



Faculty of Earth Sciences



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



The Geological Society
Accredited degree courses

INTRODUCTION TO MINERALOGY

Course Name	Course ID	Prerequisites
Introduction to Mineralogy	<i>EMR 202</i>	None

Course description

The course includes the following topics: Atoms and ions – Types of chemical Bonds – Introduction to crystal chemistry – Definition and characteristics of crystals – Crystal symmetry (axis of symmetry, plane of symmetry, center of symmetry, complete symmetry formula) - crystallographic axes and axial angles – Intercepts, parameters and Miller indices – Cubic system (Hexoctahedral class) – Tetragonal system (Ditetragonal bipyramidal class) – Hexagonal system (Dihexagonal bipyramidal class) – Orthorhombic system (orthorhombic bipyramidal class) – Monoclinic system (Monoclinic prismatic class) – Triclinic system (Triclinic pinacoidal class). Isomorphism – Polymorphism – Pseudomorphism - Physical properties of minerals (Optical properties, Cohesive properties, Sense properties, specific gravity, magnetic, electric and radioactive properties)- Classification of minerals - Origin of minerals – Description of Native minerals, sulphides, sulphates, Oxides, Halides, Carbonates, Phosphates, and silicates. The course also includes laboratory work and exercises concerning description and identification of crystal forms and systems and physical properties of minerals.

Course objectives:

- 1- Understand crystallography and the basis of crystal classifications
- 2- Know the properties that allow a material to be classified as a mineral
- 3- Understand the importance of minerals to society and to the study of Geosciences
- 4- Identification of the diagnostic physical and optical properties of minerals
- 5- Understand the linkage between macroscopic properties and a mineral's internal structure, history and evolution.

General references for course: (Books/Journals...etc.)

- 1- Phillips, F.C. (1971) Introduction to crystallography, 4th Edition, Oliver and Boyd, Edinburgh
- 2- Helmy, M.E. (2000). Mineralogy. Al Anglo Library, Cairo, Egypt. (in Arabic)
- 3- Klein, C. (2002). Manual of Mineral Science, 2nd Edition, John Wiley and Sons

Internet links:

<http://www.mineralogie.uni-wuerzburg.de/links/crys/crys.html>

<http://www.mineralogie.uni-wuerzburg.de/links/description/description.html>

Course outcome: By the end of this course the students should know the following:

- 1- Student can understand the basis of classification of crystals into seven systems
- 2- Student can be able to describe the crystals (forms, symmetry, crystallographic elements, indices)
- 3- Student can understand the importance of minerals to the society and to the study of other Geosciences modules.
- 4- Student can be familiar with the properties that allow a material to be classified as a mineral
- 5- Student can be able to identify the diagnostic physical and optical properties of minerals and subsequently identify the minerals and,
- 6- Student can understand the major procedures involving in the genesis of minerals.