

Geo 421 Course Outlines

Volcanology

1st Semester of the Academic Year

1442-2020

Course Director

Dr. Bassam Abdulmu'ti Abuamarah Al Mohanna

Volcanology Course Outlines

a. Course general information:

- i. Course Director: **Dr. Bassam A. Abu Amarah Al Mohanna**
- ii. Contributor: **Mr. Nayif Al Otaibi**
- iii. Course Title: **Volcanology**
- iv. Course Code #: **Geo 421**
- v. Credit hours: **3 credit hours: 3(2+0+1)**.
- vi. Level/ year the course is offered: **Second Semester (2016-2017) of the 8th level / 4th year.**
- vii. Course pre-requisites: **323 Geo (Petrology)- 5th level, and Igneous and metamorphic Course.**
- viii. Group Number: **850**
- ix. Lecture theater (room): **Virtual Class**

b. Course objectives and Learning Outcomes for this Course:

1- Course Description

Physical properties of magma. Genesis and ascending of magma. Volcanic activity and plate tectonics. Types and classification of volcanic eruptions. Lavas and pyroclastic. Shape of volcanoes. Succession of old and young volcanicity. Volcanic facies. Volcanic successions in the Arabian shield. Recent volcanicity in Kingdom of Saudi Arabia and Red Sea region. Mineralization related to volcanic activity. Volcanic activity and energy. Recording of volcanic activity. Risks of volcanic activity.

2- Course Objectives

1. Physical properties of magma and generation and ascent of magma and volcanic facies.
2. Types and classifications of volcanic eruptions.
3. Volcanism and plate tectonics. Mineralization associated with volcanism.
4. Volcanic successions in the Arabian Shield. Cenozoic volcanism in Saudi Arabia and the Red Sea region. Mineralization associated with volcanism.
5. Volcanism and energy. Monitoring volcanic activity. Volcanic risks.

3- Course Outcomes:

1. Student can be able to know the physical properties of magmas.
2. Student can identify volcanism and plate tectonics.
3. Student can know the types and classification of volcanic eruptions.
4. Students can know the volcanoclastic deposits and lava types.
5. Students can differentiate between volcanic landforms and facies.
6. Student can distinguish between modern and ancient volcanic succession.
7. Student can be able to know the Cenozoic volcanism in Saudi Arabia.
8. Student can be able to monitoring volcanic activities and volcanic hazards.

9. Student can be able to understand the relation between the our earth and solar system (Our Galaxy).
 10. Student can be able to identify the volcanic forming processes and features,
 11. Student can be able to classify volcanoes' types and products' types.
 12. Student can be able to determine and to state the volcanoes characteristics (Size, shape, magma type and eruptive style), as well as will be able to describe their different magma types that influences volcanic eruptions. (Shield volcanoes, composite (or Strato-) volcanoes, cinder cones, domes, and lavas flow.
 13. Student can be able to gain the petro graphic knowledge of the different types of volcanic Rocks (mineral composition, and textures; depending upon the both chemical composition of magma and its physical conditions) of magma solidification..
 14. Student can be able to nomenclature, manipulate, review compare and to discriminate among the different types of volcanic rocks in hand specimen (mega specimens), and via the study of thin section.
 15. Student can be able to debate and describe the earth's structure (magma formation, magma compositions, heat generation), the concept of plate tectonics, and to explain its relationships with the different types of plate tectonics boundaries, and the formation of volcanoes.
 16. Student can be able to differentiate, to discuss and to compare among volcanoes eruptions, as well as evaluate and estimate their' risks, and benefits.
- I. Therefore, Firstly, we will expect from our students to have the ability to demonstrate , analyzing, interpreting volcanoes formation, processes, eruptions, and determine their risks and benefits. Moreover, they will be able deliberate their origin, their products, and their volcanic' s rock types , and demonstrating its associated minerals components in both hand specimen and in thin section.
- II. Secondly, we expect the student to be able to observe , to locate different type of volcanoes, to draw out all the geological evidence in field, and to identify tectonic history of any volcanic activities in the region, as well as, to construct geological map of volcanic areas' based on its field studies correctly and perfectly manners.

4- Course Evaluation during the semester:

S. No.	Evaluation Tasks	Week due	Proportion of the final evaluation % assessment
1	Attendance, homework, field trip and Quizzes+ Question at the end of some lecture's session.	5 -9- 12	10%
2	First test	7	30%
3	Practical test	13	20%
4	Second test	-	-
5	Final Exam	15	40%

5- Essential References and text books:

1. Required Text(s):

- **T. Kusky**, (2008), *Volcanic eruption and their volcanic hazards*, Facts on File. Inc., New York.
- **J. Marti and G. Ernst**, (2005), *Volcanoes and environment*, Cambridge University Press, New York.
- **L. Magloff**, (2003), *Volcano*, DK Publishing Inc. New York.
- **C. Firth, W. McGuire**, (1999), *Volcanoes in the Quaternary*, the geological Society Publishing House, UK.
- **J. MacPhie, M. Doyle, and A. Allen**, (1993), *Volcanic Texture" a guide to interpretation of texture in volcanic rock"* Tasmanian Government Printing Office.
- **MacDonald**. (1972). *Volcanoes*, Prentice-Hall, Englewood Cliffs, New jersey.
- **S. Mc Collum**, (2007). *Volcanic Eruption, earth quakes, and Tsunamis*. Chelsea House, New York.

2. Recommended Books and Reference Material (Journals, Reports, etc) (Attach List):

- **Mac Donald**. (1972). *Volcanoes*, Prentice-Hall, Englewood Cliffs, New jersey.
- **T. Kusky**, (2008), *Volcanic eruption and their volcanic hazards*, Facts on File. Inc., New York.

3. Other learning material (Videos, software ... etc.)

6- Lecture's title outlines: Course started on 11/ 01 /1441 - 30/ 8 /2020

Wks #	Day,s name	Date	Lecture's Title	Hours	Contacted Hours
1	Sunday	11/1/1442 30/8/2020	Creation of the Earth and Introduction to Volcanology: Basic concept and reviewing the definitions applied in Volcanology, and creation of the earth.	2	4
	Wednesday	14/1/1442 2/9/2020			
2	Sunday	18/1/1442 6/9/2029	Volcanoes linkage with Plate Tectonic and magma and (structure of the earth).	1	2
	Wednesday	21/1/1442 9/9/2020			
3	Sunday	25/1/1442 13/9/2020	Magma's types (Its origin) and Volcanoes heat generation	1	2
	Wednesday	28/1/1442 16/9/2020			
4	Sunday	3/2/1442 20/9/2020	Dynamic of volcanoes. Type of volcanoes, and type of eruptions+ (Homework)	1	2

	Wednesday	6/2/1442 23/9/2020	National Day Celebration		
5	Sunday	10/2/1442 27/9/2020	Spreading centre volcanism, subduction zone	1	2
	Wednesday	13/2/1442 30/9/2020			
6	Sunday	17/2/1442 4/10/2020	volcanism, and intera-plate volcanism.	1	2
	Wednesday	20/2/1442 7/10/2020			
7	Sunday	24/2/1442 11/10/2020	First Assessment Exam	1	2
	Wednesday	27/2/1442 14/10/2020	Volcano's products and its classifications.		
8	Sunday	1/3/1442 18/10/2020	Volcano's products and its classifications.	1	2
	Wednesday	4/3/1442 21/10/2020	The earth's internal structure and mechanism of volcanoes.		
9	Sunday	8/3/1442 25/10/2029	The earth's internal structure and mechanism of volcanoes.	1	2
	Wednesday	11/3/1442 28/10/2029	Physo-chemical factors influencing its volcanic eruptions.	1	2
10	Sunday	15/3/1442 1/11/2020			1
	Wednesday	18/3/1442 4/11/2020	Volcanic and earthquake activities in Saudi Arabia/ and its historical activities	1	2
11	Sunday	22/3/1442 8/11/2020	Volcanic types of Eruptions	1	2
	Wednesday	25/3/1442 11/11/2020			
12	Sunday	29/3/1442 15/11/2020	Volcanoes risk and benefits.	1	2
	Wednesday	3/4/1442 18/11/2020			

13	<i>Sunday</i>	7/4/1442 22/11/2020	<i>Volcanoes risk and benefits.</i>	1	2
	<i>Wednesday</i>	10/4/1442 25/11/2020	<i>Volcanoes records in Saudi Arabia</i>	1	2
14	<i>Sunday</i>	14/4/1442 29/11/2020	<i>Volcanoes records in Saudi Arabia.</i>	1	2
	<i>Wednesday</i>	17/4/1442 2/12/2020		1	2
15	<i>Sunday</i>	21/4/1442 6/12/2020	<i>Revisions</i>	1	2
	<i>Wednesday</i>	24/4/1442 9/12/2020		1	2
16	<i>Sunday</i>	28/4/1442 13/12/2020	<i>Starting of General Course Exams</i>		
	<i>Wednesday</i>	5/5/1442 20/12/2020	<i>Starting date of final Exams</i>		

ملاحظات :

- نسبة الغياب التي تؤدي إلى حرمان الطالب من دخول الاختبار النهائي محددة 25% يتم بموجبها الرفع للكلية .
- لا يسمح للطالب أو الطالبة بدخول المقرر الدراسي الغير المسجل به رسميا.
- التزام الطالب بالحضور الكترونيا ويدويا.

Wishing you All the Best and Success

Course Director :

Dr. Bassam A. Abuamarah Al Mohanna