M. Sc. First Year (Semester II)
GEOLOGY

M2GEO01-CT05 Core Course – V : Structural Geology No. of Credits : 4

Unit- I

Primary sedimentary and igneous structures, Gravity related features and their usefulness in structural analyses. Unconformities and basement cover relationship. Principles of geological mapping, projection diagrams.

Unit-II

Stress, Strain, Stress-strain relationship of elastic, plastic and viscous materials. Mechanical behaviour of rocks. Measurement of strain in deformed rocks.

Unit-III

Folds: Geometry, classification, mechanism of folding. Superimposed folds: occurrence, recognition and geometric analyses. Time relationship between crystallization and deformations.

Unit-IV

Faults: Geometry, classification, mechanism of faulting. Shear zones, Shear sense indicators, shear zone kinematics. Role of fluids. Joints: Relation of joints and fractures to strain field.

Unit-V

Cleavage: Types, origin, mechanics and relationship with folding. Lineation: Types, origin and deformation. Basic principles of structural analyses.

Recommended Books:

Badgely, P.C., *1965: Structure and Tectonics. Harper and Row.*
Bayly B., 1992: *Mechanics in Structure Geology. Springer Verlag*
Davis, G.R., 1984*: Structural Geology of Rocks and Region. John Wiley*
Ghosh S.K., 1995*: Structural Geology Fundamentals of Morder Development. Persimmon Press*
Hobbs, B.E., Means, W.D. and Williams, P.F*., 1976: An Outline of Structural Geology, John Wiley*
Price, N, J. and Cosgrove, J.W., *1990: Analysis of Geological Structure. Cambridge univ. Press.*
Ramsay, J.G., *1967: Folding and Fracturing of Rocks. Mc Graw Hill.*
Ramsay, J.G. and Huber, M.I., *1987: Modern Structure Geology, Vol. I & II. Academic Press*

M. Sc. First Year (Semester II)
GEOLOGY

M2GEO02-CT06 Core Course – VI : Sedimentary Petrology No. of Credits : 4

Unit – I

Weathering & Erosion; Sediment transport: modes of transport, fluid flow, movement of particles, settling velocity of sediments, transport types, Textures and sedimentary structures and their significance.

Unit – II

Classification, nomenclature and genesis of sedimentary rocks. Clastic rocks: Conglomerate, Breccia, Sandstone, and Shale. Non clastic rock: Limestone and Dolomite. Evaporite, Phosphorite, Chert, Iron and Manganese rich sediments.

Unit – III

Sedimentary environment and facies models-Marine, Non -Marine and Mixed environments.

Unit – IV

Tectonics and sedimentation, Classification, definition and description of sedimentary basins, Paleocurrent analysis and its application in basin analysis. Sedimentary basins of India.

Unit – V

Stratigraphy and Sedimentation. Concepts of stratigraphy, Vertical and lateral relationships, subsurface correlation. Modern concepts in stratigraphy.

Recommended Books:

Allen, J. R. L., 1985 *Principles of Physical Sedimentation, George Allen & Unmin*
Cover, R.E.1971 : *Procedures in Sedimentary Petrology. Wiley Interscience, John Wiley*
Davis, R.A. Jr., 1992: *Davis, R.A. Jr., 1992: Depositional System. Prentice Hall*
Einsele , G., 1992: *Sedimentary Basins. Springer Verlag*
Friedman, G.M. and Sander, J.E., 1978: *Principles of Sedimentology. John Wiley*
Guy Plint, A., 1995: *Sedimentary Facies Analysis. Spi. Publ IAS No. 22 , Blackwell*
Miall, A.D., 2000: *Principles of Sedimentary Basins Analysis, Springer Verlag*
Nichols, G., 1990: *Sedimentology and Stratigraphy. Blackwell*
Pettijohn, F.J., Potter, P.E. and Siever, R., 1990: *Sand and Sandstone. Springer Verlag*
Prothero, D.R. and Schwab, F., 1996 : *Sedimentary Geology. Freeman*
Reading, H.G., 1996: *Sedimentary Environments. Blackwell*
Reineck, H.E. and Singh, I.B., 1980: *Depositional Sedimentary Environments. Springer Verlag*
Sengupta, S., 1997: *Introduction to Sedimentology. Oxford – IBH*
Tucker, M., 1988: *Techniques in Sedimentology. Blackwell*

M. Sc. First Year (Semester II)
GEOLOGY

M2GEO03-CT07 Core Course – VII : Palaeontology – II No. of Credits : 4

Unit I

Antozoan: Morphology, evolution, Palaeoecology and geological history of Tetracoralla, hexacoralla and tabulata.

Unit II

Bivalve: Evolution of hinge and dentition, adaptive modification of foot, mantle and pallial sinus, Classification, palaeoecology and geological history.

Gastropoda: Morphology, forms, twisting of nervous system, various apertures, evolutionary trends, classification, palaeoecology and geological history.

Unit III

Cephalopoda: Classification and siphuncle of cephalopods. Ammonite: Morphology, ornamentation and type of sutures, evolutionary theories about ammonite and geological history of Ammonite. Nautiloidea: Morphology, variation of conchs of nautiloidea, Morphology of Coleidea.

Unit IV

Brachiopoda: Morphology variation in brachial skeleton, pedical opening and commissure, Study of important Indian Gondwana plant fossils.

Unit V

Outline of classification of vertebrates, Significance of vertebrate paleontology, Sequence of vertebrates through geological ages. Evolutionary history of man, elephant and horse.

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 II)
GEOLOGY

M2GEO04-CT08 Core Course – VIII: Phanerozoic Stratigraphy No. of Credits : 4

Unit –I

Nomenclature ,classification, distribution, structures, succession, sedimentary history, fauna, flora, age, igneous intrusion, palaeogeography, palaeoclimate and regional correlation of the Paleozoic sediments of India: Permian- Triassic boundary.

Unit- II

Nomenclature, classification, distribution, structures, succession, sedimentary history, fauna, flora, age, igneous intrusion, palaeogeography, palaeoclimate and regional correlation of the Gondwana Supergroup of India.

Unit- III

Nomenclature, classification, distribution, structures, succession, sedimentary history, fauna, flora, age, igneous intrusion, palaeogeography, palaeoclimate and regional correlation of the Mesozoic marine rocks Cretaceous/ Tertiary (K/T) Boundary.

Unit- IV

Deccan Volcanic Province: Stratigraphy, Field Features of Basalt Flows, Regional Volcano-Plutonic Complexes, petrology and petrogenesis, Age and Duration of Volcanism.Inter-Trappeans and associated sedimentary Formations

Distribution Palaeobiogeography,Stratigraphy and Sedimentation Faunam, Trend of Life, Tectonic Setting and Structure,Correlation and Age of Siwaliks.

Unit – V

Nomenclature classification distribution magmatic activity, succession, sedimentary history, fauna, flora, age, igneous intrusion, palaeogeography, palaeoclimate and regional correlation of the Tertiary rocks. Geology of offshore basins of India.

Recommended Books:

Gupta V.J. 1973 : *Indian Palaeozoic Stratigraphy. Hindusthan Publishing Corporation*
Gupta V.J. 1975: *Indian Mesozoic Stratigraphy. Hindusthan Publishing Corporation*
Gupta V.J. 1976: *Indian Cenozoic Stratigraphy. Hindusthan Publishing Corporation*
Krishnan M.S*. : Geology of India and Burma. Higginbothams (P) Ltd.*
Moullade, M. and Nairn, A.E.M., 1983: *Vol. I: Palaeozoic; Vol. II Mesozoic A & B; Vol. III: Cenozoic. Elsevier.*
Pomerol, C., 1982 : *The Cenozoic Era: Tertiary and Quaternary. Ellis Harwood Ltd.*
Ravindra Kumar 1988; *Fundamentals of Historical Geology and Stratigraphy of India. New Age International Publishers.*

M. Sc. First Year (Semester II)
GEOLOGY

M2GEO05-CP03 Core Course PRACTICAL – III No. of Credits : 4
(Structural Geology, Sedimentary Petrology)

Structural Geology :- 35

1. Solution of structural problems by stereographic and orthographic projections.
2. Identification of structural elements and their chronology in hand specimen.
3. Structural analysis with stereonet: S-pole and beta-pole diagrams; Fold axis and axial plane; Countoured diagrams; Methodology and interpretation of patterns.
4. Interpretation of complex geological maps and drawing of cross sections.

Sedimentary Petrology:

1. Identification and description of important sedimentary rocks in hand specimen.
2. Petrographic studies of important sedimentary rocks.
3. Graphic representation of data, histogram, cumulative curves, frequency curves, rose diagram, star symbols.

Viva-Voce
Field work
Record

M. Sc. First Year (Semester II)
GEOLOGY

M2GEO06-CP04 Core Course PRACTICAL – IV No. of Credits : 4
(Palaeontology-II & Phanerozoic Stratigraphy)

Palaentology – II :

Drawing, description, age and identification of important fossils of Anthozoa, Bivalvia, Brachiopoda, Gastropoda, Cephelopoda and Gondwana Plant fossils.

Phanerozoic Stratigraphy:

Identification, description and geochronology of Indian phanerozoic stratigraphic rocks.
Phanerozoic Stratigraphic maps of India.
Phenerozoic Palaeogeographic maps of India.

Viva-Voce
Record

Compulsory Field Training Program : Geological & Structural Mapping Training – 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**

M. Sc. First Year (Semester II)
GEOLOGY

M2GEO07-SE01 Skill Course Elective - Application of GIS No. of Credits : 2

GIS Fundamentals and Applications

Hardware and Software

Spatial Data and Map Projection

Data base

Data Capture, Conversion, Linking, Quality

GIS Operations