical stakeholders.
5. Students will demonstrate recognition of moral considerations and environmental impacts in geological workespecially, which deals with oil, natural gas, and mineral resources exploration techniques that align with sustainable and ethical practices.

PILO's	*National Qualifications Framework Descriptors*		
	Competency (C)	Skills (B)	Knowledge (A)
1.	☒	☒	☒
2.	☒	☒	☒
3.	☒	☒	☒
4.	☒	☒	☒
5.	☒	☒	☒

21. Course Intended Learning Outcomes (CLO's): (Upon completion of the course, the student will be able to achieve the following intended learning outcomes)

1. To know and analyze the relationships between regional and local geology to demonstrate the subsurface geological succession in the area.
2. To know and analyze the relationships between stratigraphyin the different nearby countries.
3.To understand the overall frame and the application of stratigraphic and sedimentary principles which govern the actual situation in adjacent countries.
4. To identify the geological problems associated with the oil and natural gas in Jordan and the nearby countries.
5. Apply their knowledge to Jordan territories and evaluate the possibilities of the presence of oil and natural gasin Jordan.

Course CLOs	**The learning levels to be achieved**					
	Remembering	**Understanding**	**Applying**	**Analysing**	**evaluating**	**Creating**
1	**X**	**X**				
2	**X**	**X**				
3	**X**	**X**				
4			**X**	**X**	**X**	**X**
5			X	X	X	X
6			X	X	X	X

22. The matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program:

Program SO's / Course CLO's	SO (1)	SO (2)	SO (3)	SO (4)	SO (5)	SO (6)	**Descriptors**		
CLO (1)	X	X	X	X	X		A	B	C
CLO (2)	X	X	X	X	X		☒	☒	☒
CLO (3)	X	X	X	X	X		☒	☒	☒
CLO (4)	X	X	X	X	X		☒	☒	☒
CLO (5)	X	X	X	X	X		☒	☒	☒
CLO (6)	X	X	X	X	X		☒	☒	☒

In this, the Ph.D. students will adopt their knowledge accumulated from their previous studies in the BSC and Master Program and probably from their work to apply in the searching and investigation the different terrains for oil, natural gas and mineral resources in any place.

Their accumulated knowledge's deal with general geology, stratigraphy, geophysics and other fields studied before to looking for Oil, Natural Gas and Mineral Deposits.

23. Topic Outline and Schedule:

Week	Topic	CLO/sLinked to the Topic	Learning Types (Face to Face/Blended/ Fully	Platform Used	Synchronous / Asynchronous	Evaluation Methods	Learning Resources
1	Introduction To Subsurface Geology	1					
2	Precambrian Geology	2	Face to face				
3+	The Nature of Petroleum – Chemistry and Properties Natural Carbon Bearing Compounds Physical Properties of Alkanes API gravity and Some Hydrocarbon Compounds Methane in Natural Gas	3	Face to face				
4+5							
6+	The Nature of Petroleum Chromatograms Chromatograms of Gas and Oil Oil through time Petroleum accumulation Categories of hydrocarbon accumulation and sources	3					
7+8			Face to				

	Conventional and Nonconventional hydrocarbons and reservoirs Five elements of a conventional petroleum accumulation Conventional / discrete vs unconventional/ continuous hydrocarbon accumulations	3	face				
9	Typical pressure and temperature conditions in sedimentary basins Pressure regimes from onshore to offshore						
10+11	Paleogeothemometric indicators and organic diagenesis Depth – density and mobility of salt Heat flow, thermal conductivity, geothermal gradient and subsurface temperatures		Face to face				
		4 + 5					
12+13 +14	The smaller scale subsurface environment of petroleum: Lithology and Hydrology Rocks relevant to petroleum: Hydrology and rheology Reservoirs and seals Origins of unconventional accumulations Categorization of pores in sedimentary rocks I Categorization of pores in sedimentary rocks II Vertical segregation of oil reservoirs		Fac e to face				

24. Evaluation Methods:

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

Evaluation Activity	Mark	Topic(s)	CLO/s Linked to the Evaluation activity	Period (Week)	Platform
Midterm Exam	25	Introduction To Subsurface Geology. Precambrian Geology. The Nature of Petroleum – Chemistry and Properties Natural Carbon Bearing Compounds	1,2,3	5th week	Class Room
Students Activities: Project, problem solve, field application, seminar	35	Physical Properties of Alkanes API gravity and Some Hydrocarbon Compounds Methane in Natural Gas The Nature of Petroleum Chromatograms Chromatograms of Gas and Oil Oil through time	3,4,5		Class Room
Final exam	40	Typical pressure and temperature conditions in sedimentary basins Pressure regimes from onshore to offshore Paleogeothemometric indicators and organic diagenesis Depth – density and mobility of salt Heat flow, thermal conductivity, geothermal gradient and subsurface temperatures The smaller scale subsurface environment of petroleum: Lithology and Hydrology Rocks relevant to petroleum:	1,2,3,4,5	16th	Class Room

		Hydrology and rheology Reservoirs and seals Origins of unconventional accumulations Categorization of pores in sedimentary rocks I Categorization of pores in sedimentary rocks II Vertical segregation of oil reservoirs			

25.Course Requirements:

(e.g.: students should have a computer, internet connection, webcam, and account on a specific software/platform…etc.):

26. Course Policies:

A- Attendance policies: **University regulation**

B- Absences from exams and submitting assignments on time: **University regulation**

C- Health and safety procedures:

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

E- Grading policy: May subjected to changes (depends on the overall results)

60- 64 C

65- 69 C+

70- 74 B-

75- 79 B

80- 84 B+

85- 89 A-

90-100 A

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

27. References:

A- Required book(s), assigned reading and audio-visuals: Subsurface Geology Literature

28. Additional information:

Name of the Instructor or the Course Coordinator: **Prof. Dr. Omar Abdelkarim Rimawi**	Signature: ……..……	Date: ……..……
Name of the Head of Quality Assurance Committee/ Department ……	Signature: ……..……	Date: ……..……
Name of the Head of Department ……**Dr.Bety Saqarat**	Signature: ……..……	Date: ……..……
Name of the Head of Quality Assurance Committee/ School ofScience **Prof. Emad A. Abuosba**	Signature: ……..……	Date: ……..……
Name of the Dean or the Director **Prof. Mahmoud I. Jaghoub**	Signature: ……..……	Date: ……..……