

M. Sc. First Year (Semester I) : 2019-20
GEOLOGY

Course S.No.	Course Code	Title of Course	L-T-P	No. of Credit	Max. Marks		Total	
					Univ. Exam	Inter. Exam		
1	M1GEO01-CT01	Core Course – I Tectonics and Geomorphology	3-1-0	4	80	20	100	
2	M1GEO02-CT02	Core Course – II Mineralogy	3-1-0	4	80	20	100	
3	M1GEO03-CT03	Core Course – III Palaeontology -I	3-1-0	4	80	20	100	
4	M1GEO04-CT04	Core Course – IV Precambrian Stratigraphy	3-1-0	4	80	20	100	
5	M1GEO05-CP01	Core Course PR– I (Tectonics and Geomorphology & Mineralogy)	0-0-8	4	80	20	100	
6	M1GEO06-CP02	Core Course PR– II (Palaeontology & Precambrian Stratigraphy)	0-0-8	4	80	20	100	
TOTAL					24	480	120	600

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

Moore, E and Twiss. R.J., 1995: Tectonics. Freeman

Storetvedt, K.N., 1997: Our Evolving Planet: Earth's History in Perspective. Bergen (Norway), Alma Mater Forlag

Summerfield, 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. Uniaxial 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, garnet, 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., Howie, 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, W.M., 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, palaeoecology 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 Townehofel : Principal of invertebrate Palaeoecology.

Smith, A.B., 1994: Systematic and the Fossils Record – Documenting 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- Mesoproterozoic and Neoproterozoic – 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 of 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
(Tectonics and Geomorphology & Mineralogy)**

No. of Credits : 4

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

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M1GEO06-CP02

Core Course PRACTICAL – II
(Palaeontology I & Precambrian Stratigraphy)

No. of Credits : 4

Palaeontology I:

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

Precambrian 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

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