

**B.Sc. (CBCS) Geology - II Year  
Semester - III : Theory Paper - III  
Igneous and Metamorphic Petrology**

(4 hrs/week)

**Credits-4  
(60 hours)**

**UNIT-I**

Nature and scope of petrology – definition of rock, classification of rocks into igneous, sedimentary and metamorphic. Distinguishing features of three types of rocks.

**Igneous Rocks:** Classification into plutonic, hypabyssal and volcanic rocks; Forms – Lava flows, Intrusions, sills, laccolith, dykes, ring dykes, cone sheets, volcanic necks, phacoliths and batholiths.

Structures – vesicular, amygdaloidal, blocky lava, ropy lava, pillow, flow, jointing and sheet structures. Plates, columnar and prismatic structures.

Textures – Definition of texture, micro-structure, devitrification – allotrimorphic. Hypidiomorphic, panidiomorphic, porphyritic, poikilitic, ophitic, intergranular, intersertal trachytic graphic and micro graphic textures.

Reaction structures – corona, myrmekitic, orbicular, spherulitic, pelitic.

**UNIT-II**

Classification of Igneous rocks - CIPW and Tyrrell Tabular classification.

**Descriptive Study of following rock types:** Granite, Granodiorite, Syenite, Nephelinesyenite, Diorite porphyry, Pegmatite, Aplite, Gabbro, Anorthosite, peridotite, Pyroxenite, Dunite, Dolerite, Rhyolite, Obsidian, Trachyte, Andesite and Basalt.

Composition and constitution of magma – Crystallization of Magma, Uni-component, bi-component, eutectic and solid solutions.

Origin of igneous rocks – Bowen's reaction principle, differentiation and assimilation of magma.

**UNIT - III**

**Metamorphic Rocks:** Definition of metamorphism, agents of metamorphism, types of metamorphism, grades and zones of metamorphism. Structures of metamorphic rocks – Cataclastic, maculose, schistose, granulose and gneissose. Textures of metamorphic rocks crystalloblastic, palimpsest, xenoblastic, idioblastic.

**UNIT - IV**

Classification of metamorphic rocks – concept of metamorphic facies. Cataclastic metamorphisms of argillaceous and arenaceous rocks. Thermal metamorphism of argillaceous. Arenaceous and calcareous rocks. Dynamo thermal metamorphism of argillaceous, arenaceous and igneous rocks.

Plutonic metamorphism, metasomatism and its types. Definition of anatexis and palingenesis. Descriptive study of the following metamorphic rocks. Gneiss, schist, slate, phyllite, quartzite, marble, granulite, eclogite, amphibolites, migmatite – Charanokite and Khondalite.

**Practicals: (3 hrs/week)****45 hrs (Credits: 1)**

1. Megascopic Examination of Igneous Rocks and Metamorphic rocks like Granite, Syenite, Diorite, Gabbro, Dolerite, Rhyolite, Basalt, Pegmatite, Schist, Gneiss, Quartzite, Marble, Charnockite and Khondalite.
2. Microscopic examination of Granite, Syenite, Diorite, Gabbro, Dolerite, Rhyolite, Basalt, Pegmatite, Conglomerate, Breccia, Sandstone, Shale, and Limestone. Schist, Gneiss, Quartzite, Marble, Charnockite and Khondalite.

**Text Books:**

1. The Principles of Petrology, G.W. Tyrrell.
2. Petrology - W.T.Huang.

**Reference Books:**

1. Petrology – Turner and Verhooegen
2. Petrology of Igneous rocks – Alok Gupta

