SYLLABI for B.Sc (Hons) in Geology

Makeup Courses, Core Courses & Geological Field Training

1st Year -Semester 1

GEOL-111

Unit - 1: General Geology (a)

Geology - Its evolution to earth system sciences, scope and subdivisions , and its relationship with other branches of science. Earth in the Solar System. Origin and age of the earth - its shape, size, mass, density, etc. Internal structure . Earthquakes and seismic belts.

Unit - 2: General Geology (b)

Volcano and volcanism . Mobile and stable regions of the earth. Isostasy. Magma :types and magmatic provinces. Geohazards.

Unit - 3: Geomorphology (a)

Surface Processes: Weathering and erosion. mass wasting. Kinds of waters. Geological works of underground water , wind, river and river valleys - fluvial deposits. Springs and ice masses.

Unit - 4: Geomorphology (b)

Lake Processes and lakes. Oceans and forms of the ocean floor. Marine environments.

Unit - 5: Quaternary Geology: Divisions of geological records. Quaternary Geology with reference to the Himalayas. Patterns of the earth's history. Quaternary sea level changes, landforms and deposits. Environmental geology & climate change.

Practical ~~121~~: 112:

Study of geomorphic forms. Contour patterns and maps. Drawing of contour profiles. Practical records.

Field Geology: Forms of outcrops, soils ,dip and strike

Viva voce.

1st Year - Semester II

GEOL-121

Unit - 1: Crystallography (a)

Crystalline and non-crystalline substances. Crystals - definition, characteristics, intercepts, parameters, indices and forms. Symmetry elements and classification of crystals. Forms - Seven systems. International Symbols.

Unit - 2: Crystallography (b)

Study of axial relationship. Symmetry elements and forms present in lower classes. Twinning. Fundamentals of stereographic projections of crystals. Zones and zonal laws.

Unit - 3: Mineralogy (a)

Atomic structure of minerals. Physical properties of minerals. Classification of minerals.

Chemical composition of minerals. Silicate structures. Study of olivine, feldspar, pyroxene, amphibole, garnet, feldspathoids and mica groups.

Unit - 4: Mineralogy (b)

Parts of petrological microscope, Optical properties of minerals.

Identification of important rock -forming minerals under the microscope.

Isomorphism and polymorphism

Unit - 5: Geochemistry

Cosmic abundance of elements. Chemical configuration of planets and meteorites. Structure and composition of the earth.

Geochemical classification of elements. Primary geochemical differentiation; Atomic substitution and solid solutions.

GEOL-122

Practical: Study and identification of crystal models pertaining to theory courses.

Megascopic identification of rock- forming minerals

Microscopic identification of rock -forming minerals with the help of optical properties.

Laboratory records

Viva voce.

2nd Year - Semester III

GEOL-231

Unit - 1: Igneous Petrology (a)

Magma : kinds and characteristics. Crystallization and differentiation. Derivatives of magma- binary, and ternary systems.

Introduction to Di-Ab-An ternary system.

Forms, textures, mega- and micro-structures of igneous rocks.

Unit - 2: Igneous Petrology (b)

Bowen's reaction series and its implications.

Classification of igneous rocks. Assimilation processes.

Petrography of granite, pegmatite, syenite, basalt, dolerite, gabbro, dunite, diorite, peridotite, carbonatite, anorthosite and kimberlite and their occurrences in India.

Unit -3: Sedimentary Petrology (a)

Formation of sediments. Sedimentary rocks.
Sedimentary environments.

Unit -4: Sedimentary Petrology (b)

Texture, structure and diagenesis of sedimentary rocks. Classification of sedimentary rocks. Sedimentary basins of India. Petrography of sandstones, conglomerate, shale, limestone and breccias.

Unit-5:Metamorphic Petrology

Agents and types of metamorphism. Textures and structures of metamorphic rocks.

Classification of metamorphic rocks. Zones and grades of metamorphism. ACF and AKF diagrams.

Petrography of important rock types including schists, gneisses, marble, quartzite, slate, phyllites. Typical metamorphic rocks of India and their distribution.

GEOL-232

Practical: Megascopic and microscopic identification of igneous , sedimentary and metamorphic rocks.

Laboratory records

Study on outcrops

Viva voce

2nd Year - Semester ~~III~~ IV

GEOL-241

Unit - 1: Structural Gelogy (a)

Geologic Structures: Folds – classification and geometry.

Top- bottom criteria of deformed strata.

Faults- classification and geometry.

Joints - classification and significance.

Recognition of geologic structures in the field

Unit - 2: Structural Gelogy (b)

Unconformity - types, significance, recognition in the field between fault and unconformity.

Minor structures: Foliation , types and relation with major structures.

Lineation - types and relation with major structures.Salt domes

Unit 3: Tectonics (a)

Tectonic movements – Epeirogeny and orogeny. Types of mountain belts.Characteristics and origin of fold mountains with special reference to the Himalayan fold belt. Geosynclines. Mobile belts.

Unit 4: Tectonics (b)

Plate tectonics –types of plate boundaries and motions . Mid-oceanic ridges. Island arcs.

Continental drift – evidences and causes. Sea-floor spreading.

Unit - 5: Marine Geology

Relief of ocean floor. Marine sediments and their classification. Marine resources. Sub -marine canyons, Sea mounts .Coral reefs.

GEOL-242

Practical: Map study - Interpretation of structures and stratigraphy. Drawing of geologic sections; Completion of outcrops. Three point problems. Problems related to strata thickness and depth.

Laboratory records.

Viva voce.

(O.P.Varma)
Former Professor & Head,
Applied Geology, ISM, Dhanbad

(Madhumita Das)
Professor&Former, Head,
Department of Geology,
UtkalUniversity,Bhubaneswar,

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RGU,Doimukh,Itanagar