SYLLABUS

M. Sc. First Year (Semester I)
GEOLOGY

M1GEO01-CT01 Core Course – I : Tectonics and Geomorphology No. of Credits : 4

Unit - I

Internal Constitution of the Earth, heterogeneity of the earth's crust as determined by seismic, gravity and magnetic characters. Continental drift: - Geological and geophysical evidences, mechanism and present status.

Unit - II

Features associated with oceanic crust, mid-oceanic ridges, gravity and magnetic anomalies at mid oceanic ridges, Deep sea trenches, Island arcs and Volcanic arcs, Paleo-magnetism.

Unit - III

Theory of Plate Tectonics, Plate Tectonics and Seismicity, seismic belts of the earth, Continental shield areas and mountain chains.

Unit- IV

Basic principles of Geomorphology, Weathering,and erosion pathogenesis, mass movement, erosion, transportation and deposition. Geomorphic landforms: fluvial, glacial, aeolian, eolian, coastal and karst.

Unit- V

Geomorphic mapping and slope analysis, drainage, basin analysis, Applications of geomorphology in mineral prospecting, civil engineering and environmental studies.

Recommended Books:

Badgely, P.C., *1965: Structure and Tectonics. Harper and Row.*
Keary, P. and Vine, F.J., *1990: Global Tectonics. Blackwell*
Moores, E and Twiss. R.J., *1995: Tectonics. Freeman*
Storetvedt, K.N., *1997: Our Evolving Planet: Earth's History in Prespective. Bergen (Norway), Alma Mater Fortag*
Summerfied, M.A., *2000: Geomorphology and Global tectonic. Springer Verlag.*
Valdia, K.S., *1988: Dynamic Himalaya. Universities Press, Hyderabad*

M. Sc. First Year (Semester I)
GEOLOGY

M1GEO02-CT02 **Core Course – II : Mineralogy** **No. of Credits : 4**

Unit- I

Polarized light, Nicol prism and working of petrological microscope. Study of orthoscopic and conoscopic properties of minerals. Optical accessories and their use. Uniaxail and biaxial indicatrix and interference figures.

Unit- II

Systematic mineralogy- structure, mineral chemistry, P.T. stability, Physical and optical properties, mode of occurrence of Olivine, garmet, pyroxene and amphibole group of minerals.

Unit- III

Study of Mica, feldspar, silica and nepheline group of minerals with respect to their chemical composition, crystal structure, P-T stability, physical and optical properties and mode of occurrence.

Unit- IV

Mineralogical study of non-silicates such as spinel, sulfide, sulfate, halides, Phosphate and carbonate (calcite, aragonite, dolomite) group of minerals.

Unit- V

Study of precious and semiprecious minerals. Introduction to X-Ray, Bragg's Law Application of X-ray to the study of minerals.

Recommended Books:

Deer, W.A., Howise, R.A. and Zussman, J. *1996: The Rock Forming Minerals. Longman*
Hutchinson, C.S., *1974: Laboratory Handbook of petrographic Techniques. John Wiley*
Klein, C. and Hurlbut, Jr., C.S., *1993: Manual of Mineralogy. John Wiley*
Krauskopf, K.B., *1967: Introduction to Geochemistry. McGraw hill*
Phillips, wm, R. and Griffen, D.T., *1986: Optical Mineralogy, CBS Edition*
Putnis, Andrew, *1992: Introduction to Mineral Sciences. Cambridge University Press*
Spear, F.S.*1993: Mineralogical phase Equilibrium and Pressure – Temperature- Time Paths. Mineralogical Society of America Publ.*

M. Sc. First Year (Semester I)
GEOLOGY

M1GEO03-CT03 Core Course – III : Palaeontology –I No. of Credits : 4

Unit I

Origin of life, origin of metazoan, nomenclature, and Classification, species concept, Migration dispersion and extinction of animals and plants.

Unit II

Mechanism and evidence of evolution. Evidences of life during Precambrian, major events in the history of Paleozoic life. Elements of Palaeoecology and limiting environmental factors.

Unit III

Paleobiogeographic provinces. Collection, preparation and preservation of fossils, Outline of classification of invertebrates. Classification and significance of micropaleontology.

Unit IV

Foraminifers: Morphology, Classification, evolution, geological history, and palaeoecology. Graptolites : morphology, systematic position, evolution, palaecoecology and geological history

Unit V

Trilobite: Morphology, Growth stages, evolutionary trends, geological history and palaeoecology. Echinoid Morphology, Change in symmetry, variation in oculogenital system, ambulacral areas and compound plates, classification, evolution and geological history.

Recommended Books:

Age, D.V., 1980: *Introduction to palaeoecology. McGraw Hill*
Clarkson, E.N.K., 1998: *Invertebrate paleontology and Evolution. IV Ed. Blackwell*
Colbert, E.H. *Outline of the Vertebrates. Johan Wile & Sons*
Glaessner, M.F, 1972: *Principals of Micropalaeontology. Hafner publishing Company.*
Kathal, P.K. 1998*: Microfossils & their applications. C B S Publishers & Distributors. Treatise on Intertebrate palaeoecology (Separate parts for different Classes)*
Moore, R.C., Lalicker, C.G. and Fisher, A.G*.: Invertebrate Fossils. McGraw Hill*
Shrock and Towenhofel : *Principal of invertebrate palaeoecology.*
Smith, A.B., 1994: *Systematic and the Fossils Record – Documneting Evolutionary Pattern. Blackwell*
Swinnerton, H.H.: *Outlines of palaeoecology.*

M. Sc. First Year (Semester I)
GEOLOGY

M1GEO04-CT04 Core Course – IV : Precambrian Stratigraphy No. of Credits : 4

Unit I

Early history of the earth Nature and evolution of early crust. Nature and form of early life. Evolution of Granite- Greenstone and Granulites belts. Archean and Proterozoic tectonic patterns. Major Stratigraphic breaks and events in Stratigraphy. Episodic nature of the stratigraphic records.

Unit II

Methods of Correlation of Precambrian rocks. Indian Stratigraphic code. Principles of lithostratigraphy. Sequence Stratigraphy. Seismic Stratigraphy, Event Stratigraphy. Geochronology and Chronostratigraphy.

Unit III

Precambrian Stratigraphic belts. Precambrian Geology of Greenland, Canadian Shield, Rhodesian Craton, Western Australia and Baltic Shield with their equivalents in Indian shield.

Unit IV

Precambrian province of India and their Stratigraphic correlation, succession, structure geochronology and economic importance of Dharwar, Singhbhum, Aravalli, Bundelkhand and Sausar – Sakoli.

Unit V

Proterozoic Sedimentary Basins of India: Palaeoproterozoic- Mesoproterzoic and Neoproterzoic – Igneous Intrusions- Evolution of Purana Basins.

Recommended Books:

Goodwin, A.M., 1991: *Precambrian Geology: The Dynamic Evolution of Continental Crust. Academic Press*

Gupta V.J. 1977: *Indian Precambrian Stratigraphy. Hindusthan Publishing Corporation Ltd.*

Krishnan M.S*. : Geology of India and Burma. Higginbothams (P) Ltd.*

Lemon R.R. 1990: *Principles of Stratigraphy. merrill Publishing Company.*

Naqvi, S.M. and Rogers , J.J.W., 1987: *Precambrian Geology og India, Oxford University Press*

Rankama, K.1967: *The Precambrians, Vol 1,2 &3. Interscience Publishers, John Wiley & Sons Inc.*

Ravindra Kumar 1988; *Fundamentals of Historical Geology and Stratigraphy of India. New Age International Publishers.*

M. Sc. First Year (Semester I)
GEOLOGY

M1GEO05-CP01 Core Course PRACTICAL – I No. of Credits : 4
(Tectonics and Geomorphology , Mineralogy)

Tectonics and Geomorphology:
1. Identification and description of various landforms.
2. Morphometric analysis of drainage basins.
3. Studies of drainage patterns.
4. Exercises on Slope analysis.

Mineralogy:-
1. Principles of stereographic projection and determination of axial ratio.
2. Identification of minerals in hand specimen.
3. Microscopic properties of minerals with emphasis on pleochroic scheme, identification of interference figures and optical sign, determination and measurement of 2V.

Viva-Voce
Record

M. Sc. First Year (Semester I)
GEOLOGY

M1GEO06-CP02 Core Course PRACTICAL – II No. of Credits : 4
(Palaeontology, Precambrian Stratigraphy)

Palentology:
Drawing, description, age and identification of important fossils of Trilobites, Echinoids, Foraminifers and Graptolites

Stratigraphy:
1. Identification, description and geochronology of Indian Pre-cambrian stratigraphic rocks.
2. Pre-cambrian Stratigraphic maps of India.
3. Pre-cambrian Palaeogeographic maps of India.

Viva-Voce
Field work
Record

Compulsory Field Training Program : Geological Field Training mainly based on stratigraphy and palaentological aspects. – 10 days duration
Note: **Field Training is Compulsory, Student not taking part in the field training shall not be allowed to appear in the examination**