

**SYLLABUS FOR LAB. ASSISTANT (GEOLOGY)****PART I**

1. GENERAL GEOLOGY: Energy in relation to Geo-dynamic activities. Origin and interior of the earth. Dating of rocks by various methods and age of the earth. Volcanoes-causes and products; volcanic belts. Earthquake cause, geological effect and distribution; relation to volcanic belts. Geosynclines and their classification. Island arcs, deep sea trenches and mid-ocean ridges, sea-floor spreading and plate tectonics, Isostasy Mountains-types and origin. Brief ideas and about continental drift, origin of continents and oceans. Earthquake zone of India

II GEOMORPHOLOGY: Basic concept significance. Geomorphic process and parameters. Geomorphic cycles and their interpretation. Relief features; topography and its relation to structures and lithology, drainage systems, significance of weathering in geomorphology, geomorphic features of Indian subcontinent.

III STRUCTURAL GEOLOGY: Stress and strain ellipsoid, and rock, deformation. Mechanics of folding and faulting. Linear and planer structures and their genetics significance. Significance and recognition of unconformities. Tectonic frame-work of India.

IV PALEONTOLOGY: Micro, and macro-fossils, Modes of preservation and utility of fossils. General idea about classification and nomenclature. Organic evolution and the bearing of paleontological studies on it. Morphology, classification and geological history including evolutionary trends of brachiopods, bivalves, gastropods, ammonoids, trilobites, echinoids and corals. Principal groups of vertebrates and their main morphological characters, vertebrates life through ages; Siwalik vertebrates; Gondwana flora and its importance. Types of microfossils and their significance with special reference to petroleum exploration.

V STRATIGRAPHY: Principles of Stratigraphy. Stratigraphic, classification and nomenclature. Standard stratigraphical scale. Detailed study of various geological systems of Indian sub-continent. Boundary problems in stratigraphy. Correlation of the major Indian formations with their world equivalents. Palaeogeographic reconstructions.

**(PART-II)**

1. CRYSTALLOGRAPHY: Crystallography and non-crystalline substance. Special groups. Lattice symmetry. Classification of crystals into 32 classes of symmetry, International system of crystallographic notation. Use stereographic projections to represent crystal symmetry. Twinning and twin laws. Crystal irregularities. Application of X-Rays for Crystal studies.

II OPTICAL MINERALOGY: General principles of optic. Isotropism and anisotropism; concepts of optical indicatrix. Pleochroism; interference colour and extinction. Optic orientation in crystals. Dispersion optical accessories.

III MINERALOGY: Elements of crystal chemistry-types of bondings, Ionic radii-coordination number. Isomorphism polymorphism & pseudomorphism, structural classification of Silicates. Detailed study of rock forming minerals-their physical, chemical and optical properties, uses, if any. Study of the alteration products of these minerals.

IV PETROLOGY: Magma-its generation, nature and composition. Simple phase diagram of binary and ternary systems, and their significance. Bowen's Reaction principle. Magmatic differentiation assimilation. Textures and structures, and their petrogenetic significance. Classification of igneous rocks. Deccan basalts. (a) Sedimentary- Petrography and petrogenesis

of important rock types: Sandstones, limestones and shales (b) Metamorphic- Petrography and petrogenesis of important rock

types: Gneiss, Schist and Slates (c) Igneous- Petrography and petrogenesis of important rock types: Granites, Charnokites and Deccan basalts. Process of formation of sedimentary rocks. Diagenesis and lithification. Textures and structures and their significance. Classification of sedimentary rocks, classic and non-classic. Heavy minerals and their significance. Elementary concept of depositional environments, sedimentary facies and provenance. Petrography and common rock types. Types of metamorphism. Metamorphic grade, Zone and facies. ACF, AKF and AEM diagrams. Textures, structures and nomenclature of metamorphic rocks. Petrography and petrogenesis of important rock types.

V ECONOMICS GEOLOGY: Concepts of ore, ore mineral and gangue, tenor of ores. Processes of formation of mineral deposits. Common forms and structure of ore deposits. Classification of ore deposits. Metallogenetic epochs. Study of important metallic and non metallic deposits, oil and natural gas fields, and coals fields of India. Minor economics National Mineral policy, Conservation and utilization of minerals. Radioactive minerals and their resources in India.

VI APPLIED GEOLOGY: Essentials of prospecting and exploration techniques. Principal methods of mining, sampling, ore-dressing and beneficiation. Application of Geology in Engineering works. Elements of soil and groundwater geology and geochemistry, use of aerial photographs in geological investigations. (a) Strategic, critical and essential minerals, marine mineral resources and laws of the sea. (b) Concepts of watershed management and groundwater provinces of India.

VII ENVIRONMENT GEOLOGY: Concepts of Environmental geology, soil degradation and mitigation, concepts of natural ecosystems and their interrelations and interactions, environmental changes due to influence of human dominated environment. Causes and mitigation of natural and man-induced geo-hazards.



COMMITTED TO EXCELLENCE