OIL AND GAS TECHNICAL COMPETENCY DEVELOPMENT PROGRAM

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"Growing talents…. bringing strategies to LIVE!"

EMERGENCY PREPAREDNESS: COMMAND & CONTROL

Course Length: **5 Days**
Course Dates: **May 8-12, 2017**
Course Venue: **Houston, TX**

Course Description:
With disasters increasing in frequency and costs each year, there is increasing need to improve effectiveness of incident command and control systems for emergency preparedness. This course will teach participants principles of emergency management (preparedness and response) and the industry best practice of incident command and control system design, operations, structure and development process to keep communities and industry safe. The course will also provide activities and exercises that build the participants: abilities to perform the tasks and responsibilities of the emergency manager's role; create long-term strategies for emergency management; design and operate command and control systems to select mitigation solutions to hazard risk problems and carry out mitigation activities in a post-disaster environment. Practical examples will be presented to assist participants in developing pertinent skill sets and the abilities to apply the skills and information gained in this training course.

Who Should Attend:
This course is designed for professional engineers, asset managers, all members of emergency management team, emergency service personnel, etc

What You Will Learn:

- Fundamentals of emergency preparedness & and their roles in keeping communities and industry safe
- Principles & applications of command and control systems for emergency response management
- Understand the different command and control systems available in emergency management
- Design and operations of an effective command and control systems for managing emergency events
- The knowledge and skills to plan, implement and evaluate stages of a range of command and control systems for managing emergency events
- How to apply latest knowledge of command and control systems and best practices into organizational emergency management business decisions and operations
- Assess the role of command & control systems in the success of an emergency management plan

Course Outline:

- Overview of emergencies preparedness and response systems. Overview of emergency response programs & management systems. General problems associated with emergency response in large-scale disasters (emergency management - preparedness and response)

- Anticipating potential hazards and threats hazardous products in E & P operations for emergency planning, warning and response purposes in an area
- Fundamentals of command and control system, and their implementation
- Description, necessity and roles of command and control systems in emergency management
- Components and operation of command and control system for managing emergency events
- Best practices on command and control system applications in emergency events mitigation and management

HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT FOR FIELD DEVELOPMENT PROJECTS

Course Length: **5 Days**
Course Dates: **May 8-12, 2017**
Course Venue: **Houston, TX**

Course Description:
This course deals with the fundamental HSE concepts and ways of putting in place effective HSE management systems. Practical examples will be presented to assist participants in developing pertinent skill sets.

Who Should Attend:
This course is designed for professional reservoir engineers, production engineers, facility engineers, asset managers

What You Will Learn:

- Understand national/local HSE legislation and the roles of standards
- Understand the different HSE management systems available
- Design of an effective HSE management systems
- Fundamentals of risk assessment and the role of safety regulations
- The Principles and applications of safety life cycle for petroleum project management
- How to use fault tree analysis to predict accident rates and failure rates
- The meaning and implications of safety integrity levels (SILs)
- The knowledge and skills to plan, implement and evaluate stages of a range of HSE management systems
- How to apply latest knowledge of HSE management systems and best practices into organizational business decisions and operations
- Assess the role of HSE management systems in the success of a maintenance plan

Course Outline:

- Overview of the oil and gas exploration and production process
- Overview of HSE programs and management systems
- Overview of HSE regulations and issues
- Safety life cycle models
- Risk assessment and management processes
- Hazard identification and risk management techniques
- Application software for risk and safety management

- Fundamentals of alarm management and their implementation
- Properties and effects of wastes
- Waste treatment and disposal methods
- HSE management systems and their implementation
- Fundamentals of reliability analysis
- Best practices

PETROLEUM ECONOMIC EVALUATION & PROJECT INVESTMENT DECISION MAKING

Instructor: **Akinlolu (Akin) Oni, PMP, CCP**
Course Length: **5 Days**
Course Dates: **May 15-19, 2017**
Course Venue: **Houston, TX**

Course Description:

This course covers the fundamental principles of economics and engineering related to petroleum reservoirs. This course will review the concepts of petroleum reserves, the time value of money and their applications for evaluating investment situations. These techniques can be used to systematically qualify the relative economic merits of investment opportunities. A number of analytical, empirical and numerical methods for estimating volumetric performances of petroleum reservoirs under uncertainties will be discussed. Field case studies will be provided to illustrate the field application of the petroleum economic evaluations and project investment decision making concepts, methods, processes and practices

Who Should Attend:
This course is designed for project engineers, geoscientists, reservoir engineers, production engineers, petroleum engineers, planning and development analysts, business planner, senior/ executive managers

What You Will Gain:

- Knowledge of tools and processes for evaluating projects and prioritizing investments decisions
- How to help a project developer evaluate the economic impact of his project, which accelerate ability to procure financing for the project
- How to help several investment groups determine economics of new asset and value of existing assets, This help to evaluate projects and execute projects faster
- Understand field planning optimization . Understand risks and rewards to make better decisions on key projects pertaining to portfolios and resources
- Preparation of project expenditure proposals that can win management approval

Course Outline:

- Overview of petroleum reserves definition and classifications.
- Reservoir performance forecasting methods - decline curve analysis and material balance approach - deterministic and probabilistic methods
- Concepts of economic evaluation. Risk and Uncertainties in Economic Evaluation. Economic indicators and profitability. Risk analysis. PSC analysis and fiscal system

- Basics of decision analysis. Different classes of decision problems. Investment proposal ranking methods. Investment decisions
- Decision under uncertainty. Decision under risk. Multiple-objective problems
- Field Case Studies

RISK ASSESSMENT & MANAGEMENT IN OIL AND GAS INDUSTRY

Instructor: **Akinlolu (Akin) Oni, PMP, CCP**
Course Length: **5 Days**
Course Dates: **May 22-26, 2017**
Course Venue: **Houston, TX**

Course Description:
This course highlights advanced risk management techniques in petroleum exploration and production projects' life cycle. Multiple case studies are presented to demonstrate risk management and mitigation processes in the upstream petroleum industry.

Who Should Attend:
This course is designed for reservoir engineers, geologists, geophysicists, project managers, asset managers and senior managers

What You Will Learn:
- Understand foundations of modern petroleum risk management techniques and processes
- How to systematically assess relevant risks and uncertainties in petroleum E & P projects
- Learn to think more probabilistically and promote the use of rigorous risk analysis
- Measure the value of seeking additional information
- Communicate and implement a consistent risk and uncertainty management policy
- Understand the value of portfolio analysis and optimization in E & P projects
- Develop clear guidelines for making decisions E & P projects
- Better evaluate the firm's position relative to a strategic plan

Course Outline:
- Phases of Oil and Gas Projects
- Introduction to the Concept of Risk and Uncertainty
- Value of Information (VOI) in E & P Projects
- Concept of Risk Assessment in E & P Projects
- Risk Management & Deterministic Cost & Schedule Risk Analysis
- Risk Management & Probabilistic Cost & Schedule Risk Analysis
- Integrated (Project) Cost and Schedule Risk Analysis
- Modeling Risk Optimization in E & P Projects
- Risk Optimization Techniques
- Integrating Uncertainty and Risk Management in E & P Projects

- Advanced Risk Analysis and their Applications in E & P Projects
- General Advice on Correlations and Other Forms of Dependencies
- General Best Practices
- Case Studies
- Reflection & Overall Summary

PROJECT MANAGEMENT PROFESSIONAL (PMP®) CERTIFICATION EXAM PREP

Instructor: **Akinlolu (Akin) Oni, PMP, CCP**
Course Length: **5 Days**
Course Dates: **May 29 - June 02, 2017**
Course Venue: **Houston, TX**

Course Description:
This short course is a unique blend of cutting-edge techniques and practical tools for managing projects, portfolios and complex systems. It offers the highest quality education and certification training course specifically designed to meet the needs of project managers willing to pass the PMI Project Management Professional (PMP®) certification examination on time and on budget. Case studies and online PMP® certification tests will be provided to illustrate the field application of the PMI standard norms, fundamentals, methods, processes and practices. This course is aligned with A Guide to the Project Management Body of Knowledge (PMBOK®) – fifth edition, which provides industry standard tools approved by the Project Management Institute (PMI®).

Who Should Attend:
This course is designed for project engineers, design engineers, consulting engineers, petroleum engineers, facility engineers and senior managers

What You Will Gain:
- Expert instruction from PMP® certified instructors
- Practical know-how from practising experts with demonstrated capital project delivery ability
- Advanced skills and knowledge in project management
- Knowledge and skills to be actively involved in planning, implementation and evaluation stages of a range of petroleum E & P projects
- Ability to make independent judgements and high level decisions in a variety of technical or managerial contexts
- Realistic exam preparation software with over 1200+updated practice questions
- Customized training program assessed by PMI®, and fully accredited 35 contact hours

Course Outline:
- Project management concepts
- Project management process groups
- Project management fundamentals 101 (project integration, scope, time and cost management)
- Project management fundamentals 102 (project quality, risk and procurement management)

- Project management fundamentals 103 (project stakeholder, communication and human resources management)
- Project economics and finance
- Leadership and change management
- Project delivery systems
- Professional development and ethics
- Case Studies and online PMP® certification tests

COST ESTIMATION AND MANAGEMENT FOR E & P PROJECTS

Instructor: **Akinlolu (Akin) Oni, PMP, CCP**
Course Length: **5 Days**
Course Dates: **June 5-9, 2017**
Course Venue: **Houston, TX**

Course Description:

This course covers the fundamental principles of cost estimation and uncertainty management techniques. Field case studies will be provided to illustrate the field application of the cost estimation and management fundamentals, methods, processes and practices

Who Should Attend:
This course is designed for project engineers, design engineers, consulting engineers, petroleum engineers, facility engineers and senior managers

What You Will Gain:

- Understand the financial workings of your company
- Read and explain simple financial statements
- Understand economic evaluation techniques in project proposals
- Calculate the financial viability of expenditure proposals
- Optimize the use of scarce capital on your projects
- Prepare project expenditure proposals that can win management approval
- Make effective decisions under capital rationing situations
- Communicate effectively with your financial managers
- Effectively execute sensitivity studies taking into account risk and uncertainty

Course Outline:

- Introduction to Cost Estimation and Management Concepts
- Accounting Basics and Financial Statements
- Ratio Analysis
- Investment Decisions and Profitability
- Economic Factors
- Cost Accounting
- Cash Flow Concept

- Time Value of Money
- Investment Proposal Ranking Methods
- Capital Management
- Inflation
- Risk and Uncertainties in Economic Evaluation
- Field Case Studies

FUNDAMENTALS OF PETROLEUM EXPLORATION, DRILLING AND PRODUCTION FOR NON-TECHNICAL PERSONNEL

Course Length: **5 Days**
Course Dates: **June 5-9, 2017**
Course Venue: **Houston, TX**

Course Description:

This course covers the fundamental principles of petroleum exploration, drilling and production design and operations. Field case studies will be provided to illustrate the field application of the concepts, methods, processes and practices

Who Should Attend:
This course is designed for project engineers, geoscientists, reservoir engineers, production engineers, petroleum engineers, planning and development analysts, business planner, senior/ executive managers

What You Will Gain:

- Tools for Exploration, Field Appraisal and Development
- Field Development Planning Processes. Decision Modeling for Petroleum Production Improvement Opportunity
- Reservoir Engineering and Management Processes
- Drilling and Production Workflows
- Cost Estimations. Risk Analysis and Decision Makings

Course Outline:

- Overview of the Petroleum Industry. Energy Sources; Nature of Oil and Gas
- Contracts and Regulations for Petroleum Exploration and Production
- Petroleum Leasing and Agreements (Joint Ventures, Production Sharing Agreements, etc
- The Earth's Crust and Geological Time. Sedimentary Rocks Distributions, Ocean Environment and Maps. Source Rocks Definition; Petroleum Generation, Migration, Traps and Accumulation
- Petroleum Geology and Reservoir Types. Field Development Planning Processes
- Drilling Systems Design & Operations. Formation Evaluation Methods. Well Logging Techniques

- Subsurface Fluid Flow and Reservoir Performance. Reservoir Reserves and Hydrocarbon Recovery. Well Completions Systems Design & Operations
- Well Testing and Formation Damage Identification
- Production Performance Monitoring and Well Management
- Field Case Studies

RISK MANAGEMENT IN PETROLEUM E & P PROJECTS

Instructor: **Akinlolu (Akin) Oni, PMP, CCP**
Course Length: **5 Days**
Course Dates: **June 12-16, 2017**
Course Venue: **Houston, TX**

Course Description:
This course highlights modern concepts risk management techniques in petroleum exploration and production projects' life cycle. Multiple case studies are presented to demonstrate risk management and mitigation processes in the upstream petroleum industry.

Who Should Attend:
This course is designed for reservoir engineers, geologists, geophysicists, project managers and senior managers

What You Will Learn:
- Understand foundations of modern petroleum risk management techniques and processes
- How to systematically assess relevant risks and uncertainties in petroleum E & P projects
- Learn to think more probabilistically and promote the use of rigorous risk analysis
- Measure the value of seeking additional information
- Communicate and implement a consistent risk and uncertainty management policy
- Understand the value of portfolio analysis and optimization in E & P projects
- Develop clear guidelines for making decisions E & P projects
- Better evaluate the firm's position relative to a strategic plan

Course Outline:
- Phases of Oil and Gas Projects
- Project Valuation and Selection Methods
- Introduction to the Concept of Risk and Uncertainty
- Overview of Risk Management in Petroleum E & P Projects
- Value of Information (VOI) in E & P Projects
- Concept of Risk Management in E & P Projects
- Advanced Risk Analysis and their Applications in E & P Projects
- Fundamental Concepts in Probabilistic Modeling for Risk Assessment
- Geo-statistics for Stochastic Reservoir Characterization
- Monte Carlo Simulation and Its Interpretation
- Probabilistic Reservoir Modeling for Uncertainty & Risk

- Modeling Risk Optimization in E & P Projects
- Risk Optimization Techniques
- Integrating Uncertainty and Risk Management in E & P Projects
- Incorporating Risk in E & P Project Optimization
- Integrated Uncertainty and Risk Management Workflow
- Case Studies

RISK AND UNCERTAINTY MANAGEMENT IN FIELD DEVELOPMENT PLANNING (FDP)

Course Length: **5 Days**
Course Dates: **June 19-23, 2017**
Course Venue: **Houston, TX**

Course Description:
This course covers the fundamental principles of probabilistic methods for risk assessment and uncertainty quantification and their application to reservoir characterization, development and management. It covers a variety of topics related to the integration of production and performance data into reservoir models and account for their respective errors and uncertainties. The topics also include history matching problem formulation, deterministic and probabilistic history matching techniques, risk and decision analysis techniques, as well as common techniques for regularization and parameterization of reservoir models for history matching. Applications and case studies on risk and uncertainty management methods in field development planning will be presented and discussed.

Who Should Attend:
This course is designed for professional reservoir engineers, petrophysicists, geophysicists, geologists, asset managers and senior managers

What You Will Learn:
- Understand foundations of modern petroleum risk and uncertainty management techniques
- Systematically assess relevant risks and uncertainties in FDP
- Learn to think more probabilistically
- Measure the value of seeking additional information
- Communicate and implement a consistent risk and uncertainty management policy
- Understand the value of portfolio analysis in FDP
- Develop clear guidelines for making decisions in FDP
- Better evaluate the firm's position relative to a strategic plan
- Provide a platform for communication and teamwork in the overall decision making progress

Course Outline:
- Reservoir modeling for field development planning
- Sources of uncertainties in reservoir performance simulation
- Fundamental concepts in probabilistic modeling for risk assessment
- Uncertainty quantification with probabilistic reservoir modeling
- Geo-statistics for stochastic reservoir characterization
- History matching formulations
- History matching techniques for uncertainty reduction

- Regularization and parameterization for addressing data limitation
- Model-based field development planning
- Modeling for decision analysis and options
- Modeling for risk management;
- Managing risk in field development under uncertainty
- Case Studies

RESERVOIR CHARACTERIZATION USING TIME-LAPSE SEISMIC AND PRODUCTION DATA

Course Length: **5 Days**
Course Dates: **June 19-23, 2017**
Course Venue: **Houston, TX**

Course Description:
Reservoir modeling is the practice of generating numerical representations of reservoir conditions and properties on the basis of geological, geophysical and engineering data measured at a limited number of borehole locations. Building an accurate reservoir model is a fundamental step of reservoir characterization fluid flow performance forecasting and has direct impact on reservoir management strategies, risk/uncertainties analyses and key business decisions. Seismic data (due to its high spatial resolution), plays a key role not only in defining the reservoir structure and geometry, but also in constraining the reservoir property variations. This course presents innovative solutions and methods to incorporate seismic and production data in reservoir characterization and model building processes to improve consistency of reservoir models with geological and geophysical measurements. The course also address issues related to (mis)match of the initial reservoir model with well logs and 3D seismic data. These issues include the incorporation of various seismic constraints in reservoir property modeling, the sensitivity of the results to realistic noise in seismic data, geo-statistical modeling parameters and the uncertainties associated with quantitative integration of seismic data in reservoir property modeling. Case studies will be discussed to illustrate the field application of the concepts in the course.

Who Should Attend:
This course is designed for reservoir engineers, petrophysicists, geoscientists and asset managers

What You Will Learn:
- Integration of 3D and time-lapse seismic data into reservoir modeling and history matching processes
- Estimation of subsurface geo-models using multi-objective (stochastic) optimization methods and direct/indirect measurements to simultaneously constraint model
- Novel methods to generate reservoir models that optimally match geological and geophysical data to improve the processes of reservoir characterization and fluid flow performance forecasting

Course Outline:
- Introduction to integrated reservoir studies. Rock physics analysis. Reservoir modeling and data integration. Reservoir modeling and joint inversion. Simultaneous optimization of multiple objective functions for reservoir modeling. Seismic constrained static reservoir modeling. Seismic and production data incorporation into reservoir models. Uncertainty analysis
- Workflows for statistical integration of 3D seismic/4D time-lapse seismic & production data

- Estimation of subsurface geo-models by multi-objective optimization methods. Probabilistic reservoir property modeling jointly constrained by 3D seismic data, well logs and production data. Challenges in 4D seismic data incorporation into dynamic reservoir models
- Field case studies and hands-on practice

APPLIED GEO-STATISTICS FOR RESERVOIR MODELING AND CHARACTERIZATION

Course Length: **5 Days**
Course Dates: **June 5-9, 2017**
Course Venue: **Houston, TX**

Course Description:
This course addresses the application of geo-statistical techniques to build reservoir models through the integration of geological, core/well log, seismic and production data to generate a consistent reservoir description. It will introduce reservoir modeling workflow from construction of the 3D static reservoir model through up-scaling and dynamic reservoir simulation. The course provides background and insights to geo-statistical modeling techniques and the situations where the application of geo-statistics could add value. It will also provide guidance in the assembly and analysis of the required data for geo-statistical techniques and the resulting numerical models. The course includes extensive hands-on training and problem solving using public domain software.

Who Should Attend:
This course is designed for professional reservoir engineers, petrophysicists, geophysicists, geologists and asset managers

What You Will Learn:
- Review of steps in building static reservoir model
- Decision making under uncertainty
- Variogram definition, calculations and physical meaning
- Simple and ordinary kriging
- Conditional simulations/sequential approaches
- Indicator simulation of lithofacies
- Point & block estimation
- Integration of seismic data
- Up-gridding and Up-scaling
- Experimental design and applications
- Flow simulation through geologic models using streamlines
- History matching- preliminaries

Course Outline:
- Introduction to petroleum geo-statistics in reservoir characterization and modeling
- Review of probability and distributions

- Covariance and correlation, analysis of spatial continuity, variogram definition, calculations and physical meaning
- Modeling & interpreting the variogram
- Cokriging/Collocated Cokriging
- Boolean/Object-based models
- Multidisciplinary data integration
- Field case studies and hands-on practice

INTEGRATED PRODUCTION AND WELL OPERATIONS MODELING - RAPID PERFORMANCE ASSESSMENT OF MARGINAL AND MATURE FIELDS

Course Length: 5 Days
Course Dates: June 19-23, 2017
Course Venue: Houston, TX

Course Description:
The five days course provides detailed discussions and hands-on training for building integrated production and well operations performance models using commercial software applications. The training course will provide fundamental and advanced knowledge of integrated production and well operations modeling components, beginning with the static reservoir pressure, inflow performance, flow across the completion, up the tubing string, surface choke, horizontal flow lines, and into the separator. Novel workflows for thoroughly evaluating, analyzing and optimizing performance of oil and gas field/well production system components to achieve an objective rate at the different states of the well/field life (early-, mid- and later-life) will also be presented. Framework to generate production optimization opportunities at different levels, from reservoir and near wellbore remediation to lift performance improvement via the additional and optimization of artificial lift will be illustrated as well. Applications and case studies of multiple petroleum production technologies will be presented and discussed.

Who Should Attend:
This course is designed for reservoir engineers, production engineers, facility engineers and asset managers

What You Will Learn:
- Establish the performance of a hydrocarbon producing well in natural and artificial flowing conditions
- Learn how to model the interactions between the reservoir deliverability and the wellbore completion. Rapid assessment of marginal and mature fields re-development potentials
- Identify potential problems and warning signs from the well's operations behavior
- Recognize different remedial actions to restore or improve well deliverability

Course Outline:
- Introduction to integrated production modeling (IPM) suite. Data validation and reconciliation.
- PVT properties modeling. Inflow and outflow (multiphase) performance modeling. Choke & network performance modeling. System (nodal) analysis concepts. Estimation of OOIP & GIP
- Facility modeling (compressor, pumps, pipelines, valves, etc)

- Integrated production model calibration and updating. Calibrated production forecasting based on well performance. Scenario, sensitivity, risk and uncertainty analysis. Liquid loading in the wellbore and near reservoir condensate dropout. Well performance analysis
- Workflows for modeling well operation problems and remedial options. Artificial lift systems
- Optimization of well productivity. Well Stimulation. Intelligent and complex well architectures
- Class exercises and field case studies

INTEGRATED ASSET MODELING & OPTIMIZATION

Instructor: **Dr. Oladele Bello**
Course Length: **5 Days**
Course Dates: **June 19-23, 2017**
Course Venue: **Houston, TX**

Course Description:
This course provides an overview of integrated asset modeling (IAM), its concept and significance to enhance and optimize complex oil and gas field systems. The course also equips participants with knowledge and skills necessary to create and maintain an integrated asset modeling tools using multiple software applications to build models for thermodynamic, reservoirs, completion-wellbores, surface pipeline networks, surface process equipment and economic, respectively. The main focus is to learn how to build these models from the scratch and understand the theory and concept behind them. Participants will learn how to integrate these different models and run them all as a piece. It will also highlight methodology to detect, resolve and optimize bottlenecks, and perform forecasting to get a better insight for future deterministic and probabilistic performance of the model. It also reviews different hydrocarbon production optimization methods for single and multi-reservoir fields. Different scenarios will be reviewed and discussed to understand the potentials and limitations of the IAM as a key tool for field optimization, re-development, and budget planning. Case studies will be discussed to illustrate the field application of the concepts in the course.

Who Should Attend:
This course is designed for reservoir engineers, production engineers, facility engineers and asset managers

What You Will Learn:
- Novel methods to generate integrated asset modeling (IAM) to improve the processes of fluid flow performance forecasting and scenarios analysis
- Integration of production data into integrated asset modeling (IAM) reservoir modeling and history matching processes
- Improving integrated asset performance management using single and multi-objective optimization methods

Course Outline:
- Introduction to integrated asset modeling (IAM) & optimization
- Initial data review and integrated reservoir development workflow
- Preparation of IAM components – thermodynamic model, reservoir simulation model, completion-wellbore models, surface network models, surface process model, economic model
- Model integration and software application (automated workflow construction and configuration)

- Hydrocarbon production optimization methods in single and multi-reservoir fields
- Multi-reservoir production performance simulation-optimization workflow under uncertainties
- Analyzing scenarios with the IAM. Technical and economic evaluation of alternatives
- Field development and/or re-development planning issues
- Field case studies and hands-on practice

INTELLIGENT OIL & GAS FIELDS MODELING AND OPTIMIZATION

Instructor: **Dr. Oladele Bello**
Course Length: **5 Days**
Course Dates: **June 26-30, 2017**
Course Venue: **Houston, TX**

Course Description:
This course provides a comprehensive overview of advanced intelligent completions for oil and gas wells. The benefits and multiple applications of the intelligent wells will be discussed. Design methodologies of completing intelligent wells will also be emphasized with multiple hands-on field examples.

Who Should Attend:
This course is designed for professional petroleum engineers, reservoir engineers, production engineers, operation engineers, drilling engineers and asset managers

What You Will Learn:
- Learn about Intelligent Well Completion Systems components: from downhole sensors and actuators (ICV, ICD and mechanically driven sleeves)
- Provide design methodologies of completing intelligent wells
- Hands-on exercises on intelligent well Modelling and Value Quantification to build nodal analysis models to determine the desired behavior of remote actuators
- Hands-on training of Intelligent field Modelling and Value Quantification
- Optimal operating strategy for wells with downhole inflow control technologies
- Provide a general overview of Digital Oilfield and Real-time production optimization by sharing the best practices and lessons learned after 10 years of digital oilfield (DOF) implementations

Course Outline:
- Overview of intelligent or smart well technologies. Economics of intelligent wells
- Intelligent well components and their potential applications
- Selection between passive & active downhole flow control technologies
- Intelligent well completion performance modeling and optimization using nodal analysis
- Comprehensive workflow for the design of intelligent well completions
- Intelligent field modeling and value quantification using modeling tools
- Comprehensive workflow for the design of advanced well completions and field development well configuration

- Automated optimization strategies for integrated intelligent well placement and design in oil fields
- Workflow for uncertainty reduction in intelligent field development planning
- Flow estimation & allocation using downhole pressure and distributed temperature data
- Using distributed downhole measurements to optimize production in intelligent wells
- Closed loop monitoring and optimization of intelligent well operations performance
- Class exercises and field case studies

WELL TESTING – DESIGN AND ANALYSIS

Course Length: 5 Days
Course Dates: June 26-30, 2017
Course Venue: Houston, TX

Course Description:
This course will address how transient flow of reservoir fluids (natural gas or oil) enables characterization of the well damage or stimulation and of the well drainage area. The course will show how parameters quantified from rate and pressure transient analysis enable well performance enhancement through improved new well and workover designs. Applications and case studies of well testing technologies will be presented and discussed.

Who Should Attend:
This course is designed for reservoir engineers, production engineers and asset managers

What You Will Learn:
- Basic well testing including flow tests and pressure transient analysis. Flow tests provide an empirical characterization of gas well deliverability. Pressure buildup transient analysis quantifies non-Darcy flow and characterizes well damage or stimulation and the well drainage size and shape
- Pressure transient analysis of hydraulically fractured and horizontal wells and long term production data analysis from rate and pressure data
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Course Outline:
- Introduction to gas well testing, flow and buildup tests
- Diffusivity Equation derivation; natural gas pseudo potential, non-Darcy flow
- Gas well flow testing including back pressure tests, isochronal and modified isochronal tests
- Pressure buildup analysis for diagnosis and characterization of damage and stimulation
- Non-Darcy flow characterization; relationship between flow test and transient test analyses
- Pressure buildup analysis for horizontal well characterization
- Pressure buildup analysis hydraulically fractured well characterization
- Pressure buildup analysis of reservoir limits to characterize well drainage size and shape
- Empirical rate transient analysis; Arps and other decline curve models
- Rate and pressure analysis for quantifying well and well drainage characterization
- Class exercises
- Field case studies

RESERVOIR & ALS PRODUCTION OPTIMIZATION

Instructor: **Dr. Oladele Bello**
Course Length: **5 Days**
Course Dates: **June 26-30, 2017**
Course Venue: **Houston, TX**

Course Description:
The objective of this course is to introduce reservoir/petroleum engineers to practical optimization algorithms and their application to solving oil and gas reservoir development optimization problems. The course covers an overview of production optimization problems in oil and gas industry followed by the presentation of practical gradient-based and stochastic optimization algorithms that are commonly applied to field development optimization problems. The course also presents the fundamental and practical aspects of production optimization and illustrates how reservoir simulation models can be integrated with optimization algorithms to perform automated/assisted field development optimization. Case studies from well flow rate control optimization and well placement planning will be discussed.

Who Should Attend:
This course is designed for professional reservoir engineers, production engineers, petrophysicists, geophysicists, geologists and asset managers

What You Will Learn:
- Introduction to reservoir modeling and inverse theory
- Knowledge of optimization algorithms and their application to solving oil and gas reservoir development optimization problems
- Knowledge of integrating production optimization and reservoir simulation models to perform automated/assisted field development optimization
- Use of optimization techniques, together with reservoir simulation tools, for planning and optimizing field development

Course Outline:
- Integrated geological model
- Petrophysical evaluation
- Numerical reservoir simulation
- Reservoir modeling, characterization, history matching and Forecasting
- History matching and production forecasting
- Single and multi-objective functions
- Production optimization elements
- Numerical Optimization Methods for Oil and Gas Reservoirs

- Applications of single and multi-objective optimization techniques to petroleum fields
- Methods for uncertainty estimation
- Field development optimization
- ALS system performance design and operations
- ALS production optimization and operations management
- Field case studies and hands-on practice

PETROLEUM RESERVOIR SIMULATION TECHNOLOGIES

Course Length: 5 Days
Course Dates: July 03-07, 2017
Course Venue: Houston, TX

Course Description:
This course addresses development of the equations for single phase and multiphase, multidimensional flow in porous media and the mathematical procedures required for their solution using finite-difference method. In particular, continuity equations for flow of several phases will be derived. Finite-difference methods based on implicit and explicit discretization will be introduced. Stability, consistency and convergence concepts will be explained in detail. Newton's method for solving the nonlinear algebraic system of equations arising from discretization of governing equations will be covered. Well models will be discussed and various ways of treating wells in simulation models will be introduced. IMPES method will be introduced and its advantages and limitations compared to fully implicit discretization will be described. Finally, compositional simulation will be introduced. Formulation, discretization and phase behavior computations will be covered. The course is designed for engineers who use reservoir simulation software as a black box on a regular basis, with limited knowledge of the underlying equations and solution methods.

Who Should Attend:
This course is designed for professional reservoir engineers, petrophysicists, geophysicists, geologists and asset managers

What You Will Learn:
- Review of steps in building static and dynamic reservoir models
- Present modern reservoir simulation framework that incorporate a large variety of options which can be used to answer important questions about reservoir behavior, reservoir performance optimization, complex well design, uncertainties estimation and reservoir management
- Learn new reservoir simulation technology developments, such as unstructured gridding and reduced order modeling

Course Outline:
- Introduction to petroleum modeling and simulation workflows
- Reservoir simulation and model design concepts
- Introduction: Basic Concepts and Derivations
- Numerical solution of single-phase and multi-phase flow equations
- Well models in reservoir simulation
- Implicit pressure explicit saturation (IMPES) formulation
- Black oil and compositional reservoir simulation

- Reduced order reservoir modeling
- Use of Streamline Simulation for integrated reservoir modeling
- Aquifer modeling and Uncertainty quantification
- Applications (pressure transient test simulation, horizontal well modeling, water conning and cusping, gas field simulation, oil field simulation, volatile oil reservoir simulation, stimulated well modeling, pattern waterflood, etc) and case studies

FIELD DEVELOPMENT PLANNING (FDP)

Course Length: **5 Days**
Course Dates: **June 26-30, 2017**
Course Venue: **Houston, TX**

Course Description:
This course covers the fundamental principles of reservoir modeling and probabilistic methods for risk assessment and uncertainty quantification and their application to reservoir characterization, development and management. It covers a variety of topics related to the integration of production and performance data into reservoir models and account for their respective errors and uncertainties. The topics also include history matching problem formulation, deterministic and probabilistic history matching techniques, risk and decision analysis techniques, as well as common techniques for regularization and parameterization of reservoir models for history matching. Applications and case studies on risk and uncertainty management methods in field development planning will be presented and discussed.

Who Should Attend:
This course is designed for professional reservoir engineers, petrophysicists, geophysicists, geologists, asset managers and senior managers

What You Will Learn:
- Understand foundations of field development planning
- Modern petroleum risk and uncertainty management techniques
- Systematically assess relevant risks and uncertainties in FDP
- Learn to think more probabilistically
- Measure the value of seeking additional information
- Communicate and implement a consistent risk and uncertainty management policy
- Understand the value of portfolio analysis in FDP
- Develop clear guidelines for making decisions in FDP
- Better evaluate the firm's position relative to a strategic plan
- Provide a platform for communication and teamwork in the overall decision making progress

Course Outline:
- Overview of Field Development. Field development processes and decisions
- Field development planning and optimization concepts
- Integrated reservoir characterization and modeling for field development planning
- Sources of uncertainties in reservoir performance simulation
- Fundamental concepts in probabilistic modeling for risk assessment
- History matching formulations and uncertainty quantification

- Modeling for decision analysis and options
- Modeling for risk management
- Managing risk in field development under uncertainty
- Decision Scenario Optimization (DSO)
- Case studies

SUBSEA COMPLETIONS & DEEPWATER TECHNOLOGY

Course Length: **5 Days**
Course Dates: **July 03-07, 2017**
Course Venue: **Houston, TX**

Course Description:
The course is designed to provide an overview of subsea completions & deepwater equipment in the oil and gas industry. The participants will learn about the subsea completions deepwater design options to meet deliverability, safety and integrity requirements in completions and workover operations. The main components of a subsea well completions are described and analyzed by their function and design criteria. Participating will also learn to calculate tension, compression, burst, collapse, yield and threshold strength. This course covers all the relevant subjects needed to describe structural mechanics of downhole tubular. The course will give participants the Case studies will be provided to help the participants understand the hands-on aspects of subsea completions and deepwater technologies.

Who Should Attend:
This course is designed for reservoir engineers, production engineers and asset managers

What You Will Learn:
- Proficiency and confidence that is needed to design safe and cost-effective subsea well completions and production systems including the key components
- Learn how to select the optimum completion option for the type of reservoirs and general operational procedures for preparation and start up
- Detailed understanding of the issues and the physics of sand producing reservoirs
- Gain knowledge on how to identify the problems associated with sanding: when it will happen, mode of occurrence, volumes of sand and risk presented by these types of reservoirs
- Importance of deepwater technology for oil and gas production. Different structural and platform types . Main engineering principles for deepwater technology
- Design and operation of fixed and floating structures often used in harnessing oil and gas resources in deepwater/offshore environments

Course Outline:
- Introduction to subsea well completions. Workflows for subsea well completions design
- Designing Well Completion for the Life of the Field
- Subsea well completions equipment selection. System approach to casing and tubing design
- Subsea well perforations technologies. Production Packers. Subsurface Safety Valves
- Subsea well completion performance analysis of well with and without downhole flow control technologies

- Physics of sand producing reservoirs. Sand stabilization and exclusion. Sand production management completion design
- Subsea well completion performance analysis of well with and without sand control technologies
- Subsea Wellheads, Xmas Trees and Connectors. Subsea Manifolds, Pipelines and Flowlines
- Offshore Structures and Operations. Principles of Mooring Analysis and Riser Design
- Class exercises and Field case studies

PETROLEUM ROCK MECHANICS & APPLIED RESERVOIR CHARACTERIZATION

Course Length: **5 Days**
Course Dates: **July 03-07, 2017**
Course Venue: **Houston, TX**

Course Description:
This training course presents workflow that makes use available geo-mechanical and geophysical data for reservoir characterization. The methodology incorporates soft computing tools as well as geo-statistical simulation techniques to improve the property estimates as well as overall characterization efficacy. The course also includes extensive hands-on training and problem solving using public domain software.

Who Should Attend:
This course is designed for professional reservoir engineers, petrophysicists, geophysicists, geologists and asset managers

What You Will Learn:
- Integrated characterization framework for petroleum reservoirs with adaptable workflows for all stages of data processing, interpretation and analysis
- A novel auto-picking workflow for noisy passive seismic data used for improved accuracy in event picking as well as for improved velocity model building
- Improved seismic survey design optimization framework for better data collection and improved property estimation.
- Property mapping from well logs and seismic data including stress and anisotropic weakness estimates for integrated reservoir characterization and analysis
- Integration of results (seismic and well logs) from analysis of individual data sets for integrated interpretation using predefined integration framework and soft computing tools
- Uncertainty quantification and analysis to better quantify property estimates over and above the qualitative interpretations made and to validate observations independently with quantified uncertainties to prevent erroneous interpretations

Course Outline:
- Introduction to petroleum geo-mechanics. Rock mechanical properties
- Concept of stress and strain. Stress-strain relationships. General Hooke's law.
- Transversally –isotropic medium. Thomsen parameters. Young modules and Poisson's ratios
- Static and dynamic coefficients. Brittleness index. Theoretical description of overall rock mechanical properties. Rock physics modeling. Rocks and Waves. Elastic Rock Properties

- Waves-Based Forward and Inverse Problem. Waves in Isotropic and Anisotropic Unbounded Media. Reflection –Refraction. Isotropy-anisotropy
- Forward and inverse modeling of reservoir structure. Manual and automatic history matching
  - Various elements for automatic history matching workflow: Generation of multiple models, Simulation flow, Petro-elastic model, Optimization algorithms
- 4D seismic history matching workflow and case studies
- Field case studies and hands-on practice

INTEGRATED RESERVOIR STUDIES

Course Length: **5 Days**
Course Dates: **July 10-14, 2017**
Course Venue: **Houston, TX**

Course Description:

This course covers the processes and workflows for performing integrated reservoir studies using geological, geophysical, petrophysical and engineering data. The course highlights concepts pertaining to reservoir description, reservoir modeling and simulation, reservoir production optimization, and economic and uncertainty analysis. The course also includes extensive hands-on training and problem solving using public domain software.

Who Should Attend:
This course is designed for project engineers, geoscientists, reservoir engineers, production engineers, petroleum engineers, planning and development analysts, business planner, senior/ executive managers

What You Will Gain:

- How to work together on a multidisciplinary team consisting of geophysicists, geologist, petrophysicists, and petroleum engineers
- Understand the workflow for conducting integrated reservoir studies, including the components of a study and data required
- How to perform a complete description of a hydrocarbon reservoir (static reservoir model) using geo-scientific, geo-statistical and engineering methods
- How to design, construct, execute and quality check an integrated reservoir simulation model given a geological, geophysical, seismic, electromagnetic, well log and production data
- How to predict and optimize reservoir performance using reservoir simulation, economic modeling and uncertainty assessment. How to document results of integrated reservoir studies

Course Outline:

- Overview and objectives of integrated reservoir studies. Workflow for integrated reservoir studies. Geological description (facies, mapping, etc). Geophysical description
- Spatial and structural modeling. Facies/rock type modeling
- Introduction to reservoir rock petrophysical properties. Estimation of properties at well locations.
- Well logging and logging analysis. Standard and special core analysis
- Core-well log integration synchronization and workflow
- Integrated formation evaluation and reservoir characterization

- Reservoir model construction and calibration. Ranking of realizations
- Economic and risk analysis
- Project management applications to integrated reservoir studies
- Field Case Studies

HORIZONTAL & DIRECTIONAL DRILLING: DESIGN AND ANALYSIS

Course Length: **5 Days**
Course Dates: **July 10-14, 2017**
Course Venue: **Houston, TX**

Course Description:
This course builds a firm foundation in the principles and practices of horizontal and directional drilling, calculations, and planning for directional and horizontal wells. Specific problems associated with directional/horizontal drilling such as torque, drag, hole cleaning, logging and drill string component design are included. Participants will receive instruction on planning and evaluating deviated and horizontal wells and learn how to perform simple calculations associated to well survey. The basic applications and techniques for multi-lateral wells are covered in the course. Additionally, participants will become familiar with the tools and techniques used in directional drilling such as survey instruments, bottomhole assemblies, motors, steerable motors and steerable rotary systems. Participants will be able to predict wellbore path based on historical data and determine the requirements to hit the target.

Who Should Attend:
This course is designed for professional drilling engineers, production engineers, petrophysicists, geophysicists, geologists and asset managers

What You Will Learn:
- Knowledge of key characteristics and challenges of horizontal and directional engineering from a well design, planning, construction and operational perspective
- Knowledge of horizontal and directional modeling drilling processes based on industry best practices. Both steady state and dynamic models of the drilling processes
- Knowledge of different frameworks for optimizing the horizontal and directional drilling processes
- How to apply technical limit principles to guide horizontal and directional well planning
- Use number of popular industry software packages to demonstrate the concepts explained during lectures

Course Outline:

- Formation pressures and formation strength
- Introduction to horizontal and directional wells. Directional drilling design workflow
- Long, Medium, Short and Extreme Directional Wells
- Directional Drilling Tools
- Drill bit selection, downhole drilling equipment and drilling hydraulics

- Drilling fluid and cementing program
- Measurement while Drilling (MWD), Logging while Drilling (LWD), and Geo-steering
- Horizontal and directional borehole problems
- Optimization of horizontal and directional process parameters
- horizontal and directional drilling optimization Workshop

WELL PLANNING AND DRILLING OPTIMIZATION

Course Length: **5 Days**
Course Dates: **July 17-21, 2017**
Course Venue: **Houston, TX**

Course Description:
This course will equip participants with knowledge and skills necessary to ensure that well plans lead to the lowest well costs while still achieving production or exploration goals. This course uses a balanced combination of lecture, discussion and case studies where participants will learn how to apply technical limit principles to guide well planning, develop a risk-weighted well cost estimate, create well plans that explicitly identify and manage risk, audit and select rigs, create contingency plans (oil spill contingency plans, safety cases and joint operation manuals) using well's specific objectives, plans and previous fillings, and conduct post analysis that documents the root of unscheduled events and lessons earned.

Who Should Attend:
This course is designed for professional drilling engineers, production engineers, petrophysicists, geophysicists, geologists and asset managers

What You Will Learn:
- Knowledge of key characteristics and challenges of well engineering from a well design, planning, construction and operational perspective
- Knowledge of modeling drilling processes based on industry best practices. Both steady state and dynamic models of the drilling processes
- Knowledge of different frameworks for optimizing the drilling processes
- How to apply technical limit principles to guide well planning
- Use number of popular industry software packages to demonstrate the concepts explained during lectures

Course Outline:

- Designing an Oil and Gas Wells
- Formation Pressures and Formation Strength
- Drilling Fluid and Cementing Program
- Drill bit Selection, Downhole Drilling Equipment and Drilling Hydraulics
- Well Perforation
- Borehole Problems
- Introduction to Drilling Process Optimization
- Key Performance Indicators

- Optimization of Drilling Process Parameters
- Drilling Optimization Workshop

ADVANCED PROCESS SIMULATION FOR IMPROVED HYDROCARBON PROCESSING FACILITY MANAGEMENT

Course Length: **5 Days**
Course Dates: **July 10-14, 2017**
Course Venue: **Houston, TX**

Course Description:
The course presents new methods and applications to create competitive designs for both current and future hydrocarbon process or equipment needs that is capable of operating in challenging situations. The course will further provide practical deterministic and probabilistic simulation modeling and optimization workflow for key management decisions during hydrocarbon processing and conditioning operations. Case studies on the applications of deterministic and probabilistic based simulation techniques to process and equipment designs in middle and downstream petroleum industry are also illustrated.

Who Should Attend:
This course is designed for professional process engineers, facility engineers, operation engineers, and asset managers

What You Will Learn:
- Basic knowledge and fundamentals of available commercial simulation tools
- Planning and executing simulation and optimization projects
- Understand the use of steady state simulation tools for process and equipment design
- Understand the use of dynamic simulation tools for process and equipment design
- Understand the use of stochastic -based simulation tools for process and equipment design
- Improve basic concepts in process economics and risk assessments
- Apply uncertainties in process and equipment design
- How to develop simulation model workflow for FEED studies
- How to perform troubleshooting and/or de-bottlenecking of existing facilities to optimize operations

Course Outline:
- Overview of hydrocarbon processing and conditioning
- Overview of process simulation procedures
- Key steps in carrying out process simulation
- Simulation concepts and tools
- Coping with uncertainties in process and equipment simulation
- Process synthesis in hydrocarbon processing and conditioning

- Simulation tools for hydrocarbon processing and conditioning
- Closed-loop process management
- Class exercises

HYDROCARBON METERING TECHNOLOGY AND PRODUCTION ACCOUNTING

Course Length: **5 Days**
Course Dates: **July 17-21, 2017**
Course Venue: **Houston, TX**

Course Description:
This training course provides an in-depth consideration of all aspects of hydrocarbon metering technologies and production accounting. The course describes in general terms the evolution and need for well metering techniques. The course defines basic principles and requirements for deploying modern well metering tools in support of design and operations of integrated production systems. The course will also explain how to apply modern well metering system in production accounting, production allocation, reserves estimation, history matching, production optimization and reservoir management.

Who Should Attend:
This course is designed for metering engineers, production engineers, facility engineers, design engineers, station operators, service staff and inspectors of custody transfer stations

What You Will Learn:
- Gain an understanding of the fundamentals of metering technologies in petroleum industry
- The current status and limitations of the available metering technologies
- Understand foundations of multiphase flow metering techniques
- Develop clear guidelines for uncertainty management in hydrocarbon flow estimation
- Become familiar with virtual flow metering systems and their configuration process
- Know the use of conventional and virtual flow meters in real-time monitoring and optimization of well/reservoir performance, formation properties estimation, production forecasting, reserves estimation

Course Outline:
- Needs and drivers for hydrocarbon metering in petroleum industry
- Hydrocarbon flow metering applications
    - Custody transfer, fiscal allocation and reservoir production allocation
    - Production testing (well and pipeline surveillance)
    - Well testing and reserves tracking
    - Production optimization
    - Reservoir management
- Fundamentals of hydrocarbon flow metering systems
- Design, installation and operations of hydrocarbon flow metering systems

- Uncertainty management in hydrocarbon flow estimation
- Overview of hydrocarbon flow metering technologies currently used in the oil and gas industry
- Theory and applications of production accounting systems
- Case histories

PRODUCTION & MULTIPHASE METERING TECHNOLOGY

Course Length: **5 Days**
Course Dates: **July 24-28, 2017**
Course Venue: **Houston, TX**

Course Description:
This training course provides an overview of the modeling and surveillance methods to understand petroleum production performance problems and to design remedial actions to optimize production. The course also defines basic principles and requirements for deploying multiphase flow metering technologies in support of integrated production system operations.

Who Should Attend:
This course is designed for production engineers, completion engineers, reservoir engineers, facility engineers and asset managers

What You Will Learn:
- How to establish the performance of a hydrocarbon producing well in natural and artificial flowing conditions
- How to model the interactions between the reservoir deliverability and the wellbore completion
- How to identify potential problems and warning signs from the well's behavior
- How to recognize different remedial actions to restore or improve well deliverability
- Know the use of multiphase flow meters in real-time monitoring and optimization of well and reservoir performance, and reserves estimation

Course Outline:
- Inflow performance (single and two phase flow, steady vs steady state)
- Outflow performance model (multiphase correlations for tubing and choke)
- Artificial Lift modeling (Gas Lift, Pump Assisted)
- Complex well performance (horizontal, multilateral, smart/intelligent wells)
- Well expected performance
- Well performance forecasting with time
- Production test validation and well transient analysis (pressure, skin and drainage area)
- Well operating envelope (well operating guidelines)
- Near wellbore skin analysis and chemical impairment (scale, salt, wax and asphaltene)
- Well diagnosis with production logging and other (e.g. echometer)
- Acidizing (Matrix, carbonate) and hydraulic fracturing (High vs low perm)
- Water and gas management (coning, conformance)

- Chasing barrels behind casing (re-Perforation, plugs, re-entries, sidetracks)
- Artificial lift optimization (Gas Lift, Pump Assisted)
- Mutiphase flow metering technologies
- Erosion and corrosion
- Class exercises

INTELLIGENT OILFIELD TECHNOLOGIES IN DRILLING AND PRODUCTION OPERATIONS

Course Length: **5 Days**
Course Dates: **July 24-28, 2017**
Course Venue: **Houston, TX**

Course Description:
This course provides a comprehensive overview of intelligent oilfield solutions in closed-loop drilling and production operations. The benefits and various applications of the intelligent oilfield solutions in closed-loop drilling and production operations will be discussed. The course will also covers multiple hands-on field examples.

Who Should Attend:
This course is designed for professional petroleum engineers, reservoir engineers, production engineers, operation engineers, drilling engineers and asset managers

What You Will Learn:
- How to place optimal weight on bit (WOB) when drilling through a rock formation to reach a hydrocarbon reservoir
- How to apply a model predictive control strategy in drilling operations
- The effects of uncertainty in drilling process optimization
- Knowledge of reservoir phenomena, and efficient data management
- Knowledge of real-time production optimization (RTPO) in oil and gas processes
- Knowledge of integrating asset-wide operations at multiple time scales

Course Outline:
- Overview of intelligent oilfield technologies
- Overview of well drilling process
- Automated well drilling system
- Well drilling modeling framework
- Theory of closed-loop control
- Application of closed-loop control in well drilling process
- Reservoir modeling for large-scale production performance monitoring
- Short-term parametric modeling for large-scale production performance monitoring
- History matching formulations and techniques
- Uncertainties quantification in reservoir performance simulation
- Production forecasting
- Production optimization

- Production allocation
- Real-time production optimization workflow
- Class exercises

WELL LOG INTERPRETATION

Course Length: **5 Days**
Course Dates: **July 24-28, 2017**
Course Venue: **Houston, TX**

Course Description:
This is an applied training course that is designed to equip participants with professional skill sets they need to evaluate drilling wells, estimate reserves, and evaluate assets for performance status monitoring, acquisition and/or disposal. The training course covers current challenges in well-log interpretation and modern techniques for well-log interpretation and formation evaluation. The training accommodates a wide range of background, educational and experience levels. Experience levels have ranged from little Geoscience, or Petroleum Engineering exposure to petroleum industry veterans, with several years of practical experience. The goal of this training course is to keep the class level basic enough to accommodate the skill sets of those participants with little Petroleum E&P background, while still keeping the class interesting for industry veterans.

Who Should Attend:
This course is designed for professional reservoir engineers, petrophysicists, geophysicists, geologists.

What You Will Learn:
- Interpret well logs and core data to estimate petrophysical and compositional properties of different formations
- Understand the physics of nuclear, electromagnetic, and acoustic logs.
- Analyze the effect of static (e.g. porosity, volumetric concentration of shale, water saturation, and volumetric concentrations of mineral constituents) and dynamic (e.g. permeability and saturation-dependent capillary pressure) petrophysical properties on well logs
- Evaluate the quality of well logs & estimate petrophysical and compositional properties
- Use well logs to identify rock types for quantifying reservoir quality
- Make decisions for good candidate locations for completion and fracture treatment based on combined interpretation of well logs and core data

Course Outline:
- Introduction to well logging techniques and review on petrophysical concepts
- Quick-look and reconnaissance well log interpretation methods
- How to use gamma rays logs, spontaneous potential logs, density logs, PEF logs, neutron logs, acoustic logs, NMR logs, caliper, tension and temperature logs
- cross-plots techniques and some useful short cuts
- Modern techniques for well-log interpretation and formation evaluation

- Assessment of static and dynamic petrophysical properties based on combined interpretation of well logs and core data
- Well log-based and core calibrated petrophysical rock classification techniques and their use reservoir characterization
- Inversion-based petrophysical interpretation of advanced well logging measurements

INTEGRATED CORE & WELL LOG DATA INTERPRETATION FOR RESERVOIR CHARACTERIZATION

Course Length: **5 Days**
Course Dates: **July 31-Aug 04, 2017**
Course Venue: **Houston, TX**

Course Description:
Analyzing data derived from well logging and core-plug to understand the heterogeneity of reservoir properties in geologic formations is paramount in petrophysical rock classification and characterization. This course aims to present various concepts of core and well log data acquisition, analysis, interpretation, integration, and their use in petroleum exploration and production. On completion of the course, the participants will be able to: (i) interpret well logs and core data to estimate petrophysical and compositional properties of different formations (ii) understand the physics of nuclear, electric, electromagnetic, nuclear-magnetic, acoustic, imaging, technical, LWD and MWD logs (iii) understand core and plug data acquisition and analysis (iv) understand the principle of petroleum geo-statistics for reservoir characterization (v) perform geo-statistical integration of core-plug and well log data to build accurate models describing porosity, permeability and saturation distributions in reservoir modeling and simulation. The course includes extensive hands-on training and problem solving using public domain software.

Who Should Attend:
This course is designed for professional reservoir engineers, petrophysicists, geophysicists, geologists.

What You Will Learn:
- Significance of core data in petrophysical rock classification and characterization
- Reservoir description with well log-based and core calibrated-based petrophysical rock classification
- Assessment of static petrophysical properties using core & well logs data interpretation
- Construction of static and dynamic multi-layered petrophysical models for petroleum reservoirs
- Joint inversion of well logs & cores to assess petrophysical properties of multi-layered formations
- Pore scale models for simulation and estimation of petrophysical properties
- Link to core-based calibration and updating in petrophysical reservoir characterization
- geo-statistical characterization of petroleum reservoirs

Course Outline:
- Introduction to reservoir rock petrophysical properties
- Well logging and logging analysis

- Standard and special core analysis
- Core-well log integration synchronization and workflow
- Integrated formation evaluation and reservoir characterization
- Assessment of net sand/pay, resources, and reserves

OPTIMAL PARAMETER UPDATING IN SEISMIC HISTORY MATCHING

Course Length: **5 Days**
Course Dates: **August 07-11, 2017**
Course Venue: **Houston, TX**

Course Description:
This course highlights history matching problem formulation, deterministic and probabilistic history matching techniques, as well as common techniques for regularization and parameterizarion. The course also presents a 4D seismic history matching workflow based on streamline simulation, parameterization via pilot points and Kriging and geo-body updating, a petro-elastic model and the neighborhood algorithm, all in an automatic framework. The automatic framework is used for updating parameters such as permeability, barrier transmissibilities and NTG (Net to Gross) by matching 4D seismic predictions from the simulations to observed data. Applications and case studies of the 4D seismic history matching methods in reservoir management decisions and planning of future production strategies will be presented and discussed.

Who Should Attend:
This course is designed for professional reservoir engineers, petrophysicists, geophysicists, geologists and asset managers

What You Will Learn:
- Understand foundations of modern history matching process
- Seismic history matching using time-lapse seismic data
- Apply automatic seismic and production history matching workflow
- How to identify uncertainty associated with seismic history matching techniques
- How to quantify uncertainty associated with seismic history matching techniques
- How to use automatic framework for updating parameters such as permeability, barrier transmissibilities and NTG (Net to Gross)
- Improved reservoir description via seismic history matching

Course Outline:
- Reservoir modeling for field development planning
- Fundamentals of manual and automatic history matching
- Various elements for automatic history matching workflow
  - Generation of multiple models
  - Simulation flow
  - Petro-elastic model

  - Comparison of simulated data with historical data
  - Optimization algorithms
- Pilot points and Kriging
- 4D seismic data and observed production data
- Objective function
- 4D seismic history matching workflow and case studies

ADVANCED DATA ASSIMILATION METHODS IN HISTORY MATCHING AND UNCERTAINTY QUANTIFCATION: THEORY AND PRACTICE

Course Length: 5 Days
Course Dates: August 07-11, 2017
Course Venue: Houston, TX

Course Description:
This course covers the fundamental principles of deterministic and stochastic inverse modeling and their application to calibration of hydrocarbon reservoirs and uncertainty quantification. It covers a variety of topics related to the integration of production and performance data into reservoir models and account for their respective errors and uncertainties. The topics include history matching problem formulation, deterministic non-linear least-squares methods, probabilistic Bayesian methods, iterative and recursive history matching techniques, gradient-based techniques and adjoint method, as well as common techniques for regularization and parameterizarion of reservoir models for history matching. Applications and case studies from both deterministic and probabilistic history matching will be presented and discussed.

Who Should Attend:
This course is designed for professional reservoir engineers, petrophysicists, geophysicists, geologists and asset managers

What You Will Learn:
- Understand foundations of modern history matching techniques
- Understand foundations of uncertainty management in history matching techniques
- Communicate and implement a consistent uncertainty management policy
- Understand the value of uncertainty management analysis in reservoir development and management
- Develop clear guidelines for making decisions in analysis in reservoir development and management

Course Outline:
- History Matching Problem Formulation
- Linear Inverse Problems
- Regularized Least Squares Inverse Problems
- Nonlinear History Matching Inverse Problems
- Preliminary Material on Stochastic Approaches

- Bayesian History Matching and Stochastic History Matching with the Ensemble Kalman Filter
- Reservoir Parameterization for History Matching
- Case Studies
    - Case Study 1: Gradient-Based History Matching
    - Case Study 2: Ensemble Kalman Filter for History Matching
    - Case Study 3: History Matching with Parameterization

INVERSE-BASED SEISMIC INTERPRETATION FOR PETROLEUM RESERVOIR CHARACTERIZATION

Course Length: **5 Days**
Course Dates: **August 07-11, 2017**
Course Venue: **Houston, TX**

Course Description:
This course addresses mathematical methodologies for seismic reservoir characterization in order to provide 3-dimesentional models of the main properties in the reservoir for fluid flow simulations and enable 4D reservoir modeling characterization by time-lapse seismic data integration. These properties generally include rock properties such as porosity, lithology, water and hydrocarbon saturations, pressure and permeability are estimated from well log and seismic data. This course includes multiple innovative and sate of the art inverse modeling methodologies for seismic reservoir characterization: Case studies will be discussed to illustrate the field application of the concepts in the course.

Who Should Attend:
This course is designed for professional reservoir engineers, petrophysicists, geophysicists, geologists and asset managers

What You Will Learn:
- Definition of the rocks. Clastics sedimentology basics
- Concept of stress and strain. Stress –strain relationships. General Hooke's law
- The connections between Young Modules, Poisson's ratios and Thomson's parameters
- Velocity-Porosity Models: Critical Porosity and Nur's Modified Vogt Average.
- Velocity-Porosity-Clay Models: Castagna's Empirical Relations for Velocities
- Vp –Vs Relations. Velocity-Density Relations
- Updating a reservoir model to behave as closely as possible to the real reservoir
- Estimation of reservoir properties using inversion methods

Course Outline:
- Introduction to Reservoir Modeling and Inverse Theory
- Rock Physics and seismic methods for characterizing petroleum reservoirs
- Mathematical modeling of elastic properties of minerals and rocks
- Seismic waves in real media and fluid effects on wave propagation
- Seismic based reservoir characterization
- Seismic data processing and conditioning
- Forward modeling and inverse problem. Travel –time inversion
- Dynamic data integration and history matching with 4D Seismic Data

- Micro-seismic events. Analysis raw data
- Estimation of permeability base on MS event locations
- Permeability upscaling : from lab to field
- Field case studies and hands-on practice

LARGE-SCALE FIELD DEVELOPMENT OPTIMIZATION

Course Length: **5 Days**
Course Dates: **August 14-18, 2017**
Course Venue: **Houston, TX**

Course Description:
A typical reservoir development problem involves many variables that affect the operational schedule involved in its management subject to economic and physical limits. It is therefore essential these operations be performed as close to optimal as possible. This course is designed to equip participants with computational methods to solve field development problems. Field cases involving well control optimization, well placement and generalized field development full field development are presented to gain hands-on experience and best practices in the industry.

Who Should Attend:
This course is designed for professional reservoir engineers, production engineers, petrophysicists, geophysicists, geologists and asset managers

What You Will Learn:
- Introduction to reservoir modeling and inverse theory
- Knowledge of optimization algorithms and their application to solving oil and gas reservoir development optimization problems
- Knowledge of integrating production optimization and reservoir simulation models to perform automated/assisted field development optimization
- Use of optimization techniques, together with reservoir simulation tools, for planning and optimizing field development

Course Outline:
- Integrated geological model
- Petrophysical evaluation
- Numerical reservoir simulation
- History matching and production forecasting
- The objective function
- Overview of optimization techniques
- Multi-objective optimization techniques
- Applications of single and multi-objective optimization techniques to petroleum fields
- Methods for uncertainty estimation
- Reservoir management decisions
- Field case studies and hands-on practice

ADVANCED PETROLEUM ROCK MECHANICS

Course Length: 5 Days
Course Dates: August 14-18, 2017
Course Venue: Houston, TX

Course Description:
This course will introduce professionals to principles and applications of geo-mechanics in the exploration and production industry. The student will understand the drivers and rock responses to drilling, stimulation and production operations. Wellbore stability, hydraulic fracturing, compaction and water injection will be discussed, and general concepts will be introduced. Examples of solutions of available tools will be reviewed.

Who Should Attend:
This course is designed for professional reservoir engineers, petrophysicists, geophysicists, geologists and asset managers

What You Will Learn:
- Understand principles and applications of geo-mechanics in the exploration and production industry
- Understand the drivers and rock responses to reservoir, drilling, completions, stimulation and production operations

Course Outline:
- Introduction to petroleum geomechanics and rock mechanical properties
- Linear and non-linear deformation and failure properties of rocks
- Geomechanics for integrated reservoir characterization problems (seismic, well log, production data)
- Geomechanics for 4D seismic history matching and uncertainty quantification (data integration and multi-objective optimization for 3D reservoir characterization and building reservoir models)
- Geomechanics for sand production problems (production induced changes in reservoir geomechanics)
- Geomechanics for subsidence and compaction problems
- Integration or coupling of geomechanics and multiphase reservoir flow (production induced changes in reservoir geomechanics under fluid flow)
- Geomechanics for casing stability problems
- Geomechanics for borehole stability and breakout problems (rock stability)
- Field case studies and hands-on practice

FAULT SEAL ANALYSIS IN PETROLEUM EXPLORATION AND DEVELOPMENT

Course Length: **5 Days**
Course Dates: **August 21-25, 2017**
Course Venue: **Houston, TX**

Course Description:
In reservoir settings with structural compartmentalization, fault properties can constrain fluid flow and pressure development, thus affecting decisions associated with the selection of the drainage strategy within the reservoir management activities. This course covers the basic and advanced concepts in fault seal analysis in petroleum exploration and production. The course also includes extensive hands-on training and problem solving using public domain software.

Who Should Attend:
This course is designed for professional reservoir engineers, petrophysicists, geophysicists, geologists and asset managers

What You Will Learn:
- Quantification and characterization of faults (fault mapping techniques)
- Fault facies and its application to petroleum reservoirs
- Relation between faults and hydrocarbon migration
- Influence faulting on hydrocarbon migration (fault clay content predictions)
- Faults and hydrocarbon migration model (fault seal theory and controls on flow)
- Fault statistics, fault diagnosis, fault geometric & juxtaposition analysis
- Fault properties analysis and its application to reservoir models

Course Outline:
- Introduction to tectonic evolution, and development of fault zones and fault rocks
- Fault seal process, fault seal types and generated fault rocks
- Methods to evaluate fault sealing properties
- Dynamic fault evolution and deformation mechanisms
- Factors affecting petrophysical properties of fault rocks
- Zone properties modeling and layering process
- 3-D stratigraphy modeling and faulted cellular models
- Fault zone architecture, fault framework construction & fault seal analysis

- Fault and fracture prediction
- Uncertainty associated with fault sealing analysis
- Workflow for quantitative evaluation of structural compartmentalization reservoir fault communication using 4D Seismic Data
- Field case studies and hands-on practice