21 Course Specification of Engineering Geology

I. Course Identification and General Information:							
1	**Course Title:**	***Engineering Geology***					
2	**Course Code & Number:**	CE 105					
3	**Credit hours:**	C.H				**Credit Hours**	
		Th.	**Tu.**	**Pr.**	**Tr.**		
		2		2		**3**	
4	**Study level/ semester at which this course is offered:**	2^{nd} Level/1^{st} semester					
5	**Pre –requisite (if any):**	N/A					
6	**Co –requisite (if any):**	N/A					
8	**Program (s) in which the course is offered:**	Bachelor of Science in Civil Engineering					
9	**Language of teaching the course:**	Arabic / English					
10	**Location of teaching the course:**	Inside the University (Eng. Faculty)					
11	**Prepared By:**	Dr. Faisal Saeed Al-Huzaim					
12	**Date of Approval**						

II. Course Description:

This course aims to help students to use the concepts of engineering geology, to implemented in civil engineering.
The course focus on the most important concepts regarding to civil engineering such as Importance of geology to civil engineering, Minerals and rocks formation , Structure geology, External Processes of weathering and erosion, Internal Processes and Geological Hazards, Geologic time scale and Continental Drift, and Site Investigation Methods.

III. Course Intended learning outcomes (CILOs) of the course		Referenced PILOs
a.1	Explain geological characteristics to Recognize the common Minerals.	**A1**

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a.2	Define the geological parameters important in civil engineering studies.	**A2**
a.3	Clarify scientific and construction materials related to engineering geology.	**A5**
b.1	Demonstrate the geological structures, hazards and risk phenomena in the geological maps and cross sections.	**B1**
b.2	Investigate the ground water aquifer to solve the supplement networks.	**B3**
c.1	Test rock samples and building material using laboratory equipment	**C1**
c.2	Cary out the geological engineering to describe the soil and rock properties.	**C2**
d.1	Argue geological report for a field trip.	**D1**

(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1- Explain geological characteristics to Recognize the common Minerals.	1.Interactive Lectures 2- Discussion 3- Demonstration	1.Assignments: - Draw contour map and cross section. 2. Written exams (Midterm and final).
a2- Define the geological parameters important in civil engineering studies.		
a.3 Clarify scientific and construction materials related to engineering geology.		

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b.1- Demonstrate the geological structures, hazards and risk phenomena in the geological maps and cross sections.	1-Interactive Lectures 2- Discussion 3- problem solving 4-Brain storming	1. Quizzes, 2. assignments: - Compare between different type of rocks, 3. Practical exam and written exam (Midterm and final).
b.2- Investigate the ground water aquifer to solve the supplement networks.		

(C) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c.1- Test rock samples and building material using laboratory equipment.	1. Demotion 2-Discussion, 3- Field trip (study tour) 4. Lab	1. Quizzes, 2-Assignment: 3-describe the rock specimen 4- Report
c.2- Cary out the geological engineering to describe the soil and rock properties.		

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1- Argue geological report for a field trip.	1-Cooperative learning 2-Discussion	Present geological reports.

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IV. Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Sub Topics List	Learning Outcomes	Number of Weeks	contact hours
1	Introduction to Geology and Its importance for civil engineering	1- Definitions geology and engineering geology 2- the role of geology in the projects. 3-Types of maps and it's elements.	a1,a2,a3	1	2
2	The Solar System and Earth Composition	1-Earth site in the universe 2- Planets of the solar 3 -Earth's layered structures 4-Atmosphare, Hydrosphere and Lithosphere. 5-Core, Mantle and Crust	a1,a2,a3 ,b1,b2	1	2
3	The Minerals	1-Introduction 2-Mineral groups 3-Physical properties of minerals	a1,a2,a3, b1,b2 c2,	1	2
4	The Rocks formation and classification	1. Igneous rock. 2. Igneous rocks classified. 3. Intrusive and effusive igneous rocks. 4. Sedimentary rocks: formation. 5.Types of Sedimentary Rock: Clastic, Organic and Chemical. 6. Formed of metamorphic rocks 7- Textural and mineralogical change 8. The rock cycle	a1,a2,a3 ,b1,b3 c1 ,c2	3	6
5	Geological Structures	1-Deformation 2-Folds 3-Faults 4-Fractures	a1,a2 ,b1,b2	1	2

IV. Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Sub Topics List	Learning Outcomes	Number of Weeks	contact hours
		5-Crustal fragments and mountain buildings			
6	External Processes of weathering and erosion.	Weathering and soil -Types of weathering -Rates of weathering -Soil Classification -Ground water	a1,a2,a3 ,b1,b2,,c2	2	4
7	Internal Processes and Geological Hazards	Natural Geological Hazards and Planning 1-Volcanic Activity 2-Earthquakes 3- landslides	a1,a2,a3,b 1,b2, c2	2	4
8	Geologic time scale and Continental Drift	1- Introduction 2- Relative date-key principle 3- Shapes of deposition 4- Plate tectonic	a1,a2,a3 ,b1,b2	1	2
9	Introduction to site investigation methods	1- Site Exploration 2- Direct Methods 3- Indirect Site Exploration 4- Field Instrumentation	b1,b2, c2	2	4
Number of Weeks /and Units Per Semester				**14**	**28**

B - Practical Aspect:				
Order	**Tasks/ Experiments**	**Number of Weeks**	**contact hours**	**Learning Outcomes**
1	-Introduction to the laboratory. -Drawing the contour map.	1	2	a1, a2 , a3
2	Hardness, Transparency of minerals	1	2	a1,a2,a3 ,b1,b2 c1,c2,
3	Diffraction and density of minerals	1	2	a1,a2,a3 ,b1,b2 c1,c2,
4	Fractures and brokenness of minerals	1	2	a1,a2,a3, b1,b2 c1,c2,
5	Description the igneous rocks specimen	1	2	a.3, b1,b2,c1,c2,d1
6	Description the sedimentary rocks specimen	1	2	a.3, b1,b2,c1,c2 ,d1
7	Description the metamorphic rocks specimen	1	2	a.3, b1,b2,b1, b2,c1,c2,d1
8	Field trip (study tour)	1	2	a1, a2 , a3, b1,b2,c1,c2 ,d1
9	Site Exploration Tests	6	12	b1,b2,c1,c2,d1
Number of Weeks /and Units Per Semester		**14**	**28**	

V. Teaching strategies of the course:

- Interactive Lectures
- Discussion
- Demonstration
- problem solving
- Brain storming
- Field trip (study tour)
- Cooperative learning
- Lab

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VI. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Assignments: -Draw contour map and cross section.	a1,a2,a3,b1,b2	2nd	3
2	Assignments: - Recognize the different type of Minerals.	a1,a2,a3,b1,c1	5th	2.5
3	Assignments: - Describe the rock specimen	a1,a2,a3,b1,b2,c1,c2	9th	2
	Total			**7.5**

VII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	2nd, 5th, 9th	7.5	5%	a1,a2,a3,b1,b2,c1,c2,d1
2	Participation	Weekly	15	10%	a1,a2,a3,b1,b2,c1,c2,d1
3	Quizzes	End of a topic	7.5	5%	b1,b2,c1,c2
4	Present geological reports	End of field trip	7.5	5%	c1,c2,d1
5	Mid-term Practical test	7th	15	10%	c1,c2,d1
6	Mid-term written test	8th	22.5	15%	a1,a2,a3,b1,b2
7	Final exam practical	12th	15	10%	c1,c2,d1
8	Final exam theory	14th	60	40%	a1,a2,a3,b1,b2
	Total		**150**	**100%**	

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VIII. Learning Resources:

- Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).

1- Required Textbook(s) (maximum two).

1- Bell, F.G. 2006, Engineering Geology, Butterworth-Heinemann, second Edition.
2- Hencher, S. 2012, Practical Engineering Geology First published.

2- Essential References.

1- Richard Throner, 2001, Engineering geology Manual Field, 2nd Ed. Vol.1.
2- Suping Peng and Jincai Zhang, 2007, Engineering Geology for Underground Rocks,Spring.
3- Al-Dahaan Saadi, 2014,Principle of Earth Science, Al-Kufa University ,Iraq,1st Ed.

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IX.	**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.

Reviewed By	**Vice Dean for Academic Affairs and Post Graduate Studies** **Dr. Tarek A. Barakat** **Dr. Mohammad Algorafi**
	Deputy Rector for Academic Affairs Dr. Ibrahim AlMutaa **Dr. Ahmed mujahed** **Dr. Munaser Alsubri**

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Course Plan (Syllabus) of Engineering Geology

I. Information about Faculty Member Responsible for the Course:								
Name of Faculty Member	Dr. Faisal Saeed Al-Huzaim	**Office Hours**						
Location& Telephone No.	777144140	**SAT**	**SUN**	**MON**	**TUE**	**WED**	**THU**
E-mail	fahuz88@gmail.com						

II. Course Identification and General Information:						
1-	**Course Title:**	***Engineering Geology***				
2-	**Course Number & Code:**	CE 105				
3-	**Credit hours:**	**C.H**				**Credit Hours**
		Th.	**Tu.**	**Pr.**	**Tr.**	
		2	-	2	-	3
4-	**Study level/year at which this course is offered:**	3rd Semester/ 2nd Year				
5-	**Pre –requisite (if any):**	N/A				
6-	**Co –requisite (if any):**	N/A				
7-	**Program (s) in which the course is offered**	Bachelor of Science in Civil Engineering				
8-	**Language of teaching the course:**	Arabic / English				
9-	**System of Study:**	Semesters				
10-	**Mode of delivery:**					

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11-	**Location of teaching the course:**	Inside the University (Eng. Faculty)

III. Course Description:

This course aims to help students to use the concepts of engineering geology, and implement them in civil engineering.
The course focuses on the most important concepts regarding civil engineering such as Importance of geology to civil engineering, Minerals and rocks formation, Structure geology, External Processes of weathering and erosion, Internal Processes and Geological Hazards, Geologic time scale and Continental Drift, and Site Investigation Methods.

IV. Intended learning outcomes (ILOs) of the course:

a.1	Explain geological characteristics to Recognize the common Minerals.	A1
a.2	Define the geological parameters important in civil engineering studies.	A2
a.3	Clarify scientific and construction materials related to engineering geology.	A5
b.1	Demonstrate the geological structures, hazards and risk phenomena in the geological maps and cross sections.	B1
b.2	Investigate the ground water aquifer to solve the supplement networks.	B3
c.1	Test rock samples and building material using laboratory equipment	C1
c.2	Cary out the geological engineering to describe the soil and rock properties.	C2
d.1	Argue geological report for a field trip.	D1

V. Course Content:

- **Distribution of Semester Weekly Plan Of course Topics/Items and Activities.**

A – Theoretical Aspect:

Order	Topics List	Sub Topics List	Week Due	Contact Hours
1	Introduction to Geology and Its importance for civil engineering	1- Definitions geology and engineering geology 2- the role of geology in the projects. 3-Types of maps and it's elements.	1	2
2	The Solar System and Earth Composition	1-Earth site in the universe 2- Planets of the solar 3 -Earth's layered structures 4-Atmosphare, Hydrosphere and Lithosphere. 5-Core, Mantle and Crust	2	2
3	The Minerals	1-Introduction 2-Mineral groups 3-Physical properties of minerals	3	2
4	The Rocks formation and classification	1. Igneous rock. 2. Igneous rocks classified. 3. Intrusive and effusive igneous rocks. 4. Sedimentary rocks: formation. 5.Types of Sedimentary Rock: Clastic, Organic and Chemical. 6. Formed of metamorphic rocks 7- Textural and mineralogical change 8. The rock cycle	4,5 ,6	6
5	Geological Structures:	1-Deformation 2-Folds 3-Faults 4-Fractures 5-Crustal fragments and mountain buildings	7	2
6	Midterm Written test		8	2
7	External Processes of weathering and erosion	Weathering and soil -Types of weathering -Rates of weathering -Soil Classification	9,10	4

		-Ground water		
8	Internal Processes and Geological Hazards	Natural Geological Hazards and Planning 1-Volcanic Activity 2-Earthquakes 3- landslides	11, 12	4
9	Geologic time scale and Continental Drift	1- Introduction 2- Relative date-key principle 3- Shapes of deposition 4- Plate tectonic	13	2
10	Introduction to site investigation methods	1- Site Exploration 2- Direct Methods 3- Indirect Site Exploration 4- Field Instrumentation	14, 15	4
11	Final Exam.		16	2
Number of Weeks /and Units Per Semester			**16**	**32**

B – Practical Aspect:

Order	Topics List	Week Due	Contact Hours
1	Introduction to the laboratory. Drawing the contour map.	1	2
2	Hardness, Transparency of minerals	2	2
3	Diffraction and density of minerals	3	2
4	Fractures and brokenness of minerals	4	2
5	Description the igneous rocks specimen	5	2
6	Description the sedimentary rocks specimen	6	2
7	Description the metamorphic rocks specimen	8	2
8	Field trip (study tour)	9,10	4
9	Site Exploration Tests	11,12,13,14,15	10
Number of Weeks /and Units Per Semester		**14**	**28**

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VI. Teaching strategies of the course:

- Interactive Lectures
- Discussion
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- problem solving
- Brain storming
- Field trip (study tour)
- Cooperative learning

VII. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Assignments: -Draw contour map and cross section.	a1,a2,a3,b1,b2	2	3
2	Assignments: - Recognize the different type of Minerals.	a1,a2,a3,b1,c1	5	2.5
3	Assignments: - Describe the rock specimen	a1,a2,a3,b1,b2,c1,c2	9	2
	Total			**7.5**

VIII. Schedule of Assessment Tasks for Students During the Semester:

Assessment	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment
1	Assignments	2, 5 ,9	7.5	5%
2	Participation	Weekly	15	10%
3	Quizzes	End of a topic	7.5	5%
4	Present geological reports	End of field trip	7.5	5%
5	Mid-term Practical test	7	15	10%
6	Mid-term written test	8	22.5	15%
7	Final exam practical	12	15	10%
8	Final exam theory	14	60	40%
	Total	**16**	**150**	**100%**

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3- Al-Dahaan Saadi, 2014,Principle of Earth Science, Al-Kufa University ,Iraq,1st Ed

3- Electronic Materials and Web Sites *etc*.

1- Geology and Geological Engineering,
2- Springer Link : Bulletin of Engineering Geology,
3- Journals in engineering Geology, Earth Science, Environment.
4- www.geologypage.com
5- https://www.britannica.com,engineeringgeology
6- https://engineeringgeology.ethz.ch
7- https://www.geologoc.org.uk,careers

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