

**CENTRAL UNIVERSITY OF KERALA
DEPARTMENT OF GEOLOGY
M.Sc. GEOLOGY**

Course Code	EGE 5203	Semester	II
Course Title	Sedimentology		
Credits	3	Type	Core

This is a participatory, experimental and employability based skill development course for sedimentological techniques.

Course Description

Sedimentology is the study of sediments and sedimentary rocks and the processes by which they are formed. The course will provide an understanding of sedimentary processes, collection and analysis of sedimentary data. It also develops an understanding of the processes involved in the formation and diagenesis of sedimentary rocks. The course deals with the analysis of deposits from a variety of continental, marginal marine and marine sedimentary environments using various sedimentary techniques. This course develops the skills needed to make interpretations of sedimentary successions, decipher sedimentary processes, past environmental conditions and provenance of sediments.

Course Outcome

By the end of the course, students are expected to be able to:

- Describe and interpret sedimentary rocks and their depositional environment.
- Describe and illustrate the various types of sedimentary structures and relate these to the processes which are responsible for these structures.
- Summarise the composition and properties of sedimentary rocks and justify the classification schemes used for these sediments.
- Evaluate the physical, chemical and biological processes that lead to sedimentary rock formation under different environmental conditions.
- Be conversant with the principal environments in which sediments are deposited and be able to identify these in the geological record on the basis of their distinguishing features.
- Interpret sedimentary processes based on the composition of the rock and sedimentary structures.
- Identify the depositional environment of sediments (i.e. continental; shallow and deep marine)
- Identify sedimentary deposits that are characteristic of various types of sedimentary basins

Course Structure

Module - 1

Fluid flow and sediment transport- Reynolds number, Froude Number, Hjulstrom's diagram. Sedimentary Textures: Concept of grain size and classification. Grain size estimation: direct measurement, sieving and settling methods. Modern methods- Laser diffraction analysis. Frequency distribution and grain size (statistical) parameters. Grain shape and fabric. Sedimentary structures: Classification and origin- depositional structures, deformational structures, erosional structures and biogenic structures. Applications of sedimentary structures in paleo-environmental and paleocurrent studies.

Module – 2

Sedimentary Petrology: Mineralogy, classification and depositional environments of conglomerate, sandstone, limestone and mud rock. Diagenesis of clastic and non-clastic rocks- diagenetic processes and diagenetic environments. Provenance studies: mineral stability, mineralogical maturity and mobility. Use of heavy minerals in provenance studies.

Module – 3

Depositional environments - marine, non-marine, and mixed depositional environments. The association of primary sedimentary structures and textural characteristics with depositional environments and settings. Concept of sedimentary facies, association models. Walther's Law of correlation of sedimentary facies. Types and classification of sedimentary basins. Basin analysis. Sedimentary basins of India.

Evaluation & Grading

Skill development (Analytical, Writing and Presentation) – 20%

Class Test – 20%

End Semester Assessment – 60%

References

- Blatt, H., Middleton, G.V. and Murray, R.C. (1980). Origin of Sedimentary Rocks, Prentice-Hall Inc., 768p.
- Collins, J.D. and Thompson, D.B. (1982): Sedimentary Structures, George Allen and Unwin, London, 194p.
- Gary Nichols (2016) Sedimentology and Stratigraphy. Wiley India, 336p.
- Lindholm, R.C. (1987). A Practical Approach to Sedimentology, Allen and Unwin, London, 160p.
- Miall, A.D. (2000). Principles of Basin Analysis, Springer-Verlag, 616p.
- Pettijohn, F.J. (1975). Sedimentary Rocks (3rd Ed.), Harper and Row Publ., New Delhi, 718p.
- Prothero, D.R. and Schwab, F., (2003) Sedimentary Geology. W. H. Freeman; 2nd edition, 593p.
- Reading, H.G. (1997). Sedimentary Environments and facies, Blackwell Scientific Publication, 615p.
- Reineck, H.E. and Singh, I.B. (1973): Depositional Sedimentary Environments, Springer-Verlag, 439p.
- Sam Boggs Jr (2016). Principles of Sedimentology & Stratigraphy. Pearson Education India, 568p.
- Selley, R. C. (2000). Applied Sedimentology, Academic Press, 523p.
- Sengupta, S.M. (2015). Introduction to Sedimentology. CBS Publications, 339p.
- Tucker, M.E. (1981). Sedimentary Petrology: An Introduction, Wiley and Sons, New York, 272p.
- Tucker, M.E. (1990). Carbonate Sedimentology, Blackwell Scientific Publication, 482p.