



**Faculty of Earth Sciences**



**Department of Mineral Resources & Rocks  
3rd & 4th Years Program**



**The Geological Society**  
*Accredited degree courses*

### ***ADVANCED METAMORPHIC PETROLOGY***

<b>Course Name</b>	<b>Course ID</b>	<b>Prerequisite</b>
<b><i>ADVANCED METAMORPHIC PETROLOGY</i></b>	<b><i>EMR 422</i></b>	<b><i>EMR 304</i></b>

#### **Course Description**

Metamorphic facies and their properties. Phase rule. Graphical representation of metamorphic rocks. Thermodynamic applications in metamorphic rocks. Metamorphic reactions in pelitic, mafic and carbonate rocks. Examples and geologic description of metamorphic areas. Metamorphic rocks in the Arabian shield.

#### **Course Objectives**

1. Different types of metamorphic facies and the main characteristic minerals in each of them.
2. To know the relationship between metamorphic facies and metamorphic zones.
3. Understanding the different types of metamorphic reactions and metamorphic models.
4. What is meant by phase rule and its application?
5. How to represent the metamorphic minerals and rocks in representative diagrams?
6. To follow the mineralogical changes associated with the progressive metamorphism of calcareous, pelitic, mafic and ultramafic rocks.
7. To understand the relationship between metamorphism and plate tectonic.
8. To apply what we learn from this course on an example of metamorphic rocks in KSA.

**General References for the Course:** (Books/Journals...etc.)

Students in this course can read from:

1. *An Introduction to Metamorphic Petrology*, by Yardley, B.W.D., 1989. New York.
2. *Equilibrium Thermodynamics in Petrology*, by Powell, R., 1978. Harper and Row, London
3. *Metamorphic Phase Equilibria and Pressure-Temperature-Time Paths (Monograph)*, by Spear, 1993. Mineralogical Society of America.
4. *Petrogenesis of Metamorphic Rocks, 6th Edition (Complete Revision of Winkler Textbook)*, by Bucher K., and Frey M., 1994. Springer-Verlag.

### **List of URLs for this Course**

- <http://www.usgs.gov/>

### **Course Outcome**

The student is able to know the metamorphic processes that separate within the earth (examples from Saudi Arabia).

1. Student can know the meaning of phase rule and its applications.
2. Student can understanding the different types of metamorphic reactions.
3. Student can be able to understand the mineralogical changes associated with progressive metamorphism of calcareous, pelitic and mafic-ultra mafic rocks.
4. Student can know the relationship between metamorphic and plate tectonics.