

Introduction to Geo-Engineering Applications in Conventional and Unconventional Hydrocarbon Reservoirs

Overview

Broad Area: Integrated Rock Mechanics and Petrophysics, Reservoir Geomechanics, Reservoir Characterization, Petroleum Geostatistics

1. Overview

This course will examine the theory and applications of petroleum geomechanics and petroleum geostatistics at fundamental and advanced levels. Primary focus will be on the integration of Petrophysical, Geomechanical and Seismic measurements applied to both conventional and unconventional hydrocarbon reservoirs.

We will also discuss the applications of rock mechanics in conventional and unconventional hydrocarbon reservoir characterization at various levels. Light will be shed on the application of these core concepts in Coalbed Methane and Shale and Tight Sand Reservoirs.

2. Objectives

The course will provide a comprehensive background in Geomechanics and Geostatistics applied to both Conventional and Unconventional Hydrocarbon Reservoirs.

The participant will gain competency in the physics and mathematics behind these core concepts and obtain a unique 'hands on learning' experience using some associated software package for Geomechanical and Geostatistical Characterization of Hydrocarbon Reservoirs.

The outcomes of this course will be,

- Comprehension of geological and physical nature of Hydrocarbon Reservoirs
- Understanding of the theory and application of Rock Mechanics in Reservoir Characterization
- Understanding of the Integration of Petrophysical, Geomechanical and Seismic Measurements
- Comprehension of core concepts of Geostatistical modeling and its applications

Modules	<p>November 11th Monday Module A: Petrophysics Lecture 1: 9:30 to 10:30 AM Stress, Strain, Elasticity, Poroelasticity, Petrophysical properties Lecture 2: 11:00 AM to 12:00 PM Failure Mechanics, Geological aspects of Rock Mechanics Lecture 3: 2:00 to 3:00 PM Fundamentals of Reservoir Geomechanics Lecture 4: 3:30 to 4:30 PM Stresses around borehole, Borehole failure criteria</p> <p>November 12th Tuesday Module B: Geomechanics and Wellbore Stability Lecture 5: 9:30 to 10:30 AM Reservoir Compaction: Subsidence and Well Problems Lecture 6: 11:00 AM to 12:00 PM Mechanical Earth Model, Single and Multi-Dimensional Modelling approaches <i>Tutorial: Problem solving session with examples (2:00 to 5:00 PM)</i></p> <p>November 13th Wednesday Lecture 7: 9:30 to 10:30 AM Fracturing of conventional and unconventional reservoirs, Hydraulic fracturing Lecture 8: 11:00 AM to 12:00 PM Fracture Optimization, Fracture Characterization, Fracture Intensity and Orientation Lecture 9: 2:00 PM to 3:00 PM Shale and Tight Sand Reservoirs, Coalbed Methane Lecture 10: 3:30 PM to 4:30 PM Geomechanical aspects of Unconventional Hydrocarbon Reservoirs</p> <p>November 14th Thursday Module D: Geostatistics Lecture 11: 9:30 to 11:00 AM Variogram and Covariance, Kriging and Co-kriging Lecture 12: 11:15 to 12:45 AM Geostatistical simulation, Multipoint Geostatistics <i>Tutorial: Problem solving session with examples (2:00 to 5:00 PM)</i></p> <p>November 15th Friday Lecture 13: 9:30 to 10:30 AM Working in teams Revision of concepts learnt during the previous week, Interactive sessions and real field and case-study examples 2:00 to 4:00 PM Examination</p>
You Should Attend If...	<ol style="list-style-type: none"> 1. Geoscientists and Petroleum Engineers from R& D Laboratories of Oil and Gas Industry. 2. Students at all levels (B.Tech/MSc/M.Tech/PhD) with fundamental knowledge of Mathematics, Physics and Computing 3. Faculty from reputed academic and technical institutions

Fees

The participation fees for taking the course is as follows:

Participants from abroad : US 500 \$ Student participants: 1000 INR
Faculty participants: 15,000 Industry participants: 20,000
Research Organizations: 15,000

The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility.

Modes of payment:

Online transfer:

Account Name: CCE IIT Madras

Acc. No: **36401111110**

Branch: SBI, IIT Madras Branch, Chennai

IFSC Code: SBIN001055

Swift Code: SBININBB453

Note: The participants should be mentioned the purpose of GIAN while the transaction and have to send the transaction details to gian@iitm.ac.in

OR

Demand draft in favour of "**CCE IIT Madras**" payable at **Chennai**. The demand draft is to be sent to the course coordinator at the address given below.

Address of the Course Coordinator:

Prof. Rajesh Nair

Head, Petroleum Geomechanics Laboratory

Associate Professor of Petroleum Engineering

Department of Ocean Engineering

IIT Madras

Chennai

600036

The participants may be provided with hostel accommodation, depending on availability, on payment basis. Request for hostel accommodation may be submitted through the link:

<http://hosteldine.iitm.ac.in/iitmhostel/>

Registration Procedure

Please follow the following steps for the registration:

1. Go to GIAN website (<http://www.gian.iitkgp.ac.in/GREGN/index>)

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First time users need to register and pay a one-time fee of INR 500 /

2. Enroll for the course: Once you enroll for the course, an Enrollment/Application number will be generated, and the course coordinators will be notified.

The Faculty



Prof. Vamegh Rasouli is Professor and Chair of Continental Resources Distinguished Professor, Department of Petroleum Engineering of University of North Dakota, USA. Vamegh is the Department Chair and continental resources distinguished Professor at the Department of Petroleum Engineering, University of North Dakota, USA. He served as the head of Department of Petroleum Eng of Curtin University in Western Australia prior to his move to the States. Vamegh has been involved in development of Petroleum Eng Programs at both undergraduate and graduate levels, establishment of advanced labs in the area of Geomechanics and Drilling and has supervised several PhD students. He has a strong record of collaboration with oil and gas industry and has been the recipient of several industry and research funded projects. Vamegh has been a consulting Engineer to Schlumberger in the past and is now serving as an instructor for their NExT (Network of Excellence in Training) program, delivering industry short courses worldwide in different subjects including Petroleum Geomechanics, Drilling Eng, Hydraulic Fracturing, Pore pressure estimation and Sand Control.



Prof. Rajesh Nair is Head of Petroleum Geomechanics Laboratory and an Associate Professor of Petroleum Engineering, Department of Ocean Engineering, Indian Institute of Technology, Madras. His research interest is Petroleum Geomechanics, Fracturing and Recovery process, Geostatistics for Reservoir Modeling and Seismic characterization and Near surface geophysics including ground penetrating radar data analysis and seismic refraction

Course Co-ordinator

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