

Course Type	Course Code	Name of Course	L	T	P	Credit
DP	GLC203	Crystallography and Optical Mineralogy Practical	0	0	2	2

Course Objective

The student will learn the basics of crystallography and its applications to optical mineralogy; X-Ray Diffractometry (XRD) will also enable the student to understand the fundamentals concepts in crystal structure, morphology and its applications to mineral sciences. Optical Mineralogy part will help the student to understand microscopic techniques applicable to mineralogical and petrographic studies.

Learning Outcomes

Upon successful completion of this course, students will be able to:

- Understand the fundamentals of crystallography
- Appreciate the techniques in recognition and identification of minerals under thin section
- Learn XRD technique in mineral identification and use stereographic projection for plotting and understanding crystal data

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Study of crystal models of different classes. Miller indices and zone axis calculations.	3	Recognition of different crystal structures found in minerals. The Laboratory models are of great use in visualizing the crystal geometry of the natural minerals.
2	Stereographic projections of some important crystal classes, axial ratio calculations.	3	Understanding of crystal habits based on stereographic projection system.
3	Determination of cell parameters and d-spacing using XRD data	2	Utility of XRD tool to identify the minerals.
4	Physical properties of common rock-forming and ore-forming minerals in hand specimen.	2	How different types of rocks are identified based on their physical properties.
5	Study of optical properties of minerals under petrological microscope; Determination of optic sign of minerals; Determination of 2V.	2	Students will learn the different optical properties of minerals and identification criteria of minerals.
6	Study of common rock-forming minerals in thin section.	2	To make the students understand to identify the different rock types using petrological microscope.
7	Practical Examination	1	To test the practical knowledge gained during the semester.

Text Books:

1. C. Klein and B. Dutrow. *Manual of Mineral Science*. CBS Publishers & Distributors Pvt. Ltd., New Delhi, 2012.
2. Ernest G. Ehlers. *Optical Mineralogy, Vol. 1: Theory and Technique*. Blackwell, 1987.

Reference Books:

1. Ernest G. Ehlers. *Optical Mineralogy, Vol. 2: Mineral Descriptions*. Blackwell, 1987.
2. W. H. Blackburn and W. H. Dennen. *Principles of Mineralogy*. Universal Book Stall, New Delhi, 1990.