

Semester	AUG 2022
Open to semester	7,21
Course code	<b>EC4153/EC6314</b>
Course title	<b>Sequence Stratigraphy</b>
Credits	3 /4
Course Coordinator & participating faculty (if any)	Alok Dave
Nature of Course	Lectures and Tutorials
Pre-requisites	Basic knowledge of Sedimentology and General Geology
Objectives (goals, type of students for whom useful, outcome etc)	<p>Sequence stratigraphy is the most recent and revolutionary paradigm in the field of sedimentary geology, and completely revamps geological thinking and methods of stratigraphic analysis. The concepts embodied by this discipline have resulted in a sea change in geological thinking and in particular, the methods of facies and stratigraphic analyses. In recent times, this approach has been embraced by geoscientists as the preferred style of stratigraphic analysis, which has served to tie together observations from many disciplines. As opposed to the other, more conventional types of stratigraphy, such as biostratigraphy, lithostratigraphy, chemostratigraphy or magnetostratigraphy, which are mostly concerned with data collection, sequence stratigraphy has an important built-in interpretation component which addresses issues such as (i) the construction of the allogenic controls at the time of sedimentation, and (ii) predictions of facies architecture in yet unexplored areas.</p> <p>In fact, a key aspect of the sequence stratigraphic approach is to encourage the integration of data sets and research methods. Blending insights from a range of disciplines invariably leads to more robust interpretations and consequently, scientific progress. Thus, the sequence stratigraphic approach has led to improved understanding of how stratigraphic units, facies tracts, and depositional elements relate to each other in time and space within sedimentary basins.</p> <p>Sequence stratigraphy builds on many exciting data sources. It requires a good knowledge of sedimentology and facies analysis, fills the gap between sedimentology, basin analysis, and the various types of conventional stratigraphy. The study includes integration of disciplines including sedimentology,</p>

	<p>facies analysis, depositional systems, biostratigraphy, well logs, seismic, tectonics and basin analysis among others. Seismic stratigraphy, which is the precursor of modern sequence stratigraphy, was specially designed to facilitate the exploration of hydrocarbons. The methods of seismic and sequence stratigraphy are now increasingly popular, and routinely employed as part of the exploration strategies for other natural commodities as well, including coal and mineral resources. What used to be an exclusive asset of the petroleum industry, has been proven to have value for all types of exploration, and the mining industries too are now making use of the genetic benefits of the sequence stratigraphic approach. For these reasons, sequence stratigraphy is currently one of the most active areas of research in both academic and industrial environments.</p>
<p>Course contents (details of topics /sections with no. of lectures for each)</p>	<ul style="list-style-type: none"> <li>• Overview</li> <li>• Early developments</li> <li>• Definition</li> <li>• Core concepts</li> <li>• Accommodation and shoreline shifts</li> <li>• Base level</li> <li>• Shoreline trajectories- Transgression and regression</li> <li>• New approaches- Stratigraphic sequences</li> <li>• Well logs</li> <li>• Seismic data</li> <li>• Unique/non unique stratal geometries</li> <li>• Stratal stacking patterns in downstream/ upstream controlled settings</li> <li>• Sequence stratigraphic units</li> <li>• Sequence stratigraphic surfaces</li> <li>• Systems tracts</li> <li>• Sequence Models</li> <li>• sequences in fluvial systems</li> <li>• sequences in coastal to shallow-water systems</li> <li>• sequences in deep water clastics</li> <li>• Scales in sequence stratigraphy</li> <li>• Sequence stratigraphic hierarchy</li> <li>• Sequences in Carbonate Systems</li> <li>• Depositional sequences in Indian Petroliferous basins</li> </ul> <p>Basics : (4) Introduction, Definitions , Stratigraphic Contacts ,Accommodation and shoreline shifts,Accommodation and</p>

	<p>shoreline shifts , Downstream and upstream controlled areas , Base level, Shoreline trajectories, Well logs</p> <p>Seismic Stratigraphy : (2) Seismic data , Stratal terminations</p> <p>Shoreline Trajectories : (4)Stratal geometries and stratal stacking patterns in downstream settings , Normal regression , Forced regression , Transgression ,</p> <p>Stratal stacking patterns in upstream settings , Stratigraphic surfaces</p> <p>Sequence stratigraphic surfaces : (4) Subaerial unconformity , correlative conformity, BSFR and RSME, MRS,MFS , TRS,WRS</p> <p>Systems Tracts : (3) Highstand systems Tract , Falling Stage systems Tract, Case study – FSST , Lowstand systems Tract , Transgressive Systems Tract, condensed sections</p> <p>Sequence models : (5) Systems Tracts in upstream setting, Parasequences ,Genetic and T/R sequences, Sequences in Fluvial systems ,</p> <p>Sequences in coastal to shallow water clastic systems , Sequences in Deep water systems , Case study, Scales in sequence stratigraphy and sequence stratigraphic hierarchy</p> <p>Carbonate sequence stratigraphy: (2)</p> <p>Sequence stratigraphic studies in Indian petroliferous basins (2)</p>
<p>Evaluation /assessment</p>	<p>End-Sem Examination-40%</p> <p>Mid-Sem Examination-30%</p> <p>Others-Internal assessment = 30 % (class test =20%, tutorial = 10%)%</p>
<p>Suggested readings (with full list of authors, publisher, year, edn etc.)</p>	<p>Material will be provided by the instructor</p>