

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
DSE-9 Applied Stratigraphy (L3, P1)	4	3	0	1	12 th pass with science	Studied Earth System Science and Structural Geology, Hydrogeology or Equivalent

Learning Objectives: To make students understand concepts of dynamic stratigraphy, how eustasy, sediment supply and tectonics control a basin filling history in space-time domain. Additionally, how magnetic signature and isotopic values help in the analysis of basin filling history.

Learning Outcome: After taking this course students will be able to cope up with the need of oil/gas industry, sustainable energy and use of isotope geochemistry. Students will be ready for cutting-edge research

SYLLABUS OF DSE-9

Theory 45 hours

Unit I: Sequence Stratigraphy (12 hours)

Historical developments. Definitions and key concepts. Base level changes, Geomorphic and Stratigraphic base level. Transgressions and regressions, T-R cycles. Stratigraphic surfaces: Stratal terminations, sequence stratigraphic surfaces; surface and sub-surface signature Unconformity and correlative conformity, Ravinement surface, Initial and maximum flooding surface. Systems Tracts: Lowstand, Transgressive, Highstand, Falling stage.

Unit II: Sequence models and their application in hydrocarbon sector (11 hours)

Sequence Models: Depositional sequence (Type I, 11, III), Genetic stratigraphic sequence, Transgressive-Regressive sequence. Hierarchy of sequences and bounding surfaces. Application of sequence stratigraphy in hydrocarbon exploration; stratigraphic trap delineation. Concepts of event stratigraphy.

Unit III: Magnetic Stratigraphy (11 hours)

Principles, Earth Magnetism, The magnetization process, Inclination, Declination Paleomagnetism, Magnetic epochs, magnetic properties of marine sediments. Fundamentals of reversal magneto-stratigraphy, The Plio-Pleistocene reversal record. Magnetic stratigraphy of Cenozoics

Unit IV: Isotope stratigraphy (11 hours)

Geochemistry of stable isotope (C, O, S). Application of stable isotopes: Oxygen and hydrogen in Paleothermometry, and Paleoclimatology. Carbon in modern biosphere, sedimentary rocks of Precambrian age, and marine and nonmarine sediments.

Practicals (30 hours)

1. Problems on paleoenvironmental interpretation
2. Problems on sequence stratigraphic surfaces (unconformity, BSRF, Correlative conformity, Transgressive surface, Maximum flooding surface)
3. Problems of stratigraphic correlation and identification of proximal-distal relationship
4. Problems involving different branches of stratigraphy

Suggested Readings:

1. Sequence Stratigraphy: D. Emery, and K. Meyers (1996) Blackwell Publishers
2. Principles of Sequence Stratigraphy Octavian Cateneanu (2006) Elsevier
3. Basin Analysis: Principles and Applications: P. A. Allen and J.R. Allen (1990) Blackwell Publishing
4. The geology of stratigraphic sequences: A.D. Miall (1997) Springer