Sedimentology

1.1. Course Number: GE313

1.2. Contact Hours: 3-0-0 Credits: 9

1.3. Semester Offered: 3rd Year-Even

1.4. Prerequisite: Basic knowledge of geology, Physics, and chemistry

1.5. Syllabus Committee Members: Dr. Alok Kumar Singh & Dr. Hemant Kumar Singh

2. Objective: The course aims to understand the Sedimentary processes, weathering, various flow regimes of sediments, classification of sedimentary rocks and textures, and paleocurrent analysis.

3. Course Content: Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-topics	Lectures
1	Origin of sediments	Physical and chemical weathering, soils and paleosols, Geological Rock cycle.	6
2	Sediment granulometry	Grain-size scale, particle size analysis and connotations; particle shape and fabrics	4
3	Sedimentary Flux regimes	Sediment transport mechanism-types of flow (Newtonian and Non-Newtonian), Reynold's Numbers, Froude; Number, laminar and turbulent flow, subcritical, critical, and supercritical flows, concept of mean flow velocity, flow profile and flow separation, particle entrainment, transport, and deposition, bedform stability diagram. Sediment-gravity flow—types and deposits.	7
4	Diagenesis and Sedimentary rocks	Concepts of diagenesis, processes and stages of diagenesis, dolomites and dolomitization, mudrocks, Components and classification(s) of conglomerates, sandstones, carbonate rocks and iron formations, General outline of controls on deposition of sandstones and carbonate rocks, Argillaceous rocks and their classification and genesis, Volcaniclastic sediments and their characteristic.	9
5	Sedimentary Structures	Bedforms and sedimentary structures, sedimentary structures in Paleocurrent analysis, Sedimentary texture, textural parameters, and their significance. Textural and compositional maturity.	7
6	Paleoenvironment and basin analysis	Application of radioactive and stable isotopes in the reconstruction of paleoenvironments. Basin Analysis: Sedimentary basins and their classification, basin analysis	7

		(maps, cross-sections, petrofacies, geological history, applications), Tectonics and Sedimentation: Sedimentation in orogenic belts and cratons, plate tectonics and sedimentation (sedimentation divergent margins, convergent margins, transform margins) secular changes in the sedimentary record.	
		Total	**40**

4. Readings:

4.1. Textbook:

- Babu, S. K. & Sinha, D. K. (1987): Sedimentary Petrology Practical, CBS Pub., N. Delhi.
- Blatt, M. and Murray (1980): Origin of sedimentary rocks, Printice Hall Inc.
- Blatt, H. E., (1972): Sedimentary Petrology, 2nd Ed. W. H. Freeman & Co. New York.
- Pettijohn, F. J. (1975): Sedimentary rocks, Harper and Row Publ., New Delhi.
- Reading, H. G. (1986): Facies. Blackwell Scientific Publication.
- Reinbeck, H. E. & Singh, I. B. (1980): Depositional Sedimentary Environments. Springer

4.2. Reference Books:

- Boggs, Sam (Jr.) (1996): Princiles of Stratigraphy and Sedimentology. 2nd Ed. Prentice Hall.
- Selly, R. C. (1976): An Introduction of Sedimentology. Academic Press London.
- Sengupta, S. M. (2007): Introduction of Sedimentology. 2nd Ed. CBS Pub., New Delhi.
- Sukhtankar, R. K. (2004): Applied Sedimentology. 1st Ed. CBS Pub. & Dist., New Delhi.
- Tucker, M. E. (1981): Sedimentary Petrology: an introduction. John Willey & Sons, New York.

5. Outcome of the course:

After the successful completion of the course, the students will be able to:

- Explain the Sedimentary Processes, weathering and description and classification of sedimentary rocks.
- Recognize the Sedimentary texture and Siliciclastic rocks

- Enlighten the Non-siliciclastic rocks and environments, Paleoenvironment analysis and Basin Analysis.