CBCC offered by Department of Applied Geology

Earth System Science

Geology: Definitions and Scope.

Earth's materials, minerals and rocks: Broad groups of minerals, oxides, sulphides, carbonates, sulphates and phosphates, silicates. Rocks as mineral assemblages, fabric, texture. Classification of rocks. Igneous rocks; types: acid, intermediate, mafic and ultramafic rocks. Sedimentary rocks; types: clastic and non-clastic. Metamorphic rocks; types: foliated, nonfoliated.

Structure of geologic bodies: Extrusive and intrusive igneous rock bodies, lava flows, sills, dykes, batholiths. Bed and stratum, dip and strike. Folds, antiform, synform, anticline, syncline. Fractures, joints and faults. Foliation, lineation.

The fossil record: Fossils as evidence of past life. Modes of preservation of fossils. Uses of fossils.

Elementary idea of theory of plate tectonics: Basic concepts and geological evidences of continental drift, sea-floor spreading and plate tectonics. Lithosphere, asthenosphere. Plates and plate boundaries, relative motion of plates. Present day configuration of plates. Mid-oceanic ridges, oceanic islands and trenches, hot spots and aseismic ridges. Volcanism and plate tectonics, earthquakes and plate tectonics, continental margins and their evolution. Life cycles of oceans.

Earth's internal processes: Magmatism, metamorphism, deformation. Volcanoes and volcanism, products of volcanic eruption, eruptive styles, volcanic belts, recent volcanism in India.

Earthquakes: Causes, elastic rebound theory, focus and epicenter, intensity and magnitude. Seismic waves, seismograms, travel-time curves for seismic waves, seismic discontinuities, locating epicenter, and determining magnitude. Earthquake belts. Effects of earthquakes, seismic zones of India.

Internal Constitution of Earth: Evidence from seismic waves, meteorites, other lines of evidence. Heat flow, basic concepts, geothermal gradient. Hotspot and mantle plume.

Gravity and gravity anomaly on Earth: Bouger and Free-air anomaly. Concept of isostasy and compensation, hypotheses of Airy and Pratt.