

BACHLOR OF SCIENCE (GEOLOGY)

3rd SEMESTER

DISCIPLINE SPECIFIC COURSE -3 (CORE-3)

GL321C: GEOLOGY: SEDIMENTOLOGY AND STRATIGRAPHY

CREDITS: THEORY-4, PRACTICAL-2

MAXIMUM MARKS: THEORY: 60, PRACTICAL: 30

MINIMUM MARKS: THEORY: 24, PRACTICAL: 12

THEORY (4 CREDITS: 60 HOURS)

Objective/Expected learning outcomes:

The students will gain an understanding of the processes involved in the formation of sedimentary rocks, their textures, structures, classifications and their importance. The study of stratigraphy and Palaeontology encompasses the aspects of the age of the earth, chronological arrangement of rocks and appearance and evolution of life through the geologic time. The knowledge of the concepts in stratigraphy, correlation, and palaeontology would enable the students to understand the changes that occurred in the history of the earth and relate them to their field observations and also, in understanding the framework of the stratigraphy of India. The students will be exposed to the principles of stratigraphy including order of superposition. They will also be able to identify primary sedimentary structure and their depositional environments. Upon completion of this course, students will be able to identify sedimentary rocks and their depositional environments with stratigraphic sequence and their paleontological aspects.

CREDIT -1 (15 HOURS)

Sedimentary rocks: Process involved in formation of sedimentary rocks: erosion, transportation, deposition, diagenesis and lithification. Texture: size, roundness, sphericity, surface texture fabric, porosity and permeability. Grain size analysis, grade scale, sieving method: types, use and methods. Sedimentary Structures: Primary, secondary and biogenic. Major primary structures: cross bedding, cross lamination, horizontal bedding, graded bedding, sole marks, ripple marks, rain prints and dunes. Classification of clastic and non-clastic rocks: Rudaceous, Arenaceous, Argillaceous and calcareous.

CREDIT -2 (15 HOURS)

Palaeontology: Origin and evolution of the life through ages; Geological time scale; Preliminary idea about faunal succession. Fossils, their characters, conditions necessary for fossilization; types of preservation and occurrence. Application of Palaeontology. Evolution of Man, Horse & Elephant. Morphology characters, geological, geographical and stratigraphic distribution of the following: (1) Brachiopoda (2) Bivalvia (3) Gastropoda (4) Cephalopoda (5) Graptoloida (6) Anthozoa (7) Echinoidea (8) Trilobita. Introduction to micropaleontology and microfossils and their application.

CREDIT -3 (15 HOURS)

Elementary ideas about Foraminifera, Ostracoda, Radiolarian and Conodonts. Elementary concept of vertebrate Palaeontology with special reference to Siwaliks. Introduction to Palaeobotany with special reference to Gondwana plant fossils. Extinction of organisms with special reference different hypothesis for the extinction of dinosaurs. Introduction to Palynology and its applications. Application of Paleontological data in paleogeographic reconstructions. Paleontological evidence in favour of continental drift.

CREDIT-4 (15 HOURS)

Stratigraphy: introduction, nomenclature and Principles. Stratigraphic correlation; imperfection of geological record. Brief introduction to Precambrian rocks of India; Dharwar, Aravalli, Cuddapah, Vindhyan and Himalayas with special emphasis to the classification, distribution, lithology and economic deposits. Stratigraphy of Phanerozoic rocks with reference to the lithology and fossil content. Palaeozoic succession of Kashmir, Triassic of Spiti, Jurassic of Kuch, Cretaceous of Tiruchirapalli. Stratigraphy of Siwaliks and Karewas of Kashmir.

PRACTICAL (2 CREDITS: 60 HOURS (MAXIMUM MARKS: 30, MINIMUM MARKS: 12))

Sedimentology: Study in hand specimen and under microscope of the mineral composition, textures and structures of important sedimentary rocks as included in theory paper.

Palaeontology: Study of morphological characters of the selected genera- Brachiopoda, Bivalvia, Gastropoda, Cephalopoda, Trilobita, Echinoidea, Graptoloidea and Anthozoa.

SUGGESTED READINGS:

- Arnold, C. A., 1947: An introduction to Paleobotany. McGraw - Hill Book Co.
- Bignot, G., 1985: Elements of Micropaleontology. Graham and Trotman.
- Brasier, M. D., 1980: Microfossils. George Allen & Unwin.
- Collinson, J. D., 1999: Sedimentary Structures. Springer Verlag.
- Einsele, G., 1992: Sedimentary Basins. Springer Verlag.
- Friedman, G. M. and Sanders, J. E., 1978: Principles of Sedimentology. John Wiley.
- Krishnan, M. S., 1968: Geology of India and Burma. Higginbothams Pvt. Ltd., Madras.
- Kumar, R., 1998: Fundamentals of Historical Geology and Stratigraphy. Wiley Eastern Limited.
- Miall, A. D., 1999: Principles of Sedimentary Basin Analysis. Springer-Verlag.
- Pettijohn, F. J., Potter, P.E. and Siever, R., 1990: Sand and Sandstone. Springer Verlag.
- Reading, J. G. 1996: Sedimentary Environment and Facies. Blackwell.
- Selley, R. C., 1976: Introduction of Sedimentology. Academic Press, London.
- Selley, R. C., 1976: Introduction of Sedimentology. Academic Press, London.
- Sengupta, S., 1997: Introduction to Sedimentology. Oxford-IBH.
- Sengupta, S., 1997: Introduction to Sedimentology. Oxford-IBH.
- Shrock & Twenholf, 1987: Principles of invertebrate Paleontology. CBS Pub., N. Delhi.
- Weller, J. M., 1960: Stratigraphy Principles & Practice. Harper & Row Pub.