

THE SYLLABUS/COURSE STRUCTURE OF M.Sc. (GEOLOGY) UNDER CHOICE BASED CREDIT SYSTEM

w.e.f. – 2018-2020 Session

FIRST SEMESTER

Paper I (GEOLF 01) –FOUNDATION - Basics of Geology -5 Credits (Teaching 5 hours per week and minimum 60 teaching hours). **Time -3 hours; F. M. -70**

Instructions-In all NINE questions of equal value will be set out of which an examinee shall have to answer FIVE questions. Q.N. 1 will be compulsory consisting of SEVEN very short answer type questions, each of TWO marks covering the entire syllabus.

. Continental drift- evidences, causes, mechanism, and present status. Sea floor spreading- mid oceanic ridges, magnetic and gravity anomalies, deep sea trenches, island and volcanic arc. Plate tectonics –types of plate boundaries, causes of plate motion, relation of plate tectonics with seismicity, volcanism and diastrophism.

Concept of stress and strain. Two dimensional stress and strain analysis. Types of strain ellipses and ellipsoid, their properties and geological significance. Nomenclature, Classification, causes and mechanism of folding.. Classification, causes and mechanism of faulting.

Paper II (GEOLC 02) CORE 1- Crystallography, Optical Mineralogy, Systematic Mineralogy, Geomorphology, 5 Credits (Teaching 5 hours per week and minimum 60 teaching hours)- **Time -3 hours; F. M. -70**

Instructions-In all NINE questions of equal value will be set out of which an examinee shall have to answer FIVE questions. Q.N. 1 will be compulsory consisting of SEVEN very short answer type questions, each of TWO marks covering the entire syllabus.

Crystallography

Crystallography- introduction. International system of crystallographic notation- Miller system and Hermann- Mauguin system. Symmetry elements & common forms of normal classes of all the systems. Point group, lattice and space group. Twinning and twinning laws, crystal imperfection.

Optical Mineralogy

General principles of mineral optics. Isotropism and anisotropism. Important optical properties of mineral – R.I and relief, colour and pleochroism, interference colours, birefringence, extinction, optic axial angle. Optical properties of minerals in relation to crystallography. Dispersion and optic anomalies. Behavior of Uniaxial and Biaxial minerals under convergent polarized light. Uses of accessory plates.

Systematic Mineralogy

Structure and classification of silicates. Atomic structure, mineral chemistry, P-T stability, properties, paragenesis and occurrence of the following silicate mineral groups: Olivine, Pyroxene, Amphibole, Clay, Feldspar

Geomorphology .

Land forms in relation to lithology and structure. Morphometric analysis. Fluvial land forms, drainage pattern and its significance. Aeolian processes and land forms. Glacial processes and land forms. Coastal geomorphology. Karst topography. Application of geomorphology in mineral prospecting, civil engineering and environmental studies.

Paper III (GEOLC 03) CORE 2- Sedimentology, Palaeobiology-5 Credits (Teaching 5 hours per week and minimum 60 teaching hours).

Time -3 hours; F. M. -70

Instructions-In all NINE questions of equal value will be set out of which an examinee shall have to answer FIVE questions. Q.N. 1 will be compulsory consisting of SEVEN very short answer type questions, each of TWO marks covering the entire syllabus.

Sedimentology

Texture – clastic and non-clastic texture, Mechanical analysis of sediments: concept of grain size and grade, graphical representation of grain size and statistical parameters; Palaeocurrent analysis; Classification and description of sandstone; Concept of sedimentary facies. Sequence stratigraphy.

Palaeobiology

Morphology and geological records of Brachiopoda, Lamellibranchia, Trilobita, Foraminifera,. Evidence of life in Precambrian time. Applications of micropaleontology in petroleum exploration. Evolution of Horse .

Books recommended:

- Principles of Geomorphology—W.D.Thornbury
- Geomorphology-Bloom
- Applied Geomorphology – J.R. Helis
- Holme’s Principles of Physical Geology—P. McL D. Duff
- Structural Geology -- M.P. Billings
- Folding and fracturing of rocks—J.G.Ramsay
- Techniques of Modern Structural Geology (vol. 1 & 2)—Ramsay & Huber
- An outline of structural Geology-Hobbes, Means and Williams
- Structural geology: fundamentals of modern developments – S.K. Ghosh ?
- Structural Geology of Rocks & Regions—Davis & Reynolds
- Dynamic Himalaya -- K. S. Valdiya
- Plate Rectonics and Crustal Evolution – Kent. C. Condie
- Theory of evolving continents: Windley
- Plate Tectonic : By M.Wilson

- Geomorphology and global tectonics- M. A. Summerfield
 - Invertebrate palaeontology and evolution – E.N.K. Clarkson
 - Principles of Palaeontology—David M. Raup & Steven M. Stanley
 - Principles of Invertebrate palaeontology – Shrock and Twenhofel
 - Sedimentary Rocks—F.J. Pettijohn
 - A Practical Approach to Sedimentology – R.C.Lindholm
 - Principles of Basin Analysis – A.D.Maill
 - Geology of India – Vaidyanadhan and Ramakrishnan
 - Introduction to Sedimentology- S.M.Sengupta
 - Applied Sedimentology – R.C.Selley
 - Sedimentary Petrology: An Introduction – M.E. Tucker
 - Carbonate Sedimentology – M.E. Tucker
 - Principles of physical sedimentation-Allen, J R L
 - Depositional sedimentary environments – H.E. Reineck and I.B. Singh

Paper IV (GEOLP 04) Practical -5 Credits (Teaching 10 hours per week and minimum 120 teaching hours). F. M. - 70

1. Calculation of axial ratio of common crystal forms of tetragonal systems.
2. Identification of common rock forming minerals under petrological microscope.
3. Geological cross-section of maps and their interpretation.
4. Identification of important invertebrates, vertebrates, microfossils and plant fossils
5. Grain-size analysis on log probability graph paper.
6. Megascopic and microscopic study of important sedimentary rocks.