

Sequence Stratigraphy

1.1. Course Number: GE513

1.2. Contact Hours: 3-0-0

Credits: 9

1.3. Semester Offered: 5th Year-Odd

1.4. Prerequisite: Geology, Sedimentology

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

2. Objective: The main aim of this is to reconstruct how sediments filled a basin and thereby, how the stratigraphy was formed through space and time.

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

Unit	Topics	Sub-topics	Lectures
1	Introduction	Introduction and historical perspective, Review: litho vs. chrono stratigraphy, Foundations of sequence stratigraphy, Concepts and Principles of Sequence Stratigraphy, Sedimentary Basins, relative sea level & sediment supply, Key surfaces and stratal patterns, Order and duration of sequences, application and significance of sequence stratigraphy.	10
2	Fundamentals of sequence stratigraphy	Depositional sequence, boundaries and its types, condensation and starvation, conformity and unconformities, Flooding surface, maximum flooding surface, marine flooding surface, parasequence, parasequence boundary, parasequence set, System tracts (lowstand system tract, transgressive system tract, transgressive surface and highstand system tract, overlap, offlap, toplap and onlap), aggradation, progradation, retrogradation, transgression and regression, sea level changes, sediment supply, basin subsidence rate, and accommodation	15
3	Sequence Models	Depositional sequence, Genetic stratigraphic sequence, Transgressive-Regressive sequence, Hierarchy of sequences and bounding surfaces.	6
4	Geophysical Techniques	Seismic Stratigraphy, Geophysical Well Logs and Sequence Stratigraphy, Sequence stratigraphy in outcrop & core.	4
5	Sequence Stratigraphy in Hydrocarbon Exploration	Sequence stratigraphy of hydrocarbon reservoirs, Applications to source rocks exploration, Application of sequence stratigraphy in clastic and carbonate depositional	5

		systems, Case studies of applicability of sequence stratigraphic concepts for understanding petroleum plays.	
			Total
			40

4. Readings:

4.1. Textbook:

- Catenuanu, O. Principles of Sequence Stratigraphy, Elsevier, Amsterdam, 2006
- Emery, D. and Myers, K.J. Sequence Stratigraphy, Blackwell, Oxford, U.K., 1996
- Miall, A.D. The Geology of Stratigraphic Sequences, Springer-Verlag, Berlin, 1997.

4.2. Reference books:

- Miall, A.D. Principles of Sedimentary Basin Analysis, 3rd edition, Springer-Verlag, Berlin, 2000
- Payton, C.E., 1977. Seismic Stratigraphy- Applications to Hydrocarbon Exploration, Memoir of the American Association of Petroleum Geologists 26, Tulsa, Oklahoma.

5. Outcome of the course:

On successful completion of the course, the student will be able to:

- understand basic concept of sequence stratigraphy, different types of depositional environments and system tract.
- understand what dissimilar sources of sediments are filled in basins.
- Know the application of sequence stratigraphy in hydrocarbon exploration.