King Saud University

College of Sciences

Geology and geophysics Department

جامعة الملك سعود

كلية العلوم

قسم الجيولوجيا والجيوفيزياء

Summer Course
Igneous Petrology
321 Geo Course
Academic Year 1431- 1432H
(2010 – 2011)

i. **Course Director:** *Dr. Bassam A. Abu Amarah*

ii. Contributer: ***Hashim Babakur***

iii. Course Title: ***Igneous Petrology***

iv. Course Code: ***321 Geo.***

v. Credit hours: ***3 credit hours (2+1+0)*****.**

vi. **Level/year at which this course is offered:** ***5th level / Summer semester of the above academic year 5th semester***

vii. **Course pre-requisites for this course:** ***Optical mineralogy Course (224 Geo) & Crystallography Course (223 Geo).***

viii. Group Number: ***616.***

ix. Lecture theater (room): ***AB 054*****.**

x. Course objectives and Learning Outcomes for this Course:

a. ***The usages of the petrological studies of the different rock types and minerals.***
b. ***Their relation to the universe and the formation of the Earth.***
c. ***Its types and forms of magmas and their identification. Value of the economic process. Rock's relation to tectonics (earthquakes and volcanos). Geochemical relations between the magma and the formation of the rocks. Geological maps and its applications***
d. ***Gaining and understanding of the processes responsible for forming igneous rocks.***

e. ***Gaining and understanding of how the chemical composition, structure and texture of rocks can be used to interpret igneous rocks processes and the geologic history of the earth.***

f. ***Identifying igneous rocks in hand specimen and thin section.***

We expect from our students to demonstrate, and to have the ability in analyzing, interpreting scientific data and verify the igneous rocks, and its genesis and minerals contents, either in both hand specimen, or in thin section by using polarizing Microscope and the other tools related. The student also should have abilities and competency to use, to read/construct geologic maps; in terms of the geologic and tectonic history of any region based on field studies.

xi. Course Description (Summer Course):

The 321 Geo. Course summer session consists of 7 wks; with 28 lectures (each lecture time will be two hours), and 15 practical hours. Subsequently, the student is expected to acquire knowledge in methods and procedures of igneous petrology, and to identify minerals under the polarizing microscope and also their optical properties, and the applying its physics and chemical affinities, as well as gaining knowledge in igneous petrology and their relationships in the field.

xii. Course Evaluation:

Student Evaluation during the course:

No.	Evaluation Tasks/tools	Week due	%Proportion of the evaluation during the course session
1	Homework	3-4	10%
2	Writing Reports	6	3%
3	First Exam	5	10%
4	Practical (Lab)Test	7	15%
5	Second Test	6 or 7	10%
6	Final Exam	8	50
7	Student Attendance+mind-setup		2%

xiii. Essential References and text books:

- ***Required Text(s) :***

- ***محمد كمال العقاد 1967. علم الصخور النارية. الطبعة الثانية. جامعة أسيوط. الهيئة العامة لشؤن المطابع الأميرية، القاهرة. 270 صفحة.***
- ***Hatch F.H. Hatch, Wells A.K. & Wells M.K. 1962, Petrology of the igneous rocks, 13th edition, George Allen &Unwin, London.***
- ***Walter T Huang. Petrology, Ncgraw-Hill Book Company, INC.***
- ***Best, M.G. 1982. Igneous and Metamorphic Petrology. W.H. Freeman Company, New York. P. 1-340***

- ***Electronic Materials, Web Sites etc***

  - *Atlas of Igneous and metamorphic rocks, minerals, and textures*

  - ***Other learning material such as computer-based programs/CD, professional standards/regulations***

2. Course titles and outlines:

No of weeks	Lecture Time	Date	Lecture's Title	**No. Of Weeks**	**Contact hours**
1	1 – 3 PM	*Sat 23/7/1432 12/2/2011*	*Introduction, Formation and occurrences of the igneous rocks and their structures.*	1	4
	1 – 3 PM	*Mon. 11/3/1432 14/2/2011*	*The magmas and their movements*		
2	1 – 3 PM	*Sat 16/3/1432 19/2/2011*	*Principals of geochemistry for minerals and rocks. Field relations. Igneous textures and structures.*	1	4
	1 – 3 PM	*Mon. 18/3/1432 21/2/2011*	*Bowen's reaction series , methods of crystallizations, Rocks' derivatives. Geochemistry of the magmas*		
3	1 – 3 PM	*Sat. 23/3/1432 26/2/2011*	*Chemistry of crystallisation and Crystallisation of the magma. Group of minerals. Replacement and reactions with other rocks (igneous, metamorphic and sedimentary rocks). Hybridization. . Geochemical classifications and the distribution of the elements in the rocks.*		4
	1 – 3 PM	*Mon. 25/3/1432 28/2/2011*	*Relation between magma and the heat, viscosity and replacement.*		
4	1 – 3 PM	*Sat 30/3/1432 5/3/2011*	*Early and post crystallisation of the magma and the relation of the geochemistry of the igneous rocks to the formation of the different minerals*	1	4
	1 – 3 PM	*Mon. 2/4/1432 7/3/2011*			
5	1 – 3 PM	*Sat 7/4/1432 12/3/2011*	*Petrological coherences, changing in the geochemistry of the rocks, magma's equilibrium. Type of magmas and their relations to pressure and temperature*	1	4
	1 – 3 PM	*Mon. 9/4/1432 14/3/2011*	First assessment exam.		
6	1 – 3 PM	*Sat 14/4/1432 19/3/2011*	*Origin and classification of the igneous rocks. The evolution according to the descriptions of appearance, field and microscopic studies*	1	4
	1 – 3 PM	*Mon. 16/4/1432 21/3/2011*	*Rock families and their classifications*		
	1 – 3 PM	*Sat 21/4/1432 26/3/2011*	2nd Assessment Exam.	1	4

7	1 – 3 PM	*Mon. 23/4/1432 28/3/2011*	*Rock forming minerals, the usages of the rocks and minerals in military, structure industrial and construction sectors. Methods of collecting the samples.*		
8	1 – 3 PM	*Sat. 28/4/1432 2/4/2011*	*The applications of the C.I.P.W. Norms and modal analyses.*	1	4
	1 – 3 PM	*Mon. 20/9/1432 20/8/2011*	***Summer Course Final exams starting and ending dates.***		

N.B.:

- *Summer Course starts date on Sat. 23/7/1432 corresponding to 26/6/ 2011.*
- *final exams will start on 20/9/1432 – 20/8/2011 and end by 23/9/1432- 23/8/2011.*