Gujarat University
(Recognised by University Grants Commission)

SYLLABUS
(As per the Guidelines of UGC)

For Graduate Degree in

GEOLOGY
(Earth Sciences)
(In force from June, 2011)

Three Years – Six Semester studies leading to degree of
Bachelor in Science (B. Sc.)
based on
Choice Based Credit System (CBCS)

Submitted by
Department of Geology
M. G. Science Institute
Navrangpura
Ahmedabad – 380 009.

February, 2011.

GUJARAT UNIVERSITY

Design and Structure of Geology (Earth Sciences) UG Courses for Choice Based Credit System to be implemented from February 2011

Department	Semester	Course		No. of Hours per week		
		No.	Name	Lectures	Practicals	Total
Geology	1	GEL101	General and Physical Geology, Mineralogy	4		4
		GEL102 PR	Mineralogy Lab.		3	3
			Total	**4**	**3**	**7**
	2	GEL103	Optical Mineralogy, Crystallography and Petrology	4		4
		GEL104PR	Optical Mineralogy, Crystallography and Petrology Lab.		3	3
			Total	**4**	**3**	**7**

F. Y. B.Sc.

Semester I

GEOLOGY - THEORY and PRACTICALS

Course-wise detail syllabus

GEL 101: General and Physical Geology, Mineralogy

Unit	Course details
Unit –1	EARTH AS A PLANET: General principles of geology as a science. Branches & scope of subject. Earth as a member of solar system – shape, size, mass and density of the earth – its movements. Origin of the earth – review of the different theories. Origin of the universe and evolution of the solar system.
Unit –2	EARTH'S INTERNAL STRUCTURE: Earth's internal structure, constitution, composition and formation. Brief introduction to Radioactivity and age of the Earth. Introduction to Convection in the earth's interior and earth's magnetic field. Elementary ideas of continental drift and plate tectonics.
Unit - 3	PHYSICAL GEOLOGY: Weathering, erosion, denudation, transportation and deposition. Introduction to Geological agents – Glaciers, Rivers, Lakes, Winds.
Unit - 4	MINERALOGY: Chemical bonding and compound formation. Definition, Classifications and Physical properties of minerals.

Reference Books:

1) Introduction to Physical Geology, A. K. Datta, Kalyani Publisher, New Delhi.
2) A Text Book of Geology, P. K. Mukerjee, World press.
3) A Text Book of Geology with Special Reference to India, G. B. Mahapatra.
4) General Geology, V. Radhakrishnan (1987), V.V.P. Publishers, Tuticorin.
5) Geomorphology, Enayat Ahmed, Kalyani Publisher, New Delhi.
6) Principles of Geomorphology, W. D.Thornbury (1969), John Willey Inc.
7) Principles Physical Geology, Arthur Holmes (1978), ELBS.
8) Engineering and General Geology, Parbin Singh (1994), S.K. Kataria and Sons, Delhi.
9) Rutley's Elements of Mineralogy, H. H. Read, CBS publishers.
10) Introduction to Rock Forming Minerals, R. A. Deer, R. E. Howie and J. Zussman (1978), The English Language Book Society.

GEL 102 PR: Mineralogy Lab.

Course details
Study of the physical properties of the minerals – Megascopic identification of the following common rock forming minerals: Quartz, amethyst, chalcedony, agate, jasper, orthoclase, microcline, plagioclase, muscovite, biotite, garnet, hornblende, augite, tourmaline, olivine, chlorite. Ores – magnetite, hematite, chromite, pyrolusite, pyrite, galena, sphalerite, bauxite. Determination of specific gravity of minerals – by Walker Steel Yard Balance and Jolly's spring Balance.

F. Y. B.Sc.

Semester II

GEOLOGY - THEORY and PRACTICALS

Course-wise detail syllabus

GEL 103: Physical Geology, Mineralogy and Petrology

Unit	Course details
Unit –1	DYNAMICS OF THE EARTH: Volcanoes – types, causes, effects, products and distribution. Earthquakes – causes, classification, intensity, effects, seismic belts, seismograph and seismogram, prediction. Mountains – causes, types, distribution.
Unit –2	OPTICAL MINERALOGY: Nature of light, Phenomenon of polarisation, Reflection, Refraction, Double refraction, Properties of isotropism, anisotropism. Construction of Nicol prism, Petrological microscope and its parts. Passage of light through Nicol prism.
Unit - 3	CRYSTALLOGRAPHY: Definition, Characteristics, Laws of Crystallography, Interfacial angle, Elements of symmetry, Parameters system of Weiss and Miller Indices. Classifications of crystals.
Unit - 4	PETROLOGY: Magma: Definition, composition, origin; Definition and classification of rocks **Igneous rocks:** Origin, classification, common textures, composition and uses. **Sedimentary rocks:** Origin, classification, consolidation, diagenesis, fabric and textures, composition and uses. **Metamorphic rocks:** Agents, origin, classification, textures, composition and uses.

Reference Books:

1) Elements of Optical Mineralogy, N. H. Winchel, A. N. Winchel (1968), Willey,
2) The Principles of Petrology, G. W. Tyrell (1960), Asia Publishing House.
3) Petrology, W. T. Haung (1962), Mc. Graw Hill.
4) Dana's Text Book of Mineralogy, Revised by W.E. Ford, Wiley Eastern Ltd., New Delhi.

GEL 104 PR: Optical Mineralogy, Crystallography and Petrology Lab.

Course details
Identification of the following minerals in thin sections – Quartz, orthoclase, microcline, plagioclase, muscovite, biotite.
Classification of crystals in to six types. Study of Elements of Symmetry of Eleven (11) types of symmetry.
Megascopic identification of typical rocks: Granite, Syenite, Gabbro, Rhyolite, Basalt, Conglomerate, Sandstone, Shale, Limestone, Quartzite, Marble.