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	
	Deans Council Approval Decision Number	2/3/24/2023
	The Date of the Deans Council Approval Decision	23/01/2023
	Number of Pages	06

1.	**Course Title**	Geophysics
2.	**Course Number**	0305771
3.	**Credit Hours(Theory, Practical)**	3 theoretical
	Contact Hours (Theory, Practical)	--------
4.	**Prerequisites/Corequisites**	-----
5.	**Program Title**	M.Sc. In Geology Thesis track
6.	**Program Code**	0305
7.	**School/ Center**	Science
8.	**Department**	Geology
9.	**Course Level**	Graduate
10.	**Year of Study and Semester (s)**	First Semester/ 2024/2025
11.	**Other Department(s) Involved in Teaching the Course**	-----
12.	**Main Learning Language**	English
13.	**Learning Types**	■Face to face learning ☐Blended ☐Fully online
14.	**Online Platforms(s)**	☐Moodle ☐Microsoft Teams
15.	**Issuing Date**	24/11/2024
16.	**Revision Date**	

17. Course Coordinator:

Name: Hani R. Al Amoush
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18. Other Instructors:

None

19. Course Description:

As stated in the approved study plan.

Seismic methods and its importance in exploration, analysis and interpretation of seismic refraction data, constant and variable velocity models. Processing and interpretation of reflection data, preparation of seismic & geologic cross-sections. Gravity methods & its importance in exploration, Gravitational effect of subsurface bodies and models, separation of anomalies. Electrical methods and its importance in exploration, quantitative interpretation of resistivity data. Magnetic methods and its importance, qualitative & quantitative interpretation.

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.

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.

6. Students will understand the importance of ongoing professional development and demonstrate a proactive method to stay updated on new studies, technological advancements, and industry traits in geology.

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. The students should understand and apply the international stratigraphic codes (ISC) for any stratified rocks.
2. The students should be able to differentiate between stratigraphical subdivisions and when each subdivision should be applied for a specific rock sequence.
3. The students should be able to apply stratigraphic analysis and lithologic correlation task for any rock sequence or core samples.
4. Able to apply what they learn from the course at field.
5. Able to write, analyze, propose and share some stratigraphical data with others.

Course CLOs	The learning levels to be achieved					
	Remembering	**Understanding**	**Applying**	**Analysing**	**evaluating**	**Creating**
1		**X**	**X**			

2		**X**	**X**	**X**		
3		**X**	**X**	**X**		
4		**X**	**X**	**X**	**X**	
5			X	X	X	

2. 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)	SO (7)	SO (8)
CLO (1)	X	X		X		X		
CLO (2)	X	X		X		X		
CLO (3)	X	X		X		X		
CLO (4)	X	X		X		X		
CLO (5)	X	X		X		X		

23. Topic Outline and Schedule:

Week	Lecture	Topic	CLO/sLinked to the Topic	Learning Types (Face to Face/Blended/ Fully Online)	Platform Used	Synchronous / Asynchronous	Evaluation Methods	Learning Resources
1	1.1 1.2 1.3	Introduction to Geophysics, branches of Geophysics, its relation with other sciences	1	Face to Face			Assign ments	**Dobrin**, **M.B. & Savit, C.H. (1988)** *Introduction to Geophysical Prospecting* (4th edn). McGraw Hill, New York. **Telford**, **W.M., Geldart, L.P. & Sheriff, R.E. (1990)** *Applied Geophysics*, 2nd edn. Cambridge University Press Cambridge **Reynolds, J.M (1997)** *An*

								Introduction to Applied and Environmental Geophysics. Wiley, Chichester.
2	2.1 2.2 2.3	Importance of Geophysics in oil exploration, classification of geophysical methods	2	Face to Face			Problem set	
3	3.1 3.2 3.3	Seismic methods, Refraction and Reflection Principles, Govern laws, comparison between refraction and reflection						
4	4.1 4.2 4.3	Seismic Refraction Method: Critical Refraction, Total arrival time due to two horizontal discontinuities, Three layers case, Fault Case, Derivation Total time equations using Ray path geometry and General equation, Exercises and Assignments						
5	5.1 5.2							

	5.3	Derivation of Travel Time equations Due to Dipping Layer, Limitations of Seismic Refraction method, Interpretation methods, delay times, Plus-minus methods				
6	6.1	Seismic Reflection method, principle, govern laws, Travel time equation, NMO, processing of seismic reflection data, Acoustic Impedance, Coefficient of Reflection, Transmission coefficient				
	6.2					
	6.3					
7	7.1	Gravity methods, Introductions, application, governs law, Gravity acceleration and factors affecting, Newton's law, Potential Field,				
	7.2					
	7.3					
8	8.1	Gravity measurements, absolute and relative gravity, gravity units, gravity data reductions, gravitational effects due to	2-3	Face to Face		
	8.2					
	8.3					

		different geometrical shapes, Exercises and Assignments						
9	9.1	Magnetic methods, Introduction, importance and applications, governs law, earth's magnetic field, Time variations in magnetic fields,	2-3					
	9.2							
	9.3							
10	10.1							
	10.2							
	10.3							
11	11.1							
	11.2							
	11.3							
12	12.1	Potential fields, instrumentation, data collection, reduction and data analyses, Interpretation, quantitative and qualitative interpretation techniques. Exercises and Assignments	4-5	Face to Face			Exercises	
	12.2							
	12.3							
13	13.1	Electrical Resistivity method, Introduction, Principle, current flows in homogeneous media, single electrode, two electrical electrode state, Field Techniques Field	4-5	Face to Face				
	13.2							
	13.3							
14	14.1							
	14.2							
	14.3							

15	15.1 15.2 15.3	electrode layout, electrical electrode configurations, Schlumberger and WENNER configurations, square array, reciprocal-schlumberger and many other configurations. Data collection, analyses processing and Interpretation, using different modeling codes, Exercises and assignments **Electromagnetic methods: GPR,** principles, Field techniques, data collection, data processing and analyses, Data interpretation**.** **TDEM**: Principles, Governs Law, Data collection, Data analyses and processing Interpretations, Applications. MASW: Principles and Theory data collection, data processing applications, case studies, data Interpretation.						

		Exercises and Assignments.						

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	30				
Students Activities: Project, problem solve, field application, seminar	30				
Final exam	40				

25.Course Requirements:

(e.g.: students should have a computer, internet connection, …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:

- **Reynolds, J.M (1997)** *An Introduction to Applied and Environmental Geophysics*. Wiley, Chichester.
- **Telford**, **W.M., Geldart, L.P. & Sheriff, R.E. (1990)** *Applied Geophysics*, 2nd edn. Cambridge University Press Cambridge
- **Dobrin**, **M.B. & Savit, C.H. (1988)** *Introduction to Geophysical Prospecting* (4th edn). McGraw Hill, New York.

B-Recommended books, materials,and media:

28. Additional information:

Lectures notes, Assignments

Name of the Instructor or the Course Coordinator: **Prof. Hani Al Amoush**	Signature: **Hani Al Amoush**	Date: **25-3-2025**
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: ……