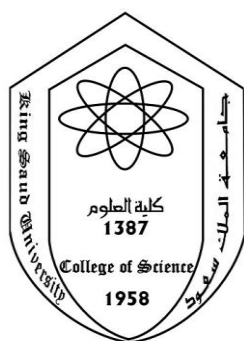


King Saud University

College of Sciences

Geology and geophysics Department



جامعة الملك سعود

كلية العلوم

قسم الجيولوجيا والجيوفيزياء

## Metamorphic Petrology Geo 322 Course

### Geo 322 Course

Academic Year 1431- 1432H

(2010 – 2011)

- i. **Course Director:** Dr. Bassam A. Abu Amarah
- ii. **Contributer:** Said Al Shaltouni
- iii. **Course Title:** Metamorphic Petrology
- iv. **Course Code:** Geo 322.
- v. **Credit hours:** 3 credit hours (2+1).
- vi. **Level/ year the course is offered:** 1st semester of the fourth year.
- vii. **Course pre-requisites:** Geo 224 course (Optical mineralogy).
- viii. **Group Number:** 4259.
- ix. **Lecture theater (room):** B 070.
- x. **Course objectives and Learning Outcomes for this Course:**

- 1- Students should learn how to identify the metamorphism and the three motivating force in metamorphism heat, pressure, and chemically active fluids or gases.
- 2- This Course will expose students to different types and zones of metamorphic rocks.
- 3- The student will gain an understanding of the processes responsible for forming igneous and metamorphic rocks.

- 4- The student will gain an understanding of how the chemical composition, structure and texture of rocks can be used to interpret past geologic processes and the geologic history of the earth.
- 5- The student will be able to identify igneous and metamorphic rocks in hand specimen and thin section.

We expect from our students with a major in Geology to demonstrate, to have the ability in analyzing, interpreting scientific data and verify the origin of metamorphic rocks, and its minerals contents in both hand specimen and in thin section by using polarizing Microscope and the other one related to. 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. Student Evaluation during the course:**

No.	Evaluation Tasks/tools	Week due	%Proportion of the evaluation during the course session
1	Homework	5-9-12	10%
2	Writing Reports	7	3%
3	First Exam	6	10%
4	Practical (Lab)Test	13	15%
5	Second Test	14	10%
6	Final Exam	15	50
7	Student Attendance+mind-set		2%

**xii. Essential References and text books:**

**1. Required Text(s) :**

- **Best M.** (1982). *Igneous and Metamorphic Petrology*, W.H Freeman and company, **San francisco**.
- **Spray A..** (1969). *Metamorphic and Textures*. Pergamon Press.Ltd
- **Kornprobst, J.** (2002). *Metamorphic Rocks and Their Geodynamic Significanc:. A Petrological Handbook*. Petrology and Structural Geology Series Vol. 12. Kluwer , Dordrecht.

- **Yardley, B. W. D.** (1989) *An Introduction to Metamorphic Petrology*, Longman, Harlow.
- **Shelley D.** (1993). *Igneous and metamorphic rocks under the microscope*. Chapman & Hall, London.
- **Yardley B.W.D., McKenzie W.S. & Guilford C.** (1990). *Atlas of metamorphic rocks and their textures*. Longman, Harlow.
- **Harker A.**, (1974). *Metamorphism " A study of the transformation of rock-masses"*, Chapman And Hall, London.

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

- **Best M.G.** (2002). *Igneous and Metamorphic Petrology*, 2nd ed. Blackwell.
- **Bucher K. & Frey M.** (1994) *Petrogenesis of Metamorphic Rocks*.
- **Kretz R.** (1994). *Metamorphic Crystallisation*. John Wiley and Sons, Chichester.
- **Miyashiro A.** (1994). *Metamorphism and Metamorphic Belts*. Unwin Hyman, London.
- **Philpotts A.R.** (1990). *Principles of Igneous and Metamorphic Petrology*. Prentice Hall.
- **Desmons J. & Smulikowski W.** (2007). *A systematic nomenclature for metamorphic rocks. 4. High P/T metamorphic rocks. Recommendations by the IUGS Subcommittee on the systematics of metamorphic rocks*.
- **Spear, F.S.** (1993). *Metamorphic Phase Equilibria and Pressure-Temperature Time Paths*. Mineralogical Society of America, Washington, D.C.

## 3. Electronic Materials, Web Sites etc

- [Journal of Metamorphic Geology](#)
- [MetPetDB](#): A database for metamorphic petrology.
- [Atlas of Igneous and metamorphic rocks, minerals, and textures](#)
- [Introduction to Metamorphic Rocks](#) Dave **Waters**, Department of Earth Sciences, University of Oxford.
- [Phase Equilibria in Metamorphic Rocks](#): Thermodynamic Background and Petrological Applications.

## 4. Other learning material such as computer-based programs/CD, professional standards/regulations

No. of Wk	Lecture Time	Date	Lecture's Title	No. Of Weeks	Contact hours
1	4-5 pm	Sun 24/10/1431 3/10/2010	<b>Introduction to metamorphism: its processes and categories</b>	1	2
	4-5 pm	Tue 26/10/1431 5/10/2010			
2	4-5 pm	Sun 2/11/1431 10/10/2010	<b>Review of the mineralogy of metamorphic rocks</b>	1	2
	4-5 pm	Tue 4/11/1431 12/10/2010			
3	4-5 pm	Sun 9/11/1431 16/10/2010	<b>Classification schemes and metamorphic textures</b>	1	2
	4-5 pm	Tue 11/11/1431 19/10/2010			
4	4-5 pm	Sun 16/11/1431 24/10/2010	<b>Radiometric dating of metamorphic rocks</b>	1	2
	4-5 pm	Tue 18/11/1431 26/10/2010			
5	4-5 pm	Sun 23/11/1431 31/10/2010	<b>The phase rule and composition-assemblage diagrams</b>	1	2
	4-5 pm	Tue 25/11/1431 2/11/2010			
6	4-5 pm	Sun 30/11/1431 7/11/2010	<b>Metamorphic facies</b>  <i>(Hajj vacation from 4/12 to 16/12/1432 H).</i>	1	2
	4-5 pm	Tue 3/12/1431 9/11/2010			
7	4-5 pm	Sun 15/12/1431 21/11/2010	<i>(Hajj vacation from 4/12 to 16/12/1432 H).</i>	1	2
	4-5 pm	Tue 17/12/1431 23/11/2010	<b>Micro-analytical techniques and recalculation of mineral analysis</b>		

8	4-5 pm	Sun 22/12/1431 28/11/2010	<i>First assessment exam</i>	1	2
	4-5 pm	Tue 24/11/1431 30/11/2010	<i>Micro-analytical techniques and recalculation of mineral analysis</i>		
9	4-5 pm	Sun 29/12/1431 5/12/2010	<i>Geothermometry and geobarometry</i>	1	2
	4-5 pm	Tue 1/1/1432 7/12/2010	<i>Contact metamorphism</i>		
10	4-5 pm	Sun 6/1/1431 12/12/2010	<i>Contact metamorphism</i>	1	2
	4-5 pm	Tue 8/1/1432 14/12/2010	<i>Dynamic metamorphism</i>		
11	4-5 pm	Sun 13/1/1432 19/12/2010	<i>Dynamic metamorphism</i>	1	2
	4-5 pm	Tue 15/1/1432 21/12/2010	<i>Metamorphism in subduction zones</i>		
12	4-5 pm	Sun 20/1/1432 26/12/2010	<i>Metamorphism in subduction zones</i>	1	2
	4-5 pm	Tue 22/1/1432 28/12/2010	<i>Ocean-floor metamorphism</i>		
13	4-5 pm	Sun 27/1/1432 2/1/2011	<i>Ocean-floor metamorphism</i>	1	2
	4-5 pm	Tue 29/1/1432 4/1/2011	<i>Metamorphism in collision zones</i>		
14	4-5 pm	Sun 4/2/1432 9/1/2011	<i>Metamorphism in collision zones</i>	1	2
	4-5 pm	Tue 6/2/1432 11/1/2011	<i>Meteorite impacts and shock metamorphism</i>		
15	4-5 pm	Sun 11/2/1432 16/1/2011	<i>Metamorphic and tectonic evolution of the Arabian Shield</i>	1	2
	4-5 pm	Tue 13/2/1432 18/1/2011	<i>Second assessment exam</i>		

		18 -29 / 2/1432	<b>1<sup>st</sup> semester Final Exams starting and ending dates.</b>		
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N.B.:

- ♣ *1<sup>st</sup> semester course starting date on Sat. 16/10/1431 corresponding to 25/9/ 2010-10-02.*
- ♣ *- Al Adha vacation starts on Wed. 4/12/1431 – 10/11/2010.*
- ♣ *- Commencing the semester study session by Mon. 16/12/1432 -22/11/2010.*
- ♣ *- 1st semester exams will start on 18/2/1432 – 22/1/2011.*
- ♣ *- Med year vacation will start by Wed. on 29/2/1432 -2/2/2011.*
- ♣ *- Commencing date of the Second semester session will be on Sat. 9/3/1432H-*