

مواصفات مقرر: علم الزلازل

Course Specification of: Seismology

المعلومات العامة عن المقرر General information about the course					
1.	اسم المقرر Course Title	علم الزلازل Seismology			
2.	رمز المقرر ورقمه Course Code and Number	GEOS 457			
3.	الساعات المعتمدة للمقرر Credit Hours	الساعات المعتمدة Credit Hours			الإجمالي Total
		محاضرات Lecture	عملي Practical	سمنار/تمارين Seminar/Tutorial	
		2	1	-	3
4.	المستوى والفصل الدراسي Study Level and Semester	4 th level, 1 st semester			
5.	المتطلبات السابقة للمقرر (إن وجدت) Pre-requisites (if any)	PNR 213			
6.	المتطلبات المصاحبة (إن وجدت) Co-requisites (if any)	-			
7.	البرنامج الذي يدرس له المقرر Program(s) in which the course is offered	Bachelor of Geosciences (Geophysics Track)			
8.	لغة تدريس المقرر Language of teaching the course	English/Arabic			
9.	نظام الدراسة Study System	Academic year of two semesters			
10.	مكان تدريس المقرر Location of teaching the course	Faculty of Petroleum and Natural Resources			
11.	اسم معد (و) مواصفات المقرر Prepared by	Assoc.Prof. Ahmed Alaydrous			
12.	تاريخ اعتماد مجلس الجامعة Date of Approval	2020			

وصف المقرر Course Description	
وصف المقرر بالإنجليزية	وصف المقرر بالعربية
<p>This course aims to provide the student with:</p> <ul style="list-style-type: none"> - The Interior structure of the earth. - The seismicity map of the world and its relation to global tectonics. - Determination of earthquake size in terms of magnitudes and intensity. - Assessment of seismic hazard. 	<p>يهدف هذا المقرر إلى تزويد الطالب بما يلي:</p> <ul style="list-style-type: none"> - البنية الداخلية للأرض. - خريطة الزلازل للعالم وعلاقتها بالتكتونية العالمية. - تحديد حجم الزلازل من حيث شدته وقوته. - تقييم مخاطر الزلازل.
مخرجات تعلم المقرر Course Intended Learning Outcomes (CILOs)	
After completing the course, the student will be able to:	بعد الانتهاء من دراسة المقرر سوف يكون الطالب قادراً على أن:



a1.	Describe rock types and materials forming the interior earth structure.	يوصف أنواع ومواد الصخور التي تشكل بنية الأرض الداخلية.	- a1
a2.	Define earthquakes and know their causes and types.	يعرف الزلازل ومعرفة أسبابها وأنواعها	- a2
b1.	Discuss the subject-related theories, concepts and principles of earthquake seismology.	يناقش النظريات والمفاهيم والمبادئ المتعلقة بعلم الزلازل.	- b1
b2.	Distinguish between earthquake magnitude and intensity.	يُميِّز بين شدة الزلازل وقوته.	- b2
c1.	Determine earthquake parameters (location, depth, magnitude).	تحديد معاملات الزلازل (الموقع والعمق والقوة).	- c1
c2.	Draw seismicity maps and using (GIS) for mapping and presenting earthquakes data.	يرسم خرائط الزلازل باستخدام (GIS) لرسم خرائط وتقديم بيانات الزلازل.	- c2
d1.	Interpret seismological data in team works, each overcoming specific problems and uncertainties.	تفسير البيانات الزلزالية بشكل جماعي، كل عضو يتغلب على مشاكل معينة أو عدم يقين.	- d1
d2.	Investigate prior work and references about earthquakes	يبحث في الأعمال السابقة والمراجع حول الزلازل	- d2

مواصلة مخرجات تعلم المقرر مع مخرجات التعلم للبرنامج: Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)			
مخرجات التعلم المقصودة من المقرر (Course Intended Learning Outcomes)		مخرجات التعلم المقصودة من البرنامج (Program Intended Learning Outcomes) (تكتب جميع مخرجات البرنامج كما هي رمزا ونصا)	
a1	Describe rock types and materials forming the interior earth structure.	A1	Demonstrate knowledge and understanding of geological-specific theories, paradigms, concepts and principles, in addition to general literature and basic science
a2	Define earthquakes and know their causes and types.	A1	
b1	Discuss the subject-related theories, concepts and principles of earthquake seismology.	B1	An ability to link synthesized geological data on a range of spatial and temporal scales to allow for scientific interpretations.
b2	Distinguish between earth magnitude and intensity.	B3	Communicate geological information concisely and accurately using written, visual, and verbal means appropriate to the situation.
c1	Determine earthquake parameters (location, depth, magnitude).	C5	An ability to collect various geological data, integrate, scientifically interpret, and report them.
c2	Draw seismicity maps and using (GIS) for mapping and presenting earthquakes data.	C5	
d1	Interpret seismological data in team works, each overcoming specific problems and uncertainties.	D2	Demonstrate the necessary skills of practicing responsible and personal characteristics with discipline, and ability in making decision.
d2	Investigate prior work and references about earthquakes	D2	

مواصلة مخرجات التعلم باستراتيجيات التعليم والتعلم والتقويم Alignment of CILOs to Teaching and Assessment Strategies			
أولاً: مواصلة مخرجات تعلم المقرر (المعارف والفهم) باستراتيجية التعليم والتعلم والتقويم: First: Alignment of Knowledge and Understanding CILOs			
مخرجات المقرر/ المعرفة والفهم Knowledge and Understanding CILOs		استراتيجية التعليم والتعلم Teaching Strategies	استراتيجية التقويم Assessment Strategies
a1 -	Describe rock types and materials forming the interior earth structure.	Interactive Lectures Discussion Case study	Examinations, Assignments, Oral presentations
a2 -	Define earthquakes and know their causes and types.		
ثانياً: مواصلة مخرجات تعلم المقرر (المهارات الذهنية) باستراتيجية التدريس والتقويم: Second: Alignment of Intellectual Skills CILOs			
مخرجات المقرر/ المهارات الذهنية Intellectual Skills CILOs		استراتيجية التعليم والتعلم Teaching Strategies	استراتيجية التقويم Assessment Strategies
b1 -	Discuss the subject-related theories, concepts and principles of earthquake seismology.	Discussion Demonstration Brain storm Problem solving	Essay test, Assignments, Oral presentations.
b2 -	Distinguish between earth magnitude and intensity.		
ثالثاً: مواصلة مخرجات تعلم المقرر (المهارات المهنية والعملية) باستراتيجية التدريس والتقويم: Third: Alignment of Professional and Practical Skills CILOs			
مخرجات المقرر/ المهارات المهنية والعملية Professional and Practical Skills CILOs		استراتيجية التعليم والتعلم Teaching Strategies	استراتيجية التقويم Assessment Strategies
c1-	Determine earthquake parameters (location, depth, magnitude).	Self and independent learning Tutorials & practical classes, case study,	Achievement tests Chart Drawing practical exams
c2-	Draw seismicity maps and using (GIS) for mapping and presenting earthquakes data.		
رابعاً: مواصلة مخرجات تعلم المقرر (المهارات العامة) باستراتيجية التدريس والتقويم: Fourth: Alignment of Transferable (General) Skills CILOs			
مخرجات المقرر Transferable (General) Skills CILOs		استراتيجية التعليم والتعلم Teaching Strategies	استراتيجية التقويم Assessment Strategies
d1-	Interpret seismological data in team works, each overcoming specific problems and	Small group working Student-led Seminars	Achievement tests



	uncertainties.	Case Study Method	Team working
d2-	Investigate prior work and references about earthquakes		

Course Content محتوى المقرر

Theoretical Aspect الموضوعات الجانب النظرية

الرقم Order	الموضوعات الرئيسية/الوحدات Topic List / Units	الموضوعات الفرعية Sub Topics List	عدد الأسابيع Number of Weeks	الساعات الفعالية Contact Hours	رموز مخرجات التعلم للمقرر (CILOs)
1	History of seismology		1	2	a2
2	Earthquakes and plate tectonics.		1	2	a1 b1
3	Geographical distribution of earthquakes (active belts).		1	2	a2 b1 b2
4	Earthquakes and interior structure of the earth.		1	2	a1 a2 b1 b2
5	Classification of earthquakes.		1	2	a2 b1
6	Seismic waves.		1	2	b1
7	Location of earthquakes.	Distribution of earthquake epicenter and its relation to global tectonics.	2	4	a2 c1
8	Earthquake magnitude and intensity.		1	2	b2 c1
9	Seismic wave propagation in layered medium.		1	2	b1 c2
10	Focal mechanism and source inversion.		1	2	b1 c1
11	Role of the earthquakes in the exploration of the interior structure of the earth according to the epicenter measurement.		2	4	a1 a2 b1 c1 d1
12	Seismic hazard analysis.		1	2	c1 d1 d2
عدد الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester			14	28	

Practical Aspect (if any) الموضوعات العملية (إن وجدت)

Prepared by
Assoc.Prof. Adel Al-
Matary

Quality Assurance Unit
Assoc.Prof. Adel Al-Matary

Dean of the Faculty
Assoc.Prof. Bassim
AlKhirbash

Dean of the Development
& Quality Assurance Center
Assoc.Prof. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al Qaseem Mohammed Abas



الرقم Order	التجارب العملية/ التمارين / تدريبات Practical / Exercises/ Tutorials topics	عدد الأسابيع Number of Weeks	الساعات الفعالية Contact Hours	رموز مخرجات التعلم Course ILOs
1	The earthquakes measuring tools	1	2	a2
2	Differentiate between earthquake magnitudes and intensity.	1	2	b2
3	Determination of the location of earthquake epicenter.	2	4	c1
4	Calculation the different types of earthquake magnitudes and intensity.	2	4	a2 b1c1
5	Construction of intensity maps (Iseismics).	3	6	c2
6	Interpretation of seismological data both qualitative and quantitative	2	4	b1 b2 c1 c2
7	Assessment of seismic hazard by using probabilistic and deterministic approaches.	2	4	b1 c1 d1 d2
اجمالي الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester		13	26	

استراتيجيات التعليم والتعلم Teaching Strategies

- Interactive Lectures
- Discussion
- Demonstration
- Brain storm
- Problem solving
- Case study,
- Computer based teaching
- Small group working

الأنشطة والتكليفات Tasks and Assignments

م No	التكليف/ الواجب Assignments/ Tasks	نوع التكليف (فردى / تعاونى)	الدرجة المستحقة Mark	أسبوع التنفيذ Week Due	مخرجات التعلم CILOs (symbols)
1	n/a				
إجمالي الدرجة Total Score					

تقييم التعلم Learning Assessment

الرقم No.	أنشطة التقييم Assessment Tasks	أسبوع التقييم Week due	الدرجة Mark	نسبة الدرجة إلى الدرجة النهائية Proportion of Final Assessment	مخرجات التعلم CILOs (symbols)
1	Lab Exercises	Weekly	10	6.7%	b1, b2,c1,c2

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2	Assignments	Quarter	10	6.7%	a1,a2,a3,c1,c2
3	Participation	Weekly	10	6.7%	a1,a2,c1,c2,d1
4	Quizzes	End of a topic	10	6.7%	a1,a2,b1,b2,
5	Mid-Term written exam	Week 7	20	13.3%	a1,a2,b1,b2,
6	Final lab Exam	Week 15	20	13.3%	b1,b2,c1,c2,d1
7	Final Exam (theoretical)	Week 16	70	46.6%	all
Total الإجمالي			150	100.00%	

Learning Resources مصادر التعلم	
Required Textbook(s) المراجع الرئيسية (لا تزيد عن مرجعين)	
1. Agustín Udías Vallina and E. Buforn. 2017. Principles of Seismology. Cambridge University Press.	
2. Course notes: Compiled and provided by the course instructor.	
References	
3. Peter M. Shearer.1999. Introduction to seismology. Cambridge university press.	
كتاب أساسيات علم الزلازل - سهل عبد الله السنوي - 1997	
Electronic Materials and Web Sites etc. المصادر الإلكترونية ومواقع الإنترنت	
1 - Journal of Seismology	
2 - Journal of African earth science	

Course Policies:	
1	Class Attendance: - Students are expected to attend classes regularly and promptly. - The attendance should not be less than 80%. - If the student has been absent, he is responsible for finding out any missed material by consulting other students or going to the professor's office hours.
2	Tardy: - Attendance and arriving on time for the class are necessary. If the student is late, he will be prevented from class.
3	Exam Attendance/Punctuality: - According to the rules the student gets absent in the exam of the course.
4	Assignments & Projects: - Papers survey or projects should be submitted by the time detriment by the professor.
5	Cheating: - According to the rules, cheating is a serious offense and will always result in an imposition of a penalty. The penalties that can be started from the range of canceling the result of the course to canceling the student's admission.
6	Plagiarism: - Plagiarism is a serious offense and will always result in an imposition of a penalty. The penalties



	that can be started by making a zero mark for the work.
7	Other policies: -The student should by a commitment by the rules inside class and university. Therefore, he is expected to show respect for his classmate, instructors & others.

Prepared by
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Prof. Dr. Al Qaseem Mohammed Abas

قسم/ برنامج: برنامج العلوم الجيولوجية Geosciences - مسار الجيوفيزياء Geophysics
العام الجامعي: 2019-2020م

خطة مقرر: علم الزلازل

Course Plan (Syllabus): Seismology

معلومات عن أستاذ المقرر Information about Faculty Member Responsible for the Course						
الاسم Name	Assoc.Prof. Ahmed Alaydrous		الساعات المكتبية (أسبوعياً) Office Hours			
المكان ورقم الهاتف Location & Telephone No.	777005199		السبت SAT	الأحد SUN	الاثنين MON	الثلاثاء TUE
البريد الإلكتروني E-mail	a.alaydrous@su.edu.ye					الأربعاء WED
						الخميس THU

معلومات عامة عن المقرر General information about the course						
1.	اسم المقرر Course Title	علم الزلازل Seismology				
2.	رمز المقرر ورقمه Course Code and Number	GEOS 457				
3.	الساعات المعتمدة للمقرر Credit Hours	الساعات المعتمدة Credit Hours				الإجمالي Total
		محاضرات Lecture	عملي Practical	سمنار/تمارين Seminar/Tutorial	تدريب Training	
		2	1	-	-	3
4.	المستوى والفصل الدراسي Study Level and Semester	4 th level, 1 st semester				
5.	المتطلبات السابقة للمقرر Pre-requisites	PNR 213				
6.	المتطلبات المصاحبة (إن وجدت) Co-requisite	-				
7.	البرنامج الذي يدرس له المقرر Program (s) in which the course is offered	Bachelor of Geosciences (Geophysics Track)				
8.	لغة تدريس المقرر Language of teaching the course	English/Arabic				
9.	مكان تدريس المقرر Location of teaching the course	Faculty of Petroleum and Natural Resources				

وصف المقرر Course Description	
<p>This course aims to provide the student with:</p> <ul style="list-style-type: none"> - The Interior structure of the earth. - The seismicity map of the world and its relation to global tectonics. - Determination of earthquake size in terms of magnitudes and intensity. - Assessment of seismic hazard 	<p>يهدف هذا المقرر إلى تزويد الطالب بما يلي:</p> <ul style="list-style-type: none"> - البنية الداخلية للأرض. - خريطة الزلازل للعالم وعلاقتها بالتكتونية العالمية. - تحديد حجم الزلازل من حيث شدته وقوته. - تقييم مخاطر الزلازل.



Course Intended Learning Outcomes (CILOs) مخرجات تعلم المقرر	
After completing the course, the student will be able to:	بعد الانتهاء من دراسة المقرر سوف يكون الطالب قادرا على أن:
a1 Describe rock types and materials forming the interior earth structure.	يوصف أنواع ومواد الصخور التي تشكل بنية الأرض الداخلية.
a2 Define earthquakes and know their causes and types.	يعرف الزلازل ومعرفة أسبابها وأنواعها
b1 Discuss the subject-related theories, concepts and principles of earthquake seismology.	يناقش النظريات والمفاهيم والمبادئ المتعلقة بعلم الزلازل.
b2 Distinguish between earth magnitude and intensity.	يُميِّز بين شدة الزلزال وقوته.
c1 Determine earthquake parameters (location, depth, magnitude).	تحديد معاملات الزلزال (الموقع والعمق والقوة).
c2 Draw seismicity maps and using (GIS) for mapping and presenting earthquakes data.	يرسم خرائط الزلازل باستخدام (GIS) لرسم خرائط وتقديم بيانات الزلازل.
d1 Interpret seismological data in team works, each overcoming specific problems and uncertainties.	تفسير البيانات الزلزالية بشكل جماعي، كل عضو يتغلب على مشاكل معينة او عدم يقين.
d2 Investigate prior work and references about earthquakes	يبحث في الأعمال السابقة والمراجع حول الزلازل

Course Content محتوى المقرر				
Theoretical Aspect خطة تنفيذ الموضوعات النظرية				
الرقم Order	الوحدات (الموضوعات الرئيسية) Units	الموضوعات التفصيلية Sub Topics	الأسبوع Week Due	الساعات الفعلية Con. H
1	History of seismology		Week 1	2
2	Earthquakes and plate tectonics.		Week 2	2
3	Geographical distribution of earthquakes (active belts).		Week 3	2
4	Earthquakes and interior structure of the earth.		Week 4	2
5	Classification of earthquakes.		Week 5	2
6	Seismic waves.		Week 6	2
7	Mid term exam		Week 7	2
8	Location of earthquakes.	Distribution of earthquake epicenter and its relation to global tectonics.	Week 8-9	4

Prepared by
Assoc.Prof. Adel Al-Matary

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9	Earthquake magnitude and intensity.		Week 10	2
10	Seismic wave propagation in layered medium.		Week 11	2
11	Focal mechanism and source inversion.		Week 12	2
12	Role of the earthquakes in the exploration of the interior structure of the earth according to the epicenter measurement.		Week 13-14	4
13	Seismic hazard analysis.		Week 15	2
14	Final exam		Week 16	2
عدد الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester			16	32

خطة تنفيذ موضوعات الجانب العملي Practical / Training/ Tutorials/ Exercises Aspects			
الرقم Order	موضوعات العملي/ المهام / التمارين Practical/ Tutorials/ Exercises Aspects	الاسبوع Week Due	الساعات الفعلية Cont. H
1	The earthquakes measuring tools	Week 1	2
2	Differentiate between earthquake magnitudes and intensity.	Week 2	2
3	Determination of the location of earthquake epicenter.	Week 3-4	4
4	Calculation the different types of earthquake magnitudes and intensity.	Week 5-6	4
5	Mid term lab exam	Week 7	
6	Construction of intensity maps (Isoseismics).	Week 10-8	6
7	Interpretation of seismological data both qualitative and quantitative	Week 12-11	4
8	Assessment of seismic hazard by using probabilistic and deterministic approaches.	Week 14-13	4
9	Final lab exam	Week 15	2
اجمالي الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester		15	30

استراتيجيات التعليم والتعلم Teaching Strategies
<ul style="list-style-type: none"> ▪ Interactive Lectures ▪ Discussion ▪ Demonstration ▪ Brain storm ▪ Problem solving ▪ Case study,

Prepared by
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- Computer based teaching
- Small group working

Tasks and Assignments الأشطة والتكليفات

م No	التكليف/ الواجب Assignments	نوع التكليف (فردى / تعاونى)	الدرجة المستحقة Mark	أسبوع التنفيذ Week Due
1				
Total Score إجمالي الدرجة			15/150 10/ 100	

Learning Assessment تقويم التعلم

م No	أساليب التقويم Assessment Method	موعد (أسبوع) التقويم Week Due	الدرجة Mark	الوزن النسبي % Proportion of Final Assessment
1	Lab Exercises	Weekly	10	6.7%
2	Assignments	Quarter	10	6.7%
3	Participation	Weekly	10	6.7%
4	Quizzes	End of a topic	10	6.7%
5	Mid-Term written exam	Week 7	20	13.3%
6	Final lab Exam	Week 15	20	13.3%
7	Final Exam (theoretical)	Week 16	70	46.6%
Total المجموع			150	100.00%

Learning Resources مصادر التعلم

المراجع الرئيسية (لا تزيد عن مرجعين)
1. Agustín Udías Vallina and E. Buforn. 2017. Principles of Seismology. Cambridge University Press.
2. Course notes: Compiled and provided by the course instructor.
References
3. Peter M. Shearer.1999. Introduction to seismology. Cambridge university press.
كتاب أساسيات علم الزلازل - سهل عبد الله السنوي - 1997
المصادر الإلكترونية ومواقع الإنترنت etc. Electronic Materials and Web Sites
1- Journal of Seismology
2- Journal of African earth science

Course Policies:

Prepared by
Assoc.Prof. Adel Al-
Matary

Quality Assurance Unit
Assoc.Prof. Adel Al-Matary

Dean of the Faculty
Assoc.Prof. Bassim
AlKhirbash

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1	<p>Class Attendance:</p> <ul style="list-style-type: none"> - Students are expected to attend classes regularly and promptly. - The attendance should not be less than 80%. - If the student has been absent, he is responsible for finding out any missed material by consulting other students or going to the professor's office hours.
2	<p>Tardy:</p> <ul style="list-style-type: none"> - Attendance and arriving on time for the class are necessary. If the student is late, he will be prevented from class.
3	<p>Exam Attendance/Punctuality:</p> <ul style="list-style-type: none"> - According to the rules the student gets absent in the exam of the course.
4	<p>Assignments & Projects:</p> <ul style="list-style-type: none"> - Papers survey or projects should be submitted by the time detriment by the professor.
5	<p>Cheating:</p> <ul style="list-style-type: none"> - According to the rules, cheating is a serious offense and will always result in an imposition of a penalty. The penalties that can be started from the range of canceling the result of the course to canceling the student's admission.
6	<p>Plagiarism:</p> <ul style="list-style-type: none"> - Plagiarism is a serious offense and will always result in an imposition of a penalty. The penalties that can be started by making a zero mark for the work.
7	<p>Other policies:</p> <ul style="list-style-type: none"> - The student should by a commitment by the rules inside class and university. Therefore, he is expected to show respect for his classmate, instructors & others.