



Department of Geology
University College of Science,
Osmania University

Scheme of Instructions for B.Sc. Regular
(as per the CBCS and Semester System to be Implemented from the
academic year 2016-2017)

Year	Semester	Paper	Paper Code	Title of the paper	Hours Per Week	Exam Duration
I Year	I	I		Physical Geology & Mineralogy	4	3
	II	II		Crystallography Optical Mineralogy	4	3
II Year	III	III		Igneous and Metamorphic Petrology	4	3
	IV	IV		Sedimentary Petrology & Structural Geology	4	3
III Year	V	V		Indian Geology & Paleontology	3	3
		VI	Elective Paper-I	Hydrogeology / Environmental Geology	3	3
	VI	VII		Economic Geology	3	3
		VIII	Elective Paper- II	Mineral Exploration / Mining Geology & Mineral beneficiation	3	3

B.Sc. I - Year - Semester - I
Paper – I - Physical Geology & Mineralogy

Unit - I

Physical Geology: General aspects, Definition of Geology – Basic assumptions of Geology – Its relationship with other sciences – Branches of Geology – Aim and Applications of Geology. Earth as a Planet: Its shape, size, and density – movement and their effects. Origin and age of earth. Geological process – exogenic and endogenic, Definition of weathering – Types of weathering of rocks – physical and chemical; Definition of erosion and denudation, cycle of erosion; erosion, transportation and deposition; agents of erosion. Rivers: Erosion, Transportation and deposition of river (fluvial) cycle in different stages – Development of typical land forms by river erosion and deposition. V-shaped valley. Waterfall, alluvial form, meander, ox-bow lake-flood plane, natural plane, peneplain and deltas. Types of rivers.

Unit – II

Glaciers: Definition of a glacier – types of glaciers – development of typical land forms by glacial erosion and deposition – cirque, U-shaped valley – changing valley, Rocks monadnocks. Morains, drum-line - Eskors and Varves, Characteristic features of glaciated regions.

Groundwater – storage, of ground water – porosity, permeability aquifer, water table, zone of saturation, artesian well, spring, geysers development of typical land form by erosion and deposition by groundwater (Karst topography) sinkhole, cavern, stalactites and stalagmites.

Unit - III

Seas: offshore profile – land forms of sea – marine deposits and coral reefs Lacustrine deposits, Atmospheric circulation, weather and climatic changes, land air, interaction. Earth's heat budget and global climatic changes. Wind: Development of characteristic features by wind (arid cycle) erosion and deposition – pedestal rock-mushroom topography Incelberg – Ventifacts – locus – sand dunes. Earth movements – definition of diastrophism, epirogenic and orogenic movements – Mountains. Geosynclines. Basic concepts of isostasy, continental drift and plate tectonics. Earthquakes: Causes kinds of earthquake waves, and mode of propagation, intensity of earthquakes, Richters scale – seismograph and scismogram. Effects of earthquakes, earthquake zones – Interior of the earth. Volcanoes: Origin, products of Volcanoes.

Unit - IV

Mineralogy: Definition of mineral– classification of minerals into rock forming and ore forming minerals. Physical properties of minerals – colour, streak, play of colours, opalescence, asterism, transparency, luster, luminescence, specific gravity, magnetic properties, Electrical properties, pyro and piezo electricity. Modes of Minerals Formation: Occurrence and association of Minerals. Chemical properties of minerals – Isomorphism, solid solution, polymorphism, allotrophy, pseudomorphism, radioactivity; silicate structures. Descriptive Mineralogy: Study of physical properties, chemical properties and mode of occurrence of the following mineral groups.

Nesosilicate : Olivine, Garnet, Aluminum silicates; Sorosilicate : Epidote

Cyclosilicate : Beryl; Inosilicate :Pyroxene; Amphibole; Phyllosilicate : Mica, Hydrous magnesium silicate; Tectosilicate : Feldspars, Feldspathoids and quartz; Miscellaneous : Staurolite, Tourmaline, zircon, Calcite, Corundum, Apatite

Practicals

1. study of physical properties and diagnostic features of the following minerals viz., Quartz, Jasper, Agate, Chalcedony, Amethyst, Orthoclase, Microcline, Albite, Anorthite, Tremolite, Asbestos, Muscovite, Biotite, Phlogopite, Olivine, Epidote, Garnet, Kyanite, Sillimanite, Andalusite, Beryl, Zircon, Apatite, Corundum, Talc, Gypsum Calcite, Fluorspar and Serpentine.
2. Study of important geomorphological models and charts..

Text Books

1. Hollmes Principles of Physical Geology by D.L.Holmes (1978).
2. Physical Geology by A.N.Stracher (1981).
3. Putnam's Geology 4th Edt. By E.E. Larson and P.W. Birkeland (1982).
4. Basic Physical Geology by E.S.Robinson (1982).
5. The evolving Earth: A text in Physical Geology by E.S.Sawkins et al., (1978).
6. Physical Geology by B.F.Mallory and D.N.Gargo (1979).
7. Rutley's elements of mineralogy - H.H.Reed.
8. Manual of mineralogy - C. S.Hurlbut and C.Klein.
9. Mineralogy for students - M.H.Batey.
10. An introduction to rock forming minerals - Deer, Howie, and Zussman.
11. Elements of mineralogy - Mason and Berry.

B.Sc. I - Year - Semester - II
Paper – II - Crystallography and Optical Mineralogy

Unit - I

Crystallography : Definition of a crystal – amorphous and crystalline states, Morphology of Crystals – face, edge, solid angle, interfacial angle. Forms: Simple, combination, closed, and open forms. Symmetry: Plane, axis, centre, crystallographic axes, Parameters, indices; crystallographic notation – parameter system of Weiss, index system of Miller.

Unit - II

Classification of Crystals into 7 Systems. Morphological study of the following classes of symmetry. Cubic system – Normal (Galena type); Tetragonal system – Zircon type; Hexagonal system – Beryl type.

Unit - IV

Trigonal system- Calcite type; Orthorhombic system – Barytes type ; Monoclinic system – Gypsum type; Triclinic system – Axinite type; Twinning in crystals – Definitions of twin plane, twin axis, and composite plane.

Unit - III

Optical Mineralogy: Petrological microscope (polarizing) its mechanical and optical parts behavior of isotropic and anisotropic minerals between crossed nicols – extinction, pleochroism, interference colours. Optical properties of important minerals.

Practicals

1. Study of Symmetry Elements of Seven Crystal Systems
2. Study of optical properties of following minerals.
Quartz, Orthoclase, Microcline, Plagioclase, Augite, Hornblende, Hypersthene, Muscovite, Biotite, Garnet, Olivine, Chlorite, Kyanite, Silliminite, Leucite, Calcite.

Text Books

1. A text book of mineralogy E.S.Dana and W.E.Ford.
2. Elements of Crystallography - F.A..Wade & R.B.Mattox.
3. Elements of Mineralogy - Rutlelys.
4. An introduction to Crystallography - R.C.Phillips.
5. Essential of Crystallography - E.Flint.
6. Rutleys Elements of mineralogy - H.H.Reed.
7. Optical Crytstallography - Wahlstorm.
8. Atlas of rock forming minerals in their sections - machenzic Guford.
9. Manual of optical mineralogy - Shelley.