Complete Suite of Training and Competency Development

2014 COURSE CATALOG

86 New Courses
- 66 Technical Courses
- 20 Software Courses
Today, the E&P industry faces significant human resource challenges. Companies with a deficit of mid-career expertise are under huge pressure to accelerate the development of their young professionals.

And as the industry focuses on hard-to-extract oil and gas resources, professionals at all levels need to acquire fresh skill sets and better understand new technologies and their applications.

NExT is dedicated to the professional development of the E&P industry's petrotechnical professionals. With a portfolio of more than 420 expert-led courses, training programs, and competency services, NExT has helped more than 10,000 E&P professionals in more than 50 countries develop the petrotechnical expertise needed to meet today's increasingly complex industry challenges.

By combining expert-led courses, in-class projects customized for your asset challenges, field and lab courses that provide hands-on learning experiences, industry-leading software tools, and one-on-one mentoring, NExT training blends a targeted skills-development program that aligns your team's abilities to your strategic objectives. Our goal is to provide the best tools to help you meet your competency development objectives in a sustainable way. Our years of experience in the oil and gas business, backed by first-class training knowledge gained through university partnerships, enable us to develop, customize, and continually update the industry's most advanced E&P training and competency development plans to meet your business goals.

In the following pages, you'll find discipline maps that explain our public course offering. Each color-coded map shows courses grouped by discipline and proficiency level to help you find the right ones for you. You can register for a public course or find out more by visiting us at NExTtraining.net/classes. As always, any of our courses can be tailored to your in-house training program. To find out more or to ask questions about public courses, please e-mail us at classes@NExTtraining.net.

For 2014, we have added 86 new courses to our growing course curriculum and expanded our technical training programs with new programs for Surface Facilities O&M, Exploration, Geomechanics, and Unconventional Resources. For training on industry-leading software tools from Schlumberger, we have added new courses for the latest release of Petrel* E&P software platform, Techlog* wellbore software platform, and PetroMod* petroleum systems modeling software.

NExT training is here to help move your professional workforce forward. We look forward to serving you and hearing about your training needs and aspirations.

Hooman Sadranah
Managing Director, NExT
Oil and Gas Training and Competency Development

The NExT Edge

1. Full suite of training courses in upstream oil and gas industry disciplines as well as surface facility and midstream training for operators and technicians

2. Training on industry-leading software tools and software certification

3. Partnership with advanced industry and academic institutions to deliver best-in-class oil and gas technical and software training

4. A teaching faculty of more than 1,000 independent instructors, all experts in their fields, with a wide variety of technical and regional experience

5. Recognized as the 2013 Getenergy Education/Training Provider of the Year, reinforcing NExT as the industry’s trusted partner for training and competency development

6. Access to a global network of Schlumberger training centers, where Schlumberger trains its customers as well as its own staff

Winner: 2013 Getenergy Education/Training Provider of the Year Award

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
The NExT directors of curriculum (DOC) and training managers are responsible for maintaining the superior standards of our course materials and ensuring the high-quality delivery of our training solutions worldwide. With their respective peer review boards, the DOCs and training managers continuously evaluate the technical content of our courses to ensure that we are delivering the latest technology to our clients. The DOCs are responsible for ensuring that our virtual faculty members are not only leaders from a technical viewpoint, but are also competent instructors. Through the NExT comprehensive course and instructor evaluation system, a continuous quality assurance process is in place that enables us to react immediately to any quality assurance issues. All of our DOCs and training managers routinely teach in the NExT programs and direct competency assessment projects.

Stephen Pickering is the learning content and delivery director for the NExT oil and gas training and development program. Since joining Schlumberger in 2000, he has held various technical positions, including operations manager for seismic reservoir inversion, 4D business development manager, and geophysics domain career leader. Before joining Schlumberger, he was a seismic data processing analyst for Western Geophysical, a chief geophysicist and exploration manager for Hamilton Brothers Oil and Gas Ltd., and UK exploration manager UK and Europe and manager of exploration resources and technology for BHP Petroleum Ltd. Stephen holds two degrees in geology and an MBA.

Abdel Aleem Hassan is the training manager, Petrel* platform, for the NExT oil and gas training and development program. A geophysicist with demonstrated strengths in the fields of geophysics, seismic processing, and data acquisition with more than 20 years of experience, he has taught the various Petrel platform courses since 2005 to the staffs of international and national oil companies. From 2010 to 2012, Abdel established and managed the Schlumberger Information Solutions (SIS) operations in Iraq. Abdel has been associated with international, independent, joint venture, and national oil companies in survey planning, data acquisition, and data processing, in addition to being a Petrel workflow consultant for seismic interpretation groups. Abdel obtained a BS degree in geophysics and an MS degree in engineering geophysics from Mansoura University, and a PhD degree in geophysics from Ain shams University in Egypt.

Andy MacGregor is the training manager, PetroMod* software, for the NExT oil and gas training and development program. He began his career with Schlumberger 21 years ago and has served in a variety of roles ranging from petrophysicist to workflow consultant to product line manager. Andy previously headed the project management team in SIS North America where he was responsible for implementing multiple high-value production data management solutions in addition to managing a team of consulting petroleum system geologists in Aachen, Germany. Prior to joining Schlumberger, Andy was a geophysicist with a major oil and gas company for 6 years. He holds a BS degree in physics from the University of Birmingham and an MS in exploration geophysics from the University of Leeds.

Birol M.R. Demiral is the director of curriculum, reservoir engineering, for the NExT oil and gas training and development program. With more than 34 years of teaching and research experience in reservoir engineering, he has been one of the directors of curriculum for reservoir engineering with the NExT program since 2011. Prior to joining the NExT program, Dr. Demiral was the Schlumberger professorial chair at the Universiti Teknologi Petronas, Malaysia for 5 years where he held the position of director of enhanced oil recovery (EOR) mission-oriented research and was the head of the EOR Centre. Previously, he was chairman of the Petroleum and Natural Gas Engineering Department at the Middle East Technical University (METU) in Ankara, Turkey, where he earned all of his degrees in petroleum engineering and was on the staff for 24 years. While working at the METU, he joined the Stanford University Petroleum Research Institute Heavy Oil Group (SUPRI-A) as a post-doctoral research affiliate for 4 years between 1988 and 1992.

Charanjit Jootla is the associate director of curriculum, surface facility, for the NExT oil and gas training and development program. He has extensive experience in onshore and offshore facilities engineering design and operations for oil handling and gas processing facilities. From 1998 to 2012, Charanjit was with Ras Gas as a facilities engineering specialist and subsequently a loss prevention specialist within the same organization. Prior to that time, he worked on various engineering and design-related assignments with McDermott Engineering in Singapore, Transfield Worley in Australia, Petronas Carigali in Malaysia, and Brunei Shell Petroleum in Brunei. He holds a chemical engineering degree from the Indian Institute of Technology, Kanpur, India.

David Conroy is the director of curriculum, drilling engineering, for the NExT oil and gas training and development program. From 1997 to
2012, he held a variety of drilling and drilling optimization positions with offshore and onshore operators in several global regions. With a background in drilling process optimization, subsurface geoscience, competency assessment, and business analysis, he has supported several major IOC and NOC exploration-production drilling departments in meeting their operational and planning objectives. He holds a BS in geology and a PhD in structural geology and deep earth geophysics from The Queen’s University (UK).

**David Humphrey** is the director of curriculum, drilling in North, Central, and South America, for the NExT oil and gas training and development program. As a licensed professional engineer with more than 35 years of experience in the upstream petroleum energy business, David has been associated with the NExT program since 2001. His experience includes well design and operations management, both at the project and division level for numerous complex onshore and offshore wells worldwide, complemented with experience as a division health, safety, and environment (HSE) manager and as a production operations manager. He has worked for medium and large independent oil and gas companies, large international integrated oil and gas companies, and as a consulting engineer. He holds a petroleum engineering degree from the University of Tulsa and an MBA degree from the Oklahoma City University.

**Florence Einaudi** is the training manager, Techlog platform, for the NExT oil and gas training and development program. She joined Schlumberger in 2006 as a petrophysicist in the Caspian Sea region. Since 2011, she has been the Techlog platform training manager and has played an integral role in the development of training class content and material. As a geologist with an academic research and teaching background, she was previously associated with the International Ocean Drilling Program for 7 years as a logging staff scientist where she participated in 7 sea expeditions. During that time, she also instructed classes in geology and geophysics at the University of Montpellier where she participated in slimline logging data acquisition. She holds a PhD degree in geology-geophysics from the University of Aix-Marseille.

**Gary W. Gunter** is the director of curriculum, petrophysics and NExT subsurface integration programs, for the NExT oil and gas training and development program. With more than 35 years of industry experience and prior to joining the NExT program, he worked for integrated oil and gas producers as a field development reservoir engineer, conducted special advanced EOR studies as a research engineer, and provided technical leadership for the Amoco Petrophysics Development Program. He has a special interest in wettability, carbonate reservoirs, practical aspects of relative permeability and special core analysis, and the evolving science of unconventional petrophysics. During the past 20 years, he has trained more than 1,500 individuals, delivered more than 150 commercial classes in more than 25 countries, and developed more than 15 industry courses. He was an adjunct professor of geoscience and petroleum engineering at the University of Tulsa prior to joining Schlumberger.

**Ildar Diyashev** is a senior petroleum engineer, primarily responsible for teaching multidisciplinary project-based courses in the NExT oil and gas training and development program. His previous experience includes working for research organizations in Russia and for the Schlumberger Integrated Project Management team where he evaluated performing wells and selected well candidates for production enhancement processes. Other responsibilities include teaching various reservoir and production engineering courses. He holds a PhD degree in petroleum engineering from Texas A&M University.

**Jeannine Boubel Smith** is the director of curriculum, management, economics, and finance, for the NExT oil and gas training and development program. She joined Schlumberger in 1999 and has held various technical and management roles since that time. Jeannine has expertise in petroleum economics, decision and risk analysis, Merak® planning, risk, and reserves software, planning and budgeting, portfolio management, and training and mentoring. Prior to joining Schlumberger, she spent 22 years with...
large and small E&P companies where she gained experience in management, reservoir and production engineering, field operations, acquisitions and divestitures, technical and business software, and integrated workflows. Her passion for the oil and gas business began as a roostabout and continued as a production engineer with Mobil after graduation. She holds a BS degree in petroleum engineering from Texas A&M University, is a registered professional engineer in the State of Texas, and also has an MEd degree with a specialization in global training and development.

John Afilaka is the training manager, reservoir engineering in the NExT oil and gas training and development program. He joined Schlumberger in 1992 as a geotechnical engineer and has held various engineering and management positions in Data and Consulting Services, NExT oil and gas training program, and SIS in Europe, the US, South America, the Middle East, and Africa. He specializes in rock mechanics, reservoir characterization, reservoir simulation, integrated reservoir studies, reservoir modeling, and reserves estimation and risk analysis. John holds BS and MS degrees in mineral resources engineering and rock mechanics, respectively, from Imperial College, London, and MPhil and PhD degrees in engineering geology from Ecole Nationale Superieure des Mines de Paris, Paris, France.

Laurence Darmon is the director of curriculum, geology and geophysics, for the NExT oil and gas training and development program, and is also a principal geologist for Schlumberger. In his current position, he is responsible for technical content, new course development, instructor verification, and program creation for the geology and geophysics disciplines. His 38 years of experience in the oil and gas industry include both technical and management positions in exploration, wellsite operations, reservoir characterization, and software development. He has extensive global experience in North and South America, Europe, Africa, the Middle East, Southeast Asia, and Australia. Laurence spent 7 years with WesternGeco as manager of reservoir characterization groups and 14 years in software design, creation, and management, including 4 years as president of an independent company. He holds BS and MS degrees in geology and petroleum geology, respectively, from the University of London.

Leslie Warren is the director of curriculum, management studies, in the NExT oil and gas training and development program. She has worked for Schlumberger for 23 years in diverse assignments spanning geological/geophysical interpretation, workflow analysis, knowledge management, program and project management, and business consulting. Leslie, a certified PMI® (Project Management Professional) with more than 15 years of managing projects in the oil and gas industry, and 9 years of experience in reservoir characterization and well planning, joined the NExT program in 2012 and is also coleader of the Schlumberger Project Management Technical Community. She holds a BS degree in geological sciences from the University of Texas at Austin.

Luis Carlos Jaramillo is the training manager, information management, for the NExT oil and gas training and development program. In 2009, he began as an instructor and manager of the software and technical curriculum for SIS in the area of information management. Prior to that time, he was a senior consultant and project manager with responsibilities for managing, delivering, and implementing information technology, petrotechnical infrastructure, and E&P information management solutions for the oil industry. He holds a BS degree in systems engineering from the District University of Bogota, Colombia and an MS degree in petroleum engineering with project management from the Heriot-Watt University.

Manuel Bramao is the director of integrated programs, production technology, for the NExT oil and gas training and development program. With more than 30 years of industry experience, principally with Schlumberger, he has integrated and led multidisciplinary teams in Latin America, Europe, West Africa, North Africa, the Middle East, and the Far East on production engineering projects related to production optimization and completions. These projects focused on well diagnosis, formation damage, stimulation (matrix treatments and hydraulic fracturing), and sand ACE™ completions. He has also been actively involved in production engineering training (designing, teaching, and supervising training programs and courses) and strategic planning of human resources, developing proficiency matrices, performing and analyzing competence assessments, and developing discipline training roadmaps. Manuel holds an MS degree in applied thermodynamics and fluid mechanics in mechanical engineering from the Technical University, Lisbon, Portugal.

Marcelo Laprea-Bigott is the director of curriculum, reservoir engineering and unconventional resources, for the NExT oil and gas training and development program. He has been associated with the NExT program since 2001, serving
Margarita Campos is the training manager, production and Merak software, in the NExT oil and gas training and development program. She has 14 years of Schlumberger experience in production surveillance projects for shale gas, steam-assisted gas drainage, and waterflooding, as well as production optimization for gas life and liquid loading. Margarita has broad experience in designing and implementing production workflows using SIS technology. She is also an expert in applying artificial intelligence to workforce candidate recognition and virtual flowmeters. She holds a BS degree in petroleum engineering from the Universidad de America and an MS degree in petroleum engineering from the University of Texas at Austin.

Olegario Rivas is the director of curriculum, artificial lift and completions, for the NExT oil and gas training and development program. He began his career with REDA* electric submersible pumping systems and Schlumberger in 1997 in the area of artificial lift. In 2007, he became a production engineering instructor with the NExT program. Olegario has 40 years of career experience in creating and developing new production engineering technologies with an emphasis in the artificial lift area and well completions. From 1977 to 1997, he headed the Artificial Lift-Pumps group at the Intevep RD center of PDVSA in Venezuela.

Rafael Guevara is the director of curriculum, geology and geophysics, Latin America, for the NExT oil and gas training and development program. He has 22 years of experience, specializing in hydrocarbon exploration, 2D and 3D seismic structural interpretation, as well as interpolation by matching pursuit (IMAP) and modeling of structural surfaces in the surface and subsoil, both in passive margins and in compressive systems of tectonic complexes. Rafael has extensive experience in field geology, and integrating surface information with subsurface information. His experience extends to advising and consulting in the areas of integrated interpretation, orientated to the geosciences and seismic interpretation, in addition working with groups of consultants in integrated management of assets.

Steve Nas is the training manager, Drillbench® dynamic drilling simulation software, with the NExT oil and gas training and development program. He has more than 35 years of experience in advanced drilling operations with international and small independent oil companies, drilling contractors, and service companies. Steve has worked as a wellsite drilling engineer for more than 17 years on land as well as offshore operations, including deepwater drilling. He has been involved in underbalanced and managed pressure drilling operations since 1995, including the first offshore underbalanced drilling operations and the first managed pressure drilling operations from floating rigs and deepwater rigs. He is considered a subject matter expert on drilling hydraulics, multiphase flow, and well control. Steve holds a BS degree in electronics and an MS degree in drilling engineering from Robert Gordon University in Aberdeen, Scotland.

Valmore Rodriguez is the director of curriculum, surface facilities and competency assessment, with the NExT oil and gas training and development program. His more than 30 years of oil and gas industry experience includes development of competency models for a large number of companies in the Americas, Europe, Asia, and Africa. Recently, he has focused on developing competency models, technical capability development, and teaching for the oil and gas industry. Valmore holds BS, MS, and PhD degrees in chemical engineering.
To meet the educational and career-advancement needs of oil and gas professionals worldwide, and to enhance E&P professionals’ core competencies, NExT offers comprehensive, customized training programs that fit the needs of your organization. Covering the entire breadth of the E&P domain, NExT builds development programs that span core industry disciplines and challenges.

The NExT team of technical and software experts is committed to employing the best instructors, producing materials to the highest standard, and ensuring that curricula evolve to embrace the latest technology advances.

By employing a comprehensive course- and instructor-evaluation system, NExT assures that a continuous quality assurance (QA) process is in place and that faculty members are technical experts as well as competent teachers.

By working with industry and university partners as well as client advisory board members, NExT continually incorporates emerging and industry-relevant concepts and technologies to its curricula. Its faculty has gained a wide variety of technical and regional experiences that allows NExT to bring world-class expertise to address each customer’s unique skills and training requirements.

NExT Client Advisory Board

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<thead>
<tr>
<th>Client</th>
<th>Company</th>
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<td>BG Group</td>
<td>Petroamazonas</td>
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<td>Ecopetrol</td>
<td>Saudi Aramco</td>
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<td>Al-Khafji Joint Operations (KJO)</td>
<td>Shell</td>
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<td>Kuwait Oil Company (KOC)</td>
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<td>Newfield Exploration</td>
<td>Sonatrach</td>
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<td>Petronas</td>
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<td>Abu Dhabi Company for Onshore Oil Operations (ADCO)</td>
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By ensuring training excellence with our university partners, NExT offers the following software training:

**SCHLUMBERGER SOFTWARE TRAINING**

NExT training in industry-leading Schlumberger software helps develop the petrotechnical skills needed to meet today's complex industry challenges.

**SOFTWARE PLATFORMS**

- Petrel platform
- Techlog platform
- Avocet* production operations software platform
- Studio* E&P knowledge environment
- Ocean* software development framework

**FOUNDATION SOFTWARE**

- Drillbench software
- ECLIPSE® industry-reference reservoir simulator
- GeoFrame® reservoir characterization software
- GeoX® exploration risk and resource assessment software
- InnerLogix® data quality management solution
- INTERSECT® high-resolution reservoir simulator
- Malcom® interactive fluid characterization software
- MEPO* multiple realization optimizer
- Merak software
- OFM® well and reservoir analysis software
- OLGA® dynamic multiphase flow simulator
- Omega* seismic data processing software
- PetroMod software
- PIPESIM® steady-state multiphase flow simulator
- ProSource® E&P data management and delivery system
NExT’s curriculum provides courses for technical and nontechnical professionals at all experience levels. The course matrix at the start of each discipline organizes the curriculum by course focus and competency level. You can use this matrix to find the right course and build your training plans. Software-intensive courses are marked , and field courses are marked . Technical courses that use software have been marked , and the courses with practical sessions are highlighted with . There are some courses that use simulators and are highlighted with . All NExT courses are available to be held at your location.

**Discipline**
The discipline is listed at the top of the page. Each discipline has been assigned a different color.

**Course Focus**
These headings show the various sections in which the courses have been organized, under each discipline.

**Competency Level**
The courses have been designed for learners at different experience levels — Awareness, Foundation, Skill, and Advanced. The course descriptions inside stipulate the prerequisites for each course, which will help you determine whether the course’s experience level is right for you.

**Technical Courses**
All technical courses are listed under their relevant discipline, on solid colored background corresponding to the subject color.

**Software Courses**
All software courses are listed under their relevant discipline, on a lighter-colored background corresponding to the subject color.
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<th>Reservoir Production</th>
<th>Reservoir Management</th>
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</thead>
<tbody>
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<td>SKILL</td>
<td>Conducting an Integrated Reservoir Study</td>
<td>Integrated Approach to Optimize the Economy of the Asset Life Cycle</td>
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<tr>
<td>FOUNDATION</td>
<td>Oil and Gas Asset Management</td>
<td>Mastering Finance for Non-Financial Oil and Gas Personnel</td>
<td>Fundamentals of Field Development Planning</td>
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<tr>
<td>AWARENESS</td>
<td>Introduction to Geology</td>
<td>Introduction to Drilling</td>
<td>Introduction to Petroleum Economics</td>
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<td>Introduction to Geophysics</td>
<td>Introduction to Production Engineering</td>
<td>Introduction to Finance and Accounting in Oil and Gas</td>
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<td>Project Management for Team Members</td>
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<td>Petroleum Technology</td>
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<td>Techlog</td>
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**COMPETENCY LEVEL**

**SKILL**

- ProSource Front Office Fundamentals

**FOUNDATION**

- Merak Peep Fundamentals and Merak Peep Decline Fundamentals Combined Course
- PIPESIM Fundamentals
- OFM Fundamentals Using Gas Operations Examples
- OFM Fundamentals Using Oil and Waterflood Production Examples

**AWARENESS**

- Petrel Fundamentals
- Techlog Fundamentals
## Petroleum Exploration and Production
### Awareness - 4 Days

In this course, attendees will be introduced to the different phases of an oil field’s life cycle: exploration, appraisal, well construction, field development, and production. The attendees will gain an overview of reservoir and field E&P through exercises, class discussions, team presentations, and interactive challenges. The course includes a review of relevant principles and consideration from a domain perspective of geology; geophysics; petrophysics; reservoir, drilling, completions, and production engineering; and production operations. Attendees will also learn about the financial implications of these various phases and the role of professionals in each, as well as the functions of stakeholders.

### COURSE CONTENT
- E&P life cycle
- Functions of companies and personnel, and their roles and responsibilities
- Technologies, processes, and workflows for successful exploitation
- Political, environmental, and financial aspects of the oil and gas industry

### AUDIENCE
Entry-level professionals of all disciplines and nontechnical support staff who want an introduction to E&P.

### PREREQUISITE
None

## Petroleum Technology
### Awareness - 5 Days

This course presents attendees with a practical understanding of petroleum industry technology in an interesting, effective, and efficient manner. Topics included are the basics of the industry from terminology through basic technology and from geology through surface processing of the petroleum product. Attendees are placed in the position of a reservoir engineer, and “Our Reservoir” is defined, analyzed, and placed on production followed by selecting drill sites. The attendees are then placed in the position of a drilling/completion engineer, and the drilling/completion program for “Our Well” is analyzed. The purpose is to develop an understanding of the technology and its applications, and the confidence, professional enthusiasm and, therefore, productivity that comes with that understanding.

### COURSE CONTENT
- Reservoir fluid properties
- Petroleum geology and reservoirs
- Hydrocarbon generation and occurrence
- Reservoir fluid distribution and flow characteristics
- Tight oil and gas reservoirs
- Exploration technology
- Hydrocarbon reservoir and reservoir development plan
- Drilling engineering and operations
- Well completion and production technology
- Reservoir development practices
- Hydrocarbon recovery mechanisms
- Surface processing of produced fluids

### AUDIENCE
Management, administrative, secretarial, field support, accounting, purchasing, economics, legal, finance, government, human resources, drafting, land and data processing personnel, as well as investors and royalty owners.

### PREREQUISITE
Course contents are essentially the same as those for Petroleum Engineering Practices but presented with much less mathematical and technical detail.

## Project Management for Team Members
### Awareness - 2 Days

This course, delivered by a Project Management Institute (PMI) education provider, will provide attendees with the basic knowledge and skills required to successfully participate in an oil and gas project. This awareness course is designed to provide attendees with an introduction to the concepts of project management. As such, this course provides a good basis for any person seeking future career advancement as a team leader or project manager. It also establishes a common language; thus, facilitating moves across segments or departments. The case studies for applying the project management methodology will use oil and gas examples, and can be tailored (for an additional fee) to specific needs of a customer. The studies will begin with correctly defining the project, including scope and requirements, and extend to planning, implementing the plan and finally, closing out the project. The course follows the guidelines established by the PMI and their Project Management Body of Knowledge (PMBOK® Guide). The course uses a combination of teaching components to ensure delegates absorb both the theory and the practical application of the topics.

### COURSE CONTENT
- Define a project and project management
- Define the difference between projects and operational work
- Explain the relationship of the project management Triangle constraint triangle
- Identify the key components of the project life cycle and expectations of team members in each phase
- Identify project stakeholders and their contributions
- Define roles and responsibilities of project team members
- Explain why we apply project management best practices
- Develop a high-level work plan, including project activities and effort estimates

### AUDIENCE
Anyone desiring an introduction to basic financial practices and principles in the oil and gas industry.

### PREREQUISITE
None

## Introduction to Finance and Accounting in Oil and Gas
### Awareness - 3 Days

This 3-day course will enable attendees who do not have a financial background to understand the basic principles, theory, and practice of financial reporting and analysis in the upstream oil and gas industry. Course attendees will learn the sources and uses of accounting and financial information and understand the differences between cash flow for project economics and accounting profit. Basic oil and gas industry accounting policies will be presented, as well as the general budgeting and financial processes of a typical international oil company.

### COURSE CONTENT
- Sources and uses of financial information and data
- Financial information for decision-making
- Basic financial principles such as the balance sheet and profit and loss
- Cash flow and profit
- Control cash flow
- Techniques for measuring financial performance
- Oil and gas accounting and budget preparation and control
- Role of financial planning
- Operating budget versus capital budget
- Budget preparation and control

### AUDIENCE
Anyone desiring an introduction to basic financial practices and principles in the oil and gas industry.

### PREREQUISITE
None
E&P INTRODUCTION AND FUNDAMENTALS

<table>
<thead>
<tr>
<th>Introduction to Geoscience</th>
<th>Introduction to Reservoir Engineering</th>
<th>Introduction to Surface Facilities</th>
<th>Introduction to Production Engineering</th>
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<tbody>
<tr>
<td>Awareness - 5 Days</td>
<td>Awareness - 3 Days</td>
<td>Awareness - 5 Days</td>
<td>Awareness - 5 Days</td>
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The objective of this 5-day course is to introduce attendees from disciplines other than the geosciences to the key concepts and principles of geology, geophysics, and petrophysics as applied to today’s oil and gas industry with emphasis on business applications. This course is a condensed version of three popular NEXT courses: Introduction to Geology, Introduction to Geophysics, and Introduction to Petrophysics. Many of the same topics are covered, but in less detail, and with more emphasis on the links between the three disciplines. This is an ideal introductory-level course to the geoscience disciplines.

**COURSE CONTENT**

- Geology and exploration
- Petroleum, depositional, and pore systems
- Structural features
- Geological mapping, correlation, and modeling
- Basic geophysics principles
- Marine and land seismic data acquisition
- Data processing
- Seismic interpretation and borehole seismic
- Basics of logging, logging tools, logging measurements, and log interpretation
- Reservoir parameters
- Coring and core analysis
- Basics of geomechanics

**AUDIENCE**

Oil and gas industry professionals wishing to understand the principles of the primary geoscience disciplines and their applications in today’s E&P industry.

**PREREQUISITE**

None

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This course on reservoir engineering introduces attendees to the classic and current techniques used to obtain reservoir fluid properties from laboratory data and correlations. The attendees will learn the fundamental concepts of fluid flow, including laminar and non-Darcy flow in multiphase situations. Basic theory and practice of well test analysis are presented as a means for preparing input data for reservoir simulation modeling. Exercises and examples demonstrate applications to actual situations.

**COURSE CONTENT**

- Introduction to reservoir engineering
- Reservoir types and lithologies
- Reservoir fluid properties: Pressure-volume-temperature data, specific gravity, bubblepoint pressure, gas/oil ratio, viscosity, and formation volume factor
- Reservoir rock properties: Porosity, permeability, formation capacity, and not pay thickness
- Fundamentals of fluid flow in porous media
- Darcy’s law
- Reservoir classification and drive mechanisms
- Oil and gas inflow and outflow performance
- Pressure buildup analysis
- Oil displacement and enhanced recovery
- Basic concept of reservoir simulation modules

**AUDIENCE**

Junior-level reservoir engineers, production engineers, and development geologists wanting to learn reservoir fundamentals, monitoring, and production enhancement techniques.

**PREREQUISITE**

None

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Structured to provide attendees with the fundamentals of surface facilities, this course covers the production process from the wellhead to custody transfer. Topics are production surface facilities systems, including gathering, separation, production treatment, metering systems, and process equipment. The attendees will learn about applied flow assurance and how produced fluids are converted to salable products.

**COURSE CONTENT**

- Field development overview
- Well flow control and safety system
- Gathering system
- Fluid separation system
- Oil treatment
- Water treatment
- Gas treatment
- Flow assurance overview
- Custody transfer and measurements
- Process equipment

**AUDIENCE**

Engineers and geoscientists involved in field development or production of oil and gas

**MINIMUM 2-YEAR TECHNICAL DEGREE OR EQUIVALENT EXPERIENCE.**

---

This course focuses on the basics of production engineering that attendees need to improve their asset team interactions. The attendees will learn about the role of production engineering in building capacity and maximizing production performance using tools including well testing, nodal analysis, and artificial lift. This engineering overview covers the equipment and techniques that production engineers employ both downhole and on the surface.

**COURSE CONTENT**

- Overview of production engineering
- Reservoir fundamentals and nodal analysis
- Well testing
- Lower and upper completions, perforations, and sand control
- Completion fluids
- Multilaterals
- Well completion equipment
- Production logging
- Artificial lift
- Stimulation
- Surface facilities

**AUDIENCE**

Anyone wanting a better understanding of basic production processes and operations.

**PREREQUISITE**

None
<table>
<thead>
<tr>
<th>COURSE CONTENT</th>
<th>COURSE CONTENT</th>
<th>COURSE CONTENT</th>
<th>COURSE CONTENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction to Petrophysics</strong></td>
<td><strong>Introduction to Geophysics</strong></td>
<td><strong>Introduction to Drilling</strong></td>
<td><strong>Introduction to Petroleum Economics</strong></td>
</tr>
<tr>
<td>Awareness - 5 Days</td>
<td>Awareness - 4 Days</td>
<td>Awareness - 5 Days</td>
<td>Awareness - 2 Days</td>
</tr>
<tr>
<td><strong>COURSE CONTENT</strong></td>
<td><strong>COURSE CONTENT</strong></td>
<td><strong>COURSE CONTENT</strong></td>
<td><strong>COURSE CONTENT</strong></td>
</tr>
<tr>
<td>This course introduces attendees to the fundamental principles and techniques through hands-on physical experiments that illustrate the importance of basic reservoir properties: porosity, permeability, resistivity of oil and water, and capillary pressure. The course topics include petrophysical rock types in conventional and unconventional reservoirs, wireline logging, logging while drilling (LWD), porosity, core, and coring processes. The attendees will discover how conventional reservoir properties differ from unconventional reservoirs.</td>
<td>Porosity: bulk volume, grain volume, and pore volume</td>
<td>If you work closely with drilling</td>
<td>This blended-learning class is an excellent introduction for the attendees to the fundamentals of petroleum economics, including revenue, expenditures, fiscal systems, risk analysis, and investment analysis. The blended-learning experience includes questions and answers from learning material, exercises, class discussions, and an interactive challenge.</td>
</tr>
<tr>
<td>Porosity: bulk volume, grain volume, and pore volume</td>
<td>Permeability</td>
<td>This course will increase your understanding of the concepts, terminology, and processes used in drilling a well. The course provides a complete overview of the workflow involved in the drilling of oil and gas wells, from office to wellsite.</td>
<td><strong>COURSE CONTENT</strong></td>
</tr>
<tr>
<td>Pore geometry fundamentals and impacts in sandstone, limestone, and dolomite</td>
<td>Wireline logging and LWD</td>
<td>Attendees will also learn the roles and responsibilities involved in a drilling operation.</td>
<td><strong>Cash flow basics</strong></td>
</tr>
<tr>
<td>Core and coring operations</td>
<td>Reservoir principles and mechanics</td>
<td><strong>Well construction and the role of drilling</strong></td>
<td><strong>Calculating revenue</strong></td>
</tr>
<tr>
<td>Unconventional reservoirs</td>
<td><strong>COURSE CONTENT</strong></td>
<td>in the E&amp;P life cycle</td>
<td><strong>Estimating expenditures</strong></td>
</tr>
<tr>
<td><strong>AUDIENCE</strong></td>
<td><strong>COURSE CONTENT</strong></td>
<td><strong>Well design, including planning and engineering, and the data and analysis techniques needed to design a quality well</strong></td>
<td><strong>Fiscal systems</strong></td>
</tr>
<tr>
<td>Geoscientists, engineers, and technicians who provide petrophysical technical support in need of an introductory understanding of petrophysical principles.</td>
<td><strong>Terminology and concepts used in the business of drilling, such as well timing, costs, risks, and AFE generation</strong></td>
<td><strong>Risk analysis</strong></td>
<td><strong>Investment analysis</strong></td>
</tr>
<tr>
<td><strong>PREREQUISITE</strong></td>
<td><strong>Drilling equipment explanation:</strong> Drilling rigs, bits, casing, and rig floor equipment</td>
<td><strong>Petroleum economics challenge (interactive exercise)</strong></td>
<td><strong>PREREQUISITE</strong></td>
</tr>
<tr>
<td>None</td>
<td><strong>Directional drilling and deviation control equipment and their operation, including unique characteristics of directional drilling</strong></td>
<td>None</td>
<td><strong>None</strong></td>
</tr>
<tr>
<td><strong>AUDIENCE</strong></td>
<td><strong>Wellsite operations: Drilling, logging, casing, cementing, and completions</strong></td>
<td><strong>DRILLING KIDS AND WELL CONTROL,</strong> including well control equipment</td>
<td><strong>AUDIENCE</strong></td>
</tr>
<tr>
<td>Any E&amp;P professional wanting to better understand the principles of geophysics.</td>
<td><strong>Drilling and interpretation techniques used during drilling operations</strong></td>
<td>Real-time data collection, monitoring, and interpretation techniques used during drilling operations</td>
<td>Entry-level professionals of all disciplines and nontechnical support staff.</td>
</tr>
<tr>
<td><strong>PREREQUISITE</strong></td>
<td><strong>AUDIENCE</strong></td>
<td><strong>AUDIENCE</strong></td>
<td><strong>PREREQUISITE</strong></td>
</tr>
<tr>
<td>None</td>
<td><strong>Nontechnical support staff.</strong></td>
<td>Any E&amp;P professional wanting to better understand the principles of geophysics.</td>
<td>None</td>
</tr>
<tr>
<td>Course Title</td>
<td>Type</td>
<td>Duration</td>
<td>Description</td>
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</tr>
<tr>
<td><strong>Introduction to Geology</strong></td>
<td>Awareness</td>
<td>4 Days</td>
<td>Attendees will be presented with an overview of the fundamentals of geology and its impact on the processes of petroleum exploration, development, and production. The introductory geology course focuses on the key concepts and principles of geology as applied to the oil and gas industry.</td>
</tr>
<tr>
<td><strong>Health, Safety, and Environment in Exploration and Production</strong></td>
<td>Foundation</td>
<td>3 Days</td>
<td>This course presents comprehensive HSE methods and tools used to develop risk management processes. Attendees will learn how to improve the safety of operating conditions at production facilities, minimize the risk in emergency situations, and establish proactive mitigation strategies.</td>
</tr>
<tr>
<td><strong>Fundamentals of Field Development Planning</strong></td>
<td>Foundation</td>
<td>5 Days</td>
<td>This field development planning course provides attendees with the fundamental approach to working with and writing a field development plan (FDP). The document, which is the output of a sequence of decision- and discipline-based tasks, is designed to create a development plan. This plan is the basis for a method of developing, producing, and maintaining hydrocarbon resources, including surface design, and forms an input for designing associated surface facilities. Combined documents, both subsurface, and surface form the basis for financial decisions. The attendees will be introduced to all these concepts as they are applied in the process of creating a development plan in relation to the reservoir life cycle.</td>
</tr>
<tr>
<td><strong>Mastering Finance for Non-Financial Oil and Gas Personnel</strong></td>
<td>Foundation</td>
<td>2 Days</td>
<td>This course will instruct attendees who do not have a financial background in understanding the basic principles, theory, and practice of financial reporting and analysis as applied to the oil and gas industry. The course uses a combination of instruction, group discussions, and practical examples and exercises to ensure that the attendees absorb both the theory and the practical applications of the topics, which will include learning how to interpret, understand, and act on financial information, how to develop more effective decision-making skills, the elements of financial management specific to the oil and gas industry, and a conceptual understanding of key E&amp;P accounting topics, including depreciation, reserves, decommissioning, and asset impairment tests.</td>
</tr>
</tbody>
</table>

**COURSE CONTENT**

- History and economics of petroleum
- Earth structure and plate tectonics
- Major rock types
- Structural style and stress fields
- Folds, faults, unconformities, and fractures
- Structural and hydrocarbon traps
- Clastic and carbonate depositional systems
- Geologic mapping and cross sections
- Petroleum systems
- Source rocks and types of organic matter
- Traps and seals
- Correlation and stratigraphy
- Pore systems and diagenesis
- Pore system characterization
- Porosity and permeability
- Static reservoir model
- Seismic methods and petroleum geology
- Wireline logging and interpretation fundamentals

**AUDIENCE**

E&P professionals with a need to better understand geology principles.

**PREREQUISITE**

None
### Oil and Gas Asset Management

**Foundation - 5 Days**

Attendees will gain an understanding of the entire oil company decision-making process from initial new country entry strategy to field abandonment. This course addresses the technical and business challenges as well as the interactions with fiscal and government bodies. Topics include the value of information (VOI) in various aspects from exploration to production, as well as the typical business and economics frameworks for oil companies.

**COURSE CONTENT**
- Worldwide oil and gas supply and demand, reserves, and production
- Exploration phase of the E&P life cycle
- Economics, financial planning, appraisal, and field development planning
- Industry challenges and tough problems by region and geography
- Review of independent and national oil companies
- Prospect risks and calculation of expected monetary value
- Reservoir drive mechanisms, recovery factors, and production profiles
- Well planning process, drilling problems, and solutions
- Rig types and selection, site preparation, drilling systems and equipment, drilling techniques, and casing and cementing
- Production operations
- Economic and planning scenarios reflecting investment criteria, risk analysis, decision trees, and VOI
- Review of oilfield development project

**AUDIENCE**
Anyone wanting an increased understanding of the management of E&P assets such as properties and fields.

**PREREQUISITE**
None

### Integrated Approach to Optimize the Economy of the Asset Life Cycle

**Skill - 5 Days**

Techniques that can optimize the economic value of an asset throughout its life cycle are the focus of this course. Theoretical and practical topics are included, as well as risk analysis, reliability engineering, life-cycle economic analysis (probabilistic and deterministic), and decision-making analysis for production operation activities.

**COURSE CONTENT**
- Risk analysis
- Reliability engineering
- Stepwise approach to implement integrated risk reliability practices
- Integrated approach to asset optimization throughout the life cycle: Concept, applications and benefits, implementation, and toolkit
- Statistics for risk and reliability analyses: Monte Carlo simulation
- Uncertainty management
- Data sources for reliability analysis
- Principles of subsurface risk analysis
- Principles of production process reliability analysis, and analysis of actual case
- Economic analysis
- Risk-based analysis of asset’s economic life cycle

**AUDIENCE**
Engineers or operations managers interested in applying the principles of economic analysis to asset or operations optimization.

**PREREQUISITE**
Basic knowledge of reliability engineering, risk assessment, and economic analysis.

### Conducting an Integrated Reservoir Study

**Skill - 5 Days**

In this course, attendees conduct an integrated reservoir study for the purpose of optimizing a reservoir depletion plan or instituting EOR operations. Attendees will understand the data that are required and the workflow that should be followed to ensure a successful evaluation, in addition to learning techniques to characterize hydrocarbon reservoirs, build a static reservoir model, and import the static model into a reservoir simulator. Discussion includes procedures for integrated reservoir evaluation and how to improve production rates, ultimate recovery, and field economics by identifying potential for infill drilling, recognizing bypassed hydrocarbons, and improving EOR process efficiency.

**COURSE CONTENT**
- Objectives of integrated reservoir studies
- Flow scale considerations for data management
- Reservoir characterization and building blocks of the static model
- Seismic data and well logs
- Structural compartments
- Fractured reservoir in situ stress
- Fluid contact determination: Well logs, capillary pressure, and seismic attributes
- Reservoir heterogeneity
- Sedimentary facies analysis
- Flow and nonflow units
- Data integration and 3D property modeling
- Role of geostatistics in reservoir modeling

**AUDIENCE**
Geoscientists and petroleum engineers responsible for conducting comprehensive reservoir studies.

**PREREQUISITE**
Background in petroleum engineering or geosciences and experience in reservoir studies.

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
Petrel Fundamentals
Awareness - 2 Days

This course introduces a new user to the Petrel platform with emphasis on visualization, data organization, and collaboration.

The course will take the attendee from a Petrel platform project setup to plotting results. The attendee will learn how to create surfaces and create a simple grid, in addition to how to quality control (QC) and visualize a simple grid using the geometrical modeling process, maps and intersections. The course also introduces Petrel environment, which empowers a new level of usability, collaboration and productivity.

COURSE CONTENT
- Studio environment (find, collaborate, and manage)
- Petrel platform introduction
- Project setup, coordinates, and units
- Petrel platform interface, general tools, and windows
- Overview of modeling concepts
- Surface editing and creation
- Grid building
- Geometrical modeling
- Data plotting
- Knowledge sharing and collaboration

AUDIENCE
Development and exploration geologists, geophysicists, geoscientists, petroleum engineers, managers, and technical information technology (IT) personnel with no prior experience with the Petrel platform.

PREREQUISITE
General knowledge of petroleum geology and geophysics or reservoir engineering as well as elemental software skills is recommended.

Techlog Fundamentals
Awareness - 5 Days

The Techlog platform interactive suite brings all of the petrophysical and geological data together. Attendees will learn the fundamentals of this application and its Techplot, Techdata, and Quantix base modules. In addition, the use of the data model within the Techlog application and the foundation utilities for loading, unloading, manipulating, and displaying data in the system, including core and images, will be explained. The course topics include deterministic calculations and the principles behind the application workflow interface for single- and multwell use.

COURSE CONTENT
- Techlog platform interface and data structure
- Data management and QC techniques
- Multiwell management
- Basic plotting tools
- Workflows for deterministic evaluation using Quantix module
- User-defined programming language
- Advanced Techlog platform modules

AUDIENCE
Development and exploration log analysts and petrophysicists, geologists, petroleum engineers, managers, and technical personnel with no prior experience using the Techlog platform.

PREREQUISITE
None

PIPESIM Fundamentals
Foundation - 2 Days

In this course, attendees explore the PIPESIM simulator software, which provides steady-state, multiphase flow simulation for oil and gas production systems. Individual PIPESIM simulator modules are used for a wide range of analyses, including well modeling, nodal analysis, field planning, artificial lift optimization, and pipeline and process facilities modeling. A major feature of PIPESIM simulator software is the system integration and openness that allows users to develop a Total Production System Model. The attendees will gain a general understanding of how PIPESIM simulator software is used to design and optimize total production systems from the reservoir to the final processing delivery point.

COURSE CONTENT
- Analyze well performance
- Design of models for pipeline and process facilities
- Perform nodal analysis
- Develop black-oil and compositional fluid models
- Select multiphase flow correlations
- Design surface network models

AUDIENCE
Anyone wanting to learn steady-state, multiphase flow simulation for oil and gas production systems to analyze well performance, model pipelines and facilities, and perform nodal analysis using PIPESIM simulator software.

PREREQUISITE
None

OFM Fundamentals Using Gas Operations Examples
Foundation - 2 Days

This course introduces attendees to the primary functionalities of the OFM software by allowing the attendees to interact with a prepared gas well operations project. The flow of the course centers on the attendee acting as a member of a fictional engineering team, charged with accomplishing a number of common tasks using the OFM software suite. The course covers each of the required tasks. In accomplishing the tasks, the attendees are exposed to the range of common features of the software application. During the course, the attendees will learn how to use the OFM software as a QA tool, seeking deficiencies in the data before using the project data to illustrate primary and derived performance parameters. The course also covers graphical display features, ranging from tabular plots through line graphs to geographic information system (GIS) map-based representations.

COURSE CONTENT
- Walk through a fully functioning project to provide quick set of reference points
- Review project data and chack for missing values
- Use filters to screen out unwanted entities for analysis
- Group project data at multiple levels
- Create calculated fields and calculated variables
- Create single- and multiple-well plots
- Create and format well and field summary reports
- Export reports and table data to other applications

AUDIENCE
Anyone responsible for setting up and maintaining a project using OFM software.

PREREQUISITE
None
## E&P INTRODUCTION AND FUNDAMENTALS

<table>
<thead>
<tr>
<th>OFM Fundamentals Using Oil and Waterflood Production Examples</th>
<th>Merak Peep Fundamentals and Merak Peep Decline Fundamentals Combined Course</th>
<th>ProSource Front Office Fundamentals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Foundation - 2 Days</strong></td>
<td><strong>Foundation - 3 Days</strong></td>
<td><strong>Skill - 2 Days</strong></td>
</tr>
</tbody>
</table>

This course introduces the attendees to the primary functionalities of the OFM software by allowing the attendees to interact with a preprepared oil and waterflood production project. The course centers on the attendee acting as a member of a fictional engineering team, charged with accomplishing a number of common tasks in the OFM software suite. The course covers each of the required tasks. In accomplishing these tasks, the attendees are exposed to the range of common features of the software application. During the course, the attendees will learn how to use the OFM software as a QA tool, seeking deficiencies in the data before using the project data to illustrate primary and derived performance parameters. The course also covers graphical display features ranging from tabular plots through line graphs to GIS map-based representations.

### COURSE CONTENT

- Briefly walk through a fully functioning project
- Review project data and check for missing values
- Use filters to screen out unwanted entities for analysis
- Group project data at multiple levels
- Create calculated fields and calculated variables
- Create single- and multiple-well plots
- Create and format well and field summary reports
- Export reports and table data to other applications

### AUDIENCE

Anyone responsible for setting up and maintaining a project using OFM software.

### PREREQUISITE

None

Attendees in this course will explore the functionality of the Merak Peep (petroleum economic evaluation program) and decline analysis module. These software packages allow for navigating efficiently through the case document, editing existing data, and analyzing economic runs.

### COURSE CONTENT

**Merak Peep Fundamentals**

- Create, edit, and copy economic case documents
- Review essential economic inputs
- Create filters and user parameters to easily sort large data volumes
- Use batch processes to edit or report multiple cases simultaneously and calculate price sensitivity

**Merak Peep Decline Fundamentals**

- Maintain current in-house and vendor data to understand production levels
- Import and export production history
- Create groups and summary wells to better manage well data
- Forecast production rates and volumes
- Perform basic decline analysis rate/time curves and cumulative curves

### AUDIENCE

Anyone needing to develop or improve their skill and understanding of project economics and decline curve analysis performed with the Merak Peep and Peep Decline modules.

### PREREQUISITE

Petroleum Economics Fundamentals or equivalent knowledge, in addition to an understanding of basic decline analysis techniques and theory.

This course introduces attendees to ProSource delivery system Front Office, an easy-to-use web-based application that provides workflow-based data delivery in two important methods. These methods efficiently deliver log data directly into the Petrel and Techlog platforms by means of plug-ins, allowing users to search and visualize exporting data from the ProSource delivery system through a lightweight web interface. The ProSource Front Office package interfaces with ProSource Logs, Enterprise, and Seismic systems.

### COURSE CONTENT

- Initiate the ProSource Front Office delivery system and navigate the interface
- Search for and browse well information, deviation surveys, markers, perforations, checkshot surveys, core intervals, vertical seismic profile (VSP) surveys, and seismic data
- Observe the interrelationship of ProSource Front Office delivery system software
- Use a variety of features in different windows, including map, log viewer, log pass viewer, extended binary coded decimal interchange code (EBDIC) header, and the visualization and rotation of 3D deviation graphics

### AUDIENCE

Geoscientists, petroleum engineers, data managers, and technical IT personnel with data management delivery responsibilities.

### PREREQUISITE

General understanding of data delivery and data flow processes required to perform petroleum subsurface interpretation studies.

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
Today, E&P companies face numerous challenges—not only to explore and produce complex hydrocarbon environments, but also to keep technical staff trained to successfully approach and overcome those challenges.

NExT is dedicated to the professional development of E&P industry professionals, accelerating the development of oil and gas professionals through competency management services, training programs, classroom instruction, mentoring, technical domain courses, and software training certification programs.

**Gain the expertise to meet today’s complex challenges**

Schlumberger understands that learning and adopting new technologies and workflows can be a huge challenge. NExT applies hands-on software instruction and domain training to relevant industry challenges such as deepwater, shale, and heavy oil exploration targets.

NExT training on industry-standard Schlumberger software allows maximizing return on software investment by accelerating technology adoption among customers’ technical staff. With software training that meets the needs of professionals with varying levels of experience, NExT empowers teams to reach higher levels of productivity with workflow-focused courses.

---

**Application**
- Training in Schlumberger platforms and foundation software

**Benefits**
- Maximize return on software investments
- Adopt technology faster and use more advanced software capabilities through hands-on training
- Reach higher levels of productivity with advanced or workflow-focused courses

**Features**
- Combined domain and software courses, focusing on industry challenges such as deepwater, shale, and heavy oil exploration targets
- Training centers around the world that offer courses in state-of-the-art facilities
- Private courses delivered at your offices
- Custom courses tailored to your workflows

---

*Hands-on training enables geoscientists to take full advantage of the advanced features and applications of Schlumberger software.*
### FIELD DEVELOPMENT PLANNING

<table>
<thead>
<tr>
<th>COMPETENCY LEVEL</th>
<th>Geology and Geophysics</th>
<th>Petrophysics</th>
<th>Production Engineering</th>
<th>Reservoir Engineering</th>
<th>Management and Economics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ADVANCED</strong></td>
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<tr>
<td></td>
<td></td>
<td>Reservoir Monitoring Solutions Workshop</td>
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<td>Project Risk Analysis and Management</td>
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<td>Production Logging Solutions Workshop</td>
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<td>Resources and Reserves Evaluation</td>
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<td></td>
<td>Applied Production Logging and Reservoir Monitoring</td>
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<tr>
<td><strong>SKILL</strong></td>
<td></td>
<td>Advanced Integrated Reservoir Analysis</td>
<td></td>
<td></td>
<td>Applied Project Management – Oil and Gas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Applied Geostatistics for Petroleum Engineers and Geoscientists</td>
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<td>Risk, Uncertainty and Decisions in E&amp;P Projects</td>
</tr>
<tr>
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<td>Integrated 3D Reservoir Modeling Workshop</td>
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<tr>
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<td></td>
<td>Clastic Sedimentology for Exploration and Development</td>
<td></td>
<td>Intermediate Production Logging and Reservoir Monitoring</td>
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<tr>
<td></td>
<td></td>
<td>Conducting an Integrated Reservoir Study</td>
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<tr>
<td><strong>FOUNDATION</strong></td>
<td></td>
<td>Integrated Reservoir Analysis</td>
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<td></td>
<td>Petroleum economics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Well Placement Fundamentals</td>
<td></td>
<td>Fundamentals of Reservoir Engineering</td>
<td>Project Management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Development Geology</td>
<td></td>
<td>Petroleum Decision and Risk Analysis</td>
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<tr>
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<td></td>
<td>Basic Reservoir Monitoring</td>
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<td>Prospect Evaluation, Risks and Volumes</td>
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<td>Basic Production Logging</td>
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<td></td>
<td>Basic Logging Methods and Formation Evaluation</td>
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<td></td>
<td>Fundamentals of Field Development Planning</td>
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</tr>
</tbody>
</table>

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
<table>
<thead>
<tr>
<th>SOFTWARE</th>
<th>COMPETENCY LEVEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>PETREL</td>
<td>ADVANCED</td>
</tr>
<tr>
<td>ECLIPSE</td>
<td>ADVANCED</td>
</tr>
<tr>
<td>MEPO</td>
<td>ADVANCED</td>
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<tr>
<td>MERAK</td>
<td>ADVANCED</td>
</tr>
<tr>
<td>OFM</td>
<td>ADVANCED</td>
</tr>
<tr>
<td>PIPESIM / INTERSECT</td>
<td>ADVANCED</td>
</tr>
<tr>
<td>TECHLOG</td>
<td>ADVANCED</td>
</tr>
</tbody>
</table>

### SKILL
- **Petrel Property Modeling**
  - Petrel Property Geology
  - Petrel Property Workflows and Uncertainty Analysis
- **Petrel Structural Modeling**
  - Petrel Structural Geology
  - Petrel Structural Workflows and Uncertainty Analysis
- **Petrel Velocity Modeling**
  - Petrel Velocity Geology
  - Petrel Velocity Workflows and Uncertainty Analysis

### FOUNDATION
- **Petrel Well Design**
  - Petrel Well Design Fundamentals
- **Petrel Geology**
  - Petrel Geology Fundamentals
- **Petrel Reservoir Engineering**
  - Petrel Reservoir Engineering Fundamentals

### SOFTWARE
- **Avocet**
  - Avocet Integrated Asset Modeler Fundamentals
- **ECLIPSE**
  - ECLIPSE Blackoil Reservoir Simulation Fundamentals
- **MEPO**
  - MEPO Reservoir Simulation Fundamentals
- **MERAK**
  - Merak Decision Tool Kit and Merak Peep Monte Carlo
- **OFM**
  - OFM Fundamentals Using Gas Operations Examples
- **Pipesim**
  - PIPESIM Gas Field Production Operations Fundamentals
- **Techlog**
  - Techlog for Geologists

**NextT**

- 19:00
**Fundamentals of Field Development Planning**

**Foundation - 5 Days**

This field development planning (FDP) course provides attendees with the fundamental approach to working with and writing an FDP. The document, which is the output of a sequence of decision- and discipline-based tasks, is designed to create a development plan. This plan is the basis for a method of developing, producing, and maintaining hydrocarbon resources, including surface design, and forms an input for designing associated surface facilities. Combined subsurface and surface documents form the basis for financial decisions. The attendees will be introduced to these concepts as they are applied in the process of creating a development plan in relation to the reservoir life cycle.

**COURSE CONTENT**
- Reservoir management process
- Reservoir management concepts and expertise sources
- The reservoir model
- Data acquisition and data use
- Data integration
- Reservoir monitoring, surveillance, and characterization
- Pressure profiling in developed reservoirs
- The FDP
- FDP concepts, reservoir appraisal, and development planning
- Case study

**AUDIENCE**
Multidisciplinary asset teams consisting of engineers, geoscientists, and managers who are involved in or will be involved in developing hydrocarbon resources, and other actual or potential asset team members.

**PREREQUISITE**
Engineering or geoscience background.

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**Basic Logging Methods and Formation Evaluation**

**Foundation - 5 Days**

In this introduction to openhole data acquisition, interpretation concepts, and practices, attendees will learn the primary logging tools used, the physics of how the measurements are made, and best practices to determine porosity and water saturation. Topics include new high-technology tools and their application to conventional and unconventional environments, including nuclear magnetic resonance (NMR), logging while drilling (LWD), wireline formation testing, and borehole imaging. The attendees will also learn how to interpret actual log data in exercises designed to strengthen your understanding and interpretation skills.

**COURSE CONTENT**
- Reservoir rock, sedimentary basins, rock properties, carbonates, clastics, shales, and diagenesis
- Logging overview
- Spontaneous potential (SP) and gamma ray
- Porosity logs: Density, neutron, and acoustic
- Resistivity basics, deep-reading tools, true resistivity, shallow-reading tools, and flushed-zone resistivity
- Shale volume computations
- Quicklook methods
- Water saturation computations in the presence of shale
- Carbonates and their challenges
- NMR
- Borehole imaging

**AUDIENCE**
Petrophysicists, geoscientists, engineers, and log analysts wanting to increase their understanding of basic log analysis.

**PREREQUISITE**
A 2-year technical degree.

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**Basic Production Logging**

**Foundation - 5 Days**

Production logging tools have specific uses as well as limitations. Attendees will learn the various applications for these tools, the interpretation assumptions that are integral to their designs, and how log quality is affected by the acquisition process. Hands-on demonstrations teach the fundamentals of production logging interpretation, and an in-class workshop focuses on the interpretation of single- and two-phase flow. Discussion includes use of these logs for measuring three-phase flow.

**COURSE CONTENT**
- Inflow and outflow performance and productivity index for oil and gas wells
- Tool conveyance using tractors and coiled tubing
- Depth control in cased wells using gamma ray and casing collar locator data
- Completions for vertical, deviated, horizontal, and multilateral wells
- Pressure-control system for rigless operation
- Reservoir fluids properties, including gas/oil ratio, bubblepoint pressure, and three-phase diagrams
- Reservoir drive mechanisms and associated production problems
- Justification of production log acquisition
- Standard production logging tools
- Techniques for measuring oil, water, and gas rates
- Interpretation of logs for single-, two-, and three-phase production

**AUDIENCE**
Geoscientists or engineers responsible for interpreting production logs.

**PREREQUISITE**
Engineering or geoscience degree recommended as this course deals with production logging physics.

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**Basic Reservoir Monitoring**

**Foundation - 5 Days**

In this course, attendees will study the basics of field surveillance and reservoir monitoring with tools such as pulsed neutron and carbon/oxygen logging. The attendees will learn how these tools are applied to diagnose reservoir-wide behaviors of water breakthrough, gas cap migration, and behind-pipe commingling. In an in-class workshop, attendees will learn to evaluate water and gas saturations and determine resistivity behind the casing.

**COURSE CONTENT**
- Reservoir drive mechanisms and associated production problems
- Reservoir fluid properties: Gas/oil ratio, bubblepoint pressure, and three-phase diagram
- Tool conveyance using tractors and coiled tubing
- Depth control in casedhole wells using gamma ray and casing collar locator
- Completions in vertical, deviated, horizontal, and multilateral wells
- Pressure-control system for rigless operation
- Justification for production logs
- Pulsed neutron capture cross-section mode and carbon/oxygen mode
- Acquisition of formation resistivity in casedhole
- Slimhole induction logging in plastic (nonconductive) casing
- Workshop: Using capture mode for evaluating water and gas saturation
- Workshop: Interpreting behind-casing resistivity logs

**AUDIENCE**
Geoscientists or engineers responsible for field-wide surveillance or reservoir monitoring programs.

**PREREQUISITE**
Engineering or geoscience degree.

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Visit [NExTtraining.net/classes](http://NExTtraining.net/classes) for the latest calendar or to register for a course.
## Development Geology

### Foundation – 5 Days

This course provides attendees with the fundamental skills to construct geologic models and understand the factors that affect field operations and field management. The course covers the gathering and interpretation of geologic data to the preparation of geologic models to the quantification of subsurface uncertainty, in addition to applying geologic concepts, constructing maps and sections, and validating computer-generated interpretations. Also included are calculating subsurface volumes and assessing their uncertainties, preparing a well proposal, planning appraisal wells, and assessing their economic value. Attendees will acquire practical experience by working in teams on an actual field study.

### COURSE CONTENT

- Scope of oil and gas business
- Subsurface models, input data, and modeling concepts
- Gathering, processing, and interpreting seismic data
- Structural types, traps, fault seals, maps and sections, and correlations
- Clastic sedimentary environments
- Basic well technology, horizontal wells, well data, log and core data, uncertainties, and mapping
- Carbonate reservoirs
- Subsurface development options
- Volumetrics and subsurface uncertainties
- Static and dynamic models
- Field operations, well design, and geologic input
- Development options, project planning, and phased costs
- Impact of subsurface uncertainty on project economics

### AUDIENCE

Engineers and geologists involved in reservoir appraisal and development projects.

### PREREQUISITE

Basic understanding of reservoir and petroleum geology.

## Well Placement Fundamentals

### Foundation – 5 Days

This course introduces the concept of geological well placement (geosteering) and provides knowledge of the processes and techniques that can be used to successfully place high-angle and horizontal wells using geological and petrophysical data in real-time during drilling. The main purpose of high-angle and horizontal wells is to maximize reservoir contact and enhance well productivity. To plan and construct such wells requires real-time collaboration between geologists, who need quality formation evaluation data; drillers, who require considerable input from the geologists; and petrophysicists, who interpret the formation evaluation data while drilling to optimize well placement. This process is generally facilitated by the well placement coordinator. Various technologies involved in directional drilling, measurement, and formation evaluation while drilling are reviewed. The three different methods used to geologically place horizontal wells are introduced and the applications are discussed.

### COURSE CONTENT

- Geological well placement
- Reservoir geology review
- Directional drilling
- Measurement while drilling
- Formation evaluation and LWD
- Applications of LWD measurements in well placement
- Applications of well placement methods
- Case studies illustrating the use of the three well placement methods

### AUDIENCE

Reservoir engineers, geologists, and geophysicists.

### PREREQUISITE

Basic knowledge of petroleum engineering and geology.

## Fundamentals of Reservoir Engineering

### Foundation – 5 Days

Course material focuses on the classical methods of reservoir engineering. Attendees will learn the fundamental principles of multiphase fluid flow and study fluid and rock characteristics. Case histories demonstrate engineering concepts and actual situations.

### COURSE CONTENT

- Fundamentals of reservoir engineering
- Reservoir environment and formation properties
- Reservoir pressure, pressure gradients, and contacts
- Relative permeability
- Reservoir fluids properties, fluid flow, and Darcy’s law
- Principles of well testing in reservoir characterization
- Reservoir drive mechanisms
- Water influx
- Decline curve analysis
- Determining of hydrocarbon reserves: Volumetric method
- Material balance applications

### AUDIENCE

Reservoir engineers, geologists, and geophysicists.

## Integrated Reservoir Analysis

### Foundation – 5 Days

This course focuses on the skills required for integrated analysis of rock, pore, and fluids data and how to solve problems associated with identifying and exploiting reserves. The attendees will improve their understanding of pore scale interaction, including rock texture characteristics and petrophysical rock typing techniques, in addition to learning how to use pore geometry tools such as core analysis of porosity and permeability, capillary pressure, wettability, and relative permeability. The attendees will also learn how to integrate these measurements with well log information to predict petrophysical rock types and flow units, plus gain experience with NExT QuickScan and quicklook techniques through in-class exercises.

### COURSE CONTENT

- Geological framework of reservoirs
- Environments of deposition: Carbonates and clastics
- Scale of the pore system: Core versus logs
- Lab-measured porosity and permeability
- Winland R3S method for petrophysical rock type, with emphasis on pore-throat radius
- Petrophysical rock types: Impact of water saturation
- Capillary pressure measurements: Pore-throat radius and water saturation above free water
- Flow units: Flow capacity versus storage capacity
- High-flow zones and barriers

### AUDIENCE

Geologists, geophysicists, engineers, and petrophysicists wanting to learn improved interpretation workflows.

### PREREQUISITE

Intermediate understanding of geology and petrophysics.
### Prospect Evaluation, Risks and Volumes
**Foundation - 5 Days**

Risk and volume assessments form the basis for decisions on whether to drill or not drill a well, and as such, form the link between subsurface evaluation and the business aspects of the petroleum industry. This course explains how risks and volumes can be assessed in a realistic manner based on a sound understanding of the geological details of the prospect as well as of its regional geological setting and current play understanding.

At the conclusion of the course, the participants will have an excellent understanding of the essentials required for realistic risk and volume assessments of exploration prospects. The course allows participants to produce well-considered and realistic assessments for prospects in which they may be involved, and to understand and constructively challenge risk and volume assessments of colleagues and partners or competitors.

**COURSE CONTENT**
- Risk and volumes assessment fundamentals
- Risk and uncertainty difference
- Statistics fundamentals, including distribution curves, expectation curves, adding and not adding risk volumes, and Bayes theorem
- Trap, reservoir, seal, and charge uncertainties
- Consistent and realistic risk estimation
- Volume range calculations for prospects and portfolios of prospects; prospect volume summations for a correct representation of prospect portfolios
- Geophysical evidence incorporated DHIs in a realistic risk assessment

**AUDIENCE**
Geoscientists working in exploration, prospect portfolio analysts and their direct supervisors, and staffs from disciplines working closely with reservoir engineers, petrophysicists, and geophysicists.

**PREREQUISITE**
Knowledge of basic petroleum geology as related to exploration. A knowledge of basic petroleum economics is helpful but not required.

### Project Management
**Foundation - 5 Days**

This course satisfies the PMI® certification 35-hour training requirement.

In this course, attendees will gain in-depth and comprehensive exposure to the key skills and knowledge they need for effective project management as described in the Association for Project Management Institute’s “A Guide to the Project Management Body of Knowledge.” Course instruction is through a combination of lectures, practical exercises, and interactive sessions. The attendees draw upon their own experiences and real-world examples to enhance the learning experience. The topics, disciplines, and enabling skills are progressively built upon and linked to the development of case studies in a team environment. This course, taught by a PMI registered education provider, prepares the attendees for the PMI’s PMP certification examination.

**COURSE CONTENT**
- Project financial appraisal
- Scope management, including work definition
- Time management: Planning and scheduling
- Cost management: Monitoring and control
- Risk management
- Procurement and contracts
- Alliances and partners
- Quality
- Human resources management
- Project success and failure

**AUDIENCE**
Project engineers, supervisors, and project leaders seeking to increase their knowledge of project management.

**PREREQUISITE**
None

### Petroleum Economics
**Foundation - 4 Days**

The course teaches the fundamentals of petroleum economics as applied to selecting oil and gas projects, including a review of the time value of money concepts.

**COURSE CONTENT**
- Introduction to petroleum economics
- Forecasting production volumes
- Entering and using product prices
- Calculating royalty and interest
- Understanding operating expenses, capital investments, depreciation, and taxes
- Understanding inflation, escalation, and discounting
- Calculating cash flow, economic indicators, and net present value
- Understanding worldwide fiscal systems
- Performing incremental analysis
- Selecting projects

**AUDIENCE**
Anyone wanting a fundamental knowledge of petroleum economics.

**PREREQUISITE**
None

### Petroleum Decision and Risk Analysis
**Foundation - 3 Days**

Attendees will learn multiple approaches to modeling decisions for oil and gas projects. This course highlights a proven process and technology for decision analysis used by companies worldwide. An overview includes fundamentals and examples of decision analysis, discussion of uncertainties and risk, and various ways to incorporate them in oil and gas project evaluations. Discussions cover the use of sensitivities, decision trees, and value of information in both deterministic and probabilistic approaches to evaluating oil and gas projects.

**COURSE CONTENT**
- Decision and risk analysis, including decision criteria
- Decisions: How to address them and, more importantly, how not to address them
- Essentials of uncertainty, risk, probability, and statistics, including choosing distribution types and eliminating bias
- Decision analysis process
- Upstream oil and gas decision models
- Decision analysis and recommendation options
- Key uncertainties
- Simple decision models with deterministic analysis
- Complex decision models with probabilistic analysis
- Case studies
- Group problem

**AUDIENCE**
Geoscientists, engineers, commercial team members, or anyone wanting to incorporate uncertainty and risk into models of oil and gas decisions.

**PREREQUISITE**
Petroleum Economics course with some experience in project decision making and risk analysis.
### Applied Geostatistics for Petroleum Engineers and Geoscientists

**Skill - 5 Days**

The focus of this course is to produce a consistent reservoir description through integration of core, well log, and seismic data and application of geostatistical techniques. Attendees will learn the reservoir modeling workflow, from construction of the 3D static reservoir model through upscaling for dynamic reservoir simulation, in addition to increasing your awareness of geostatistics and the situations that can benefit from application of geostatistical techniques. Instruction includes guidance through assembly and analysis of the required data for geostatistical techniques and the resulting numerical models.

**COURSE CONTENT**
- Basic probability theory and univariate and bivariate statistics
- Geologic content of data and spatial continuity of rock properties using variogram analysis
- Estimation methods, including various types of kriging
- Simulation methods, including sequential Gaussian simulation and indicator simulation
- Advanced geostatistical techniques, including object modeling and simulated annealing
- Techniques for upscaling and data integration (3D seismic and production data)

**AUDIENCE**
Practicing reservoir engineers, production engineers, and geoscientists working as a part of an integrated reservoir management team.

**PREREQUISITE**
Knowledge of basic mathematics.

### Applied Project Management—Oil and Gas

**Skill - 5 Days**

The focus of this course is delivery of project management techniques for estimating, planning, managing, and controlling an oil and gas project. It extends to identification, assessment, and control of qualitative risks, as well as quantitative risk analysis using the basics of probability. Delivered in a workshop style, the course combines lectures on how to develop relevant estimates, plans, and risk analysis with the course case study project. The workshop format can be adapted to develop estimates, plans, and risk analyses as deliverables for client-specific projects. All terms and techniques used are compatible with the PMI’s “A Guide to the Project Management Body of Knowledge.”

**COURSE CONTENT**
- Terms, processes, and stage gate reviews in capital value process
- PMI processes for management of oil and gas projects
- Decision-support reports and documents
- Project life cycle definitions and estimations
- Scope management and work breakdown structures
- Use of Microsoft® Project in project planning and control
- Basic project cost and progress recording
- Standard software for risk management, qualitative and quantitative risk assessments
- Risk mitigation strategies, preliminary contingency levels, and critical variables
- Monte Carlo methods and expected monetary outcome
- Risk, earned value, and risk-based forecasts
- Stakeholder analysis and management skills
- Project and baseline reviews

**AUDIENCE**
Oil and gas industry project management professionals.

**PREREQUISITE**
Project Management course or PMI PMP Certificate or 7 years of experience in project management.

### Advanced Integrated Reservoir Analysis

**Skill - 10 Days**

Using a subsurface integration model can resolve reservoir problems that range from petrophysical rock typing to log analysis. In this course, attendees will learn how to perform an integrated analysis of rock, pore, and fluids data and how to solve problems associated with identifying and exploiting reserves. The attendees will apply tools for analysis of the underlying uncertainty and assumptions used in many reservoir analysis techniques, in addition to learning how to identify lithologic zones and fluid types from log data, follow simple procedures for rapid and accurate interpretation, and apply correlations to core and petrophysical rock type zonation to upscale log data for reservoir simulation applications. Course materials cover advanced interpretation for better understanding of dataset limitations and measurement requirements for effective reservoir development and reservoir drive mechanisms, recovery factor, and simulation models. The attendees will gain experience with NExT QuickScan and quicklook techniques through in-class exercises.

**COURSE CONTENT**
- Integrated reservoir analysis overview and case histories
- Petrophysical rock types and flow units
- Principles of saturation distribution and capillary pressure from laboratory data
- Quicklook analysis and interpretation techniques

**AUDIENCE**
Petrophysicists, geoscientists, and engineers responsible for reservoir characterization who rely on core interpretation and other integrated petrophysical data for decisions and analyses.

**PREREQUISITE**
Basic understanding of geological concepts and reservoir characterization.
Conducting an Integrated Reservoir Study

Skill - 5 Days

In this course, attendees conduct an integrated reservoir study for the purpose of optimizing a reservoir depletion plan or instituting EOR operations. Attendees will understand the data that are required and the workflow that should be followed to ensure a successful evaluation, in addition to learning techniques to characterize hydrocarbon reservoirs, build a static reservoir model, and import the static model into a reservoir simulator. Discussion includes procedures for integrated reservoir evaluation and how to improve production rates, ultimate recovery, and field economics by identifying potential for infill drilling, recognizing bypassed hydrocarbons, and improving EOR process efficiency.

COURSE CONTENT
- Objectives of integrated reservoir studies
- Flow scale considerations for data management
- Reservoir characterization and building blocks of the static model
- Seismic data and well logs
- Structural compartments
- Fractured reservoir in situ stress
- Fluid contact determination: Well logs, capillary pressure, and seismic attributes
- Reservoir heterogeneity
- Sedimentary facies analysis
- Flow and nonflow units
- Data integration and 3D property modeling
- Role of geostatistics in reservoir modeling

AUDIENCE
Geoscientists and petroleum engineers responsible for conducting comprehensive reservoir studies.

PREREQUISITE
Background in petroleum engineering or geosciences and experience in reservoir studies.

Clastic Sedimentology for Exploration and Development

Skill - 5 Days

This course covers the fundamentals of clastic sedimentology at scales for both regional exploration and detailed reservoir characterization. Reviews of the main types of sedimentary basins are presented to the attendees in the context of crustal dynamics. Plate tectonics and the production and transport of clastic materials are included for different tectonic, topographic, and climatic settings. Emphasis is on the practical interpretation of subsurface data—seismic, core, and wireline logs—for facies analysis and reservoir characterization. Examples draw from different facies, ages, and basinal settings. Particular attention is given to the principles by which depositional settings are interpreted using both outcrop and subsurface data and to the best correlation methods for different settings.

COURSE CONTENT
- Types of sedimentary basins in different tectonic contexts
- Large-scale tectonic settings of main types of sedimentary basins and relationship between structural style and fill patterns
- Effects of base-level changes and syndepositional tectonics on sediment distribution patterns
- Correlation in different sedimentary settings
- Role of analogs in building reservoir models in different depositional settings
- Sediment generation and supply in different settings
- Fluid dynamics and rheology of erosion, transport, and deposition
- Basic mechanics of sediment erosion, transport, and deposition; resultant bedforms and sedimentary structures
- Postdepositional processes and products

AUDIENCE
Exploration and development geologists, geophysicists, and reservoir engineers who need an overview of sedimentary organization across a range of scales in different basinal and environmental settings.

PREREQUISITE
Basic knowledge of geology and sedimentary processes.
<table>
<thead>
<tr>
<th>Skill - 5 Days</th>
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<th>Skill - 5 Days</th>
<th>Advanced - 5 Days</th>
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</thead>
<tbody>
<tr>
<td><strong>Integrated 3D Reservoir Modeling Workshop</strong></td>
<td><strong>Intermediate Production Logging and Reservoir Monitoring</strong></td>
<td><strong>Risk, Uncertainty and Decisions in E&amp;P Projects</strong></td>
<td><strong>Applied Production Logging and Reservoir Monitoring</strong></td>
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<tr>
<td>In this workshop, attendees learn a hands-on practical workflow for building a static reservoir model using the Petrel platform. Course topics include a solid presentation of the theory and methodologies behind 3D reservoir modeling with practical applications. Attendees will learn a step-wise approach to model building that starts with an overview of reservoir modeling, building of a structural framework, continuing with layering and gridding, and populating the model with reservoir properties. The attendees will gain valuable experience in the use of volumetrics with uncertainties and basic geostatistics.</td>
<td>This course provides attendees with in-depth instruction on cased hole logging tool physics, interpretation, and QC techniques for wellbore-specific production logging and reservoir monitoring scenarios. Attendees learn how and when to use these tools to meet logging objectives and quicklook techniques for identifying log QC problems. Using real-world examples, the attendees learn to interpret behind-casing resistivity data and measure three-phase flow using production logs.</td>
<td>Understand why projects fail because of adverse events with geologic, technical, commercial, or contractual origins. In this course, attendees will increase their understanding of how risk and uncertainty impact the decisions on which projects they select, how to develop them, and how these decisions affect their economic performance. Improving the quality of decisions is the main goal of this course; not just understanding risk and uncertainty for their own sake. Probabilistic concepts and tools are used to describe projects with risk and uncertainty to give a better understanding of the principles and tools underlying these concepts.</td>
<td>Encompassing advanced techniques for production logging and reservoir monitoring, this course teaches attendees the design of a data-acquisition program for evaluation of wellbore or reservoir behavior based on field development objectives. Hands-on examples demonstrate in-depth log interpretation techniques for resistivity measurements acquired behind casing, three-phase flow in horizontal wells, and fluid saturations. Attendees will learn quicklook techniques for log QC as well as how to plan and integrate multisource data for a more complete evaluation.</td>
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<td><strong>COURSE CONTENT</strong></td>
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<tr>
<td>Petrel platform data import and export review</td>
<td>Inflow performance and productivity index for oil and gas wells</td>
<td>Inflow and outflow performance and productivity</td>
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<tr>
<td>Well correlations: Generate and edit well tops</td>
<td>Outflow performance: Matching inflow with outflow to optimize productivity</td>
<td>Flow regimes in vertical, deviated, and horizontal wells</td>
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<tr>
<td>Structural modeling: Fault modeling, grid design, quality checking, zonation, and layering</td>
<td>Flow regimes in vertical, deviated, and horizontal wells</td>
<td>Techniques for measuring individual fluid velocities of oil, water, and gas</td>
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<tr>
<td>Statistics and data analysis review</td>
<td>Techniques for measuring individual fluid velocities of oil, water, and gas</td>
<td>Three-phase holdups from electrical and optical sensors</td>
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<tr>
<td>Basics of geostatistics and variogram analysis, introduction to kriging, and estimation techniques</td>
<td>Production logging in horizontal wells</td>
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<tr>
<td>Deterministic and property modeling, including facies modeling</td>
<td>Pulsed neutron log physics, capture cross section, and carbon/oxygen logging</td>
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<tr>
<td>Property data (petrophysics, seismic, and well-test data) integration</td>
<td>Cased hole formation resistivity data</td>
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<tr>
<td>Volumetric calculations exercise, with multiple realizations and ranking</td>
<td>Workshops: Capture mode for evaluating water and gas saturation; Interpreting behind-casing resistivity logs: Three-phase flow</td>
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<tr>
<td>Design and properties upscaling</td>
<td><strong>AUDIENCE</strong></td>
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<tr>
<td>Geoscientists or engineers desiring a practical approach to building 3D reservoir models with the Petrel platform.</td>
<td>Petrophysicists and engineers responsible for wellbore diagnostics or reservoir monitoring who want a detailed understanding of cased hole logging tools.</td>
<td>E&amp;P professionals involved in data analysis and interpretation, including geologists, geophysicists, and reservoir engineers active in exploration, appraisal, field development, reserves estimation, or economics; decision makers interested in learning more about decision analysis.</td>
<td>Professionals with geoscience background and minimum of 2 years of exposure to field production.</td>
</tr>
<tr>
<td><strong>PREREQUISITE</strong></td>
<td>Basic Production Logging and Basic Reservoir Monitoring courses or more than 1 year of experience with applied cased hole logging.</td>
<td>Exposure to basic statistics and a working knowledge of Microsoft Excel® worksheets.</td>
<td>More than 2 years of experience interpreting reservoir monitoring logs (attendees are encouraged to bring difficult log examples for in-class discussion and interpretation).</td>
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# Field Development Planning

<table>
<thead>
<tr>
<th>Production Logging Solutions Workshop</th>
<th>Reservoir Monitoring Solutions Workshop</th>
<th>Resources and Reserves Evaluation</th>
<th>Project Risk Analysis and Management</th>
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<tbody>
<tr>
<td>Advanced - 5 Days</td>
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<td>Advanced - 4 Days</td>
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This immersive workshop teaches the attendees how to interpret difficult product logging scenarios and to diagnose production behaviors not included in classical interpretation techniques. Through a hands-on, interactive workshop, using your data and problems, attendees learn how to adjust their interpretation techniques for mechanical or fluid-specific phenomena. Attendees are encouraged to bring difficult log examples for in-class discussion and interpretation.

**COURSE CONTENT**
- High-tech production logging tools for horizontal wells
- Flow regimes in horizontal wells and effects on production log interpretations
- Spillbril calibrations and production log interpretations in horizontal wells
- Reservoir fluids and drive mechanisms
- Inflow and outflow performance
- Justification for production logging
- Leak detection inside and behind casing and tubing
- Techniques for estimating three-phase fluid velocities
- Three-phase fluid holdups in vertical, deviated, and horizontal wells
- Sippage velocities in vertical and deviated wells

**AUDIENCE**
Petrophysicists and production engineers with experience in cased hole logging and log interpretation.

**PREREQUISITE**
More than 2 years of experience interpreting production logs.

This immersive workshop teaches attendees how to interpret difficult reservoir monitoring scenarios and to diagnose reservoir behaviors not included in classical interpretations. Focused on reservoir monitoring logging techniques, this course provides attendees with specific strategies for their use and interpretation. Through a hands-on interactive workshop, using your data and problems, attendees will learn how to adjust interpretation techniques for reservoir and field-wide phenomena, especially in waterflood operations. Attendees are encouraged to bring difficult log examples for in-class discussion and interpretation.

**COURSE CONTENT**
- Reservoir fluids and drive mechanisms
- Inflow and outflow performance
- Reservoir monitoring log justification
- Nuclear physics of reservoir monitoring and pulsed neutron logging (PNN)
- PNN tools (Schlumberger and Halliburton tools)
- PNN capture cross-sectional measurements and carbon/oxygen data
- Log-inject-log technique to estimate residual oil saturation
- Formation resistivity acquisition behind steel and nonconductive casing
- Pressure measurements and sampling behind casing
- Field mapping of waterflood to identify unswept zones

**AUDIENCE**
Petrophysicists and production engineers with experience in reservoir monitoring logging, and log interpretation.

**PREREQUISITE**
More than 2 years of experience interpreting reservoir monitoring logs.

This course presents advanced techniques for reserves estimation and addresses the difference in classification of resources and reserves. Attendees will learn definitions of reserves and resources and guidelines for their application from various regulatory and industry authorities, including Society of Petroleum Engineers (SPE), World Petroleum Council (WPC), American Association of Petroleum Geologists (AAPG), and the US Securities and Exchange Commission (SEC). Attendees will discover the latest and most accurate methods for estimating reserves, both deterministic and probabilistic, and gain a thorough understanding of various reserves levels and their equivalence in both systems, including proved, proved plus probable, and proved plus probable plus possible.

**COURSE CONTENT**
- Basic definitions and classifications
- Statistics and probabilities
- Simulation
- Probability and uncertainty
- Expected value, and expected value and decision trees
- Utility theory
- Unconventional resources
- Reserves definition and classification
- Time value of money
- Before-tax and after-tax cash flows
- Decline curves
- Volumetrics
- Material balance
- Economic yardsticks
- Investment choices
- International contracts
- Field examples

**AUDIENCE**
Petroleum engineers, geologists, reserves analysts, and others involved in estimation of reserves.

**PREREQUISITE**
Degree in engineering or geoscience, and knowledge of reservoir engineering and petroleum geology.

Uncertainty is inherent in all projects and operations, particularly in technical, financial, schedule, legal, and quality arenas. This course presents the attendees with techniques used in the identification, assessment, and control of uncertainties in a project-based enterprise. Attendees will learn about risk analysis and management as a field of expertise focused on the systematic and comprehensive analysis of uncertainty.

**COURSE CONTENT**
- Risk analysis process and stages of risk life cycle
- Exposure, impact, and probability assessment
- Risk identification process
- Mitigation strategies
- Using Microsoft Excel and @Risk™ for project risk analysis
- Case study analysis: Resetting probability parameters

**AUDIENCE**
Anyone wanting to increase skills in project risk management.

**PREREQUISITE**
None

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
Avocet Integrated Asset Modeler Fundamentals

Foundation - 5 Days

The course focuses on use of the Avocet platform to integrate the reservoir with the surface models. Instruction includes software installation.

COURSE CONTENT
- Overview of key reservoir network coupling fundamentals
- Coupling reservoirs to networks
- Running time-based simulations
- Connecting models
- Adding a Microsoft Excel planning, risk, and reserves software model to a flow diagram
- Evaluating economics with Merak software models
- Transferring compositions

AUDIENCE
Anyone wanting to integrate reservoirs with surface models using Avocet software platform.

PREREQUISITE
Production, reservoir, or process engineering background with knowledge of either ECLIPSE or PIPESIM simulators.

ECLIPSE Blackoil Reservoir Simulation

Foundation - 5 Days

The focus of this course is on learning the ECLIPSE Blackoil reservoir simulation software, rather than simulation methodology. This fully implicit, three-phase, 3D, general-purpose blackoil simulator includes several advanced features of ECLIPSE simulator software.

COURSE CONTENT
- Overview of how a simulator initializes and executes
- Block-centered and corner-point grid geometries
- Rock and fluid properties
- Allocation of initial pressure and saturation distribution
- Aquifer definition
- Control wells under history-matching and production regime
- ECLIPSE Blackoil file structure
- Input rules
- Specifying and editing input and output data
- Building and executing a simulation model
- Analysis of results through postprocessing

AUDIENCE
Reservoir engineers, geoscientists, and other technically trained individuals interested in learning the ECLIPSE Blackoil simulator.

PREREQUISITE
ECLIPSE Applied Reservoir Simulation Fundamentals course and background in reservoir engineering.

MEPO Introduction

Foundation - 3 Days

This course is designed to introduce the application of the MEPO optimizer to reservoir engineers and asset teams involved with related disciplines. The course will cover workflow processes for several concrete application scenarios using industry standard design and optimization techniques in reservoir simulation. Following an introduction to the basic functionality of the tool and project structure, the course attendees will be given a brief summary of terminology and concepts in uncertainty modeling, assisted history-matching, and production forecasting, followed by presentation and hands-on experience gained by working with the application of the MEPO optimizer. Practical exercises include performing uncertainty analyses as well as investigating the influence of various parameters on reservoir modeling and alternative development strategies. The remainder of the course is dedicated to principles and practice of MEPO with a focus on history-matching tasks and uncertainty quantification. Significant emphasis will be placed on design, execution, and postprocessing of reservoir simulation runs. Using carefully selected example cases and exercises, the attendees will gain an understanding of methods and modeling techniques that will enable them to make use of the MEPO optimizer in their routine tasks.

COURSE CONTENT
- Introduction to MEPO optimizer
- Introduction to dynamic uncertainty quantification
- Experimental designs
- Analyzing features
- Introduction to optimization methods for history matching and reservoir optimization
- General understanding of the use of MEPO optimizer
- Workflow examples and best practices

AUDIENCE
Reservoir engineers.

PREREQUISITE
None

Merak Peep Fundamentals and Merak Peep Decline Fundamentals

Combined Course

Foundation - 3 Days

Attendees in this course will explore the functionality of Merak Peep software and decline analysis module. These software packages allow for navigating efficiently through the case document, edit existing data, and analyze economic runs.

COURSE CONTENT
Merak Peep Fundamentals
- Create, edit, and copy economic case documents
- Review essential economic inputs
- Create filters and user parameters to easily sort large data volumes
- Use batch processes to edit or report multiple cases simultaneously and calculate price sensitivity

Merak Peep Decline Fundamentals
- Maintain current in-house and vendor data to understand production levels
- Import and export production history
- Create groups and summary wells to better manage well data
- Forecast production rates and volumes
- Perform basic decline analysis rate/time curves and cumulative curves

AUDIENCE
Anyone needing to develop or improve their skill and understanding of project economics and decline curve analysis performed with the Merak Peep and Peep Decline modules.

PREREQUISITE
Petroleum Economics Fundamentals or equivalent knowledge in addition to an understanding of basic decline analysis techniques and theory.
This course introduces attendees to the primary functionalities of the OFM software by allowing the attendees to interact with a preprepared gas operations project. The flow of the course centers on the attendee acting as a member of a fictional engineering team, charged with accomplishing a number of common tasks using the OFM software suite. The course covers each of the required tasks. In accomplishing the tasks, the attendees are exposed to the range of common features of the software application. During the course, the attendees will learn how to use the OFM software as a quality assurance tool, seeking deficiencies in the data before using the project data to illustrate primary and derived performance parameters. The course also covers graphical display features, ranging from tabular plots through line graphs to GIS map-based representations.

**COURSE CONTENT**
- Brief walkthrough of a fully functioning project to provide quick set of reference points
- Review project data and check for missing values
- Use filters to screen out unwanted entities for analysis
- Group project data at multiple levels
- Create calculated fields and calculated variables
- Create single- and multiple-well plots
- Create and format well and field summary reports
- Export reports and table data to other applications

**AUDIENCE**
Anyone responsible for setting up and maintaining a project using OFM software.

**PREREQUISITE**
None

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The purpose of this course is to introduce the well design module and the drilling functionalities in the Petrel platform. The attendees are guided through the preparation stage for data used in offset well analysis, which includes loading of drilling events, drilling logs, and using end of well reports to filter the knowledge database by, for example, data type, category, or event severity. Attendees will become familiar with the available well design approaches, including an enhanced method also used by drilling engineers. How to import trajectory and targets from third-party applications such as the Landmark EDM™ Engineers Data Model will also be introduced. After the planning phase, attendees will learn how real-time data acquisitions are handled in the Petrel platform.

**COURSE CONTENT**
- Drilling event classification and visualization
- Webmap services
- Well design
- Well path design
- Real-time data acquisition

**AUDIENCE**
Drilling engineers, geologists, and petrotechnical personnel with fundamental knowledge in Petrel software and who need to understand well path design and optimization within the Petrel platform.

**PREREQUISITE**
Petrel Fundamentals course.
# Field Development Planning

## Petrel Reservoir Engineering

**Foundation - 3 Days**

This course enables attendees to prepare and run a Petrel platform model for reservoir simulation in ECLIPSE simulator, ECLIPSE FrontSim, and INTERSECT* next-generation reservoir simulation software. In this course, attendees will build a 3D simulation model inside the Petrel platform based on geological input data, add wells and well control rules, create black oil fluid models and rock physics functions, and submit the model to the simulators. In addition, practical application of most Petrel platform simulation processes will be discussed and illustrated in the exercises. Overall, pre processing and post processing of simulation data will be done within the Petrel platform environment.

**COURSE CONTENT**
- Simulation case setup
- Initialization and volume calculation
- Simulation run and results viewing
- History matching and prediction
- Well engineering
- Upscaling and advanced corner-point gridding

**AUDIENCE**
Development and exploration geologists, geophysicists, petroleum engineers, managers, reservoir engineers, and technical personnel with prior experience in Petrel software.

**PREREQUISITE**
Petrel Fundamentals course or equivalent Petrel platform experience, and general knowledge of reservoir engineering or petroleum geology and geophysics.

## PIPESIM Gas Field Production Operations

**Foundation - 2 Days**

This course covers the use of the PIPESIM simulator for designing and modeling gas production systems operations. Practical and comprehensive problems will be presented, discussed, and analyzed throughout the course.

**COURSE CONTENT**
- Navigate the PIPESIM simulator user interface
- Troubleshoot and debottleneck network models
- Model gas wells, including various completion models
- Match inflow performance to test data
- Model water separation, injection into a salt water disposal well, and wellhead or manifold production sources
- Construct a compositional fluid model
- Predict gas hydrate formation, erosion, corrosion, and liquid loading in gas wells
- Model centrifugal and reciprocating gas compressors
- Compare the relative benefits of push versus pull compression
- Estimate the required slug catcher size
- Model a transmission network

**AUDIENCE**
Reservoir engineers working on simulation studies.

**PREREQUISITE**
General petroleum engineering knowledge as well as elemental software skills.

## Introduction to INTERSECT

**Skill - 2 Days**

The INTERSECT simulator course introduces reservoir engineers to methods of constructing simulation models using INTERSECT simulation software. The training discusses the main features of the INTERSECT simulator relative to working with input data from Petrel or ECLIPSE software. Along the way, attendees will also be exposed to the basic features of the INTERSECT simulator. The course incorporates information about using Petrel pre and post processors as the primary front-end for the INTERSECT simulator.

**COURSE CONTENT**
- Overview of reservoir simulation using the INTERSECT simulator
- Data creation through the Petrel platform application
- Data editing using the Migrator module in ECLIPSE software and the INTERSECT simulator
- Field management
- Improving simulator performance
- Important behavioral differences in ECLIPSE and INTERSECT simulation software

**AUDIENCE**
Reservoir engineers working on simulation studies.

**PREREQUISITE**
Background in reservoir engineering.

## Merak Decision Tool Kit and Merak Peep Monte Carlo

**Skill - 1 Day**

In this course, attendees will work in the Merak Peep and Merak Decision Tool Kit modules to explore the principles of Monte Carlo analyses and how to apply them to project evaluations.

**COURSE CONTENT**
- Deterministic analysis versus Monte Carlo analysis
- Random walks and their input parameters
- Correlations
- Use of report settings
- Visual Monte Carlo trees
- Choice and chance nodes

**AUDIENCE**
Merak Peep module users responsible for preparing or modifying Merak Peep models using the Merak Fiscal Model Library application.

**PREREQUISITE**
Merak Decision Tool Kit Fundamentals course, Merak Peep Fundamentals course, and an understanding of basic Monte Carlo theory.
Petrel Property Modeling
Skill - 3 Days

This course focuses on the fundamentals of modeling using the Petrel platform. The course covers basic geostatistics, data preparation, data analysis, facies, and petrophysical modeling. Attendees will learn different ways to create property models and how to condition models to existing models and secondary data. This course guides the user through concepts, algorithms, and software functionalities in property modeling.

The first portion of the course focuses on the use of basic geostatistical tools through data analysis. Also, premodeling processes concerned with well data preparation will be covered, the first step of which is the property modeling workflow followed by upscaling well logs to create single-property values at the well location for each cell. This technique creates hard data that will be used to populate the 3D grid with either deterministic or stochastic algorithms. The second half of the course focuses on facies and petrophysical modeling workflows using stochastic methods as well as covering the usage of kriging for continuous properties. Implementing data analysis results and using secondary data to constrain the result will also be shown.

COURSE CONTENT
- Basics of uni- and bivariate geostatistics
- Data preparation, including well log edits, calculations, and upscaling for discrete and continuous data
- Facies modeling
  - Data analysis
  - Sequential indicator simulation
  - Object facies modeling
  - Truncated Gaussian simulation with and without trends
  - Using secondary data to populate facies models
- Petrophysical modeling
  - Data analysis
  - Sequential Gaussian simulation
  - Gaussian random function simulation
  - Kriging
  - Using secondary data to populate petrophysical models

AUDIENCE
Development and exploration geologists, geophysicists, petroleum engineers, managers, reservoir engineers, and technical personnel with prior experience in using Petrel platform software.

PREREQUISITE
General knowledge of petroleum geology and attendance of the Petrel Fundamentals course or equivalent experience.

Petrel Structural Modeling
Skill - 3 Days

The 2013 Petrel platform structural modeling course presents different approaches to building models that capture geologically complex situations such as reverse faults and truncations. This course covers both corner-point gridding and structural framework. Attendees will be presented with workflows that combine both processes, specifically how to use the results from the structural framework to generate a corner-point grid. The attendees will also learn how to generate partially and fully stair-stepped 3D grids. The advantages and limitations of the different types of models will also be presented.

The course will highlight the following: (1) the robust fault modeling while interpreting seismic functionality, which allows rapid real-time creation of the structural framework; (2) salt modeling techniques using both corner-point gridding and structural framework; and (3) the innovative volume-based modeling technique for the construction of complex structural frameworks.

COURSE CONTENT
- Structural framework approach
  - Geometry definition
  - Fault framework modeling
  - Fault modeling while interpreting
  - Horizon modeling
- Structural framework versus corner-point gridding
- Stair-step faulting
- Salt modeling methods
- Volume-based modeling technique (Available on releases after 2013.1)

AUDIENCE
Development and exploration geologists, geophysicists, petroleum engineers, managers, reservoir engineers, and technical personnel with prior experience using the Petrel platform.

PREREQUISITE
General knowledge of petroleum geology and geophysics as well as having attended the Petrel Fundamentals and Petrel Geology courses or equivalent Petrel experience.
Petrel Velocity Modeling

Skill - 3 Days

This course introduces the attendee to velocity modeling, velocity handling, and domain conversion functionality in the Petrel 2013 platform.

The course takes the attendee through the preparation stage of data used for velocity estimation and modeling. This preparation stage includes quality control and editing of checkshot data used in sonic calibration and quality control of time surfaces and well tops used for defining velocity intervals.

Furthermore, the available velocity modeling techniques are presented, including well velocity estimation, the nature and modeling of seismic velocities, surface-based and 3D grid-based seismic velocity modeling, as well as user-defined velocity functions.

Following the velocity modeling phase, domain conversion of various objects and methods for modeling structural uncertainty are covered.

COURSE CONTENT
- Quality control of and editing of well data
- Checkshot calibration of sonic logs
- Velocity functions and various velocity modeling approaches
- Velocity modeling quality control and modeling
- Depth error analysis and correction
- Surface-based and 3D grid-based seismic velocity modeling
- Anisotropy in seismic velocities
- Geostatistical methods
- Quantifying residual depth error and creating a depth correction model
- Creating user-defined velocity functions
- Domain conversion
- Modeling structural uncertainty

AUDIENCE
Development and exploration geologists, geophysicists, petroleum engineers, managers, reservoir engineers and technical personnel experienced with Petrel platform.

PREREQUISITE
Petrel Geophysics course or similar Petrel experience.

Petrel Assisted History Matching and Uncertainty Analysis

Skill - 2 Days

This course builds on the Petrel platform reservoir engineering course and focuses on how to use the Petrel platform for sensitivity and uncertainty studies. These studies involve how to run the simulations as well as how to use the tools that the Petrel platform offers for results viewing, including histograms, tornado plots, spreadsheets, and line vectors.

The course begins with some basic concepts of uncertainty and how they are interpreted in the Petrel platform. Next, performing a sensitivity study once the uncertain input parameters are identified will be presented; i.e., the course guides the attendees through setting input distributions, sampling input from those distributions, and running the resulting simulation cases. In the simplest context, the Petrel platform establishes a workflow that allows for running a sensitivity or uncertainty study in a few clicks. Occasionally, the default workflows might require being customized to meet the user’s needs. The course will introduce a number of ways to add functionality to the basic workflows to meet the user’s specific needs for defining input or reporting results.

COURSE CONTENT
- The uncertainty and optimization process
- The workflow editor
- Basic concepts in statistics
- Visualize results from a sensitivity or uncertainty study
- Customize prepared workflows in Petrel platform to meet user needs

AUDIENCE
Reservoir engineers, geologists, and geophysicists with previous reservoir engineering knowledge.

PREREQUISITE
Petrel Reservoir Engineering course or equivalent Petrel experience.

Petrel Well Deliverability

Skill - 1 Day

This course builds on the Petrel platform reservoir engineering course and is an extension of the well modeling environment within the Petrel platform software suite. The course provides support for existing reservoir engineering workflows such as development strategy and field management. Two main production workflows are discussed in the course: performance table collection and nodal analysis simulation. Attendees will learn how to use reservoir simulated variables as input data for creating performance tables and running a nodal analysis case. The integration of production simulated variables to support reservoir engineering workflows will be demonstrated by creating performance tables (VFP) within the Petrel platform suite and associating the results with the development strategy process. In this way, an integrated reservoir-production engineering cycle is completed without leaving the Petrel environment. The attendees will also learn how to use nodal analysis simulation to introduce several inflow performance relationship models for pressure and temperature traverse. When running the nodal analysis case, attendees will learn how to create profile plots, such as liquid holdup, erosional velocity ratio, fluid mean velocity, and so forth.

COURSE CONTENT
- Well deliverability module
- Inflow performance relationship (IPR) model manager and supported flow correlations.
- Petrel platform well model optimization by creating a single flow path model
- IPR model manager
- Fluid properties for better understanding of input data
- Hydraulic tables (VFP tables)
- VFP tables associated with a development strategy
- Nodal analysis case and display nodal charts
- Profile spreadsheets and derived logs generated from nodal analysis through Petrel platform
- Well models importing from

AUDIENCE
Development and exploration geologists, geophysicists, geochemists, petroleum engineers, managers, reservoir engineers, and other technical staff.

PREREQUISITE
Petrel Fundamentals course in addition to Petrel Reservoir Engineering course or equivalent experience.
**Petrel Geological Workflows and Uncertainty Analysis**

**Skill - 2 Days**

This two-fold course aims to give attendees insight into the Workflow editor and the Uncertainty and Optimization process in the Petrel software platform with a focus on geological modeling. During the first day, the course will focus on how to use predefined workflows and how to create your own workflows for batch processing and operations, in addition to setting up, editing, and repeating processes with new data for a complete and standardized reservoir modeling workflow. To take full advantage of the uncertainty handling in the Petrel platform, the attendee will need to have an understanding of the Workflow editor module, which is the cornerstone of the Uncertainty and Optimization process. The attendee will be also given some examples on geological workflows. On day two, this course will focus on understanding sensitivities and uncertainties of a base case volumetric reservoir model. Structural uncertainties related to surfaces will be explored, as well as stochastic parameters related to the property model. Also, the uncertainty related to the contacts defining the volume case will be examined.

**COURSE CONTENT**

- Workflow editor interface and logic
- Running predefined workflows
- Creating user-defined workflows
- Updating 3D models with new input data
- Becoming familiar with the Uncertainty and Optimization process
- Sensitivity and uncertainty analysis setup
- Well log interpretation uncertainty
- Structural uncertainty
- Fluid contact uncertainty
- Property uncertainty

**AUDIENCE**

Reservoir, development, and exploration geologists, petrophysicists, and technical personnel experienced with the Petrel software platform.

**PREREQUISITE**

Petrel Fundamentals course and the Petrel Geology course.

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**Techlog for Geologists**

**Advanced - 5 Days**

In this course, attendees learn advanced interpretation and processing capabilities with a focus on the management of wellbore image data and the performance of interpretation workflows for analysis of these data. Topics include facies typing using neural network methods, multiwell plotting, cross section building, and mapping in the Techlog software platform application. Learn to use Techlog platform geologic tools to achieve efficient data integration.

**COURSE CONTENT**

- Load, process, and manipulate image data and core photos
- Pick dips and facies
- Interpret dips and facies
- Neural network techniques for facies prediction
- Use zone editing for field maps, kriging, and multiwell cross sections

**AUDIENCE**

Development and exploration geologists with prior experience using the Techlog software platform.

**PREREQUISITE**

Techlog Fundamentals course.
NExT offers FDP training that accelerates and transforms technical skills. It builds expertise in FDP techniques, tools, and workflows that are needed to address the challenges of field developments.

This training is unique because it includes theory, software training, model building, workflows, and an in-class project designed to reinforce lessons and demonstrate the acquired practical skills and understanding.

The immersive, comprehensive curriculum starts from general understanding and extends to in-depth field assessment with economics, risk, and standard analysis techniques that provide a complete understanding of FDP.

Integrated FDP Program Flow

Field development is becoming much more complex and expensive, so getting it right is critical. NExT offers four different FDP programs, each providing the opportunity to learn fundamental approaches in developing and working an FDP. The program incorporates the latest technologies and software to enable customers to design a suitable, long-term, and profitable development strategy.
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**COMPETENCY LEVEL**

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## Introduction to Geology

### Awareness - 4 Days

Attendees will be presented with an overview of the fundamentals of geology and its impact on the processes of petroleum exploration, development, and production. This introductory geology course focuses on the key concepts and principles of geology as applied to the oil and gas industry.

#### COURSE CONTENT

- History and economics of petroleum
- Earth structure and plate tectonics
- Major rock types
- Structural style and stress fields
- Folds, faults, unconformities, and fractures
- Structural and hydrocarbon traps
- Clastic and carbonate depositional systems
- Geologic mapping and cross sections
- Petroleum systems
- Source rocks and types of organic matter
- Traps and seals
- Correlation and stratigraphy
- Pore systems and diagenesis
- Pore system characterization
- Porosity and permeability
- Static reservoir model
- Seismic methods and petroleum geology
- Wireline logging and interpretation fundamentals

#### AUDIENCE

E&P professionals with a need to better understand geology principles.

#### PREREQUISITE

None

### Introduction to Geology Including Day Pyrenees Field Trip

This 4-day course, including a 1-day field trip to the Pyrenees, introduces E&P professionals from nongeology disciplines to key geological concepts and principles for use in the oil and gas industry. The course summarizes geology fundamentals required for petroleum exploration, development, and production. This course is an offshoot of the 4-day Introduction to Geology course.

#### COURSE CONTENT

- Geology fundamentals required in petroleum exploration, development, and production
- 1-day field trip requiring a moderate amount of walking and low-incline climbing

#### AUDIENCE

Entry level-to-midlevel engineers, geoscientists, and other E&P staff who need an understanding of the role Geology plays in their everyday business activities.

#### PREREQUISITE

None

### Basin Analysis and Petroleum Systems Modeling

This 5-day course covers the key aspects of basin analysis and subsequent basin and petroleum systems modeling from input to output. The course contents include basin evolution from plate tectonics to petroleum generation and migration. Risks and uncertainties that influence understanding petroleum systems within a basin and how to quantify those uncertainties are included.

This course provides the basic geoscience background needed by anyone engaged in petroleum systems modeling. Attendees will learn the type of questions to ask, the kind of data needed to build models and solve specific problems, and how to apply geological reasoning in quantifying uncertainties.

#### COURSE CONTENT

- Introduction to sedimentary basins
- Basin forming mechanisms
- Basin classification and structural analysis
- Basin fill
- Geochemical analysis
- Temperatures and pressures in sedimentary basins
- Petroleum system modeling
- Petroleum systems modeling approach
- Hydrocarbon generation
- Hydrocarbon migration
- Uncertainty management and quantification

#### AUDIENCE

Geoscientists involved in petroleum systems modeling or anyone wanting to know more about the petroleum systems modeling approach.

#### PREREQUISITE

Basic knowledge of geology and no prior petroleum systems modeling experience.

### Deepwater Reservoirs

This in-depth course provides the process sedimentology background required to understand deepwater systems and to recognize sediment gravity flows on subsurface datasets. Course participants will be able to:

- Differentiate between mass transport complexes, sediment gravity flows, and contours and predict net-gross values for each in seismic data
- Differentiate between channels, lobes, mass transport complexes, and contoured deposits on well logs
- Identify processes responsible for sedimentary structures, bedforms, and lithology and use these to determine depositional environments and lateral continuity of reservoirs from core samples
- Correlate reservoir sandstones using concepts developed by Mike Gardner in the Brushy Canyon formation of the southwestern U.S. The course also builds on several outcrop analogs, including the Ross formation of Ireland

#### COURSE CONTENT

- Company-specific case studies
- Course manuals, including seismic data, well logs, core photos, and other handouts

#### AUDIENCE

Geoscientists who wish to understand deepwater reservoirs.

#### PREREQUISITE

Basic knowledge and understanding of geology.

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
Development Geology

**Exploration Methods and Workflows: Integrating Petroleum System, Play and Prospect Evaluation, and Assessment**

Foundation - 5 Days

This course provides attendees with the fundamental skills to construct geologic models and understand the factors that affect field operations and field management. The course covers from the gathering and interpretation of geologic data to the preparation of geologic models to the quantification of subsurface uncertainty, in addition to applying geologic concepts, constructing maps and sections, and validating computer-generated interpretations. Also included are calculating subsurface volumes and assessing their uncertainties, preparing a well proposal, planning appraisal wells, and assessing their economic value. Attendees will acquire practical experience by working in teams on an actual field study.

**COURSE CONTENT**
- Scope of oil and gas business
- Subsurface models, input data, and modeling concepts
- Gathering, processing, and interpreting seismic data
- Structural types, traps, fault seals, maps and sections, and correlations
- Clastic sedimentary environments
- Basic well technology, horizontal wells, well data, log and core data, uncertainties, and mapping
- Carbonate reservoirs
- Subsurface development options
- Volumetrics and subsurface uncertainties
- Static and dynamic models
- Field operations, well design, and geologic input
- Development options, project planning, and phased costs
- Impact of subsurface uncertainty on project economics

**AUDIENCE**
Engineers and geologists involved in reservoir appraisal and development projects.

**PREREQUISITE**
Basic understanding of reservoir and petroleum geology.

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**Fractured Reservoir Characterization with Emphasis on Carbonates**

Foundation - 3 Days

This 3-day course, covering essential geology and geomechanics of fractured reservoirs, extends from appraisal through development to secondary recovery. It also introduces the basics of reservoir engineering issues. The course contents are general to all types of fractured reservoirs with an emphasis on carbonates. Classroom sessions include exercises that provide for open discussion of the specific issues or datasets submitted by the attendees. A comprehensive reference list of technical sources is provided in addition to a slide set used during the course.

**COURSE CONTENT**
- Fractured reservoir types and introduction of the key issues
- Tools and techniques available for fractured reservoir characterization workflows
- Basic structural geology and rock mechanics, emphasizing their relevance to reservoir descriptions in the geology and geophysics environment
- Various approaches to fracture modeling, fractured reservoir characterization principles, and workflows
- Discuss specific issues relevant to real-world reservoir characterization

**AUDIENCE**
Geologists, geophysicists, petrophysicists, and reservoir engineers looking to develop their skills in the fractured reservoir characterization workflows.

**PREREQUISITE**
Basic background in geology.
GEOLOGY

Geology of Clastic Reservoirs
Foundation - 5 Days
This course focuses on in-depth analysis of the distribution, geometry, and sedimentary architecture of clastic reservoir facies. Attendees will learn the criteria for distinguishing reservoir facies by using wireline log and core data, how to interpret facies distributions at regional and field scales, and how to integrate this information into exploration and development projects. Numerous case studies are used to illustrate the nature of clastic reservoirs, and exercises employing log and core data support classroom lectures.

COURSE CONTENT
- Fluvio-deltaic facies
- Sedimentary architectures
- Alluvial fan, fluvial, eolian, shoreface, deltaic, and shelf environments
- Reservoir facies
- Data integration, quality control, and analysis techniques using outcrop data, core photos, wireline logs, isopach maps, and seismic attribute maps

AUDIENCE
Engineers, geoscientists, operating personnel, and other asset team members responsible for exploration, development, or production of clastic reservoirs.

PREREQUISITE
Basic knowledge of sedimentary geology.

Global Tectonics and Geological Prospecting Tools for Exploration
Foundation - 5 Days
A combination of lectures and hands-on practical exercises will introduce attendees to the fundamentals of an effective petroleum system. Emphasis is on global tectonics and how basins are formed, filled, and deformed as well as use of key geologic prospecting tools.

Although the course focus is on clastic rocks, especially turbidites, it also reviews carbonate rocks and evaporite formations. The Atlantic Margin basin is the source for discussions of petroleum system elements.

Attendees will be introduced to key aspects of source rock, migration, overburden rock, reservoir characteristics, seal rock, traps, timing, and preservation elements, in addition to learning the fundamental tools for exploration petrophysics. The course will also cover correlating different well logs that show faults and stratigraphic variation and creating contour maps and learn to present faults in map view.

COURSE CONTENT
- Five laws of geology
- Basin formation, plate tectonics, and source rocks
- Unconventional petroleum systems
- Evaporate and carbonate petroleum systems
- Fluvial, deltaic, and turbidite deposits
- Migration
- Basin filling and deformation
- Faulting as pathways and seals
- Structural traps
- Deformation, sutures and inclusions, rubble zones, and imaging below salt
- Petrophysics for exploration

AUDIENCE
Exploration geoscientists and managers who want a fundamental understanding of petroleum systems and key geologic prospecting techniques.

PREREQUISITE
Basic petroleum geology, and knowledge of petroleum systems.

Introduction to Biostratigraphy
Foundation - 3 Days
Structured to provide basic, practical knowledge, this course covers the main fossil groups used in geologic operations, sample processing techniques, marker identification, and use of biostratigraphic charts in the geologic interpretation of drilling sections.

Biostratigraphic information is a tool routinely used in many operations, and this introductory course covers its fundamental E&P applications and limitations. Attendees will better understand the most common mistakes made while studying samples and interpreting the fossil assemblages, in addition to correctly assessing the stratigraphic level during drilling and interpret the paleontological associations.

COURSE CONTENT
- Biostratigraphy definitions and principles
- Foraminifera, calcareous nanoplankton, and, palynomorphs
- Biostratigraphical studies while drilling
- Sample processing, picking, and identifying of fossil groups
- Biostratigraphic studies and fossil groups according to geologic section
- Design sampling strategy while drilling (exercise)

AUDIENCE
Geologists, geophysicists, petroleum engineers, drilling engineers, and other professionals working in E&P operations.

PREREQUISITE
Basic knowledge of petroleum geology.
# Mud Logging Operations

**Foundation - 5 Days**

This 5-day course consists of practical and theoretical sessions in the classroom, mud logging unit, and workshop. Experienced professionals provide in-depth details on mud logging services, coupled with hands-on practical learning centered on a state-of-the-art training environment at the Schlumberger European Learning Center (ELC) located in Melun, France. The practical sessions use the mud logging unit, acquisition sensors and sample analysis equipment, geological laboratory, and rig-based training. The course will provide a clear understanding of the primary objective of mud logging services, which is the surface measurement of drilling parameters, gas data, and geological information. The 5-day course focuses on understanding drilling operations monitored through a mud logging system, helping to understand the principle of gas measurements, and to comprehend how geological descriptions are performed together with the process of building a lithostratigraphic column. By the conclusion of the course, participants will have an improved understanding of the added value of mud logging data, be familiar with all elements related to data quality control, and have the skills needed to challenge the data quality. This course is only available at ELC Melun, Paris.

**COURSE CONTENT**

- Drilling monitoring
- Type of gas
- Degassing process and analysis
- Geological sample preparation and description

**AUDIENCE**

Geoscientists and engineers wishing to have hands-on training in mud logging.

**PREREQUISITE**

Drilling knowledge and basic geological knowledge.

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# Operations and Wellsite Geology

**Foundation - 5 Days**

In this thorough overview of wellsite data acquisition and quality control, attendees will learn the formation evaluation techniques used by wellsite geologists. A combination of lectures and practical exercises enhance the understanding of drilling problems caused by subsurface conditions and the application of wellsite data in exploration and development projects.

**COURSE CONTENT**

- Petroleum geology, depositional environments, and stratigraphy
- Drilling operations, problems, and well control
- Logging operations: Petrophysics, acquisition, fundamentals, and tools
- Operations geology: Duties, responsibilities, and well-planning processes
- Wellsite geology and mud logging services
- Hydrocarbon detection (data acquisition) and sidewall and conventional coring (acquisition and coring of poorly consolidated rocks)
- Lithological and composite well logs
- Wellsite contracting; Drilling, mud logging, wireline services, coring, and quality control
- Cuttings: Descriptions, abbreviations, lithologies, and log correlations

**AUDIENCE**

Geologists participating in well drilling or wellsite operations.

**PREREQUISITE**

Basic understanding of geology.

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# Petroleum Geology

**Foundation - 5 Days**

This course will enhance an attendee's knowledge of the fundamentals of geology and how the fundamentals are integrated with engineering data to effectively and optimally manage reservoir development. In addition to learning which geologic data are needed to describe the 3D geometry of a reservoir. The tools and techniques available for reservoir characterization and how the resulting data can be combined and harmonized are also covered.

**COURSE CONTENT**

- Geologic principles, major rock types, geologic time and age dating, structural features, and plate tectonics
- Clastic and carbonate depositional systems
- Sequence stratigraphy concepts
- Carbonate reservoir properties
- Geologic mapping and cross sections
- Hydrocarbon source rocks and petroleum systems
- Trap types and mechanisms
- Play fundamentals
- Petroleum system processes, event correlation, and biostratigraphy
- Pore systems and diagenesis
- Porosity types in carbonate and clastic rocks, clay types
- Geologic modeling: Reservoir heterogeneity, scales of investigation, and flow units
- Deterministic and stochastic modeling, use of seismic data in modeling
- Seismic methods and use of seismic tools in petroleum geology

**AUDIENCE**

Geoscientists and petroleum engineers.

**PREREQUISITE**

Basic knowledge of geology.

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# Petroleum Geoscience - Heriot-Watt University Program

**Foundation - 5 Days**

This course is a component of the Heriot-Watt University Distance Learning Masters of Reservoir Engineering Program. The course, which reviews all of the fundamental aspects of the petroleum geosciences and demonstrates their cross disciplinary applications, forms a portion of the Heriot-Watt Distance Learning MSc Petroleum Engineering degree. This course can be attended by persons who seek to better their understanding of the subject but who are not registered for the degree course. To learn more about the MSc Petroleum Engineering program, visit the following website, http://www.nexttraining.net/masters.cfm

**COURSE CONTENT**

- Introduction to earth science
- Exploration play concept
- Principles of flow in porous rocks and rock properties
- Basic structural terms
- Reservoir heterogeneity and subsurface geometries
- Depositional environments of clastic rocks and facies concepts
- Basin reservoir geology
- Principles and practice of correlation; geoscience in reservoir management; geostatistics
- Reservoir volumetrics, interfaces between geoscience and other disciplines
- Geoscience and drilling

**AUDIENCE**

Petroleum and reservoir engineers, petrophysicists, and production engineers wishing to develop interdisciplinary skills.

**PREREQUISITE**

None

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**Software**

**Technical courses that use software**

**Includes practical sessions**

**Fieldtrips**

**Uses simulation**
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| Prospect Evaluation, Risks and Volumes | Foundation - 5 Days | Risk and volume assessments form the basis for decisions on whether to drill or not, and as such, form the link between subsurface evaluation and the business aspects of the petroleum industry. This course explains how risks and volumes can be assessed in a realistic manner based on a sound understanding of the geological details of the prospect as well as of its regional geological setting, and current play understanding. At the conclusion of the course, the participants will have an excellent understanding of the essentials required for realistic risk and volume assessments of exploration prospects. The course allows participants to produce well-considered and realistic assessments for prospects in which they may be involved, and to understand and constructively challenge risk and volume assessments of colleagues and/or partners/competitors. **COURSE CONTENT**
- Risk and volumes assessment fundamentals
- Risk and uncertainty difference
- Statistics fundamentals, including distribution curves, expectation curves, adding and not adding risk volumes, and Bayes theorem
- Trap, reservoir, seal, and charge uncertainties
- Estimating risks realistically and consistently
- Calculating volume ranges for prospects and portfolios of prospects; how to add prospect volumes for a correct representation of prospect portfolios
- Incorporating geophysical evidence (direct hydrocarbon indicators [DHI]) in a realistic risk assessment
**AUDIENCE**
Geoscientists working in exploration, prospect portfolio analysts and their direct supervisors, and staff from disciplines working closely with reservoir engineers, petrophysicists, and geophysicists.

**PREREQUISITE**
Knowledge of basic petroleum geology as related to exploration. A knowledge of basic petroleum economics is helpful but not required. |

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| Siliciclastic Reservoirs in Fluvial to Shelf Transitions | Foundation - 5 Days | This course is designed for geoscientists and reservoir engineers who primarily focus on shallow marine successions. In addition to standard facies models, quantitative modeling equations are presented in exercises. By the conclusion of the course, participants will be able to predict reservoir geometries, dimensions, and net/gross of fluvial and paralic sedimentary systems. Details of deltaic reservoir properties, their motifs on wireline logs, and seismic facies are also covered in this course. **COURSE CONTENT**
- Fluvial systems: Deltaic systems
- Incised valley systems and tidal systems
- Barrier islands, shorefaces, spits, and washovers
- Sequence stratigraphy of shallow marine siliciclastics
**AUDIENCE**
Geoscientists and reservoir engineers who primarily focus on shallow marine successions.

**PREREQUISITE**
Basic understanding of geology. |

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| Applications of Borehole Imaging to Hydrocarbon Exploration and Production | Skill - 5 Days | This 5-day course includes the principles and applications of borehole imaging with a strong emphasis on practical application to hydrocarbon exploration and production. The course covers the operating principles of the borehole imaging tools, dipmeter computation and interpretation, and application to structural geology, fracture characterization, and sedimentary environments. Several of the sessions are practical, with a range of examples and scenarios. **COURSE CONTENT**
- Borehole imaging technology and tools
- Wellsite image quality control and image interpretation
- GPIT* general purpose inclinometry tool
- Dipmeter computation and interpretation principles
- Structural geology
- Schmidt stereonet basics
- Structural geology and fracture and fault characterization
- Paleocurrent analysis
- Facies analysis and sequence stratigraphy
**AUDIENCE**
Geoscientists who wish to understand how to interpret borehole imaging data and use the data to complement other available information.

**PREREQUISITE**
Petroleum geology course or thorough understanding of geology. |
Applied Geostatistics

This course focuses on application of the various geostatistics tools using both readily available and specialist software packages. These tools are now essential in most of the important aspects of E&P: gridding and contouring for maps, upscaling for reservoir simulation and basin modeling, and analysis of spatially referenced data of all kinds. The course emphasis is on practical applications and the understanding of context rather than on algorithm details and mathematics. Attendees will learn to choose the most appropriate geostatistics techniques and apply them correctly for E&P best practices, in addition to receiving a practical introduction to what is available in geostatistics software and take useful tools back to the workplace.

COURSE CONTENT
- Introduction to geostatistics and trends in spatial datasets
- Heterogeneity and discontinuity, data scale versus modeling scale, upscaling
- Spatial trends in gridding and contouring: Minimizing errors, kriging
- Bayesian and geostatistics, history matching, sequential and indicator simulation
- Uncertainty methods, Monte Carlo, and other stochastic simulations

AUDIENCE
Petroleum geologists and geoscientists preparing data for reservoir simulators and engineers involved with exploration and development of oil and gas reservoirs.

PREREQUISITE
Basic knowledge of subsurface characterization with Microsoft Excel competency.

Clastic Sedimentology for Exploration and Development

This course covers the fundamentals of clastic sedimentology at scales for both regional exploration and detailed reservoir characterization. Reviews of the main types of sedimentary basins are presented to the attendees in the context of crustal dynamics. Plate tectonics and the production and transport of clastic material descriptions are included for different tectonic, topographic, and climatic settings. Emphasis is on the practical interpretation of subsurface data—seismic, core, and wireline logs—for facies analysis and reservoir characterization. Examples draw from different facies, ages, and basinal settings. Particular attention is given to the principles by which depositional settings are interpreted using both outcrop and subsurface data and the best correlation methods for different settings.

COURSE CONTENT
- Types of sedimentary basins in different tectonic contexts
- Large-scale tectonic settings of main types of sedimentary basins and relationship between structural style and fill patterns
- Effects of base-level changes and syndepositional tectonics on sediment distribution patterns
- Correlation in different sedimentary settings
- Role of analogs in building reservoir models in different depositional settings
- Sediment generation and supply in different settings
- Fluid dynamics and rheology of erosion, transport, and deposition
- Basic mechanics of sediment erosion, transport, and deposition; resultant bedforms and sedimentary structures
- Postdepositional processes and products

AUDIENCE
Exploration and development geologists, geophysicists, and reservoir engineers who need an overview of sedimentary organization across a range of scales in different basinal and environmental settings.

PREREQUISITE
Basic knowledge of geology and sedimentary processes.
### Deepwater Petroleum Systems: Fundamentals and Applications

**Skill - 5 Days**

This course covers the fundamentals of petroleum system analysis (PSA) with an emphasis on deepwater applications. PSA, a relatively new specialization in the field of petroleum geology, is an investigation into the generation of hydrocarbons in the subsurface and reconstructing the history of existing oil and gas accumulations, aimed at quantifying the charge risk of undrilled prospects. Deepwater environments present the petroleum system analyst with a number of specific challenges because source rocks are typically beyond the reach of the drill bit and oil-to-source rock correlations are complicated by oil transformation processes such as remigration and biodegradation. Following a 3-day introduction to the PSA fundamentals, case histories from the Gulf of Mexico, offshore West Africa, and the Mediterranean are presented. Special attention is given to geophysical well evaluations, which form an essential part of PSA, not only in deepwater environments but also for the evaluation of unconventional hydrocarbons such as shale gas and basin center gas.

**COURSE CONTENT**
- Source rocks
- Burial, temperature, and maturity
- Petroleum geochemistry
- Deepwater well evaluations
- Applications

**AUDIENCE**
Geoscientists working in deepwater exploration and their direct supervisors, in addition to reservoir engineers, petrophysicists, and prospect portfolio analysts.

**PREREQUISITE**
Basic geology and chemistry understanding, but not essential.

### Deepwater Sedimentary Systems: Exploration and Production

**Skill - 3 Days**

Addressing the complexities of deep marine systems, this course teaches attendees how these facies evolved on the slope and in the open ocean, how they build into distinctive architectural elements, and how to recognize them. The course covers how to analyze and interpret seismic records, seafloor images, well logs (including borehole image logs), core materials, and outcrop characteristics of deepwater reservoir components with an emphasis on internal architecture as related to reservoir performance. Attendees will perform hands-on case studies of deepwater plays from around the world, illustrating characteristics unique to their exploration, appraisal, development, and reservoir management.

**COURSE CONTENT**
- Deepwater overview and building blocks
- Downslope, along-slope, and open-ocean systems
- Architectural elements: Nature and recognition
- Channel style and geometry
- Lobes, mounds, and sheets
- Deepwater massive sands
- Thin-bedded turbidites
- Deepwater drilling, seismic sequence stratigraphy, and deepwater plays review
- Subsurface models

**AUDIENCE**
Geologists, geophysicists, and petroleum engineers involved in exploration and development of deepwater plays and project managers of deepwater plays and reservoir production.

**PREREQUISITE**
Basic petroleum geology, basic stratigraphy, and basic sedimentology.

### Economics of Petroleum Exploration

**Skill - 5 Days**

This course focuses on the business side of exploration, i.e., how does a company decide whether to move forward with a particular project? Attendees will learn how a structured decision analysis and portfolio optimization process uses the hydrocarbon volumes and risk analyses provided by exploration geoscientists to identify the projects with the best economic potential.

**COURSE CONTENT**
- Business side of exploration
- Comparison of exploration projects under different fiscal regimes
- Role of project economics
- Calculation of cash flow and net present value (NPV)
- Worldwide fiscal regimes and their impact on exploration
- Probabilities, risk, and project risk assessment
- Fundamentals of decision analysis and decision trees
- Expected monetary value
- Value of information
- Comparative analysis of multiple projects
- Strategy and portfolio analysis

**AUDIENCE**
Exploration geoscientists and managers wanting to understand the economics of petroleum exploration.

**PREREQUISITE**
Basic petroleum geology and petroleum systems.

### Field Trip: Practical Fracture Analysis of Classic Reservoirs with Petrel: Casper, Wyoming, USA

**Skill - 5 Days**

This 5-day course combines field and classroom training sessions that integrate model building using the Petrel platform with classic field observations. The field trip portion of the course will consist of short excursions to view the oilfield facilities, surface geology, and outcrops in the area as well as time spent viewing core. This course provides the geoscience professional with tangible examples of the conceptual models they create. The classroom portion of the course is a 2-day hands-on Petrel platform fracture modeling course delivered in a classroom facility in Casper, Wyoming, in cooperation with the staff at the Rocky Mountain Oil Testing Center (RMOTC). The RMOTC is a 10,000-acre U.S. Department of Energy facility located within the Naval Petroleum Reserve No. 3 (NPR-3), also known as Teapot Dome Oil Field, roughly 35 miles north of Casper where the data used in the Petrel platform fracture modeling course was collected.

**COURSE CONTENT**
- Introduction at RMOTC office
- Field site trip and short field exercises
- Core lecture, visit OMNI Laboratories, and exercise involving three Teapot Dome Tensile cracks, standard wireline and FMI® fullbore formation microimager logs, detailed core descriptions and correlations
- Visit Alcova Lake field Location, box lunch, lecture, exercises
- Visit Tensleep of Fremont Canyon
- Petrel platform fracture modeling, fracture theory, fracture data analysis and QC
- Build a discrete fracture network (DFN), upscaling, building DFN using multiple frac drivers, dual porosity/permeability simulation
- Finalize models built in the Petrel platform, presentation of results and roundtable discussion
- Visit Emigrant Gap anticline and Bessmer anticline

**AUDIENCE**
Geoscientists, engineers, and Petrel modelers.

**PREREQUISITE**
Must have working Petrel knowledge.

**NOTE:** Please schedule your departing flight after 3 p.m. on Saturday. Participants must arrive in Denver, Colorado no later than noon on Sunday.
Field Trip: Arid Coastline Carbonates and Evaporites of Abu Dhabi, UAE

Skill – 5 Days

This course will demonstrate how a range of depositional, diagenetic, and erosional processes combine to create a complex stratigraphic architecture with a subsurface that could be difficult to interpret. Join trip leader Dr. Anthony Kirkham, in studying the recent, Holocene, Pleistocene, and Miocene carbonate and sabkha evaporite environments of central and western Abu Dhabi, one of the world’s best locations for studying such sediments. This trip’s destination is an outdoor laboratory in which attendees are given the opportunity to study geologically modern sequence stratigraphy in a proximal-ramp situation with complete exposure of the sediments and rocks.

Learning how these processes interact in real life will provide valuable insight for the geologist who is faced with limited exploration or development data and is in need of constructing 3D models.

COURSE CONTENT
- Recent carbonate sediments
- Interdelta coral patch reefs, lagoonal communities including coral thickets, red algae, sea grass, burrowing, and encrusting bivalves
- Pleistocene aeolianite, storm beach, and other enigmatic limestones
- Coastal sabkha sequence: subtidal, intertidal and supratidal sediments with evaporites and microbial mats
- Transgressive and regressive carbonates
- Salina deposits
- Origins of sabkhas

Field Trip: Characterization and Petrel 3D Modeling of Fluvio-Deltaic Sedimentary Architecture, Upper Carboniferous: East Kentucky, USA

Skill – 5 Days

This course is a field and classroom-based reservoir characterization and modeling course that focuses on capturing the geological knowledge necessary to build realistic models of coal-bearing fluvial and deltaic sediment body architecture using the Petrel platform. The course, based in Lexington and Prestonsburg, Kentucky, follows the typical workflow of a subsurface 3D modeling study and is aimed at fluvio-deltaic reservoir characterization and making realistic predictive models of sedimentary geometries and architecture by incorporating detailed knowledge of sedimentology and sequence stratigraphic concepts.

Outcrops, cores and well logs are studied to characterize both small- and large-scale patterns of sedimentary architecture within a sequence framework in these carboniferous coal-bearing fluvio-deltaic sediments.

AUDIENCE
Geoscientists interested in characterizing and realistically modeling sedimentary architecture to support hydrocarbon, coal-bed methane or coal extraction.

PREREQUISITE
Working knowledge of Petrel platform software is necessary to obtain the maximum benefit from the class.

COURSE CONTENT
- Evaluate outcrop, core, and log interpretation of coal-bearing fluvio-deltaic environments and facies
- Build a sequence stratigraphic framework in coal-bearing sediments for reservoir modeling
- Study coal and coal-bearing sediment correlation techniques from well data

Develop deterministic modeling techniques for coal-bearing sediments, horizons, zones, and layering using Petrel platform software
- Develop and apply isochores to control sediment body shapes
- Compare modeling results from different Petrel platform techniques
- Analyze static connectivity of different facies modeling techniques
Field Trip: Delta-Slope-Turbidite Deposition and Synsedimentary Deformation: County Clare, Ireland

Skill - 6 days

Using seismic scale cliff exposures of Namurian strata, this course will focus on depositional complexities and syn-depositional deformation structures that characterize delta-slope-turbidite successions. Structures include 200-m high cliffs of the carboniferous strata of County Clare currently undergoing intensive research and recently highlighted in a journal article. The strata comprise some of the most spectacular sedimentary geology in western Europe, displaying a wide range of delta, slope, and turbidite facies and sequences, enabling reconstruction of the infilling a major northern Europe basin. Cyclicality of the deltaic succession is thought to have driven eustatic sea-level changes, resulting in extensive flooding surfaces overlain by fossiliferous marine bands and in major paleovalley fill sandbodies. The deltaic intervals show abundant soft-sediment deformation, e.g., growth faults, mud diapirs, and sand volcanoes. The course will include at least one boat trip to view key cliff exposures. The course base is Kilkee, County Clare.

COURSE CONTENT
- Introduce the local stratigraphy and setting
- Mouth bar sands
- Penetrative mud diapir, flooding surfaces, and marine bands
- General basal facies, and Ross formation turbidites
- Turbidite facies, including channels and megafaults
- Bridges, major slump sheets, turbidite channels, and sand volcanoes
- Boat trip to view Ross formation in sea cliffs between Carrigaholt and Loop Head and possible boat trip to view basinal Clare shales and Ross formation base
- South of Tullog Point: Gull Island Formation (major basin-filling slope and slope ramp), lower part of Tullog cyclothem (oldest deltaic progradation), Tullog Sandstone paleovalley
- Killard: upper part of Tullog slope succession; minor mouth bar, abandonment/flooding events, Tullog Sandstone with soft-sediment deformation
- Trukieve: Tullog progradation, flooding surfaces, minor parasequences, paleovalley erosion and stacking, wave-influenced mouth bars; marine bands
- Foothagh Point: Growth faulting in Doonickey cyclothem
- West End, Kilkane: Minor mouth bars in Tullog cyclothem; nonpenetrative mud diapir; Kilkee cyclothem and sandstone
- Carrowmore Point: Upper part of Tullog cyclothem; channel sandstone; flooding surfaces
- Spanish Point: Extensional faulting of mouth bar sands over diapir; Doonickey cyclothem
- Doolin: Basinal mudstone facies at northern margin of basin
- Fisherstreet: Basal turbidites of northern margin and major slump sheet
- Cliffs of Moher: Northern equivalent of Gull Island and Tullog cyclothem

AUDIENCE
Petroleum geologists, general geologists, sedimentologists, reservoir modellers, and reservoir engineers.

PREREQUISITE
None

Field Trip: Depositional Environments from Slope Aprons to Tropical Reefs: Tabernas and Sorbas Basins, Spain

Skill - 5 Days

This 5-day field course offers attendees an extensive series of outcrop examinations, field-based correlation, reservoir description instruction, and exercises. The course aims to familiarize the attendee with the stratigraphy, shape, and scale of depositional bodies in small active Neogene basins. The value of sequence stratigraphic approaches, palaeobathymetric analyses, and structural setting of the basin in predicting the large-scale character of the late Miocene deposits will be addressed in an appraisal and development context. The outcrop studies will illustrate the types of geological heterogeneities that occur in such sequences and show the geological processes responsible for these different hierarchical scales of variability. Relaxed team exercises at the outcrops will enhance knowledge transfer.

COURSE CONTENT
- Introduction to the Paleocene to Pleistocene infill of the basin
- Evaluate mass flow processes and deposits in the basal succession
- View the transgressive systems tract on a seismic scale
- Evaluate sheet-like turbidites
- Assess a mass transport complex
- Climb to the stratigraphic pinout of the sheet-like turbidite system

AUDIENCE
E&P geologists, geophysicists, and petroleum engineers who need a sound understanding of deep-marine and shallow sediments and their architectural elements.

PREREQUISITE
Good basic knowledge of geology.
### Field Trip: Fluvial and Deltaic Architecture and Advanced Modeling using Petrel: Utah/Colorado, USA

**Skill - 7 Days**

This field and classroom-based reservoir geology and modeling course covers applied techniques for reservoir geocellular modeling. The course teaches attendees novel and practical methods to build realistic models of fluvial and deltaic sediment body architecture, demonstrated using the Petrel platform. The attendees will use the Petrel software to integrate core and well log data in a series of deterministic model exercises. The results are compared with other traditional Petrel platform modeling techniques and each is then evaluated against outcrop reality to determine which techniques are the most suitable for analogous subsurface reservoir modeling studies. The course follows the typical workflow of a subsurface 3D modeling study and is aimed at making a series of realistic predictive models of reservoir geometry and architecture using detailed knowledge of sedimentology and sequence stratigraphic concepts.

This course blends lectures, modeling exercises, and over 10 field trips to sites in Grand Junction, Colorado and Green River, Utah. A full day-by-day agenda can be found at NExTtraining.net.

**COURSE CONTENT**

- Diagnostic outcrop, core, and log interpretation of fluvio-deltaic environments and facies
- Core, log and reservoir properties integration to define flow units
- Conceptual models and sequence stratigraphic framework building for reservoir modeling
- Well data correlation techniques
- Deterministic modeling techniques
- Hierarchy, zone logs, and layering applications
- Different modeling techniques and implications comparison for static connectivity

**AUDIENCE**

Geologists and reservoir modelers.

**PREREQUISITE**

Petrel Fundamentals course or minimum 3 months of Petrel use.

### Field Trip: Foreland Basin Syntectonic Sedimentation: Southern Pyrenees, Spain

**Skill - 4 Days**

This course will cover the evolution from continental through shallow marine to slope and submarine fan sedimentation during formation of a foreland basin with syntectonic sedimentation in adjacent, but sequential subbasins associated with evolving thrust fronts during the Pyrenean orogeny. Starting and finishing in Barcelona, the Upper Paleocene-Lower Eocene Agar basin, the Eocene Tremp-Grauss, and Ainsa basins, the Upper Eocene-Oligocene Jaco basin, and finally the Oligo-Miocene Ebro basin will be visited. Impressive panoramic views of the various sedimentary sequences will be observed and show large-scale tectonic elements that controlled the sedimentation are evident.

The clastic-dominated sequences essentially record the westward-deepening and progressively marine influenced foreland basin evolving as the Pyrenean range developed from Eocene onwards, although the more southerly and younger Ebro basin succession is spectacularly dominated by alluvial fan and fluvial sediments. The course bases consist of Barcelona, Tremp, Grauss, Ainsa, Broto, and Barcelona.

**COURSE CONTENT**

- Ager basin-fill sediments in a footwall syncline
- Syntectonic unconformity
- Incision and fluvial Castisant sandstone
- Meandering stream point bar deposits
- Large-scale tidal cross-bedded Alveolina limestone
- Oyster-bearing estuarine sediments with tidal channel erosion
- Back-shed alluvial fan conglomerates with southern provenance
- Incised valley deposits
- Thrust sheet created by inversion and view stop of Castisant sandstone
- Stacked coarsening-up, storm-dominated marine shoreface sediments of Santa Lístera formation
- Slope sediment collapse; slide block
- Ainsa: channelled turbidites
- Boltana antitline
- Thin basin plain calc-turbidites and mega bed turbidites (>200-m thick)
- Slump/olistostrome and inverted mega bed turbidite
- Alluvial fan conglomerates associated with emergent thrust front
- Medial basin, low-sinuosity fluvial sheet and ribbon sands spectacularly exposed in canal cuts

**AUDIENCE**

Petroleum geologists, geophysicists, reservoir engineers, sedimentologists, and stratigraphers.

**PREREQUISITE**

None
Field Trip: Late Palaeozoic - Early Mesozoic Sedimentation: SW Province, UK

Skill - 6 Days

This course focuses on typical facies types of desert, lacustrine (including playa), marine, fluviodeltaic and submarine fan environments by comparing and contrasting the depositional processes on opposite sides of the Bristol Channel throughout the Carboniferous. A wide range of environments will be visited from Silurian to Lower Jurassic uricnic with a full range of sedimentary structures and soft-sediment deformations. One such locality, Ragwen Point, reputedly offers the best in the UK for illustrating the concepts of sequence stratigraphy. A comparison of the Crackington and Bude formations of Devon and Cornwall is always a source of controversy and usually leads to fascinating discussions in the field.

**COURSE CONTENT**
- Devonian Old Red Sandstone sequence
- Freshwater formation with pedogenic overprints
- Lower-coal measures with anarcticic coals
- Storm-dominated Namurian Turn sandstone unconformably overlying the Dinantian Oystermouth formation
- Contact between Upper Namurian and Lowermost Westphalian across the *Gastrioceras subcrenatum* marine band boundary
- Classic coarsening-up deltaic sequence incorporating the Amroth slump, culminating in the Lady Frele coal seam
- Lower Westphalian coal measures containing aneritic Amroth freshwater limestone, Kilgetty coal seam, siderite concretions, and liquefaction structures
- Wiseman’s Bridge: Multistory channel stack with possible tidal influence
- Saundersfoot: Stammers Veins (coal seams) and paleovalley fill.

- Stepped unconformity between Triassic conglomerate and Dinantian limestones
- Upwards passage from conglomerate to Liassic marine Suttonstone
- Dunraven Bay: Blue Lias cliff outcrops
- Hypersaline lacustrine sediments with teeppees and stromatolites of the Upper Triassic Mericia Mudstone (Keuper Marl) unconformably overlying Dinantian limestones
- Avon Gorge (and Burrington Combe if time permits) to view the entire Dinantian Limestone succession
- Turbidites, massive slumps/debris flows of the Namurian Crackington formation and abundant sole structures
- Depositional environment, depositional processes, and paleobathymetry
- Slab block and a massive slump and large sand volcanoes
- Cyclicity within deltaic deposits of the Namurian-Westphalian Bideford formation

**AUDIENCE**
Petroleum geologists, general geoscientists, sedimentologists, reservoir engineers, and structural geologists.

**PREREQUISITE**
None.

Field Trip: Oligo-Miocene Carbonate Sedimentary Models of Malta - Analogues for Cenozoic Reservoirs Worldwide

Skill - 6 Days

The course introduces the attendees to carbonate sedimentology and sequence stratigraphy through lectures and using the excellent Oligocene and Miocene limestone outcrops of Malta and its sister island, Gozo. Excellent exposures of systems tracts across depositional models of both carbonate-rimmed platforms and a carbonate ramp illustrate the principles of sequence stratigraphy on Malta. Additional interest arises from the overprints of synsedimentary tectonics associated with riftting, plus spectacular karstic collapse structures. These exposures provide a general training ground for carbonate rocks as well as very good analogues for Cenozoic reservoirs (e.g., SE Asia and the Gulf of Suez). This course is based in Sliema, Malta.

**COURSE CONTENT**
- Carbonate grains, carbonate accumulation processes and carbonate factories, depositional environments, facies and facies models
- Rimmed carbonate platforms and carbonate ramps
- Ramp carbonate facies and facies models
- Transect from inner, to mid, to outer ramp facies belts and discussion of facies models for ramp sedimentation
- Correlation of field sketch logs from inner to outer ramp and construction of facies model
- Principles of carbonate sequence stratigraphy using outcrop and seismic data
- Classification of carbonate platforms
- Shelf and pelagic limestones, synsedimentary tectonics, karstic dissolution features, and calcretes
- Exceptional transgressive section from inner ramp to pelagic carbonate facies; omission and flooding surfaces; lateral facies and thickness changes related to fault-block rotation
- Karst dissolution structures (Miocene blue holes)
- Subaerial exposure surface calcretes
- Contrasting carbonate factories and porosity evolution
- Various carbonate factories (Heterozoan and Plio-Pleistocene) generating different facies, stratigraphic geometries, and pore systems that have important controls on reservoir quality
- Carbonate depositional sequences, sequence boundaries, and slope deposits on a rifted platform margin
- Shelf carbonate facies in two depositional sequences subsequently dissected by the Malta Graben leading to diverse carbonate slope facies

**AUDIENCE**
Petroleum geologists, general geoscientists, sedimentologists, reservoir modellers, reservoir engineers, and petrophysicists.

**PREREQUISITE**
None.

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
Field Trip: Permian Basin Floor Fan Systems of Karoo, South Africa

Skill – 6 Days

This course will help attendees understand the lithofacies and architectural relationships of the Permian basin floor fan system in the Tangan-Karoo area (western Cape, South Africa) from outcrops, cores, and logs. This area contains some of the world’s best basin floor fan exposures. This region has been the topic of a European-sponsored research project in which a large amount of outcrop data have been acquired and seven research boreholes were drilled, cored, and logged with state-of-the-art logging suites. These data and the important results of the project will be shared with the attendees. Hiking over the succession from the basinal fans across the shelf edge to the prodelta deposits is a highlight of the course. The course base is the Inverdoorn Game Lodge.

COURSE CONTENT

- Lobe architecture, beds–elements–lobe associations, local channelization, and linked debrites
- Inverdoorn core workshop, logs and borehole images, and comparison with outcrops
- Using well data and outcrop analogues for reservoir modeling
- New information from cores/logs not observed in outcrops
- Hike entire sedimentary succession from basin floor fans to slope deposits, shelf edge transition, and prodelta deposits

AUDIENCE

Petroleum geologists, general geologists, sedimentologists, reservoir modelers, reservoir engineers, and seismic interpreters.

PREREQUISITE

None.

Field Trip: Reservoir-Scale Heterogeneity in Upper Miocene Platforms of the Balearic Islands, Spain

Skill – 6 Days

This course will help attendees understand the factors that control facies belt distributions, platform architecture, and internal distribution of heterogeneities. The first portion of the course covers a Lower Tortonian depositional sequence consisting of a transgressive systems tract (near-shore carbonates onlapping and backstepping onto Neogene and Mesozoic rocks) and a highstand systems tract (HST) that corresponds to an aggrading and prograding, high-energy, distally steepened ramp. The second portion of the course concentrates on an Upper Tortonian / Lower Miocene depositional sequence comprising a prograding, reef-rimmed platform resulting from eustatic carbonate production by a framework-dominated reef system.

COURSE CONTENT

- Geology of the western Mediterranean and Balearic Islands
- Outcrops of inner and middle zones of the Migjorn Ramp
- Carbonate platforms
- Ramp slope, toe of slope dunes, gravity flows, and subwavebase grainstones
- Phosphatic crust at the transition between rhodalgal ramp and overlying reef complex
- Ecological Accommodation Concept
- Preramp fan delta, unconformity, and backstepping beach (transgressive systems tract [TST])
- Linear versus nonlinear response of carbonate platforms to sea-level changes
- Influence of basement physiography on carbonate factories
- Llucmajor Platform outcrops
- Overview of reef-rimmed platform architecture
- Shallow basin and fore reef slope
- Reef core and inner lagoon
- Outer lagoon lithofacies
- Shallow water carbonates and subtidal stromatolites
- Karst collapse structures
- Core correlation and seismic interpretation exercises in the field

AUDIENCE

Geoscientists and earth scientists who wish to gain a better understanding of reservoir heterogeneity.

PREREQUISITE

Basic understanding of or background in geology.
Field Trip: Syn-Rift Carbonate Platforms
Miocene-Recent Gulf of Suez

Skill - 6 Days

This 6-day field and classroom-based course investigates the complex facies relationships found in rift basin carbonate platforms and provides insights into syn sedimentary structural influences and changing depositional environments with rift basin evolution. Based on the shores of the southern Gulf of Suez, this course begins with a review and update on the processes of carbonate sedimentation using the natural laboratory of the nearby modern, shallow marine environments. Tectonostatigraphic models for carbonates are then investigated with a focus on rift basin environments.

Concepts are reinforced and demonstrated in the field on world-class exposures of an exhumed Miocene carbonate platform. This enables potential reservoir facies to be studied in different structural settings (footwall, transfer zone, etc.) and the change from marine to nonmarine carbonate factories to be correlated with rift basin evolution. The final lectures examine evaporitic to marine-to-lacustrine rift basin carbonates from Mesozoic and Cenozoic basins (SW and NE Atlantic, SE Asia, and Red Sea-Gulf of Aden).

**Course Content**
- Introduction to processes of carbonate accumulation, carbonate factories, and depositional environments
- Modern carbonate grains and textural classification of carbonates
- Carbonate facies and facies models
- Carbonate grain types and early lithification in subtropical lagoon, beach, fringing reef and wadi environments, clastic-carbonate interactions in shallow marine setting
- Gulf of Suez - Red Sea rift basin geological evolution
- Principles of carbonate sequence stratigraphy and outcrop and seismic sequence stratigraphy of carbonates
- Tectonic classification of carbonate platforms
- Stratigraphic and structural settings, footwall to hanging wall facies associations, sequences, and potential reservoir facies
- Interval correlations in fault-block platform setting
- Stratigraphic architecture and carbonate facies associations in a transfer zone setting and changing carbonate factories with rift basin isolation
- Stratigraphic logging and facies correlation
- Exercises on rift basin carbonates, structural settings of platforms in marine to lacustrine and evaporitic basins, nonmarine-lacustrine carbonates in rift basin settings, and facies and facies models
- Interpretation of marine and lacustrine carbonate reservoir rocks

**Audience**
Petroleum geologists, general geologists, sedimentologists, reservoir modelers, reservoir engineers, and petrophysicists.

**Prerequisite**
Basic knowledge of geology.

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Integrated 3D Reservoir Modeling Workshop

Skill - 5 Days

In this workshop, attendees learn a hands-on practical workflow for building a static reservoir model using the Petrel platform. Course topics include a solid presentation of the theory and methodologies behind 3D reservoir modeling with practical applications. Attendees will learn a step-wise approach to model building that starts with an overview of reservoir modeling, building of a structural framework, continuing with layering and gridding, and populating the model with reservoir properties. The attendees will gain valuable experience in using volumetrics with uncertainties and basic geostatistics.

**Course Content**
- Petrel software platform data import and export review
- Well correlations: Generate and edit well tops
- Structural modeling: Fault modeling, grid design, quality checking, zonation, and layering
- Statistics and data analysis review
- Basics of geostatistics and variogram analysis, introduction to kriging, and estimation techniques
- Deterministic and property modeling, including facies modeling
- Property data (petrophysics, seismic, and well-test data) integration
- \textit{Stochastic} and conditional simulations
- Volumetric calculations exercise, with multiple realizations and ranking
- Design and properties upscaling

**Audience**
Geoscientists or engineers desiring a practical approach to building 3D reservoir models with Petrel platform software.

**Prerequisite**
Basic understanding of Petrel platform software.

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Mapping the Subsurface

Skill - 5 Days

This course will take the attendee through the primary techniques for constructing two-dimensional (2D) maps and sections of the subsurface, including the integration of well data and key surfaces defining the framework of geologic units in the subsurface as the foundation of subsurface evaluation. These initial 2D techniques allow the interpreter to display the 3D relationships of geologic surfaces and any associated faults, which are key to defining the spatial and volumetric aspects of the associated subsurface resource. The geologic surface and fault relationships analyzed in this course will also be linked to the overall aspects of depositional settings and structural styles that are present within global development of geologic terrains.

**Course Content**
- Course objectives, history and principles of surface mapping across structural styles
- Wellbore correlation of vertical and directional drilling data to subsurface feature mapping
- Applications of fault and surface mapping techniques to structural styles: strike-slip, growth, compressional, and thrust
- Petrel platform mapping introduction – volumetric calculation from surface mapping
- Computer contouring techniques

**Audience**
Geologists, petroleum engineers, and geophysicists involved with the development of oil and gas reservoirs and needing knowledge of correlation and structural/stratigraphic mapping techniques.

**Prerequisite**
A fundamental understanding of geologic concepts. The Petrel platform software will be used in the course. Although it is strongly suggested that attendees have taken the Introduction to Petrel course, it is not required.
**GEOLOGY**

**Mud Logging—Surface Gas Measurement and Fluid Characterization**

**Petroleum Systems and Exploration and Development Geochemistry**

**Play-to-Prospect Exploration: Integrated Exploration Techniques and Workflows using Petrel E&P Software Platform**

**Skill – 5 Days**

This course consists of theoretical classroom sessions led by an experienced professional providing in-depth explanation of gas analysis at the surface. The theoretical classroom sessions will be complemented with practical exercises covering the types of gas encountered during drilling, degassing apparatus, gas analysis technology, and real-time gas interpretation exercises. The course will provide a clear understanding on how gases are generated during drilling, how they are carried to surface, the technology to extract the gas from the drilling fluids, the technology used for gas analysis, and best practices for the interpretation of gas data to better reflect what is occurring downhole.

**COURSE CONTENT**

- Origins of gas in mud
- Degassing process
- Different degassing techniques
- Gas analysis technology
- Gas interpretation generalities
- New technologies
- Gas corrections
- Interpretation methodologies
- Degassing case studies

**AUDIENCE**

Wellsite geologists and operation geologists.

**PREREQUISITE**

A respectable understanding of mud logging.

**Skill – 5 Days**

Applications-oriented, this course presents interpretation guidelines to evaluate prospective source rocks and define petroleum systems. Attendees will learn about some of the main applications of geochemistry to reduce the risk in E&P: total organic carbon, rock-evaluation pyrolysis, vitrinite reflectance, thermal alteration index, kerogen elemental analysis, geochemical logs and maps, reconstructed generative potential calculations, and gas chromatography.

**COURSE CONTENT**

- Fundamentals of petroleum geochemistry
- Basic geochemical measurements and interpretation pitfalls
- Construction of the original petroleum generative potential of source rock
- Identification and quantification of elements and processes that control petroleum systems
- Collection of oil and rock samples and evaluation of data quality
- Use of biomarkers and isotopes to correlate oils and source rocks and assess thermal maturity and biodegradation

**AUDIENCE**

Exploration and development geologists, geochemical coordinators, managers, and geoscientists who require more knowledge about petroleum systems, petroleum geochemistry, and basin modeling.

**PREREQUISITE**

Knowledge of basic petroleum geology and petroleum systems.

**Skill – 5 Days**

The main goal of this 5-day course is for the attendee to learn how to perform play evaluation, which integrates all of the elements of a petroleum system into geologically based objective, consistent, and documented results used to understand and rank opportunities. Attendees will learn how to keep their play and prospect evaluation live and usable whenever new understanding or data becomes available.

**COURSE CONTENT**

- Petroleum system and play-to-prospect fundamentals
- Concession analysis
- Dry hole analysis
- Quick evaluation of hydrocarbon generation potential
- Reservoir evaluation methods
- Use structural interpretation
- Alternatives to construct a trap presence map from the input data and a conceptual model
- Charge generation
- Charge timing
- Migration
- Identify leads
- Postseismic prospect evaluation
- Rank prospects

**AUDIENCE**

Geoscientists wanting to learn prospect exploration fundamentals and how to perform the workflows using Petrel platform software.

**PREREQUISITE**

Ideally, attendees will have attended the Petrel Fundamentals class.
Sedimentology and Depositional Environments of Deepwater Deposits

Skill - 5 Days

This 5-day course covers the theory and application of sedimentology and depositional environments of deepwater deposits. The course consists of an extensive series of topic-related modules in addition to workshops on attendee datasets.

**COURSE CONTENT**
- Lecture modules supported and complemented by a number of paper-based exercises mostly built around correlation problems
- Full set of lecture materials and exercises and the book “Petroleum Systems of Deepwater Settings” by P. Weimer and R.M. Slatt given to each attendee (subject to availability from the publishers and to timely advice by the client on the required number of copies)

**AUDIENCE**
Geologists.

**PREREQUISITE**
Reasonable knowledge of petroleum geology.

Structural Geology

Skill - 5 Days

This course introduces the attendees to the main elements of geomechanics and employs these elements as the basis for understanding structural geometries, kinematics, and the universally applicable geomechanical approach. Attendees will learn basic interpretation and mapping techniques for each tectonic regime. A portable sandbox demonstrates analog modeling of the main tectonic regimes. Bringing actual problems or challenges for general discussion and integrated hands-on problem solving is encouraged.

**COURSE CONTENT**
- Geomechanics and general fault characteristics introduction
- Extensional tectonics
- Strike-slip tectonics
- Structural reservoir types, in situ stress analysis, and fault sealing mechanisms
- Compressional tectonics
- Salt tectonics
- Fault sealing and top seal integrity
- Fracture systems
- Analysis of fault and fracture systems

**AUDIENCE**
Geoscientists, engineers, and technical staff responsible for analysis and integration of image and dip data.

**PREREQUISITE**
Basic geology and reservoir modeling background.

Subsurface Facies Analysis: Integrating Borehole Images and Well Logs with Rock Physics and Seismic Data to Develop Geologic Models

Skill - 5 Days

This course presents an integrated approach to subsurface facies analysis by combining image and dip data interpretation with outcrop studies. The approach uses high-resolution seismic data to refine complete reservoir models. Attendees will learn the integrated approach from examples and case studies.

**COURSE CONTENT**
- Data acquisition, processing, and structural analysis
- Structural analysis using image and dip data
- Sedimentology and continental settings
- Eolian sediments
- Fluvial sediments and fluvial settings (various models)
- Deltaic, coastal, and shelf siliciclastic settings
- Deltaic, coastal, shelf, deepwater, and carbonate sediments
- Carbonate models and facies in coastal and shelf settings
- Fractured reservoirs and fracture systems
- Fractured reservoir case studies
- Geothermal systems in volcanic rocks

**AUDIENCE**
Geoscientists, engineers, and technical staff responsible for analysis and integration of image and dip data.

**PREREQUISITE**
Basic geology and reservoir modeling background.
# Sequence Stratigraphy: Principles and Applications

This course presents the concepts, illustrated with field examples of seismic, well logs, core, and outcrop data, and practical applications of sequence stratigraphy for petroleum exploration and production. In-class exercises emphasize the recognition of sequence stratigraphic surfaces and systems tracts on well log cross sections, seismic lines, and outcrop profiles. The points of agreement and difference between the various sequence stratigraphic approaches (models) are discussed, and guidelines are provided for a standardized process-based sequence stratigraphic analysis workflow. This analysis procedure enables the attendee to eliminate nomenclatural or methodological confusions, and apply sequence stratigraphy effectively for facies predictions in exploration and production.

**COURSE CONTENT**
- Introduction
- Historical development and fundamental concepts of sequence stratigraphy and other types of stratigraphy
- Sequence stratigraphic surfaces
- Systems tracts
- Applications to depositional systems

**AUDIENCE**
Geologists, geophysicists, and reservoir engineers who want to learn the methodology for applying sequence (and seismic) stratigraphy to correlation, facies analysis, and the delineation of stratigraphic traps.

**PREREQUISITE**
Basic knowledge of geology and geophysics.

### A Strategic Approach to Oil and Gas Exploration

This course focuses on understanding the use of strategic planning to optimize the probability of success in oil and gas exploration. The course includes recognizing the need for strategic change and developing options to respond to changing business environments, in addition to implementing new strategic directions and managing and monitoring performance.

The course builds on a number of case studies of strategic change and what can be learned from these scenarios. The course scope includes the technical, economic, and political drivers that shape the performance of all oil and gas organizations. The course will cover the importance of strategic planning at all stages of the exploration value chain (access through to basin selection and exploration play testing).

The attendees will gain an understanding of how to recognize the need for a strategic approach, how to develop a set of strategic options, and then how to select and implement the appropriate strategy for a given situation.

**COURSE CONTENT**
- Strategic change and organization life cycle
- Identify the key ingredients for winning strategies
- Exploration life cycle
- Exploration value chain
- Portfolio management – managing exposure
- Exploration process
- Delivering strategic change, organization, and performance
- People development
- Technology
- Monitoring and reviewing performance

**AUDIENCE**
E&P geoscientists and reservoir engineers involved in subsurface interpretation or planning.

**PREREQUISITE**
None

### Applied Structural Geology in Hydrocarbon Systems Analysis

In this course, attendees will learn about the processes of rock deformation and apply this knowledge to improve strategic exploration planning and the interpretation of existing data. Attendees will also understand the impact structural geology plays in controlling subsurface fluid flow and the standard techniques for estimating the flow consequences of deformation. A new geomechanics paradigm is presented that focuses on key aspects of deformation systems.

**COURSE CONTENT**
- Structural geology and rock mechanics relevance
- Rock mechanics and structural geology
- Textures of deformed rocks and relationship to deformation mechanisms
- Deformation environments
- Geomechanical issues
- Basin formation and geodynamics, reservoir depletion
- Common structural elements
- Fault zones, flexural-slip folding, and fracture processes
- Role of basement and relationship to sedimentary cover
- Hydrocarbon system deformation
- Structural features on seismic data: Interpretation pitfalls and rules

**AUDIENCE**
Geoscientists and reservoir engineers wanting to understand how fractured reservoirs differ from conventional reservoirs and how to approach their studies systematically, and personnel working with fractured basement reservoirs for groundwater and/or geothermal resources.

**PREREQUISITE**
Applied knowledge of reservoir geology or reservoir engineering.

### Evaluation and Management of Fractured Reservoirs

From both an exploration and development point of view, this course teaches attendees evaluation methods for fractured petroleum reservoirs. The course includes data acquisition techniques that employ outcrop and subsurface rock data, petrophysical data, rock mechanism principles, and reservoir performance data. Attendees will also learn how to control short-term and long-term performance in fractured reservoirs and the types of data necessary to evaluate and manage them.

**COURSE CONTENT**
- Workflows in a fractured reservoir
- Natural fracture effects in new and existing fields
- Fracture system origin and system reservoir properties
- Interaction of fracture and matrix porosities
- Classification of fractured reservoirs
- Acquisition and manipulation of subsurface fracture data
- Prediction of relative fracture intensity by rock type and across a structure in one reservoir unit
- Measurement and application of in situ reservoir stress states
- Prediction and imaging of production sweet spots
- Determination of optimal wall paths
- Static conceptual fracture modeling and preparation for stimulation
- Production and development problems by reservoir type
- Considerations for designing depletion scenarios

**AUDIENCE**
Geoscientists and reservoir engineers wanting to understand how fractured reservoirs differ from conventional reservoirs and how to approach their studies systematically, and personnel working with fractured basement reservoirs for groundwater and/or geothermal resources.

**PREREQUISITE**
Applied knowledge of reservoir geology or reservoir engineering.
In this course, basic petrophysical, wireline, and capillary pressure data are used to evaluate reservoir rock quality, pay versus nonpay, expected fluid saturations, seal capacity, depth of reservoir fluid contacts, and transition zone thickness. Attendees will study the use of two-way capillary pressure analyses to approximate recovery efficiency during primary or secondary recovery. The attendees will also gain hands-on experience working with reservoir data in four practical workshop exercises.

**Course Content**
- Reservoirs, seals, and pay evaluation
- Fundamentals and uses of capillary principles in reservoir evaluation
- Petrophysical and geochemical techniques integration to evaluate seal potential
- Basic principles of fault seal analysis
- Dynamic petroleum systems seal evaluation
- Pore geometry effects on relative permeability and capillary pressure
- Net pay determination methods
- Recovery efficiency, calculation of recoverable reserves, and evaluation of reservoir management options

**Audience**
Exploration and development geologists and reservoir engineers wanting to increase knowledge on principles governing hydrocarbon accumulations and their practical applications.

**Prerequisite**
Basic knowledge of geologic and reservoir fundamentals.

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In this modeling course that is designed for providing an understanding of integrated reservoir studies from outcrop to fluid flow simulator, attendees will learn practical requirements and workflows for modern 3D reservoir characterization. The course will employ deterministic and stochastic modeling to quantitatively integrate diverse data types, model reservoir heterogeneity, assess model uncertainty, and prepare the reservoir model as input to a flow simulator. Attendees will learn best practices for modeling and data integration using modeling software by participating in an informal, interactive discussion of the agenda topics, illustrated with case studies and demonstrations using the Petrel platform or equivalent software. In some course venues, work with the modeling software is by a hands-on method.

**Course Content**
- Geostatistical reservoir modeling introduction
- Data quality control and data analysis
- Concepts of spatial analysis and modeling
- Computer workshop
- Kriging and collocated cokriging
- Stochastic simulation and risk analysis
- Reservoir heterogeneity preservation
- Structural modeling
- Flow simulator upsampling

**Audience**
Asset team members responsible for development of reservoir models that use geostatistical techniques.

**Prerequisite**
Basic understanding of geologic techniques and processes; structure and sedimentation, and static and dynamic reservoir modeling in addition to basic experience with the Petrel platform.
GeoX Basic Risk and Resource Assessment

Foundation – 2 Days

This 2-day course provides attendees with an overview of the concepts of risk and uncertainty in prospect assessment, and prepares them to assess both simple and complex prospects using the GeoX software. The course combines lectures, exercises using manual calculations, and exercises using GeoX software to illustrate assessment concepts and their applications. A real-world multiple segment prospect is evaluated from a simple deterministic analysis of a single zone to a complex probabilistic evaluation that considers segment relationships. Attendees will evaluate the prospect using realistic descriptions of risk and uncertainty.

COURSE CONTENT

Single-zone
- Segment definition
- Volumetric uncertainty
- Play and local risks
- Correlations
- Results and analysis
- Alternative volume methods
- Multiple scenarios

Prospects (multiple zones)
- Independent segments
- Risk dependencies
- Correlations between segments
- Fluid communication
- Results and analysis

AUDIENCE

Geologists, geophysicists, and reservoir engineers involved with prospect assessment.

PREREQUISITE

None

GeoFrame Administration

Foundation – 5 Days

Administration fundamentals for GeoFrame software include installation, configuration, and maintenance. Attendees will also receive an introduction to the Oracle® database management system and its relationship to the GeoFrame software.

COURSE CONTENT

- Installation and administration of GeoFrame software
- Configuration of printers and plotters
- Management of licenses
- Addition of users and disks
- Archival and deletion of projects
- Basic Oracle administration
- Starting and stopping the database
- Backup and recovery
- Structured query language (SQL) statements related to GeoFrame software projects
- Relational database basics, design of models, and terminology
- SQL language elements
- SQL Plus environmental and basic commands
- Oracle server architecture

AUDIENCE

GeoFrame software database administrators and application support staff.

PREREQUISITE

Proficiency in Linux® and UNIX® applications.

GeoFrame CPS-3 Mapping Fundamentals

Foundation – 3 Days

This course provides the fundamentals attendees need to produce accurate reserves maps using GeoFrame® CPS-3® advanced mapping and surface modeling software. Fully integrated with GeoFrame Geology and Geophysics modules, CPS-3 software provides accurate surface mapping operations for all mapping requirements.

COURSE CONTENT

- Access well and seismic locations, seismic interpretation, markers, zone properties, grids, and other GeoFrame software data for mapping
- Create contour maps and manipulation of base map display
- Create grid horizon and fault surfaces using various algorithms
- Griding algorithms use and how to set parameters
- Surface operations, z-field arithmetic, smoothing, and refinement
- QC steps for structural volumetric envelopes
- Generate property grids from well zone data
- Workflow for calculation of reservoir volumetrics
- Overview of GeoFrame Model Editor, Map Editor, and Color Palette Editor modules, and CPS-3 macro language

AUDIENCE

GeoFrame software database model concepts and how data relate to each other
- Create, edit, back up, restore, and delete projects
- Assignment access rights to secure specific data types
- Project well data loading in several formats
- Browse, list, find, edit, and display various data types
- Set match and merge rules

AUDIENCE

New users of GeoFrame software, including database administrators, application support staff, and development and exploration geologists and geophysicists.

PREREQUISITE

None

GeoFrame Fundamentals

Foundation – 2 Days

With this course, attendees will learn the fundamentals needed to efficiently manage GeoFrame software service projects and project data. The attendees will also learn to use the GeoFrame integrated reservoir characterization system software to describe the subsurface precisely throughout the E&P workflow. The course focus is on the functionality common to all GeoFrame software applications.

COURSE CONTENT

- GeoFrame software data model concepts and how data relate to each other
- Create, edit, back up, restore, and delete projects
- Assignment access rights to secure specific data types
- Project well data loading in several formats
- Browse, list, find, edit, and display various data types
- Set match and merge rules

AUDIENCE

New users of GeoFrame software, including database administrators, application support staff, and development and exploration geologists and geophysicists.

PREREQUISITE

None
<table>
<thead>
<tr>
<th>Course Title</th>
<th>Duration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GeoFrame Geology Office</strong></td>
<td><strong>3 Days</strong></td>
<td>Course attendees will learn to use the GeoFrame Geology Office geological workflow software to harness the power of the GeoFrame software in providing seamless interpretation.</td>
</tr>
<tr>
<td><strong>Introduction to PetroMod</strong></td>
<td><strong>5 Days</strong></td>
<td>This course is structured to provide attendees with the fundamentals of PetroMod software, which combines seismic information, well data, and geologic knowledge to model the evolution of a sedimentary basin. The attendees will learn how the software predicts whether and how a reservoir has been charged with hydrocarbons, including source and timing, migration routes, quantities, and fluid type in the subsurface or at surface conditions. Attendees will also gain a comprehensive overview of the one-dimensional (1D), 2D, and 3D basic workflows in basin modeling.</td>
</tr>
<tr>
<td><strong>Petrel Fundamentals and Petrel Geology Combined Course</strong></td>
<td><strong>5 Days</strong></td>
<td>This course introduces a new user to the functionality of the Petrel platform with emphasis on visualization, data organization, and collaboration. The course will take attendees from a Petrel platform project set up to plotting the results. Attendees will learn how to create surfaces and a simple grid, as well as how to QC and visualize a simple grid using the geometrical modeling process, maps, and intersections. The course also introduces the Studio knowledge environment, which empowers a new level of usability, collaboration, and productivity. The Petrel geology portion of the course presents two workflows for volumetric calculation; a map-based and 3D model workflow. The map-based workflow focuses on the creation of surfaces that delineate the target reservoir. These surfaces, in combination with properties in the form of gridded surfaces or constants, are used to calculate volumes. The 3D model-based workflow focuses on the construction of a 3D grid, populating the grid with properties to be used in determining an accurate volume calculation.</td>
</tr>
</tbody>
</table>

**Course Content**

- **Introduction to Petroleum Systems Modeling**
- **Structural and Geochanical Features of a Petroleum System Model**
- **1D Workflow**
  - Input data and boundary conditions
  - Calibrating data using the Well Editor and calibrating models
  - Creating and editing lithologies
  - Special tools such as intrusion and fracturing
- **2D Workflow**
  - Building a 2D model based on cross sections
  - Creating and editing horizons and faults
  - Assigning properties: Lithofacies, organofacies, geologic ages, QC, and pitfalls
  - Running the simulator
  - Analyzing results (output modules)
  - Extracting data
- **3D Workflow**
  - Constructing 3D models from maps
  - Editing horizons and faults
  - Assigning properties and geologic ages, QC, and pitfalls
  - Running the simulator
  - Analyzing results (output modules) and calibrating results

**Audience**

Development and exploration geologists, and geophysicists.

**Prerequisite**

GeoFrame Fundamentals course.

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
## Petrel Geology

**Foundation - 3 Days**

The Petrel platform Geology course consists of two workflows for volumetric calculation; a map-based and a 3D model workflow.

The map-based workflow focuses on the creation of surfaces that delineate the target reservoir. These surfaces, in combination with properties in the form of gridded surfaces or constants, are used to calculate volumes. The 3D model-based workflow focuses on the construction of a 3D grid, populating the grid with properties to be used in determining an accurate volume calculation.

**COURSE CONTENT**
- Surface generation and refinement
- Well interpretation and visualization
- Isopach processing
- Map-based volume calculations
- Structural framework
- Geometrical modeling
- Up-scaling well logs
- Facies modeling
- Petrophysical modeling
- Contacts creating
- Volume calculations

**AUDIENCE**
Geoscientists, geophysicists, and engineers working on static and dynamic modeling.

**PREREQUISITE**
Petrel Fundamentals course or similar Petrel platform experience coupled with a general knowledge of petroleum geology and geophysics, as well as elemental software skills.

## Petrel Well Correlation

**Foundation - 3 Days**

The Petrel platform offers various options for well correlation. This course provides attendees with a general overview of correlation and introduces well data import procedures with different formats and the use of the Reference Project tool. This course focuses on setting well section templates, the value of sharing templates between projects, wells, and well section windows, in addition to interpreting and editing stratigraphic and fault well tops (markers) along well paths based on log readings. Attendees will learn advanced discrete and continuous log interpreting and editing options based on existing logs, and apply the different techniques in a typical working order, from simple exploration wells to production phase.

**COURSE CONTENT**
- Project organization, including Studio Favorites, Studio Find, and Studio Annotate E&P knowledge environment features
- Import procedures for wells and logs, including the Reference Project tool
- Working and setting well section and templates
- Seismic and 3D model backdrop
- Continuous and discrete log interpretation (manual, calculator, and neural nets) and log edits
- Well top interpretation and edits
- Time-depth relationship
- Creating point well data attributes
- Plotting and presenting results in different windows
- Workflows for exploration, appraisal, development, and production phases

**AUDIENCE**
Development and exploration geoscientists and petroleum engineers with prior experience in the Petrel platform.

**PREREQUISITE**
Petrel Fundamentals course or equivalent Petrel platform experience, and general knowledge of petroleum geology.

## Petrel Well Design

**Foundation - 1 Day**

The purpose of this course is to introduce the well design module and the drilling functionalities in the Petrel platform. The attendees are guided through the preparation stage for data used in offset well analysis, which includes loading of drilling events, drilling logs, and using end of well reports to filter the knowledge database by, for example, data type, category, or event severity. Attendees will become familiar with the available well design approaches, including an enhanced method also used by drilling engineers. How to import trajectory and targets from third-party applications such as the Landmark Engineers Data Model (EDM™) will also be introduced. After the planning phase, attendees will learn how real-time data acquisitions are handled in the Petrel platform.

**COURSE CONTENT**
- Drilling event classification and visualization
- Webmap services
- Well design
- Well path design
- Real-time data acquisition

**AUDIENCE**
Drilling engineers, geologists, and petrotechnical personnel with fundamental knowledge in the Petrel platform and who need to understand well path design and optimization within the Petrel platform.

**PREREQUISITE**
Petrel Fundamentals course.

## GeoX Prospect Assessment Concepts and Applications

**Foundation - 3 Days**

This 3-day course provides attendees with an overview of prospect assessment concepts and applications, and prepares them to assess both simple and complex prospects using the GeoX software. The course combines lectures, exercises using manual calculations, and exercises using the GeoX software suite to illustrate assessment concepts and their application.

The 3-day course goes into more detail on basic assessment concepts than the 2-day introduction to GeoX in the GeoX Basic Risk and Resource Assessment course, which focuses primarily on tool functionality.

**COURSE CONTENT**
- Segments
- Segment definition
- Segment volumetrics
- Volumetric uncertainty
- Segment risking
- Multiple segment prospects
- Independent segments
- Risk dependencies
- Correlations between segments
- Fluid communication

**AUDIENCE**
Geologists, geophysicists, and reservoir engineers involved with prospect assessment.

**PREREQUISITE**
None
This course is designed to introduce attendees to programming basic and advanced scripts in the Techlog platform. The attendees will learn how to create, edit, open, and run scripts in a Techlog platform workflow. Topics include Python™ syntax and programming skills, Python and Techlog program modules (libraries), and advance scripting, including reading and writing and creating Techlog platform modules.

**COURSE CONTENT**
- Introduction to Python scripting
  - History and concept
  - Python programming inside Techlog platform software
- Introduction to the Python editor
  - Opening and running scripts
  - Programming basics
  - Python syntax and coding rules
- Application workflow interface for Python platform
  - Running your own equations in a multwell and multizone environment
- Python modules
  - Data QC and harmonization, file import (Techlog platform database)
  - Custom plots (Techlog platform plot)
  - Mathematical and scientific tools (NumPy and SciPy packages)
- Advanced scripting
  - Introduction to advanced basics such as multidimensional lists and dictionaries
  - Introduction to oriented object programming
- Reading and writing files
  - Text, comma-separated values (CSV), and Excel files
  - Importing and loading data from Excel files
  - Reporting
- Creating modules and custom libraries

**AUDIENCE**
Software developers or geoscientists with basic programming skills interested in a general understanding of Python scripting in the Techlog platform software.

**PREREQUISITE**
Techlog Fundamentals course.
Petrel Introduction to Structural and Fault Analysis Module (RDR)

Skill - 4 Days

This Petrel platform module, developed by the Rock Deformation Research group, provides a broad suite of tools for all aspects of visualizing, mapping, modeling, and analyzing faults in the Petrel platform workflow. Attendees will learn new ways to integrate fault geologic information into the reservoir simulation process. Examples will show the impact of fault integration into simulation models on prospect evaluations, volumes, and simulation responses. The course highlights critical risk factors that influence the analysis of prospects and field development programs and the workflows to capture the likely structural nature of the prospect or field and to understand the implications.

COURSE CONTENT
- Exploration
  - New methods for fault identification and mapping
  - Property predictions and analysis for Petrel structural framework modeling
  - Fault dip and dip direction: Mapping seismic onto faults and juxtaposition analysis
- Tools for data cleanup for prospect creation and preparation for geomodeling
- Streamlining the seismic interpretation process with structural sense checks
- Creating trap maps and trap analyses
- Fault juxtaposition mapping
- Fault geometry and property analysis
- Prediction of hydrocarbon column heights using capillary seals
- Integration of geometric and property uncertainties in analyses

GEOLOGY


Skill - 3 Days

In this 3-day course, the attendee will learn to use the Petrel platform Petroleum Systems Quick Look and Play to Prospect Risk module. The course attendees will undertake play evaluation exercises that integrate all the petroleum system elements into geologically based objectives and documented results that can be used to understand and rank the opportunities. How to use the software tools and develop a better understanding of the fundamentals of play and prospect evaluation are also included in the course, in addition to the reasons why an integrated approach results in better evaluations and better exploration success.

COURSE CONTENT
Attendees will evaluate a concession area using the Petrel platform workflow tools. Beginning with the initial exploration data, the attendees will learn to combine results from petroleum systems modeling with their play fairway maps and transform them into play chance maps. They will also learn to use the results from this analysis to make probabilistic volumetric and chance of success assessment of their prospects that have a clear link back to the play evaluation and petroleum system analysis. Lastly, attendees will learn how to keep their play and prospect evaluation live and usable whenever new understanding or data become available.

AUDIENCE
Geoscientists working with prospect exploration fundamentals and workflows who need to learn how to perform them using the Petrel platform.

PREREQUISITE
Ideally, Petrel Fundamentals course, and should be able to work with the Petrel platform processes, input, and Windows tabs. Skills in Petrel seismic interpretation, property modeling, and well correlation are not required.
Petrel Property Modeling

Skill - 3 Days

This course focuses on the fundamentals of modeling using the Petrel platform. The course covers basic geostatistics, data preparation, data analysis, facies, and petrophysical modeling. Attendees will learn different ways to create property models and how to condition models to existing models and secondary data. This course guides the user through concepts, algorithms, and software functionalities in property modeling.

The first portion of the course focuses on the use of basic geostatistical tools through data analysis. Also, premodeling processes concerned with well data preparation will be covered, the first step of which is the property modeling workflow, followed by upscaling well logs to create single-property values at the well location for each cell. This technique creates hard data that will be used to populate the 3D grid with either deterministic or stochastic algorithms. The second half of the course focuses on facies and petrophysical modeling, workflows using stochastic methods, as well as covering the usage of kriging for continuous properties. Implementing data analysis results and using secondary data to constrain the result will also be shown.

COURSE CONTENT

- Basics of uni- and bivariate geostatistics
- Data preparation, including well log edits, calculations, and upsampling for discrete and continuous data
- Facies modeling
  - Data analysis
  - Sequential indicator simulation
  - Object facies modeling
  - Truncated Gaussian simulation with and without trends
  - Using secondary data to populate facies models
- Petrophysical modeling
  - Data analysis
  - Sequential Gaussian simulation
  - Gaussian random function simulation
  - Kriging
  - Using secondary data to populate petrophysical models

AUDIENCE
Development and exploration geologists, geophysicists, geochemists, petrophysicists, petroleum engineers, managers, reservoir engineers, and technical personnel with prior experience in using Petrel platform software.

PREREQUISITE
General knowledge of petroleum geology and attendance of the Petrel Fundamentals course or equivalent experience.

Petrel Structural Modeling

Skill - 3 Days

The 2013 Petrel platform Structural Modeling course presents different approaches to building models that capture geologically complex situations such as reverse faults and truncations.

This course covers both corner-point gridding and structural framework. Attendees will be presented with workflows that combine both processes, specifically how to use the results from the structural framework to generate a corner-point grid. The attendees will also learn how to generate partially and fully stair-stepped 3D grids. The advantages and limitations of the different types of models will also be presented.

The course will highlight the following:
1. The robust fault modeling while interpreting seismic functionality, which allows rapid real-time creation of the structural framework;
2. Salt modeling techniques using both corner-point gridding and structural framework; and
3. The innovative volume-based modeling technique for the construction of complex structural frameworks.

COURSE CONTENT

- Preprocessing input data
- Corner-point gridding approach
  - Fault modeling
  - Pillar gridding
  - Layering
  - Truncations
  - Reverse faults

AUDIENCE
Development and exploration geologists, geophysicists, petroleum engineers, managers, reservoir engineers, and technical personnel with prior experience using the Petrel platform.

PREREQUISITE
General knowledge of petroleum geology and geophysics, as well as having attended the Petrel Fundamentals and Petrel Geology courses or equivalent Petrel experience.
Petrel Velocity Modeling

Skill - 3 Days

This course introduces the attendee to velocity modeling, velocity handling, and domain conversion functionality in the Petrel 2013 platform.

The course takes the attendee through the preparation stage of data used for velocity estimation and modeling. This preparation stage includes quality control and editing of checkshot data used in sonic calibration and quality control of time surfaces and well tops used for defining velocity intervals.

Furthermore, the available velocity modeling techniques are presented, including well velocity estimation, the nature and modeling of seismic velocities, surface-based and 3D grid-based seismic velocity modeling, as well as user-defined velocity functions.

Following the velocity modeling phase, domain conversion of various objects and methods for modeling structural uncertainty are covered.

COURSE CONTENT
- Quality control of and editing of well data
- Checkshot calibration of sonic logs
- Velocity functions and various velocity modeling approaches
- Velocity modeling quality control and modeling
- Depth error analysis and correction
- Surface-based and 3D grid-based seismic velocity modeling
- Anisotropy in seismic velocities
- Geostatistical methods
- Quantifying residual depth error and creating a depth correction model
- Creating user-defined velocity functions
- Domain conversion
- Modeling structural uncertainty

AUDIENCE
Development and exploration geologists, geophysicists, petroleum engineers, managers, reservoir engineers and technical personnel experienced with Petrel platform software.

PREREQUISITE
Petrel Geophysics course or similar Petrel experience.

Petrel Geological Workflows and Uncertainty Analysis

Skill - 2 Days

This two-fold course aims to give the attendees insight into the Workflow editor and the Uncertainty and Optimization process in the Petrel platform with a focus on geological modeling. During the first day, the course will focus on how to use predefined workflows and how to create your own workflows for batch processing and operations, in addition to setting up, editing, and repeating processes with new data for a complete and standardized reservoir modeling workflow. To take full advantage of the uncertainty handling in the Petrel platform, the attendee will need to have an understanding of the Workflow editor module, which is the cornerstone of the Uncertainty and Optimization process. The attendee will be also given some examples on geological workflows. On day two, this course will focus on understanding sensitivities and uncertainties of a base case volumetric reservoir model. Structural uncertainties related to surfaces will be explored, as well as stochastic parameters related to the property model. Also, the uncertainty related to the contacts defining the volume case will be examined.

COURSE CONTENT
- Workflow Editor interface and logic
- Running predefined workflows
- Creating user-defined workflows
- Updating 3D models with new input data
- Becoming familiar with the Uncertainty and Optimization process
- Sensitivity and uncertainty analysis setup
- Well log interpretation uncertainty
- Structural uncertainty
- Fluid contact uncertainty
- Property uncertainty

AUDIENCE
Reservoir, development, and exploration geologists, petrophysicists, and technical personnel experienced with the Petrel software platform.

PREREQUISITE
Petrel Fundamentals course and the Petrel Geology course.

PetroMod Calibration Workflows for Petroleum Systems Models

Skill - 5 Days

This 5-day workshop focuses on common workflows used in PetroMod software projects. Attendees will work with a single 3D dataset with emphasis placed on model calibration and output analysis (interpretation of simulation results).

The major focus of this workshop will be on calibrating PetroMod software models to actual field data. Default lithological parameters (e.g., mechanical compaction, permeability) will be adapted to measured data (e.g., porosity, pore pressure). Thermal calibration tools will be introduced and used to calibrate the model to measured well data (temperature, vitrinite reflectance). Calibration workflows will require extensive use of the PetroMod editor and viewing tools. Different hydrocarbon migration methods (Darcy flow, flow path, and invasion percolation) will be introduced and their applications discussed. The outputs of different migration methods will be analyzed in detail. Hydrocarbon accumulations will be calibrated to volume (column height) and fluid properties (e.g., American Petroleum Institute [API], gas/oil ratio [GOR]).

This workshop is a core component in the PetroMod software Education Services offering. Attendees successfully completing this course will be able to develop petroleum system models having basic-to-moderate geological complexity.

COURSE CONTENT
- Porosity/permeability calibration
- Porosities, permeabilities, pressure, effective stress thermal calibration
- Temperature and vitrinite reflectance
- McKenzie model, Heat Flow calibration tool
- Migration modeling
- Migration methods: Darcy, flow path, Inversion Percolation hybrid
- Migration along faults
- Accumulation/fluid calibration
- Size, column height
- API, GOR

AUDIENCE
Geologists, petroleum systems modelers, and geochronists with basic experience in the use of the PetroMod software.

This course is recommended for all geoscientists working as petroleum systems modelers with the need to integrate measured field data to the model.

PREREQUISITE
Introduction to PetroMod course.
The 3-day Petroleum Systems Modeling for Shale Plays course covers all aspects of this unconventional petroleum system. Participants will use PetroMod platform Petroleum Systems Modeling software to explore tools and workflows directly applicable to solving challenges faced in shale resource exploitation.

**COURSE CONTENT**
- Introduction to global shale plays
- Shales - reservoir and charge characterization, properties and challenges
- Shales - charge, trap and seal - Langmuir adsorption, principles
- Geomechanics - theoretical overview
- Shale play petroleum system assessment
- Individual basin exercises
- Shale play exploration

**AUDIENCE**
(Unconventional) Exploration geologists, Basin and Petroleum Systems Modelers (BPSM), geoscientists and geochemists engaged in the petroleum systems modeling of shale plays.

**PREREQUISITE**
Introduction to PetroMod platform course required (within last 2 years) or existing PetroMod platform user.

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The 4-day course addresses the integration of complex structural regimes into Petroleum Systems Modeling; this course now includes 3D modeling of salt tectonics. Sediment space is primarily created by structurally and thermally induced subsidence. The structural evolution of sedimentary basins controls sediment deposition and forms structural traps and pathways for hydrocarbons. The timing of structural activity during petroleum system development is critical for exploration success. Complex tectonic development in salt basins is characterized by unique physical properties. A strong influence on depocenter distribution makes it necessary to understand the dynamics of salt movement. Areas of strong compressional tectonic deformation, such as fold-and-thrust belts, definition of paleo geometries is necessary to understand the maturity and migration pathways of the petroleum systems.

**COURSE CONTENT**
- How to edit fault geometries through time in a basin model
- Salt Tectonics in PetroMod 2D
- Salt Tectonics in PetroMod 3D
- How to build a 2D TechLink Model

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This 3-day update class takes users on a journey from the scattered interfaces of V11 to the uniform interface access for 2D and 3D models available with the 2011 and 2012 software versions. This course will review all of the changes and the attendees will perform practical exercises on 1D, 2D, and 3D models. The exercises are designed both to familiarize attendees with the new user interface and to introduce key workflow improvements, including 3D thrusting, fault handling, age assignments, erosion modeling, and heat flow calibration.

**COURSE CONTENT**
- Overview of key changes
- 1D thrusting exercises
- User interface review and exercises
- 2D PetroBuilder overview
- 2D model building exercises using new workflows
- 3D PetroBuilder overview
- 3D model building exercises
- 3D model updates and workflows: erosion, fault handling, heat flow calibration

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**AUDIENCE**
Development and exploration geologists, petrophysicists, and reservoir engineers with prior experience using Techlog platform software.

**PREREQUISITE**
Techlog Fundamentals course and formation evaluation experience using Techlog platform software.

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Visit NExTtraining.net/classes for the latest calendar or to register for a course.
GeoX Advanced Risk and Resource Assessment

Skill - 1 Day

This course combines a review of the basic methodology for evaluating multiple compartment/zone prospects with hands-on assessment of real-world cases using GeoX software. Topics covered in this course include a shared risk and dependency group approach to modeling multisegment prospects plus volumetric correlations and multiple scenarios.

COURSE CONTENT
- Shared risk and dependencies
- Modeling multi segment prospects
- Volumetric correlations and multiple scenarios

AUDIENCE
Geologists, geophysicists, and reservoir engineers familiar with basic prospect assessment principles.

PREREQUISITE
None.

GeoFrame CPS-3 Advanced Mapping and Volumes

Advanced - 3 Days

This course will enhance the attendee’s understanding of the CPS-3 software tool kit. This application contains a set of mapping and modeling functions that enable one to create many combinations of useful workflows.

COURSE CONTENT
- Functionality of CPS-3 software application
- Integrating CPS-3 software with GeoFrame software applications
- Organizing internal data into coordinate systems
- Transforming CPS-3 software data from one coordinate system to another
- Mechanics and internal operation of convergent gridding algorithm
- Mathematics and mechanics of integral algorithms
- Incorporating graphics interchange format (GIF) and tagged image file format (TIFF) images
- Zone averages and interaction of CPS-3 software with ResSum software for properties and thickness calculations
- Interacting CPS-3 software with IESK* 2D/3D/4D seismic interpretation software, GeoFrame Basemap software
- Depth velocity analysis and depth conversion software and its interaction with CPS-3 software

AUDIENCE
Development and exploration geologists.

PREREQUISITE
Familiarity with CPS-3 software basic operations and menus.

Petrel Advanced Property Modeling

Advanced - 2 Days

This course focuses on facies modeling, which in recent years has become the standard for guiding and constraining petrophysical models. Pixel-based and object models are demonstrated, in addition to complex hierarchical models combining multiple methods. Standard facies modeling methods have their limitations in more complex depositional environments; therefore, this course will explore the more advanced property modeling tools such as the cutting-edge multipoint statistics (MPS) process. Different methods for creating soft probability data using various processes to analyze data, such as trend modeling and geometrical trend modeling, and exploring the relationship of secondary data to constrain models, will also be covered in this course. There is a special focus on the theory supporting the multipoint statistical concept, covering the creation of good training images and how to incorporate soft probability data, vary direction, and scale in the final simulation model. In addition, this course covers the GeoBody modeling tool for extracting seismic bodies and use them directly as “hard data” in the modeling process. Also, Gaussian Random Function Simulation (GRFS) and Sequential Gaussian Simulation (SGS) petrophysical models constrained to the previously generated facies models will be shown. Using automated property modeling workflows to update models in a simple and rapid way will be briefly covered.

COURSE CONTENT
- Overview of basic geostatistics
- Creating soft probability data
- Facies modeling methods with classical geostatistics
- Pixel-based and object-based facies modeling methods
- Conditioning and combining modeling methods
- Neural Network Learning Systems
- Multipoint statistics theory
- Region properties
- Conditioning and scaling of MPS models
- Creating and using seismic geobodies
- Multipoint facies simulation
- Conditioned petrophysical modeling (optional)

AUDIENCE
Development and exploration geologists, geophysicists, petroleum engineers, reservoir engineers and technical personnel with experience in Petrel Property modeling.

PREREQUISITE
Petrel Fundamentals and Petrel Property Modeling courses or equivalent Petrel experience, in addition to a general knowledge of petroleum geology.
GeoFrame Litho ToolKit
Facies Classification
Advanced - 1 Day

Attendees perform quick and detailed lithology estimations with the GeoFrame software Litho ToolKit collection of lithofacies tools and analysis techniques. These various techniques can be used to generate and classify lithofacies.

COURSE CONTENT
- Apply deterministic methods using multiwell, multicurve GeoFrame LithoQuickLook analysis software
- Estimate missing log curves using neural network techniques
- Create multiwell facies logs using any log data as input
- Apply cutoffs on multiple curves
- Artificial neural networks (supervised and unsupervised neural network) for generating facies logs
- Multidimensional histograms
- Clustering methods

AUDIENCE
Development and exploration geologists.

PREREQUISITE
GeoFrame Fundamentals course.

PetroMod Advanced Topics
Advanced - 5 Days

In this 5-day course, attendees will construct complex geological models, control the processing of the models, discover available options and tools for petroleum migration modeling, and interpret and analyze the results. Through lectures and hands-on exercises, attendees alternate between 1D, 2D, and 3D modeling, which enables use of all PetroMod software packages.

This course is aimed at advanced users; practical experience has shown that the topics and workflows of interest vary widely between participants. The topics listed comprise a “standard” agenda. We are able to customize each class delivery for individual companies or groups of users and modify the agenda to suit local or specific needs.

COURSE CONTENT
- Construct petroleum systems models
- 2D salt modeling
- Model petroleum migration
- Introduce new PetroMod software simulator features
- Biodegradation
- Biogenic gas
- Shale gas
- Geomechanics

AUDIENCE
Geologists, geophysicists, and geochemists with experience working in PetroMod software.

PREREQUISITE
Introduction to PetroMod course, and experience using PetroMod software.

PetroMod Quantification of Uncertainty Analyses in Petroleum Systems Modeling
Advanced - 2 Days

In this course, attendees are introduced to the PetroMod risk management system module. They discover basic statistics, uncertainty analysis in model building, and model calibration. In addition, attendees use theory and practical exercises to evaluate the impact of uncertainties in input data on individual models and understand dependencies and correlations between geological processes and model uncertainties.

COURSE CONTENT
- Navigate the PetroRisk module user interface
- Import and edit input uncertainties
- Perform statistics runs and evaluate output results
- Populate the model with risk points for which output results are stored
- Carry out a risk data analysis using 1D, 2D, and 3D Viewer
- Calibrate your model to fit measured values
- Develop workflows for risking and calibrating your model

AUDIENCE
Geologists, geophysicists, and geochemists with experience working in PetroMod software.

PREREQUISITE
Introduction to PetroMod course, and experience using PetroMod platform software.

Techlog Advanced Analysis
Advanced - 5 Days

In this course, attendees focus on advanced interpretation and processing capabilities for the management of wellbore image data, pressure data, core data, and special core data. One discovers the performance of interpretation workflows for analysis of these data, as well as specialized tasks such as facies and rock type detection and propagation. In addition, attendees explore the power of the multiwell and multilayer aspects. You gain a foundation for advanced processing and analysis within the Techlog platform suite.

COURSE CONTENT
- Work with core data 1-loading, shifting, correcting for stress, and clay closure
- Work with core data 2-upsampling, rock typing, and special core analysis with capillary pressure data
- Use saturation-height models in core and log domains
- Work with pressure data
- Manage and resolve contacts across multiple initiation regions
- Work with image data-processing, manipulating, displaying, and picking and classifying dips
- Learn thin-bed analysis techniques
- Perform multiple-component inversion

AUDIENCE
Development and exploration log analysts and petrophysicists, geologists, petroleum engineers, managers, and technical personnel with Techlog platform experience.

PREREQUISITE
Techlog Fundamentals course.
### Techlog Borehole Image Interpretation

**Advanced - 3 Days**

In this course, attendees learn advanced interpretation and processing capabilities for the management of wellbore image data and the performance of interpretation workflows for data analysis. The attendees will gain a full range of skills to manipulate, process, and use all types of borehole image data within the Techlog platform suite.

**Course Content**
- Load, process, and manipulate image data and core photos
- Pick dips and facies
- Interpret dips and facies

**Audience**
Development and exploration geologists and petrophysicists involved in wellbore image data processing and interpretation who have prior experience using Techlog platform software.

**Prerequisite**
Techlog Fundamentals course.

### Techlog for Geologists

**Advanced - 5 Days**

In this course, attendees learn advanced interpretation and processing capabilities, with a focus on the management of wellbore image data and the performance of interpretation workflows for analysis of these data. Topics include facies typing using neural network methods, multiwell plotting, cross section building, and mapping in the Techlog platform application. Learn to use Techlog platform geologic tools to achieve efficient data integration.

**Course Content**
- Load, process, and manipulate image data and core photos
- Pick dips and facies
- Interpret dips and facies
- Neural network techniques for facies prediction
- Use zone editing for field maps, kriging, and multiwell cross sections

**Audience**
Development and exploration geologists with prior experience using Techlog platform software.

**Prerequisite**
Techlog Fundamentals course.

### Techlog Formation Evaluation

**Advanced - 5 Days**

Attendees will explore the use of the Techlog platform base modules: Techplot, Techdata, Quanti, and Quanti min. In this class, attendees will acquire a solid foundation in the data model within the Techlog platform application and the foundation utilities for loading, unloading, manipulating, and displaying data in the system, including core and images. Deterministic calculations and the principles behind the application workflow interface for single- and multiwell use are covered in this course, in addition to studying multiple log and component inversion techniques, thin-bed analysis, and integration of different types of data to enhance the interpretation process. Attendees will also learn how to perform day-to-day tasks within the Techlog platform suite and learn advanced techniques for improving the analysis results.

**Course Content**
- Techlog platform interface and data structure
- Data management and QC
- Multiwell management
- Basic plotting tools
- Workflows for deterministic evaluation using Quanti modules
- User-defined programming language
- Thin-bed analysis techniques
- Multiple-component inversion

**Audience**
Development and exploration log analysts and petrophysicists with limited or no experience using Techlog platform software.

**Prerequisite**
Techlog Fundamentals course.
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Visit NExTtraining.net/classes for the latest calendar or to register for a course.
### GeoFrame
- GeoFrame Synthetics
- GeoFrame GeoViz Advanced Seismic Interpretation and Visualization Techniques
- GeoFrame IESX Gathers Seismic Workflow
- GeoFrame GeoViz Seismic Interpretation and Visualization Techniques Fundamentals
- GeoFrame InDepth Conversion Software
- GeoFrame GIS

### Petrel
- Petrel Prestack Seismic Interpretation
- Petrel Seismic Well Tie
- Petrel Geological Workflows and Uncertainty Analysis
- Petrel Geophysics: Seismic Interpretation Workflow Tools
- Petrel Velocity Modeling

### Techlog
- Techlog Advanced Analysis

### Competency Levels
- **Advanced**
- **Skill**
- **Foundation**
- **Awareness**

### Software Technical Courses That Use Software
- Includes practical sessions
- Field trips
- Uses simulation
Introduction to Geophysics

Awareness - 4 Days

This course introduces attendees to the fundamentals and principles of value-added geophysical and seismic applications in exploration, field appraisal, and reservoir management. The attendees will gain a practical understanding of seismic acquisition, processing, imaging, interpretation, and extraction of geologic and petrophysical information, in addition to learning the practical issues and pitfalls that affect the use of seismic data in E&P workflows through data examples, exercises, and workshops. Examples demonstrate the practical aspects of seismic interpretation involving seismic structural mapping, stratigraphic analysis, and amplitude methods.

COURSE CONTENT
- Role of geophysics in E&P
- Nonseismic geophysical techniques
- Wave propagation, reflection principles, and resolution
- Signal analysis, geometry, and positioning
- Acquisition implementation, operations, and processing principles
- Seismic interpretation, processing principles, and workflows
- Prestack analysis and signal corrections, velocity analysis, static corrections, and migration and imaging
- Inversion and attributes and amplitude versus offset (AVO)
- Multicomponent (4C), time-lapse (4D), and borehole seismic data
- Role of geophysics in integrated reservoir studies

AUDIENCE
Any E&P professional wanting to better understand the principles of geophysics.

PREREQUISITE
None

Borehole Seismic Technology

Foundation - 5 Days

An introduction to the theory and fundamentals of borehole seismic (BHS), course attendees will learn the principles of acquisition and processing, and the applications of BHS data. Discussions include the latest advances in technologies and practices for the acquisition, processing, and use of BHS data.

COURSE CONTENT
- Geophysical principles
- Sources and tools
- Checkshot, sonic calibration, and well tie
- VSP
- Anisotropy and amplitude versus offset
- VSP imaging
- Reservoir, production, and drilling applications

AUDIENCE
Geologists, reservoir engineers, and geophysicists who want a better understanding of borehole seismic data for reservoir analysis.

PREREQUISITE
Basic knowledge of geology and geophysics.

Nonseismic Geophysical Methods

Foundation - 5 Days

Nonseismic data can enhance and expand seismic interpretation. This course introduces attendees to the nonseismic tools that indicate hydrocarbons and explains their integration into existing reservoir characterization. The attendees will learn which nonseismic data to acquire, and when, for the best augmentation of seismic data. Hands-on exercises and exploring recent case studies highlight the use of nonseismic data to refine the understanding of subsurface discoveries.

COURSE CONTENT
- Fundamentals of gravity and magnetic methods
- Magnetics and magnetics resolution
- Fundamentals of electrical and electromagnetic (EM) methods
- Shallow water, volcanic silts, and hydrates
- Controlled-source electromagnetic (CSEM) screening criteria
- Integrated interpretation of seismic and nonseismic data
- Sequential and joint inversions and inversion with gradient constraints
- Magnetotelluric feasibility study in Gulf of Mexico and global case studies
- Case studies: Girasol, Troll, Borneo, Brazil, Egypt, Nigeria, and Gulf of Mexico

AUDIENCE
Geoscientists involved in planning acquisition of multiple geophysical data types and interpreters responsible for combining nonseismic and seismic data.

PREREQUISITE
Awareness of exploration and appraisal phases, knowledge of seismic acquisition, processing, and interpretation.
**Seismic Acquisition and Processing**

In this course, attendees gain a practical understanding of seismic data acquisition and processing. Course material encompasses acquisition, processing, imaging, and extraction of geologic and petrophysical information. Data examples, exercises, and workshops illustrate the fundamentals, practical issues, and pitfalls as they affect the interpretation and integration of seismic data and information into E&P workflows. The attendees will learn the principles involved in imaging geologic structures and properties with seismic data, and the parameters that can seriously affect seismic data quality, costs, and interpretation accuracy. In addition, attendees will learn to determine whether seismic data have been recorded and processed correctly for your interpretation objectives and how to apply quality assurance steps.

**COURSE CONTENT**
- Introduction to acquisition and processing
- Seismic wave propagation, reflection and acquisition principles, and migration
- Survey design
- Acquisition geometry, 3D bin, and implementation
- Data processing factors
- Prestack and velocity analysis and signal corrections
- Statics
- Migration and processing strategies and pitfalls
- Specialized technologies and their issues

**AUDIENCE**
Entry- or junior-level geophysicists or experienced seismic data interpreters who want exposure to basic acquisition and processing techniques.

**PREREQUISITE**
Understanding of basic reservoir geology.

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**Seismic Stratigraphy**

This course teaches attendees practical seismic stratigraphic interpretation skills. With an emphasis on interpretation principles at basin and field scales, exercises are based on actual data from many different areas of the world. The attendees will learn to link the seismic expression of stratigraphy with basin type and evolution and demonstrate its application to prospective evaluation of sedimentary basins, in addition to understanding of how and when to apply seismic stratigraphy to field- and basin-scale reservoir analysis.

**COURSE CONTENT**
- Introduction to seismic stratigraphy
- Stratigraphic sequence fundamentals and applications
- Recognition of stratigraphic sequences on seismic data
- Geometry of sedimentary bodies
- Seismic processing effects on seismic facies expression and importance of display parameters
- Lithology, velocity, and seismic facies
- Eustacy and relative sea-level changes through time
- Sea-level and sedimentation patterns and the chronostatigraphic chart
- Review of basin formation processes and their impacts on sedimentation patterns
- Turbidite sedimentation patterns
- Mapping of seismic facies and prospective assessment
- Carbonate depositional environments

**AUDIENCE**
Geologists and geophysicists involved in seismic data interpretation.

**PREREQUISITE**
Basic knowledge of geophysics and geology, and an awareness of seismic interpretation.

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**Seismic Processing for Interpreters and Others**

Designed for attendees who work with seismic data, this introductory course illustrates the ramifications of processing decisions have on subsequent interpretations, demonstrates data potential, and warns of the possible pitfalls for the unwary interpreter.

**COURSE CONTENT**
- Simple imaging using zero-offset data, normal moveout (NMO) equation, and Dix interval velocities
- Zero-offset migration
- Artifacts introduced by migrating incomplete data, including 2D data
- Role of velocity in migration
- Kirchhoff and reverse-time, zero-offset migration algorithms
- Fourier transform (amplitude and phase), convolution, and correlation
- NMO correction and stack to convert data to zero offset
- Estimation of stacking velocities
- NMO and stack failures
- Kirchhoff before-stack migration
- Imaging conditions and before-stack, wave-equation migration algorithms

- Velocity analysis for depth migration, including tomography with salt-related velocity analysis
- Multiple attenuation and role of wide-azimuth acquisition geometry in multiple attenuation
- Statics: Land and marine
- Amplitude corrections, 1D and 2D filtering, including f-k filtering
- Wavelets and deconvolution
- VSP as a phase tool
- Fresnel zone
- Improving spatial resolution
- Noise
- Dip-moveout correction, offset continuation and MOVES
- Surface-related multiple elimination
- Statics solutions
- FX deconvolution
- Zero-offset reflection coefficients and reflection coefficients’ amplitude dependence with offset

**AUDIENCE**
Processing geophysicists, seismic data interpreters, and data acquisition specialists.

**PREREQUISITE**
Knowledge of geophysical principles.
### Foundation - 3 Days

**AVO and Seismic Inversion**

This course, which covers the use of AVO and inversion techniques, helps to create the best possible petrophysical subsurface model available. A profitable development of an oil or gas field begins with a good understanding of the subsurface as a basis for efficient and successful field management. Improved discrimination of reservoir units is made and models are generated using logs and seismic data, leading to highly accurate or highly probable (static) subsurface models compatible (if correctly upscaled) to dynamic reservoir models obtained from reservoir engineering measurements and computations. The correct use of seismic attributes, well data analysis, AVO, and seismic inversion is essential to establish subsurface models that can be used for improved field development planning and design. The course contains Petrel platform exercises to reinforce learning; however, no prior Petrel platform experience is required.

At the end of the course, attendees will understand basic concepts in quantitative seismic analysis and interpretation based on AVO, well-to-seismic calibration, and inversion techniques. The attendees will consolidate their understanding of modern technology with recent field study examples and practical workshop exercises.

#### COURSE CONTENT
- **Introduction**
- Seismic processing for AVO and inversion
- AVO theory and practical applications of AVO analysis – fluid factor, intercept, and gradient etc.
- Inversion theory and methods
- Well-to-seismic ties and wavelets
- Low-frequency model building
- Practical applications of seismic inversion, including lithology discrimination and rock physics inversion
- 4D and 3C inversion
- Stochastic Inversion
- Future directions—joint EM-seismic inversion, AVAZ, VSP inversion, full waveform

#### AUDIENCE
Geologists, petrophysicists, reservoir engineers, processing geophysicists and seismic interpreters involved with exploration and development of oil and gas reservoirs.

#### PREREQUISITE
Basic knowledge of applied geophysical principles and seismic interpretation.

### Skill - 5 Days

**Borehole Seismic Acquisition, Processing, and Operations**

This course presents an overview of all aspects of borehole seismic acquisition, operations, and processing techniques. Practical exercises are conducted using a test well at the Schlumberger Training Centre in Aberdeen using Schlumberger wireline borehole seismic equipment. The practical exercises will consist of running the VSI® versatile seismic imager with up to 4 x 3 component receivers in a 772-ft deep well and acquire VSP data using an airgun source (Run 1), which will be a 3 x 150-cu. in. G-Gun cluster (a typical offshore source) deployed in a 5-m diameter, 5-m deep purpose-built gun pit and operated with the TRSQR Insea source controller. For Run 2 the VSP will be acquired using a vibrator as the energy source. The Vibrator is a Mertz M-18HD Vibrator buggy operated with the Pelton VibPro controllers. Schlumberger’s VSI imager acquisition software (workbench) will be used for Runs 1 and 2, and all QC features of the software will be used and shown to ensure data quality optimization. The participants are encouraged to assist with the rigging up/down of all equipment, wireline winch driving, and data acquisition.

#### COURSE CONTENT
- Basic well seismic principles and applications
- VSP acquisition examples
- Borehole seismic acquisition and tools
- VSP acquisition airgun
- VSP acquisition vibrator
- Quality control
- Borehole seismic modeling
- Borehole seismic data processing
- Advanced operations
- Advanced conveyance
- Advanced processing

#### AUDIENCE
Geologists and geophysicists having the need to understand the acquisition, principles, uses, and applications of borehole seismic data.

#### PREREQUISITE
Basic understanding of geology and geophysical methods.

### Skill - 5 Days

**Deepwater Seismic Interpretation**

This course focuses on the interpretation of seismic data and the delicate construction of seismic maps in the deepwater realm, with emphasis on proximal, intermediate, and distal marine reservoirs. The attendees will learn how acquisition and processing of 2D and 3D data relate to the practical use of the extensive and growing deepwater databases in addition to studying seismic velocities, depth conversion, comparisons of 2D and 3D data, and the principles of 4D and 4C seismology. This knowledge will improve their understanding of how 3D and 2D single timeslice and amplitude and phase attributes can be applied for better reservoir characterization. Complete hands-on mapping problems and exercises are included that explore geophysical exploration and development mapping in deepwater areas.

#### COURSE CONTENT
- Seismic interpretation concepts, acquisition, and processing workflows
- Deepwater petroleum geology provinces and world distribution of deepwater basins
- Exploration and production in deepwater
- Seismic stratigraphic mapping in deep and ultradeepwater
- Deepwater reservoir stratigraphy, turbidites and mapping techniques
- Time and depth map contouring in deepwater
- Seismic velocities: Average, interval, NMO, rms, and D ix equation
- Depth conversion techniques and precision: PSTM and PSDM
- Deepwater reservoir interpretation techniques
- Comparative interpretation of poststack and prestack time migration and interpretation
- Deepwater prospects risks and project economics

#### AUDIENCE
Geologists, geophysicists, and engineers wanting a better understanding of seismic interpretation in deepwater environments.

#### PREREQUISITE
Intermediate understanding and experience of seismic interpretation techniques.

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Visit NExTtraining.net/classes for the latest calendar or to register for a course.
Practical AVO and Seismic Inversion with Petrel E&P Software Platform

**Skill - 5 Days**

AVO and inversion techniques play a significant role in creating petrophysical models of the subsurface. These geosubsurface models are compatible with dynamic reservoir models built with reservoir engineering measurements and computations. Attendees will learn the correct use of seismic attributes, well data analysis, and AVO and seismic inversion in building subsurface models suitable for improved field development planning and design. In addition to learning the basic concepts used in quantitative seismic analysis and AVO-based interpretation, calibration of well to seismic data, and inversion techniques. Your understanding of technologies will be consolidated through recent field study examples and practical workshop exercises.

**COURSE CONTENT**
- Introduction to seismic reservoir characterization
- Software and quantitative interpretation techniques
- AVO theory, inversion, modeling, QC, and pre-conditioning
- Well-to-seismic calibration
- Wavelet estimation and inversion methods
- Prestack and poststack, acoustic, and elastic inversion
- Analyzing well logs for AVO and inversion response
- Rock physics and fluid replacement modeling
- Hydrocarbon indicators
- Recent inversion methods and R&D

**AUDIENCE**
Geologists, petrophysicists, reservoir engineers, processing geophysicists, and seismic data interpreters involved with exploration and development of oil and gas reservoirs.

**PREREQUISITE**
Basic knowledge of applied geophysical principles and seismic data interpretation.

Practical Depth Conversion and Depth Imaging for the Interpreter

**Skill - 5 Days**

This course focuses on delivering a practical understanding of depth conversion. Attendees will learn the typical velocity types and their meanings in addition to understanding the methods of velocity representation, and using them for depth conversion from simple functions to more complex layer-based methods. Attendees will study the theory and estimation of velocities using various forms of tomography and the QC that ensures geologically reasonable results. Learn the techniques for depth calibration of isotropic depth images with well control, as well as the methods and impacts of including anisotropic solutions to yield better well ties and more resolved images.

**COURSE CONTENT**
- Sources and representation of velocities
- Velocity gradients
- Defining velocity as a function of depth and time
- Vertical time-to-depth conversion
- Single-layer and multilayer models
- Error analysis
- Advanced depth conversion
- Forming velocity models
- Quantitative well calibration
- Deepwater regimes
- Kirchhoff, depth, time, wave equation, and reverse-time migration
- Multicomponent and anisotropic considerations
- Tomographic velocity analysis: Layer based, grid based, and hybrid
- QC for iterative depth migration
- Depth-imaging grids
- Initial velocity model
- Iterations and velocity resolution
- Focusing and structural response
- Gatherers, vertical sections, and depth slices
- Cored rendering velocities and depth images
- Attributes and inversion
- Iterative calibration of depth migration with well control
- Isotropic and anisotropic parameter estimation and definition
- Optional interactive software work sessions

**AUDIENCE**
Seismic data interpreters, geophysicists, and geologists wanting a better understanding of velocity modeling, depth conversion, and depth migration.

**PREREQUISITE**
Basic knowledge of geophysics and seismic data interpretation.

Practical Seismic Attributes with Petrel E&P Software Platform

**Skill - 3 Days**

This course will present the practical aspects of generating and understanding seismic attribute responses and relating these from the mathematical geophysical generation to practical geological understanding and application. The course will focus on outlining the use of seismic attributes in specific geological environments and identifying specific geological features. The course philosophy is that learning is an active experience; apply understanding over memorization; provide fundamentals for growth; and provide skills for application. The learning objectives for the course include teaching the theory of seismic attributes, the practice of seismic attributes, seismic attributes using the Petrel platform, and prepare the attendants for using seismic attributes in their work.

**COURSE CONTENT**
- Theory of seismic attributes
- Seismic attributes in the Petrel platform
- Colors and visualization of attributes
- Surface attributes in the Petrel platform
- Geological scenarios and the applications of attributes
- Noise reduction
- Stratigraphic applications
- Channels and fluvial systems
- Geological scenarios and the applications of attributes
- Formation orientation
- Lithology indicators
- Textural attributes
- Structural attributes
- Edge detection
- Fracture indicators
- Carbonates and Salt
- Direct hydrocarbon indicators
- Create seismic attributes using the seismic calculator
- Seismic attribute workflows and best practices
- Getting help
- Thoughts for the future
- Group project

**AUDIENCE**
Geoscientists interpreting seismic data volumes.

**PREREQUISITE**
Petrel Fundamentals course is required and the Petrel Geophysics course is recommended.
**Rock Physics and Statistical Rock Physics for Seismic Reservoir Characterization and Quantitative Interpretation**

**Skill - 3 Days**

This course covers rock physics and statistical rock physics fundamentals, ranging from basic laboratory and theoretical results to practical "recipes" that can be immediately applied in the field. This course will include qualitative and quantitative tools for understanding and predicting the seismic velocity effects due to lithology, pore fluid types and saturation, stress and pore pressure, and temperature. Case studies and strategies will be presented for quantitative seismic interpretation, and suggestions for more effectively employing seismic-to-rock property transforms in reservoir characterization, with an emphasis on seismic interpretation for lithology and subsurface fluid detection.

**COURSE CONTENT**

- Introduction to rock physics, motivation, introductory examples
- Overview effects of fluids, stress, pore pressure, temperature, porosity
- Bounding methods for robust modeling of seismic velocities
- Effective media models for elastic properties of rocks
- Gassmann Fluid substitution
- Rock physics of AVO interpretation
- Statistical rock physics and uncertainty assessment
- Quantitative seismic interpretation and rock physics templates.
- Case studies using AVD and seismic impedance for quantitative reservoir characterization

**Audience**

Geophysicists, reservoir geologists, seismic interpreters, and engineers who work with reservoir characterization, reservoir delineation, hydrocarbon detection, reservoir development and recovery monitoring.

**Prerequisite**

None

**Seismic Attribute and Image Interpretation**

**Skill - 5 Days**

In this course, attendees are introduced to a novel approach for 3D seismic interpretation. The approach treats 3D seismic data and sampled digital images like a photograph to be interpreted directly as geology through the image attributes, seismic, or visual. The attendees will learn what can be achieved with attributes and image analysis techniques in seismic interpretation in addition to gaining speed, objectivity, interpretation quality, accuracy, and the ability to tackle interpretation tasks that previously were not feasible. Attendees will learn the geologic meaning and significance of the main seismic attributes, which are the appropriate attributes to use in certain situations, and how to make an intelligent estimate of attribute parameters.

**COURSE CONTENT**

- Understand the meaning of sampled images
- Review detectability, resolution, and color depth
- Difference between data and information
- Strengths and weaknesses of interpreters and workstations
- Review of basic seismic attributes and 3D image structure
- Noise, seismic, and geology attributes, geologic structural attributes, and noise suppression
- Interpretation of stratigraphy through attributes
- Lithology and porefill
- Time-lapse (4D) seismic data
- Comparison of skills and responsibilities distribution - the highway accident scene

**Audience**

Geophysicists, geologists, and engineers wanting to learn the basics of seismic interpretation using Petrel platform software.

**Prerequisite**

Knowledge of applied petroleum geology, exposure to seismic methods, and a working knowledge of Petrel platform software.

**Seismic Interpretation Mapping with Petrel E&P Software Platform**

**Skill - 5 Days**

Using methodologies for distinct geological and tectonic settings, this course teaches the fundamental skills attendees need for seismic interpretation. The attendees will study all aspects of seismology interpretation and compare hand-drawn and digital maps to ensure that quality meets requirements for subsequent digital interpretation. This course also includes learning the principles of reflection seismology, including data acquisition, processing, and interpretation. Lectures with hands-on seismic mapping exercises are repeated using the Petrel platform, demonstrating the subtleties of subjective hand-contouring of data versus grid-algorithm contouring.

**COURSE CONTENT**

- Seismic fundamentals
- Petroleum geology in worldwide provinces and basins
- Fundamentals of structural interpretation and seismic stratigraphy
- Seismic attributes and AVO processing
- Mapping techniques and rift-basin mapping interpretation
- Depth conversion techniques
- Comparative interpretation of poststack and prestack time migrations
- Well location and depth mapping precision
- Models for rift and salt structures in sedimentary basins
- Prospect analyses

**Audience**

Geophysicists, geologists, and engineers wanting to learn the basics of seismic interpretation using Petrel platform software.

**Prerequisite**

Knowledge of applied petroleum geology, exposure to seismic methods, and a working knowledge of Petrel platform software.
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</table>
| Seismic Petrophysics and Rock Properties         | Skill    | Seismic petrophysics involves the study and application of well log data, and rock physics theory and data to the interpretation of seismic data and observations. In this course, attendees will gain an understanding of rock physics data and theory, integrate these data with that from well logs in a petrophysical evaluation, and then use the results to model and interpret seismic data. Moving progressively, attendees begin with simple, commonly used models and continually expand them to include increasingly complicated and realistic interpretations. At each stop, the attendees investigate the relationships between theory and laboratory, well log, and seismic data. Course material includes spreadsheets that incorporate many of the studied models (predicting fluid properties, rock properties, and seismic response including AVO and elastic impedance). Exercises on rock types drawn from around the world are based on these spreadsheets and require simple calculations.  
**COURSE CONTENT**  
- Fundamentals of seismic petrophysics  
- Seismic attributes and their relationships to rock properties  
- Complex rocks: Unconsolidated and consolidated clastics, carbonates with vugs and fractures, shales, and heavy oil formations  
- Fluids and fluid substitution: Methods and input parameters  
- Fluid relationships to rock types  
- Principles of AVO  
**AUDIENCE**  
Geoscientists and engineers with some experience in at least one of the following fields: petrophysics, seismic interpretation, seismic processing, reservoir characterization, or reservoir engineering.  
**PREREQUISITE**  
General knowledge of both petrophysics and geophysics. |
| Seismic Structural Interpretation                 | Skill    | With a focus on building fundamental skills in seismic interpretation, this course employs practical examples demonstrating distinct aspects of various geological and tectonic provinces relative to their hydrocarbon prospectivity. In practical workshops, attendees will learn the main interpretation techniques used for seismic sections and skills for seismic data mapping. Special emphasis is given to comparisons of hand-contouring map interpretation with workstation interpretation mapping for 2D and 3D datasets.  
**COURSE CONTENT**  
- Principles of seismology and proper handling of seismic velocities  
- Technologies and methodologies for seismic data interpretation in specific tectonic and geologic settings  
- Seismic interpretation mapping: Hand-drawn interpretations and computer workstation mapping  
- Comparisons of hand- and computer-contoured maps and map QC  
- Hands-on mapping exercises for geophysical exploration and development  
- Seismic attributes applicable to reservoir characterization and 2D and 3D seismic data  
**AUDIENCE**  
All industry professionals, particularly geophysicists, geologists, petrophysicists, reservoir management professionals, and drilling engineers.  
**PREREQUISITE**  
Understanding of basic reservoir geology. |
| Practical Seismic Interpretation with the Petrel E&P Software Platform | Skill    | This course provides E&P professionals with seismic data visualization, integration, and interpretation techniques that have been recently developed. The attendees will gain a solid understanding of the applications and role of the seismic interpreter in studies that involve poststack seismic attributes, AVO, seismic sequence stratigraphy, seismic geomorphology, 4D time-lapse seismic, and multidisciplinary integration. Recent and relevant case histories, data examples, and exercises, conducted both on paper, and with the Petrel platform, will guide the attendees in understanding that the integration of all available data into the seismic model adds value in the required coherent and successful seismic predictions that result from an interpretation.  
**COURSE CONTENT**  
- Introduction and general overview  
- Fundamentals of signal theory, wavelet, resolution, and scaling  
- Geological concepts, sedimentary models, and structural styles  
- Introduction to the Petrel software platform  
- 2D and 3D interpretation techniques  
- Poststack attributes, reflective attributes, and transmissive attributes  
- Spectral decomposition  
- Multicomponent seismic interpolation  
**AUDIENCE**  
E&P managers, geoscientists, and reservoir engineers involved in seismic interpretation or working with results of seismic data interpretation.  
**PREREQUISITE**  
Basic or intermediate seismic interpretation knowledge. |
| Carbonate Seismic Reservoir Analysis              | Advanced | In this course, the attendees will learn fundamental techniques in carbonate reservoir analysis using seismic methods. Emphasis is given to the application of quantitative seismic methods for fluid and fracture analysis. Carbonate rocks make up only 20% of sedimentary rock yet they account for more than 50% of the world’s proven hydrocarbon reserves. Therefore, it should be no surprise that carbonate reservoirs are very important targets for oil and gas exploration. Exploring elusive stratigraphic hydrocarbon traps, developing gas resources, and arresting production decline and early water breakthrough in giant carbonate oil reservoirs have all prompted demands for new geophysical technologies targeted for prospect reconnaissance and detailed characterization of carbonate reservoirs. Incremental producibility enhancement through advanced technology application can result in significant reserve additions and economic benefits.  
**COURSE CONTENT**  
- Fundamentals of carbonate seismology  
- Application of complex attributes for carbonate reservoir analysis  
- AI and AVO seismic inversion for carbonate reservoir analysis  
- AVO pitfalls and AVO for fluid-fracture analysis in carbonate reservoirs  
- 4D and multicomponent seismic for carbonate reservoir analysis  
**AUDIENCE**  
Geologists, geophysicists, and reservoir engineers with an interest in the application of seismic methods for reservoir analysis.  
**PREREQUISITE**  
None |
This course introduces a new user to the Petrel platform functionality with emphasis on visualization, data organization, and collaboration. The course will take the attendees from Petrel platform project setup to plotting the results. Attendees will learn how to create surfaces and a simple grid as well as how to QC and visualize a simple grid using the geometrical modeling process, maps, and intersections. This course also introduces the Studio environment, which empowers a new level of usability, collaboration, and productivity.

**COURSE CONTENT**
- Studio environment (Find, Collaborate, and Manage)
- Petrel software introduction
- Project setup, coordinates, and units
- Petrel interface, general tools, and windows
- Modeling concepts overview
- Surface constructing and editing
- Simple grid constructing
- Geometrical modeling
- Data plotting
- Knowledge sharing and collaboration

**AUDIENCE**
Development and exploration geologists, geophysicists, geochemists, geoscientists, petroleum engineers, managers, and technical IT personnel with no previous Petrel platform software experience.

**PREREQUISITE**
General knowledge of petroleum geology and geophysics or reservoir engineering as well as elemental software skills.

Charisma*2D/3D/4D seismic interpretation software is fully integrated with GeoFrame software geophysics and geology modules such as Synthetics, InDepth* velocity analysis and depth conversion, SeisClass* multiattribute classification software, ASAP* automatic seismic area picker, GeoVu*3D interpretation and visualization application, and Basemap Plus gridding and contouring applications. In this course, attendees will learn to use the Charisma software in both time and depth domains and to save interpretation data directly to the GeoFrame software database, which increases the user’s understanding of the fundamentals of 2D, 3D, and 4D seismic interpretation using Charisma software.

**COURSE CONTENT**
- Displaying and interpreting seismic data using various techniques, including multiframe and seismic attribute displays
- Generating random lines
- Defining horizons and faults
- Drawing and editing of faults, horizons, fault contacts, and fault boundaries
- Manual and automatic fault assignment
- Manual and automatic horizon interpretation using various tracking techniques
- Editing, contouring, and interpolating horizon maps
- Grid operations
- Extracting and using seismic map attributes
- Interpretation of horizons and faults in 3D

**AUDIENCE**
Development and exploration geophysicists.

**PREREQUISITE**
GeoFrame Fundamentals course.

This course provides the fundamentals attendees need to produce accurate reserves maps using GeoFrame CPS-3 software. Fully integrated with GeoFrame Geology and Geophysics modules, CPS-3 software provides accurate surface mapping operations for all mapping requirements.

**COURSE CONTENT**
- Access well and seismic locations, seismic interpretation, markers, zone properties, grids, and other GeoFrame software data for mapping
- Create contour maps and manipulation of base map display
- Create grid horizon and fault surfaces using various algorithms
- Gridding algorithms use and how to set parameters
- Surface operations, z-field arithmetic, smoothing, and refinement
- QC steps for structural volumetric envelopes
- Generate property grids from well zone data
- Workflow for calculation of reservoir volumetrics
- Overview of GeoFrame Model Editor, Map Editor, and Color Palette Editor modules, and CPS-3 macro language

**AUDIENCE**
New users of GeoFrame software, including database administrators, application support staff, and development and exploration geologists and geophysicists.

**PREREQUISITE**
None

With this course, attendees will learn the fundamentals needed to efficiently manage GeoFrame software service projects and project data. The attendees will also learn to use the GeoFrame software system to describe the subsurface precisely throughout the E&P workflow. The course focus is on the functionality common to all GeoFrame software applications.

**COURSE CONTENT**
- GeoFrame software data model concept and how data relate to each other
- Create, edit, back up, restore, and delete projects
- Assignment access rights to secure specific data types
- Project well data loading in several formats
- Browse, list, find, edit, and display various data types
- Set match and merge rules

**AUDIENCE**
Development and exploration geologists and application support staff.

**PREREQUISITE**
GeoFrame Fundamentals course.
GeoFrame IESX Seismic Interpretation

Foundation - 3 Days

Build on your knowledge of the GeoFrame software fundamentals and the use of IESX software for 2D, 3D, and 4D interpretation of horizons and faults on seismic data. Attendees will learn how IESX interpretation software can be fully integrated with other GeoFrame software modules such as Synthetics, InDepth conversion software, SeisClass software, ASAP seismic picker, GeoViz application, and Basemap Plus gridding and contouring applications.

COURSE CONTENT
- Selecting and displaying seismic lines
- Interpreting and editing horizons, fault cuts, fault contacts, fault traces, and fault boundaries
- Operations and interpretation tools
- Displaying well paths, logs, and synthetics on seismic sections
- Gridding and contouring directly on the base map
- Applying operations to surfaces with Basemap Plus gridding and contouring software and 3D volume picking using ASAP seismic picker
- GeoViz Explore module

AUDIENCE
Development and exploration geophysicists.

PREREQUISITE
GeoFrame Fundamentals course.

GeoFrame Seismic Attribute ToolKit Workflow

Foundation - 1 Day

This course presents the GeoFrame software seismic attribute toolkit workflow, an integrated solution for seismic attribute extraction and analysis. The course will increase attendee knowledge of the attributes that reveal subtle variations in lithology and fluid content, which may indicate potential traps for oil and gas in addition to understanding how to combine geologic knowledge obtained from wells with seismic attributes to help identify drilling targets that involve less risk.

COURSE CONTENT
- Typical workflow for generating seismic attributes
- Key toolkit features
- Analysis of seismic attributes with the SeisClass Explore multiattribute classification software
- Use the GeoViz application volume preview capability for rapid parameter testing and QC in 3D
- Algorithms for spectral decomposition
- Display VRS attributes and tracing reconstruction in seismic window
- Interpret data during attribute extraction
- Compute multiple seismic attributes in a single run

AUDIENCE
Development and exploration geophysicists.

PREREQUISITE
GeoFrame Fundamentals course and a working knowledge of IESX seismic interpretation or Charisma seismic interpretation software.

GeoViz Seismic Interpretation and Visualization

Foundation - 3 Days

In this course, attendees will learn how GeoViz application brings power and flexibility for maximum impact on workflows.

COURSE CONTENT
- Simultaneous display of 2D and 3D seismic data
- 3D volumes
- Displays and interpretations
- Creation of fault surfaces, tessellated surfaces, and well sections
- Simultaneous interaction of IESX interpretation software or Charisma interpretation with Basemap Plus and DataManager applications
- Multitribute analysis techniques to highlight specific geologic features
- Fault interpretation workflows
- Detecting volumes and performing isolated detailed analysis
- Modifying interpretation settings and user options

AUDIENCE
Development and exploration geophysicists.

PREREQUISITE
GeoFrame Fundamentals course, GeoFrame IESX Seismic Interpretation course, or GeoFrame Charisma Seismic Interpretation course.

Petrel Geophysics: Seismic Visualization and Interpretation

Foundation - 3 Days

This course is designed to assist geophysicists and geologists learn how to effectively use the Petrel platform in the interpretation of 3D/2D seismic data. The course provides step-by-step instructions in setting up a new interpretation project, seismic data visualization and manipulation techniques, mis-tie analysis for 2D and 3D data, detailed workflow for horizon and fault interpretation, creating surfaces from seismic interpretation, using surface attributes, and 2D seismic restoration. Attendees will also be given a brief introduction to velocity modeling and depth conversion.

COURSE CONTENT
- Set up new project and projection system
- Import of 2D and 3D seismic data
- Cropping and realization of seismic volume
- Survey and interpretation managers
- Mis-tie analysis
- Volume rendering
- Interactive interpretation of seismic in 2D and 3D windows
- Fault and horizon interpretation
- Generate surfaces from seismic interpretation
- Surface attribute maps
- Seismic restoration
- Introduction to velocity modeling and domain conversion

AUDIENCE
Exploration and development geophysicists, geologists and geoscientists working with seismic data.

PREREQUISITE
Petrel Fundamentals course or familiarity with Petrel platform interface and core functions, in addition to a general knowledge of petroleum geophysics and geology as well as elementary software skills.
GeoFrame GIS

Skill - 4 Hours

This course provides information and guidance to attendees on the GeoFrame software capabilities for loading, displaying, and annotating GIS data into Basemap Plus gridding and contouring software (vector and raster), SEISpic 2D seismic interpretation application, and Seis3DV* IESX seismic interpretation application software (vector only).

COURSE CONTENT
- Loading GIS raster data into Basemap Plus gridding and contouring software
- Loading, posting, and changing GIS vector data appearance in Basemap Plus gridding and contouring software
- Posting GIS vector data on SEISpic and Seis3DV (slice and section) data

AUDIENCE
Database administrators, application support staff, and development and exploration geologists and geophysicists.

PREREQUISITE
GeoFrame Fundamentals course.

GeoFrame IESX Gathers Seismic Workflow

Skill - 4 Hours

This course will increase the attendee’s understanding of GeoFrame IESX software capabilities for displaying and annotating seismic gatherings and identifying their locations on base maps. In this course, the attendee will also learn to display AVO graphs on gatherings.

COURSE CONTENT
- Display and annotation of gatherings using multiwindow displays
- Post interpretation of gatherings and their associated stacked displays
- Display and annotation of AVO graphs on gatherings displays

AUDIENCE
Development and exploration geophysicists using prestack seismic data for interpretation.

PREREQUISITE
GeoFrame Fundamentals course.

Petrel Geophysics: Seismic Interpretation Workflow Tools

Skill - 2 Days

This course builds on the Petrel Seismic Visualisation and Interpretation course and focuses on seismic interpretation workflows, techniques, and best practices. The course includes creating and using different seismic attributes, seismic data quality enhancement using seismic attributes, conventional and contemporary methods of faults extraction, seismic attributes blending techniques, populating a model with seismic attributes, crossplotting process for surface attributes to find correlation among seismic attributes, and setting up a workflow editor for automatic attribute creation. The course also covers various workflows for geobody interpretation using different probes, populating a geobody into a 3D grid, train estimation model using neural networks to find correlation in seismic attributes for interpretation purposes, and lithology identification while using genetic inversion in Petrel.

COURSE CONTENT
- Use of available seismic attributes to enhance seismic data quality
- Conventional and contemporary methods of fault extraction
- Seismic attribute maps and surfaces
- Seismic attribute blending techniques in the Petrel platform software
- Interactive crossplot process for surface attributes in the Petrel platform
- Workflow editor setup to generate different attributes on the fly
- Generate 3D edge enhancement and ant track cubes to automatically extract faults
- Geobody interpretation using box, horizon, and well probes

AUDIENCE
Exploration and development geophysicists, geologists, and geoscientists working with advanced seismic interpretation projects.

PREREQUISITE
Petrel Geophysics: Seismic Visualisation and Interpretation course in addition to having general knowledge of exploration and development geophysics, intermediate interpretation, and software skills.
<table>
<thead>
<tr>
<th>Course Title</th>
<th>Duration</th>
<th>Description</th>
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</table>
| GeoFrame InDepth Conversion Software | Skill - 2 Days | Attendees will gain experience in use of GeoFrame InDepth software. The attendees will learn to create domain conversion models and transform horizons, faults, grids, and seismic data from one domain to another. **COURSE CONTENT**
- 3D multilayer, multifunction velocity models
- Seismic interpretations and velocity data
- Seismic interpretations and seismic data conversions between time, depth, and velocity domains
- Quality checks and edits of velocity data
- 3D velocity model building from borehole checkshot data and stacking velocities
- Stacking velocity data loading into a project
- Domain conversion of fault cuts, horizons, grids, and seismic volumes
- Crossplot use for data analysis
- Velocity model exporting to SEG Y format **AUDIENCE**
Development and exploration geophysicists. **PREREQUISITE**
GeoFrame Fundamentals course and working knowledge of IESX or Charisma seismic interpretation software. |
| Petrel Prestack Seismic Interpretation | Skill - 2 Days | This exposes seismic interpreters to the use of prestack seismic data in a typical interpretation workflow involving time migrated data in amplitude- and nonamplitude-supported settings. The course includes general theory and practical aspects with hands-on exercises directly in the Petrel platform. The course covers three aspects of prestack data use as implemented by the plug-in prestack visualization prestack interpretation plugin. **COURSE CONTENT**
- Quick prestack data overview (acquisition, gather, processing, stacking, etc.)
- Load prestack data into the Petrel platform
- Visualize data in the prestack and 3D windows
- Analyze data with on-the-fly stacks and single offset volumes
- Pick and apply the muting function and simple on-the-fly gather processing
- Pick and interpret prestack events
- Extract and analyze prestack event attributes
- Examples of AVO workflows in the Petrel platform supported by prestack seismic interpretation (PSI)
- SEG Y to DIO conversion **AUDIENCE**
Geophysicists, seismic interpreters, and seismic processors. **PREREQUISITE**
The Petrel Fundamentals and Petrel Geophysics courses, or equivalent Petrel interpretation experience and general geophysical knowledge. Seismic processing knowledge is advantageous. |
| Petrel Seismic Well Tie | Skill - 2 Days | This course will introduce the attendees to the existing workflows in the seismic well tie process. Attendees will be guided through the required steps to generate the seismic well tie, covering the three main workflows: sonic calibration, synthetic generation, and integrated seismic well tie. Supporting these workflows, the attendees will have access to the log conditioning and wavelet toolbox, which provides interactive functionalities for the creation or manipulation of the different inputs used in the seismic well tie workflows. **COURSE CONTENT**
- Quality control and editing of checkshots and sonic and density logs
- Calibrate sonic log with checkshots
- Synthetic seismogram generation
- Wavelet creation and extraction
- Integrated seismic well tie **AUDIENCE**
Geophysicists, geologists, and petrotechnical personnel with prior experience in using the Petrel software platform. **PREREQUISITE**
General knowledge of petroleum geology and geophysics; Petrel Fundamental; and Geophysics courses or equal experience in the use of the Petrel software. |
| Petrel Velocity Modeling | Skill - 3 Days | This course introduces the attendees to velocity modeling, velocity handling, and domain conversion functionality in the Petrel 2013 platform. The course takes the attendees through the preparation stage of data used for velocity estimation and modeling. This preparation includes quality control and editing of checkshot data used in sonic calibration and quality control of time surfaces and well tops used for defining velocity intervals. Furthermore, the available velocity modeling approaches are discussed, including well velocity estimation, the nature and modeling of seismic velocities, surface-based and 3D grid-based seismic velocity modeling, as well as user-defined velocity functions. After the velocity modeling phase, domain conversion of various objects and methods for modeling structural uncertainty are covered. **COURSE CONTENT**
- Quality control and editing of well data and velocity modeling
- Checkshot calibration of sonic logs
- Available velocity functions as well as different velocity modeling approaches
- Depth error analysis and correction
- Surface- and 3D grid-based seismic velocity modeling
- Addressing anisotropy in seismic velocities
- Geostatistical methods in modeling well velocities vs. seismic velocities
- Quantifying residual depth error and creating a depth correction model to address the residuals
- Creating user defined velocity functions
- Domain conversion
- Modeling of structural uncertainty **AUDIENCE**
Development and exploration geologists, geophysicists, petroleum engineers, managers, reservoir engineers, and technical personnel with prior experience in Petrel software. **PREREQUISITE**
Petrel Geophysics course or equivalent Petrel experience. |

**Skill - 3 Days**

This course provides the attendees with an insight into the Workflow editor and the Uncertainty and Optimization process with a focus on geological modeling. Initially, the course will focus on how to use predefined workflows and how to create your own workflows for batch processing and operations, in addition to setting up, editing, and repeating processes with new data for a complete and standardized reservoir modeling workflow. To take full advantage of the uncertainty handling in the Petrel platform, the attendee should have an understanding of the Workflow editor, which is the cornerstone of the Uncertainty and Optimization process. Attendees will be also given some examples of geological workflows. The course will also focus on understanding sensitivities and uncertainties of a base case volumetric reservoir model. Structural uncertainties related to surfaces will be explored, as well as stochastic parameters related to the property model. Also, the uncertainty related to the contacts defining the volume case will be examined.

**COURSE CONTENT**
- Workflow Editor interface and logic
- Operating predefined workflows
- Creating user-defined workflows
- Updating 3D models with new input data
- Becoming familiar with the Uncertainty and Optimization process
- Sensitivity and uncertainty analysis setup
- Well log interpretation uncertainty
- Structural, fluid contact, and property uncertainty

**AUDIENCE**
Reservoir, development, and exploration geologists, petrophysicists, and technical personnel experienced in the use of Petrel software.

**PREREQUISITE**
Previously completed the Petrel Fundamentals course and the Petrel Geology course.

**COURSE CONTENT**
- Attendees will evaluate a concession area using the Petrel workflow tools
- Beginning with the initial exploration data, the attendees will learn to combine results from petroleum systems modeling with their play fairway maps and transform them into play chance maps
- They will also learn to use the results from this analysis to make probabilistic volumetric and chance of success assessment of their prospects that have a clear link back to the play evaluation and petroleum system analysis
- Lastly, attendees will learn how to keep their play and prospect evaluation live and usable whenever new understanding or data becomes available.

**AUDIENCE**
Geoscientists familiar with prospect exploration fundamentals and workflows who want to learn how to perform them using Petrel platform software.

**PREREQUISITE**
Petrel Fundamentals and be able to work with the Petrel "processes," "input," and "windows" tabs. Petrel platform skills such as Petrel general layout, module operation, and surface and polygon operations will be useful; however, skills in Petrel seismic interpretation, property modeling, well correlation, etc. are not required.

**ADDITIONAL INFORMATION**
- The focus of this advanced course is to instruct the attendees in the effective use of the GeoViz application and tools within advanced workflows.

### GeoFrame GeoViz Advanced Seismic Interpretation and Visualization Techniques

**Advanced - 1 Day**

The focus of this advanced course is to instruct the attendees in the effective use of the GeoViz application and tools within advanced workflows.

**COURSE CONTENT**
- GeoViz application functionality
- Multiprobe capability
- Manipulation of lighting, material, and color properties of displayed surfaces
- Variable opacity volume manipulation
- Creation of and interactively developing fault surfaces
- Multiattribute analysis techniques to highlight specific geologic features
- Interpretation-controlled volume cuts to focus on key areas
- Interpretation of fault workflows, horizons, and the new ASAP functionality
- Voxel picking
- Detecting volumes and performing isolated detailed analysis
- Modification of interpretation settings and user options

**AUDIENCE**
Development and exploration geophysicists.

**PREREQUISITE**
GeoFrame Fundamentals course, GeoFrame IESX Seismic Interpretation course, or GeoFrame Charisma Seismic Interpretation course.

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**GeoFrame Synthetics**

**Advanced - 2 Days**

The GeoFrame Synthetics reservoir characterization software module bridges the gap between geology and geophysics by creating accurate time-to-depth relationships for wells. This course guides the attendees through all the necessary steps to generate accurate synthetic seismograms.

**COURSE CONTENT**
- Editing log data graphically
- Editing checkshot data and calibrating sonic logs
- Generating synthetic seismogram displays incorporating logs, seismic interpretation, and tops data
- Modeling reflection coefficient
- Displaying logs and synthetic traces on seismic sections

**AUDIENCE**
Development and exploration geophysicists.

**PREREQUISITE**
GeoFrame Fundamentals course and working knowledge of IESX seismic interpretation or Charisma seismic interpretation software.

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**Techlog Advanced Analysis**

**Advanced - 5 Days**

In this course, attendees focus on advanced interpretation and processing capabilities for the management of wellbore image data, pressure data, core data, and special core data. One discovers the performance of interpretation workflows for analysis of these data as well as specialized tasks such as facies and rock type detection and propagation. In addition, attendees explore the power of the multiwell and multiuser aspects. You gain a foundation for advanced processing and analysis within the Techlog platform.

**COURSE CONTENT**
- Work with core data 1-loading, shifting, correcting for stress, and clay closure
- Work with core data 2-upscaling, rock typing, and special core analysis with capillary pressure data
- Use saturation-height models in core and log domains
- Work with pressure data
- Manage and resolve contacts across multiple initiation regions
- Work with image data-processing, manipulating, displaying, and picking and classifying dips
- Learn thin-bed analysis techniques
- Perform multiple-component inversion

**AUDIENCE**
Development and exploration log analysts and petrophysicists, geologists, petroleum engineers, managers, and technical personnel with Techlog software experience.

**PREREQUISITE**
Techlog Fundamentals course.
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### Competency Level

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### Skill

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<th>Software</th>
<th>Techlog</th>
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<tr>
<td></td>
<td>Techlog Formation Evaluation with Quanti.Elan</td>
<td>Petrel Advanced Wells</td>
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<td>Petrel Property Modeling</td>
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### Foundation

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<td>Techlog Python</td>
<td>Petrel Well Correlation</td>
<td>GeoFrame CPS-3 Mapping Fundamentals</td>
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### Awareness

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<td>Techlog Fundamentals</td>
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## Introduction to Petrophysics

**Awareness - 5 Days**

In this course, attendees are introduced to petrophysical principles and techniques through hands-on physical experiments that illustrate the importance of basic reservoir properties: porosity, permeability, resistivity, oil and water content, and capillary pressure. The course covers various petrophysical rock types in conventional and unconventional reservoirs, wireline logging, LWD, core geometry, core and coring processes. The attendees will discover how conventional reservoir properties differ from unconventional reservoirs.

### COURSE CONTENT
- Porosity: bulk volume, grain volume, and pore volume
- Permeability
- Porosity measurement techniques and impacts in sandstone, limestone, and dolomite
- Wireline logging and LWD
- Core and coring operations
- Reservoir principles and mechanics
- Unconventional reservoirs

### AUDIENCE
Geoscientists, engineers, and technicians who provide petrophysical technical support in need of an introductory understanding of petrophysical principles.

### PREREQUISITE
None

## Introduction to Production Logging and Reservoir Monitoring

**Awareness - 5 Days**

Structured to provide the attendees with the fundamentals of production logging and fluid mechanics, this course covers various case studies to illustrate the importance of porosity, permeability, and water saturation. Attendees will learn the fundamentals of diagnosing these problems using production logging tools and techniques, as well as how to minimize future occurrences using proactive reservoir monitoring techniques.

### COURSE CONTENT
- Tool conveyance using tractors and coiled tubing
- Depth control in cased hole wells using gamma ray and casing collar locator
- Vertical, deviated, horizontal completions and multilateral wells
- Inflow performance and productivity index
- Fluid velocity measurements using spinners and fluid injections
- Production problem diagnosing using production logs
- Basic production logging tools
- Spinner tool calibrations
- Single-phase flow interpretation and productivity index
- Logging techniques for reservoir monitoring
- PNL in capture mode: determining water, oil, and gas saturations in cased wells
- Leak detection using applied temperature logging
- Workshop: single-phase flow and estimating water saturation

### AUDIENCE
Entry-level professionals of all disciplines and non-technical support staff responsible for interpreting production logs or using production log interpretations.

### PREREQUISITE
None

## Applied Capillary Pressure and Saturation Height Modeling

**Foundation - 5 Days**

This applied course teaches the attendee how to use capillary pressure data to help understand what is controlling the fluid distribution, the importance of pore geometry, and why water saturation is not an accident. Case studies and workshops on bimodal carbonates are used to demonstrate the challenges associated with interpreting fluid distributions. To understand many carbonates, it is necessary to examine capillary pressure, HPN laboratory nuclear magnetic resonance, thin-sections, and scanning electron microscope (SEM) images. Clastics studies and core-log integration workshops are used illustrate how simple saturation height models can be applied in field studies of numerous parameters such as fluid contacts and hydrocarbon column height to help determine the dominant hydrocarbon-water contact. A large number of workshops are used in this course, allowing the attendees to gain hands-on experience in interpreting capillary pressure data.

### COURSE CONTENT
- Pore geometry and wettability
- Drainage and imbibition capillary pressure data
- Fluid contacts and free-water level
- Measurement methods and options
- Converting from laboratory conditions to height
- Introduction to petrophysical rock types
- Saturation height models to predict saturation distribution

### AUDIENCE
Any geologist, petrophysicist, or engineer who needs to understand fluid contacts, the free-water level, and why water saturation is not an accident.

### PREREQUISITE
A basic understanding in using Microsoft Excel to make calculations and plots.

## Basic Core Analysis

**Foundation - 5 Days**

Core analysis is integral to estimating fluid flow, ultimate recovery, and displacement efficiencies. This course teaches the attendees the basics of core analysis methods as the foundation of complete reservoir characterization. Attendees will learn how comprehensive core data acquisition is designed using a multidisciplinary approach considering managerial, drilling, geologic, and engineering requirements in addition to understanding how core analysis is affected by the coring method, the coring fluid systems, core handling at the wellsite, and the core preservation techniques. This course devotes significant time to workshops, case studies, and real-world examples. With practical hands-on exercises, attendees gain a better understanding of how rocks, pores, and fluids interact within the reservoir.

### COURSE CONTENT
- Porosity, permeability, residual fluids, and lithology at a microscale
- Depositional, lithologic, and textural information
- Reservoir connate water saturation
- Directional permeability studies review
- Understanding of areal changes in porosity, permeability, and lithology
- Calibrating and improving log interpretations
- Pore geometry and mineralogy information
- Pore geometry and petrophysical rock types using high-pressure mercury porosimetry
- Core-based NMR overview

### AUDIENCE
Petrophysicists, geoscientists, and engineers wanting a better understanding of the use of core analysis in reservoir description.

### PREREQUISITE
Basic understanding of reservoir characterization and petrophysics and a working knowledge of Microsoft Excel software.

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
## Basic Logging Methods and Formation Evaluation

**Foundation - 5 Days**

In this introduction to openhole data acquisition, interpretation concepts, and practices, attendees will learn the primary logging tools used, the physics of how the measurements are made, and best practices to determine porosity and water saturation. Topics include new high-technology tools and their application to conventional and unconventional environments, including NMR, LWD, wireline formation testing, and borehole imaging. The attendees will also learn how to interpret actual log data in exercises designed to strengthen your understanding and interpretation skills.

### COURSE CONTENT
- Reservoir rock, sedimentary basins, rock properties, carbonates, clastics, shales, and diagenesis
- Logging overview
- SP and gamma ray
- Porosity tools: Density, neutron, and acoustic
- Resistivity basics, deep-reading tools, true resistivity, shallow-reading tools, and flushed-zone resistivity
- Computing shale volume
- Quicklook methods
- Computing water saturation in the presence of shale
- Carbonates and their challenges
- NMR
- Borehole imaging

### AUDIENCE
Petrophysicists, geoscientists, engineers, and log analysts wanting to increase their understanding of basic log analysis.

### PREREQUISITE
A 2-year technical degree.

## Basic Petrophysics, Quick Look, and Log Quality Control

**Foundation - 5 Days**

This course covers geology of carbonates and clastics, gamma ray and spontaneous potential tool physics, and applications for measuring clay volume, clay type, and formation water salinities. The course also includes porosity and lithology, density and neutron tool physics and applications, acoustic tool physics and applications for rock mechanics, wellbore stability, and secondary porosity. Resistivity measurement tool physics of shallow Rxo, laterolog, and induction and advanced technology resistivity tools are included in addition to an introduction to advanced technology tools such as nuclear magnetic resonance, borehole imaging, dielectric, and wireline formation testing. In the data interpretation area, this course covers the evaluation of clay volume, estimation of the parameters of “m” and “n” in the Archie equation, quicklook techniques to estimate the oil/water, gas/water and oil/gas contacts, estimate salinity of formation water and filtrate water, and unmoved hydrocarbon zone estimation of water saturations in shaly sands.

### COURSE CONTENT
- Reservoir rock and well life
- Tool Conveyance, depth Control, filtrate Invasion profiling
- Basics of logging, log quality control
- GR spectroscopy
- Resistivity, spontaneous potential, laterolog, and induction array measurements
- Acoustic log, secondary porosity, rock mechanical properties, and wellbore stability
- Neutron Log, neutron spectroscopy and sigma neutron capture cross-section
- Density-neutron applications for lithology, shale volume, and effective and total porosities
- Introduction to advanced technology tools
- Interpretation overview of important petrophysics parameters

### AUDIENCE
Geoscientists or engineers responsible for interpreting production logs.

### PREREQUISITE
None

## Basic Production Logging

**Foundation - 5 Days**

Production logging tools have specific uses as well as limitations. Attendees will learn the various applications for these tools, the interpretation assumptions that are integral to their designs, and how log quality is affected by the acquisition process. Hands-on demonstrations teach the fundamentals of production log interpretation, and an in-class workshop focuses on the interpretation of single- and two-phase flow. Discussion includes use of these logs for measurement of three-phase flow.

### COURSE CONTENT
- Inflow and outflow performance and productivity index for oil wells and gas wells
- Tool conveyance using tractors and coiled tubing
- Depth control in cased wells using gamma ray and casing collar locator data
- Completions for vertical, deviated, horizontal, and multilateral wells
- Pressure-control system for rigless operation
- Reservoir fluids properties, including gas/oil ratio, bubblepoint pressure, and three-phase diagram
- Reservoir drive mechanisms and associated production problems
- Justification of production log acquisition
- Standard production logging tools
- Techniques for measuring oil, water, and gas rates
- Interpretation of logs for single-, two-, and three-phase production

### AUDIENCE
Geoscientists or engineers responsible for field-wide surveillance or reservoir monitoring programs.

### PREREQUISITE
Engineering or geosciences degree recommended as this course deals with the production logging physics.

## Basic Reservoir Monitoring

**Foundation - 5 Days**

In this course, attendees will study the basics of field surveillance and reservoir monitoring with tools such as pulsed neutron and carbon/oxygen logging. The attendees will learn how these tools are applied to diagnose reservoir-wide behaviors of water breakthrough, gas cap migration, and behind-pipe commingling. In an in-class workshop, attendees will learn to evaluate water and gas saturations and determine resistivity behind the casing.

### COURSE CONTENT
- Reservoir-drive mechanisms and associated production problems
- Reservoir fluid properties: Gas/oil ratio, bubblepoint pressure, and three-phase diagram
- Tool conveyance using tractors and coiled tubing
- Depth control in cased hole wells using gamma ray and casing collar locator
- Completions in vertical, deviated, horizontal, and multilateral wells
- Pressure-control system for rigless operation
- Justification for production logs
- Pulsed neutron capture cross section mode and carbon/oxygen mode
- Acquisition of formation resistivity in cased hole
- Simhole induction logging in plastic (nonconductive) casing
- Workshop: Using capture mode for evaluating water and gas saturation
- Workshop: Interpreting behind-casing resistivity logs

### AUDIENCE
Geoscientists or engineers responsible for field-wide surveillance or reservoir monitoring programs.

### PREREQUISITE
Engineering or geosciences degree.
Cased Hole Logging and Formation Evaluation

Foundation - 5 Days

Attendees will learn to use cased hole logs for formation and production evaluation, including the underlying science of cased hole logs, the types of logging tools available, and optimal situations for their use. Instruction covers how to ensure the quality of logs for analysis and detect production problems.

COURSE CONTENT
- Reservoir and flow in wells
- Saturation monitoring with pulsed neutron capture and carbon/oxygen logging
- Single-phase flow in wells using basic flowmeter logs
- Cased hole logging to analyze multiphase flow
- Production logging techniques in horizontal wells
- Reservoir problem analysis
- Basic survey planning to maximize useful information
- Perforation techniques, including the choice of methods

AUDIENCE
Petrophysicists, geoscientists, or engineers who interpret cased hole logs or use cased hole log interpretation.

PREREQUISITE
A 2-year technical degree and an understanding of well operations.

Formation Evaluation: Heriot-Watt University Program

Foundation - 5 Days

This class, part of the Heriot-Watt University Distance Learning Masters of Petroleum Engineering program, is intended to give a broad understanding of the principles of formation evaluation. The Course aims are to give the attendees an understanding of the concepts of formation evaluation and well logging; an understanding of the physical principles of the tools used in logging; and an ability to characterize formations based on interpretation of well logs. More specifically, by the end of the course, the attendees will understand the properties of rocks and fluids that produce characteristic signals; be able to read and interpret a well log; be able to analyze the measurements and correct for environmental factors; and be able to interpret the log to discern porosity, water saturation, lithology, and hydrocarbon content. To find out more about the MSc Petroleum Engineering visit: http://www.nexttraining.net/masters.cfm.

COURSE CONTENT
- Concepts of formation evaluation and well logging
- Physical principles of the tools used in logging
- Characterize formations based on interpretation of well logs
- Properties of rocks and fluids and their characteristic signals
- Reading and interpreting well logs
- Analyzing the measurements, correcting for environmental factors, and interpreting logs to estimate porosity, water saturation, lithology, and hydrocarbon content.

AUDIENCE
Geologists, geophysicists, reservoir engineers, production engineers, petrophysicists, and asset teams.

Integrated Reservoir Analysis

Foundation - 5 Days

This course will help attendees develop subsurface skills for integrated analysis of rock, pore, and fluids and to solve problems associated with identifying and exploiting reserves. Experience gained will allow attendants to apply tools for analysis of the underlying uncertainty and assumptions used in many reservoir analysis techniques. A subsurface integration process model is presented that provides a multidiscipline methodology for solving reservoir problems, from facies to petrophysical rock typing through flow unit characterization to reservoir modeling.

COURSE CONTENT
- Generic integrated workflow process
- Integration of geology, facies, and petrophysical rock types
- Total and effective porosity
- Basics of core-log integration
- Applied capillary pressure, wettability, and relative permeability
- “Water saturation is not an accident…”
- Upscaling from pore throat radius to petrophysical rock type to flow units
- Introduction to saturation height modeling
- Petrophysics: Key to success in a static or dynamic model
- Relationship between the free-water level, various contacts, pore throat radius, wettability, and saturation distribution

AUDIENCE
Geologists, geophysicists, reservoir engineers, production engineers, petrophysicists, and asset teams.

Integrated Wellbore and Reservoir Analysis: From Pore to Well Test Scale

Foundation - 5 Days

This course helps attendees develop subsurface skills for integrated analysis of rock, pore, well test, and fluids to solve problems associated with identifying and exploiting reserves. Experience gained will allow the attendants to apply tools for analysis of the underlying uncertainty and assumptions used in many reservoir analysis techniques. A subsurface integration process model is presented that provides a multidiscipline methodology for solving reservoir problems, from facies, petrophysical rock typing, flow unit, and the basics of well test information for a better understanding of reservoir characterization and the input required for a reservoir mode.

COURSE CONTENT
- Generic integrated workflow process
- Integration of geology, facies, and petrophysical rock types
- Total and effective porosity
- Basics of core-log integration
- Applied capillary pressure, wettability, and relative permeability
- “Water saturation is not an accident…”
- Upscaling from pore throat radius to petrophysical rock type to flow units
- Introduction to saturation height modeling
- Petrophysics: key to success in a static or dynamic model
- Relationship between the free-water level, various contacts, pore throat radius, wettability, and saturation distribution
- Using pressure gradient analysis to establish the free-water level.
- Basic introduction to well test analysis and how the results can be integrated for an improved reservoir characterization

AUDIENCE
Geologists, geophysicists, reservoir engineers, production engineers, petrophysicists, and asset teams.

PREREQUISITE
A working understanding of geology, reservoir properties, and petrophysics.

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
## Petrophysics for Drilling Engineers

### Foundation - 5 Days

This 5-day course covers the following major fields: (1) Basics of well logging, reservoir rock basics in the logging life of a well, tool conveyance, mud log, wellbore stability and filtrate diameter of invasion depth control log quality control, gamma ray, and spontaneous - potential including tool physics and applications to estimate clay volume, clay type, and formation water salinities. (2) Porosity and lithology using density and neutron tools; physics and applications. (3) Acoustic tool physics and applications for rock mechanics, wellbore stability, and secondary porosity. In addition to the applications of acoustic tools for predicting high-pressure zones. (4) Resistivity tool measurements, including tool physics of shallow Rxo, laterolog, and induction and advanced technology resistivity tools. (5) Wireline formation testing tool physics and the theory and applications of these tools to determine mobilities, reservoir pressure and fluid contacts in the reservoir. (6) Measurement-while-drilling and logging-while-drilling data acquisition data acquisition of porosity, lithology, pulsed neutron sigma, and resistivities. (7) Formation pressure geostatistics basics and seismic acoustic interpretation covering the evaluation of clay volume (Vsh, Vcl) evaluation, estimating the m and n parameters in the Archie Equation, quicklook techniques to estimate the oil/water, gas/water, and oil/gas contacts, salinity estimations of formation water and filtrate water, and unmoved hydrocarbon zones plus estimation of porosity, lithology, and water saturations in clean and in shaly sands.

### Course Content

- Reservoir rock and life of a well
- The mud log and its applications
- Basics of well logging
- Log quality control
- Resistivity measurements and the spontaneous potential applications to estimate water salinity and volume of shale
- Acoustic log: secondary porosity, rock mechanical properties and wellbore stability
- The Neutron Log, neutron spectroscopy and sigma neutron capture cross-section
- Basics of resistivity and the Archie Equation
- Wireline formation testing
- Measurement while drilling and logging while drilling
- Estimating the “m” and “n” parameters in the Archie equation
- Quicklook techniques

### Audience

Drilling engineers, directional drillers, and other geoscientists associated with drilling.

### Prerequisite

None

## Practical Wireline Logging for Geoscientists

### Foundation - 5 Days

This course, an integrated wireline logging course for geoscientists that combines theory and practice, will be held at the Schlumberger Wireline Logging British Training Centre in Livingston, Scotland. The main objective of the course is to expose the attendees to both the practical and theoretical aspects of wireline logging data acquisition and applications. The theoretical and practical sessions will cover a wide range of tools such as resistivity, nuclear, sonic, borehole imaging, and nuclear magnetic resonance technology. The theoretical portion of the course will cover the tool physics, data acquisition procedures, log quality control, and a short workshop session on data interpretations. The workshop focus will be on interpretations in shaly sand formations, and various shaly sand equations used to estimate water saturation such as the Waxman-Smits and dual-water equations. No special software will be required. Logging operations will be performed under real conditions in the test wells at the Schlumberger Wireline Logging British Training Centre. The practical portion of the course involves hands-on connecting and running of logging tools in the hole, monitoring depth control, and the normal data acquisition procedure and log quality control. The course will be 50% in classroom and 50% on the well pad. Personnel protective equipment will be required during the practical sessions.

### Course Content

- Theory and workshops
- Tool conveyance, depth control, and log quality control
- Gamma ray spectroscopy: Applications for shale evaluations, clay typing and geological modeling
- Borehole imaging applications for structural and stratigraphic interpretations: microresistivity imaging in conductive muds and ultrasonic imaging in oil-base muds
- Density and neutron porosity log: theory and applications
- Gamma ray applications and borehole imaging workshop

### Theory and Applications

Combining density-neutron for effective porosity, total porosity and lithology evaluations.

### Geophysical Logging: Elemental Capture Spectroscopy and its applications for complex lithology evaluations.

### Audience

Log analysts, petrophysicist, geologists, and wellsite geologists needing to become better acquainted with the practical aspects of wireline logging data acquisition and interpretation.

### Prerequisite

Basic understanding of geology and formation evaluation.
<table>
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<tr>
<th><strong>PETROPHYSICS</strong></th>
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<td><strong>Well Placement Fundamentals</strong></td>
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<td><strong>Advanced Carbonate Petrophysics from Pores to Logs</strong></td>
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### Statistics and Petrophysics

**Foundation - 5 Days**
Structured to provide a strong foundation in the use of statistics for petrophysical interpretation, this course provides attendees with the basis for building static 3D models. Attendees are introduced to the use of statistical distributions, various averaging methods, smoothing, curve fitting, and regression methods in addition to learning how to understand when a dataset is statistically significant and how statistics affect typical numerical transforms, such as total porosity, effective porosity, absolute permeability, lithology, and water saturation.

**COURSE CONTENT**
- Fundamentals of statistics as applied to petrophysics
- Significance of residual analysis and multilinear regression to improve quality of fit (R2)
- Improving fit by adding grain size, shale volume, gamma ray, lithology, and additional porosity devices
- Nonparametric approaches to evaluate nonstandard porosity-permeability relationships
- Mechanisms to control water saturation distributions
- Empirical methods to calculate Winland pore throat radius, petrophysical rock type, and log-computed water saturation

**AUDIENCE**
Petrophysicists, geoscientists, and engineers wanting a better understanding of statistics used in petrophysical interpretation.

**PREREQUISITE**
Basic understanding of reservoir characterization and petrophysics.

### Tool Physics: Standard Logging Tools

**Foundation - 5 Days**

This course covers the basic logging tools:
1. The GR log physics and GR spectroscopy and its applications for geological modeling, estimating shale volume (Vsh), and determining the clay type (e.g., illite, smectite, etc.).
2. The SP physics of the SP log, its applications for estimating Vsh and the salinity of the formation water.
4. Density and hotech electric log physics and applications in measuring porosity and determining lithology.
5. Neutron-log applications in determining porosity and the sigma applications to estimate "n" at downhole conditions and the applications of the density-neutron log in determining porosity, lithology, shale volume, hydrocarbon trends, and shale distribution (dispersed or laminated).
6. Resistivity tool physics of the shallow Fkx,laterolog, and induction, and high-technology resistivity tools, which use forward modeling to provide five resistivity data curves at different depths of investigation.
7. Wireline formation testing (WFT) tool physics and the theory and applications of WFT in determining mobilities, reservoir pressure, and fluid contacts in the reservoir. An overview will be presented on the high-technology tools that include: dielectric Tool and its applications to estimate "m" and "n" at downhole conditions, nuclear magnetic resonance imaging borehole gravity meter, borehole resistivity imaging, and borehole ultrasonic imaging.

**COURSE CONTENT**
- Basics of logging
- Resistivity logging - The Archie Equation
- Forward Modeling and Inversion
- GR log physics, GR spectroscopy, and applications
- SP physics applications
- Density and photoelectric log physics and applications
- Neutron log applications
- Pulsed neutron log
- Density-neutron log applications
- Resistivity tool physics
- Wireline formation testing
- High-technology tools

**AUDIENCE**
Suitable for anyone new to the oil and gas industry.

**PREREQUISITE**
None

### Well Placement Fundamentals

**Foundation - 5 Days**

This course introduces the concept of geologic well placement (geostacking) and provides knowledge of the processes and techniques that can be used to successfully place high-angle and horizontal wells using geological and petrophysical data in real-time during drilling. The main purpose of high-angle and horizontal wells is to maximize reservoir contact and enhance well productivity. To plan and construct such wells requires real-time collaboration between geologists, who need quality formation evaluation data, drillers, who require considerable input from the geologists; and petrophysicists, who interpret the formation evaluation data during the drilling process to optimize well placement. This process is generally facilitated by the well placement coordinator. Various technologies involved in directional drilling, measurement, and formation evaluation while drilling are reviewed. The three different methods used to geologically place horizontal wells are introduced and the applications are discussed.

**COURSE CONTENT**
- Introduction to geological well placement
- Review of reservoir geology
- Directional drilling
- Measurement while drilling
- Formation evaluation and logging while drilling
- Applications of LWD measurements in well placement
- Applying well placement methods
- Case studies illustrating the use of the three well placement methods

**AUDIENCE**
Multidisciplinary asset teams of operating companies comprised mainly of drilling engineers, reservoir engineers, and geoscientists who need to make decisions regarding the applicability and benefits of implementing a geological well placement process for drilling horizontal and high-angle wellbores.

**PREREQUISITE**
Geoscience or engineering degree.

### Advanced Carbonate Petrophysics from Pores to Logs

**Skill - 5 Days**

This is a hands-on course focused on why pore geometry must be the focal point for carbonate petrophysical analysis. Attendees will work with petrographic information, mineralogy data, routine core analysis, capillary pressure, electrical rock properties, nuclear magnetic resonance, and openhole logs. The importance of core-log integration and cross calibration is shown as well to reduce the uncertainty of computed reservoir properties. Petrophysical property analysis is often the key to building a static reservoir description; however, in carbonates, a model that is not cross calibrated from core to logs to seismic may result in a large statistical uncertainty.

**COURSE CONTENT**
- Carbonate pore geometry
- Overview of carbonate systems
- Total and effective porosity
- Lithology and mineralogy
- Core-log calibration (lithology, porosity (PHI), permeability (PERM), Sw)
- Quicklook log analysis (lithology, PHI, Sw, PERM)
- Why petrophysical rock types are important
- Applied capillary pressure
- Log-based Sw
- Applied flow units

**AUDIENCE**
Any subsurface professional working on early field development, static model building, or advanced recovery methods in carbonates.

**PREREQUISITE**
Basic understanding of carbonate depositional systems, lithology, and pore geometry.
<table>
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<tr>
<th><strong>Advanced Core and Log Interpretation</strong></th>
<th><strong>Advanced Integrated Reservoir Analysis</strong></th>
<th><strong>Applied Core Analysis: How to Interpret Core Data</strong></th>
<th><strong>Dipmeter and Borehole Image Logging</strong></th>
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<td><strong>Skill - 6 Days</strong></td>
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<td><strong>Skill - 5 Days</strong></td>
<td><strong>Skill - 3 Days</strong></td>
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In this course, attendees will learn the impact that laboratory-based core data have on formation evaluation and understand the borehole data that are required for an integrated model of the reservoir at the wellbore scale. Instruction covers the key objectives of core-log calibration, including porosity, lithology, saturation, and petrophysical rock types, and makes use of core-to-log calibration workshops. In a workshop setting, attendees will increase their understanding of how the integration of lithology, pore geometry, porosity, permeability, and water saturation can improve a static reservoir model.

**COURSE CONTENT**
- Core-log integration workflow
- Core and log integration and depth shifting
- Fundamentals of log analysis using NExT 4-Line interpretation method
- Texture of matrix and pore system in context of geological framework and lithology calibration
- Porosity: Total, effective, and clay parameters (wet, dry)
- Quick-look hydrocarbon identification methods and water resistivity (Rw), oil resistivity (Ro) and apparent water resistivity (Rwa)
- Log Sw using Archie-based techniques: Variable m method
- Use of capillary pressure data for calibrating water saturation
- Petrophysical rock types
- Permeability prediction

**AUDIENCE**
Petrophysicists, geoscientists, engineers, log analysts, and other subsurface professionals responsible for exploitation or early field development projects.

**PREREQUISITE**
A working knowledge of Microsoft Excel software and a basic understanding of statistics.

The use of the subsurface integration model can resolve reservoir problems that range from petrophysical rock typing to log analysis. In this course, attendees will learn how to perform an integrated analysis of rock, pore, and fluids data and how to solve problems associated with identifying and exploiting reserves. The attendees will apply tools for analysis of the underlying uncertainty and assumptions used in many reservoir analysis techniques in addition to learning how to identify lithologic zones and fluid types from log data, follow simple procedures for rapid and accurate interpretation, and apply correlations to core and petrophysical rock type zonation to upscale log data for reservoir simulation applications. Course materials cover advanced interpretation for better understanding of dataset limitations and measurement requirements for effective reservoir development, reservoir drive mechanisms, recovery factor, and simulation models. The attendees will gain experience with NExT QuickScan and quick-look techniques through in-class exercises.

**COURSE CONTENT**
- Integrated reservoir analysis overview and case histories
- Petrophysical rock types and flow units
- Principles of saturation distribution and capillary pressure from laboratory data
- Quicklook analysis and interpretation techniques
- Saturation calculations
- Tool corrections for resistivity and Xro measurements, and tornado chart corrections
- Porosity measurements (sonic, neutron, and density)
- Capillary pressure and electrical rock properties
- Quicklook carbonate and shaly sand analysis
- Advanced log analysis

**AUDIENCE**
Petrophysicists, geoscientists, and engineers responsible for reservoir characterization who rely on core interpretation and other integrated petrophysical data for decisions and analyses.

**PREREQUISITE**
Basic understanding of geological concepts and reservoir characterization.

Increase your understanding of petrophysical properties as applied to the interpretation of reservoirs from a core analysis perspective. This comprehensive course provides attendees with detailed instruction on basic petrophysics, measurement methods, and the controls over porosity, permeability, fluids, wettability, and relative permeability data analysis. The attendees investigate and understand the source of petrophysical data errors through hands-on correlation of a sample log: a core dataset is analyzed and the saturation-height model is created.

**COURSE CONTENT**
- Reservoir geology
- Upscaling
- Preliminary characterization using core analysis, coring methods, and fluids data
- Lithology from a facies, sedimentary structure, and core description
- Fractured systems
- Characterization of pore geometry using diagenesis interpretation
- Clays and their impact on water saturation
- Total versus effective porosity
- Petrophysical rock types and differences between fluid contacts and free water level
- Rock electrical properties and their use in water saturation equations
- Relative permeability and wettability

**AUDIENCE**
Petrophysicists, geoscientists, and engineers responsible for reservoir characterization who rely on core interpretation and other integrated petrophysical data for decisions and analyses.

**PREREQUISITE**
Basic understanding of geological concepts and reservoir characterization.

Attendees will gain a practical understanding of the basics of dip and image measurement techniques in the borehole environment with an introduction to structural and stratigraphic dip analysis. The course focuses on borehole imaging, data acquisition, tool design, and data transfer from the drill bit to the workstation. Attendees learn how borehole imaging can help determine fracture orientation, identify fluidial channels, assess pore-type partitioning, distinguish matrix and fracture, improve geostriping, and determine in situ stresses. Discussions include advanced technologies for exploiting shale gas and coalbed methane resources.

**COURSE CONTENT**
- Tool review: dipmeter to high-resolution FMU microcamer, including tools for oil-based muds
- Acoustic imaging tools and LWD tools
- Image log QC
- Geomechanics during the oilfield life cycle
- Fracture interpretation
- Fluvial facies interpretation
- Borehole image and dipmeter data integrated with outcrop and core data
- Deepwater and turbidite depositional settings
- Carbonate reservoir porosity and permeability
- Integration of borehole image logs and production logs

**AUDIENCE**
Geologists using image logs for geologic sedimentary and structural analysis, and geologists and engineers wanting to increase fracture interpretation skills.

**PREREQUISITE**
Basic understanding of image tools, applications, and sedimentology and structural geology.
Intermediate Production Logging and Reservoir Monitoring
Skill – 5 Days
This course provides attendees with in-depth instruction on cased hole logging tool physics, interpretation, and QC techniques for wellbore-specific production logging and reservoir monitoring scenarios. Attendees learn how and when to use these tools to meet logging objectives and quicklook techniques for identifying log QC problems. Using hands-on examples, the attendees learn to interpret behind-casing resistivity data and measure three-phase flow using production logs.

COURSE CONTENT
- Inflow performance and productivity index for oil wells and gas wells
- Outflow performance: Matching inflow with outflow to optimize productivity
- Flow regimes in vertical, deviated, and horizontal wells
- Techniques for measuring individual fluid velocities of oil, water, and gas
- Three-phase holdups from electrical and optical sensors
- Production logging in horizontal wells
- Pulsed neutron log physics, capture cross section, and carbon/oxygen logging
- Cased hole formation resistivity data
- Workshops: Capture mode for evaluating water and gas saturation; Interpreting behind-casing resistivity logs; three-phase flow

AUDIENCE
Petrophysicists and engineers responsible for wellbore diagnostics or reservoir monitoring who want a detailed understanding of cased hole logging tools.

PREREQUISITE
Basic Production Logging and Reservoir Monitoring course or more than 1 year of experience with applied cased hole logging.

MWD and LWD Tool Physics and Applications
Skill – 5 Days
This course covers the basics of measurement while drilling (MWD) and LWD. The basics include signal processing and tool combinations, MWD data acquisition, LWD tool, physics, and applications for integrated log data acquisition that includes neutron spectroscopy, Sigma capture cross section, resistivities, density-photoelectric cross section, GR, and borehole caliber imaging. The new-technology sourcelses neutron and density data acquisition, LWD acoustic measurements, LWD seismic measurements, LWD formation pressure, and formation mobility while drilling LWD NMR while drilling, LWD laterolog and induction resistivity measurements, LWD borehole imaging, LWD geosteering tool physics and applications are also presented.

COURSE CONTENT
- MWD-LWD principles and data transmission
- Integrated log data
- Sourceless density and neutron logging
- Acoustic and seismic measurements
- Formation pressure
- Magnetic resonance imaging
- Laterolog and induction resistivity measurements
- LWD borehole imaging GeoSteering physics and applications
- Borehole imaging as an aide for GeoSteering

AUDIENCE
This is an opportunity for technical personnel in all fields, irrespective of their experience to have a full and wide exposure to the various new technologies of MWD and LWD.

PREREQUISITE
None

Openhole and Cased Hole Data Acquisition and Interpretation
NEW
Skill – 5 Days
This course covers openhole, cased hole, and production logging tools and their applications. Attendees will learn openhole logging tool principles, interpretation of log data using quicklook techniques, and how to interpret data from complex shale bearing formations. Instruction includes cased hole logging applied to reservoir monitoring problems, how to evaluate production problems and two- and three-phase flow rates using production logging tools in vertical, deviated, or horizontal wells. The attendees will use actual field log data in exercises to learn these techniques, including log quality control workflows.

COURSE CONTENT
- Basics of logging
- Reservoir rock and fluid properties
- Openhole logging tool principles and types and interpretation techniques
- Cased hole evaluations
- Well integrity: CBL-variable density log, ultrasonic, slim cement mapping tool, Isolation Scanner* cement evaluation service
- Casing corrosion principles: Ultrasonic, multifinger calipers, electromagnetic (ETT)
- Reservoir monitoring: Inelastic capture, carbon/oxygen ratios, pulsed neutron capture tools, cased hole formation resistivity
- Production logging principles and tools: Optical and electric sensors, flowmeters, FloScan Imager
- Estimating fluid holdup, two- and three-phase flow estimation

AUDIENCE
Petrophysicists, geoscientists, or engineers.

PREREQUISITE
A 2-year technical degree and an understanding of well operations.

Tool Physics of High-Technology Imaging and Logging Tools
Skill – 5 Days
NEW
This course covers the physics of all of the available advanced imaging logging tools. Included is the concept of the forward modeling and inversion WFT tool, the wide applications, tool hardware, and applications in low-permeability zones using straddle packers. The Pressure Gradient Analysis Sampling Optical Spectroscopy provides hydrocarbon composition information. New developments in LWD tools include sourceless logging to obtain density, Pn, neutron porosity, and ressure measurements while logging. Neutron logging, nuclear physics of neutron interaction with the formation, advances in neutron logging, reservoir monitoring using carbon/oxygen tools, borehole imaging for geological modeling, structural and stratigraphic features, fracture evaluations using microresistivities, ultrasonic imaging Cross-Well Electromagnetic Imaging Scanner Family of radial and circumferential imaging. This course also covers Dielectric Scanner logging, NMR Scanner Imaging, Resistivity scanner to give vertical resistivity (Rv) and horizontal resistivity (Rh), and Acoustic Scanner Formation Resistivity measurements behind the casing.

COURSE CONTENT
- Forward modeling and inversion
- WFT
- Optical spectroscopy
- New developments in LWD
- Neutron logging
- Borehole imaging
- Scanner family of radial and circumferential imaging
- Resistivity scanner and acoustic scanner
- Formation resistivity measurements behind the casing

AUDIENCE
Suitable for experienced engineers in all technical areas of the oil and gas industry who need a solid base to be up to date and understand the applications of this technology.

PREREQUISITE
None

Visit NExTTraining.net/classes for the latest calendar or to register for a course.
Advanced Formation Evaluation in Carbonates

COURSE CONTENT
- Carbonate geology and deposition
- Nuclear magnetic resonance and NMR-Scanner
- Acoustic measurements and the acoustic scanner
- Borehole imaging
- Physics of neutron logging and dielectric logging
- Variable-m and the formation factor applications
- Wettability and the variable-n
- Effect of vugs and fractures on resistivity measurements
- Quantitative evaluation of the dual porosity in carbonates
- Permeability estimations
- Connectivity Theory
- Flow Units and the Lorenz plots
- Capillary Pressure from core analysis and NMR T2 conversion
- The J-Function
- Rock types: Winland and the ADNOC function

AUDIENCE
Extremely useful to petrophysicists, reservoir engineers, and geologists working in carbonate reservoir environments.

PREREQUISITE
None

Advanced Formation Evaluation in Carbonates, Clastics, and Basement Rock

COURSE CONTENT
- Geology of carbonates and sandstones
- Core analysis
- Shale analysis
- Laminated and dispersed shale
- CEC from cores and logs

AUDIENCE
Suitable for all geoscientists and engineers who will benefit greatly from exposure to advanced knowledge and expertise in formation evaluations in carbonates, clastics and basement rock.

PREREQUISITE
None
Advanced Formation Evaluation in Sandstones

This course includes geology of clastics reservoirs and tectonic activities, GR and SP tool physics and applications in estimating clay volume, clay type, and formation water salinities will be presented. In the area of acoustics, tool physics and applications for rock mechanics; well bore stability, and sandstone compaction in addition to applications of acoustics for predicting high-pressure zones. The physics and applications of the Sonic Scanner acoustic scanning platform are presented for evaluating anisotropy. Nuclear log data and tools include density, photoelectric, and neutron tools theory and applications to clastics reservoir. Detailed applications of the density-neutron include crossplot for estimating the volume of clay (Vcl, Vsh) and the trends in silt, laminated shale, and dispersed shale. Core analysis is used to obtain porosity and permeability. Shale analysis is performed using elemental capture spectroscopy to provide evaluations of lithology and shale volume in addition to dispersed and laminated shales. CEC and its applications in the Waxman-Smits equation, detailed derivation of the dual-water equation, and comparison with the Waxman-Smits and modified Waxman-Smits equations are presented. Log interpretation in clastics is covered by presenting the derivation and applications of the various shaly sand equations, both the empirical versions (e.g., Indonesia, Nigeria, etc.), and the excess conductivity equations (e.g., Waxman-Smits, dualwater, etc.). Permeability estimations in clastics reservoirs include pore geometry and flow units in addition to capillary pressure measurements, and capillary pressure obtained from NMR J-Factor applications, and flow units by applying the modified Lorenz principle to petro-rock typing.

COURSE CONTENT
- Geology of clastics reservoirs
- Gamma ray and spontaneous potential logs
- Core analysis to obtain porosity and permeability
- Determine effective porosity, shale volume and total porosity
- Determine sand compaction and mechanical properties
- Shale analysis
- CEC analysis
- Evaluations of dispersed and laminated shale
- Shaly sand equations
- Rock pore type and flow units
- Capillary pressure analysis
- Rock pore type in clean sands
- Flow units and the use of the Lorenz plot

AUDIENCE
Suitable for all geoscientists and engineers who will benefit greatly from exposure to advanced knowledge and expertise in formation evaluations in clastics.

PREREQUISITE
None

Advanced Production Logging

This is a 5-day course for attendees with a solid background and some experience in production logging. The attendees should have attended the Cased Hole Production Logging and Reservoir Monitoring Course. This course will focus on extending the level of the earlier cased hole course through in-depth evaluations of 2- and 3-phase flow in tubulars in workshop environments to alleviate the level of exposure to advanced and more complex production systems. Local examples will be reviewed and used as a working basis for such a session. The course will also review the various types of reservoir fluids and will investigate in detail near-wellbore formation damage and the concept of positive and negative skin. This investigation is intended to help analyze the productivity index (PI) of each zone in commingled production and analyze underperforming wells. Reservoir saturation monitoring will be presented in in-depth details with an emphasis on the principles of the tools and their measurement accuracies. Carbon/oxygen ratio calibrations will also be analyzed in detail and an interpretation workshop will also be given using local examples. The course will highlight the applications of this technique in estimating water saturations behind the casing and the salinity of invading water. Behind-casing formation resistivity will also be reviewed in detail and the results compared with the carbon/oxygen ratio and pulsed neutron logging applications. Cased hole formation evaluation will also be presented and will include a review of techniques for sampling and for measuring pressure behind the casing.

COURSE CONTENT
- Reservoir fluids
- Formation damage
- Advanced production log interpretations
- Measuring fluid velocities
- Measuring hold-ups
- Classical examples of 2- and 3-phase flow domains
- Advanced production log interpretation workshop
- Saturation monitoring and water salinities
- Saturation monitoring workshop
- Cased hole formation tester
- Visit an operation base and/or the training center

AUDIENCE
Production and reservoir engineers and production technologists who have to work on reservoirs.

PREREQUISITE
Average level of experience in the use of cased hole log interpretations.

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
**Applied Production Logging and Reservoir Monitoring**

Advanced - 5 Days

Encompassing advanced techniques for production logging and reservoir monitoring, this course teaches attendees the design of a data-acquisition program for evaluation of wellbore or reservoir behavior based on field development objectives. Hands-on examples demonstrate in-depth log interpretation techniques for resistivity measurements acquired behind casing, three-phase flow in horizontal wells, and fluid saturations. Attendees will learn quicklook techniques for log quality control as well as how to plan and integrate multisource data for a more complete evaluation.

**COURSE CONTENT**
- Inflow and outflow performance and productivity
- Flow regimes and slippage velocities in vertical, deviated, and horizontal wells
- Various techniques of measuring oil, water, and gas velocity
- Measurement of three-phase holds using electrical and optical sensors
- Spinner calibrations in vertical, deviated, and horizontal wells
- Three-phase production logging in horizontal wells
- Physics of pulsed neutron and carbon/oxygen logging
- Pressure data and formation fluid sample acquisition behind casing
- Workshop: Use of capture and carbon/oxygen modes for evaluating water and gas saturations
- Workshop: Interpreting resistivity logging measurements acquired behind casing
- Workshop: Production logging in horizontal wells with three-phase flow

**AUDIENCE**
Professionals with geoscience background and minimum of 2 years of exposure to field production.

**PREREQUISITE**
More than 2 years of experience interpreting reservoir monitoring logs (attendees are encouraged to bring difficult log examples for in-class discussion and interpretation).

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**Applied Reservoir Petrophysics and Characterization**

Advanced - 7 Days

Through dynamic modeling, attendees gain an advanced understanding of applied reservoir petrophysics and characterization using integration of data at the core scale. The attendees will learn how to exploit interpretation techniques to spot exploration opportunities, such as bypassed pay and new resources in existing fields in addition to learning how to improve dynamic simulation modeling through integration of petrophysical data. Attendees study advanced permeability and capillary saturation models, and construct a wellbore numerical simulation based on facies, petrophysical rock types, and Next QuickScan-based flow units.

**COURSE CONTENT**
- Petrophysical rock types
- Water saturation (Sw) and impact of capillary pressure and rock electrical properties
- Comparison of log-based Sw relationships
- Permeability prediction and capillary saturation workflows with example model construction
- Height function and Thomeer approaches
- Drainage and imbibition relative permeability curves and their relationship to wettability
- Wellbore simulation using petrophysical rock types, facies, and flow unit
- Recovery factor simulation based on petrophysical data
- Application of field-study flow units

**AUDIENCE**
Petrophysicists, geoscientists, and engineers responsible for advanced reservoir characterization and modeling.

**PREREQUISITE**
Basic understanding of reservoir characterization and petrophysics.

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**Production Logging Solutions Workshop**

Advanced - 5 Days

This immersive workshop teaches attendees how to interpret difficult production logging scenarios and to diagnose production behaviors not included in classical interpretation techniques. Through a hands-on, interactive workshop, using your data and problems, attendees learn how to adjust their interpretation techniques for mechanical or fluid-specific phenomena.

**COURSE CONTENT**
- High-tech production logging tools for horizontal wells
- Flow regimes in horizontal wells and effects on production log interpretations
- Spinner calibrations and production log interpretations in horizontal wells
- Reservoir fluids and drive mechanisms
- Inflow and outflow performance
- Justification for production logging
- Leak detection inside and behind casing and tubing
- Techniques for estimating three-phase fluid velocities
- Three-phase fluid holds in vertical, deviated, and horizontal wells
- Slippage velocities in vertical and deviated wells

**AUDIENCE**
Petrophysicists and production engineers with experience in casetrack hole logging and log interpretation.

**PREREQUISITE**
More than 2 years of experience interpreting production logs.

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**Reservoir Monitoring Solutions Workshop**

Advanced - 5 Days

This immersive workshop teaches attendees how to interpret difficult reservoir monitoring scenarios and to diagnose reservoir behaviors not included in classical interpretations. Focused on reservoir monitoring logging techniques, this course provides attendees with specific strategies for their use and interpretation. Through a hands-on interactive workshop, using your data and problems, attendees will learn how to adjust interpretation techniques for reservoir and field-wide phenomena, especially in waterflood operations. Attendees are encouraged to bring difficult log examples for in-class discussion and interpretation.

**COURSE CONTENT**
- Reservoir fluids and drive mechanisms
- Inflow and outflow performance
- Reservoir monitoring log justification
- Nuclear physics of reservoir monitoring and PNL
- PNL tools (Schlumberger and Halliburton tools)
- PNL capture cross-sectional measurements and carbon/oxygen data
- Log-inject-log technique to estimate residual oil saturation
- Formation resistivity acquisition behind steel and nonconductive casing
- Pressure measurements and sampling behind casing
- Field mapping of waterflood to identify unswept zones

**AUDIENCE**
Petrophysicists and production engineers with experience in reservoir monitoring logging and log interpretation.

**PREREQUISITE**
More than 2 years of experience interpreting reservoir monitoring logs.
<table>
<thead>
<tr>
<th>Course Title</th>
<th>Duration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well Integrity</td>
<td>Advanced</td>
<td>This course teaches the monitoring and diagnosis of wellbore integrity using cased hole logging tools. Attendees will learn how to detect and identify interzone crossflow caused by uneven depletion, and leaks inside and behind the casing. Topics include evaluating cement bond quality, establishing corrosion monitoring, and verifying perforation efficiency.</td>
</tr>
<tr>
<td>Techlog Fundamentals</td>
<td>Awareness</td>
<td>The Techlog platform interactive suite brings all of the petrophysical and geological data together. Attendees will learn the fundamentals of this application and its Techplot, Techdata, and Quanti base modules. In addition, the use of the data model within the Techlog application and the foundation utilities for loading, unloading, manipulating, and displaying data in the system, including core and images will be explained. The course topics include deterministic calculations and the principles behind the calculation workflow interface for single- and multwell use.</td>
</tr>
<tr>
<td>GeoFrame CPS-3 Mapping Fundamentals</td>
<td>Foundation</td>
<td>This course provides the fundamentals attendees need to produce accurate reserves maps using GeoFrame CPS-3 software. Fully integrated with GeoFrame Geology and Geophysics software modules, CPS-3 software provides accurate surface mapping operations for all mapping requirements.</td>
</tr>
<tr>
<td>Petrel Well Correlation</td>
<td>Foundation</td>
<td>The Petrel platform offers various options for well correlation. This course provides attendees with a general overview of correlation and introduces well data import procedures with different formats and the use of the Reference Project tool. This course focuses on setting well section templates, the value of sharing templates between projects, wells, and well section windows, in addition to interpreting and editing stratigraphic and fault well tops (markers) along well paths based on log readings. Attendees will learn advanced discrete and continuous log interpreting and editing options based on existing logs, and apply the different techniques in a typical working order, from simple exploration wells to production phase.</td>
</tr>
</tbody>
</table>

**COURSE CONTENT**

- **Well Integrity**
  - Spinner calibration, single-phase interpretation, and productivity index
  - Leak-detection techniques and applications
  - Temperature database applications
  - Crossflow between zones caused by uneven depletion and prediction without well shut-in
  - Temperature profiling: Optical sensors
  - Casing: Primary and remedial
  - Cement bond monitoring
  - Corrosion mechanisms and monitoring
  - Corrosion mitigation: Cathodic protection and expandable tubulars
  - Perforating: Conveyance, performance, and efficiency
  - Workshop on leak detection
  - Workshop on interzone crossflow

**AUDIENCE**

Petrophysicists and production engineers responsible for field-wide reservoir monitoring or production logging programs.

**PREREQUISITE**

Intermediate Production Logging and Reservoir Monitoring (IP-TC2-NX12990) course, or more than 2 years of experience interpreting cased hole logs.

- **Techlog Fundamentals**
  - Techlog interface and data structure
  - Data management and QC techniques
  - Multivell management
  - Basic plotting tools
  - Workflows for deterministic evaluation using Quanti module
  - User-defined programming language
  - Advanced Techlog platform modules

**AUDIENCE**

Development and exploration log analysts and petrophysicists, geologists, petroleum engineers, managers, and technical personnel with no prior experience using Techlog software.

**PREREQUISITE**

None

- **GeoFrame CPS-3 Mapping Fundamentals**
  - Overview of GeoFrame software
  - Model Editor, Map Editor, and Color Palette Editor modules, and CPS-3 software macro language

**AUDIENCE**

Development and exploration geologists and application support staff.

**PREREQUISITE**

GeoFrame Fundamentals course.

- **Petrel Well Correlation**
  - Project organization, including Studio Favorites, Studio Find, and Studio Annotate E&P knowledge environment features
  - Import procedures for wells and logs, including the Reference Project tool
  - Working and setting well section and templates
  - Seismic and 3D model backdrop
  - Continuous and discrete log interpretation (manual, calculator, and neural nets) and log edits
  - Well top interpretation and edits
  - Time-depth relationship
  - Creating point well data attributes
  - Plotting and presenting results in different windows
  - Workflows for exploration, appraisal, development, and production phases

**AUDIENCE**

Development and exploration geoscientists and petroleum engineers with prior experience in the Petrel platform.

**PREREQUISITE**

Petrel Fundamentals course or equivalent Petrel experience, and general knowledge of petroleum geology.
<table>
<thead>
<tr>
<th>Course Title</th>
<th>Duration</th>
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</thead>
<tbody>
<tr>
<td><strong>Techlog Python</strong></td>
<td>Foundation - 2 Days</td>
<td>This course is designed to introduce attendees to programming basic and advanced scripts in the Techlog platform. The attendees will learn how to create, edit, open, and run scripts in a Techlog workflow. Topics include Python syntax and programming skills, Python and Techlog platform modules (libraries), and advance scripting including reading and writing and creating Techlog platform modules.</td>
</tr>
<tr>
<td><strong>Petrel Advanced Wells</strong></td>
<td>Skill - 2 Days</td>
<td>This course builds on the Petrel Reservoir Engineering course and goes more into depth on modeling of deviated wells. The standard well modeling with the ECLIPSE simulator package and the FrontSim module treats the entire wellbore as a single entity; therefore, the model cannot take into account pressure changes along the wellbore due to friction, valves, or pumps. Such devices are often used with horizontal wells to control the inflow profile along the well trace. To model these effects, a multisegmented well model must be used. This course explains the capabilities of this well model and how to use the Petrel platform to set up the model. Methods for adding completions such as valves and pumps and making development strategies using the equipment are also covered in this course. Sector models can be useful to study portions of a reservoir. This course shows how to define sectors, select boundary conditions, and run sector models.</td>
</tr>
<tr>
<td><strong>Petrel Property Modeling</strong></td>
<td>Skill - 3 Days</td>
<td>This course focuses on the fundamentals of modeling using the Petrel platform. The course covers basic geostatistics, data preparation, data analysis, facies, and petrophysical modeling. Attendees will learn different ways to create property models and how to condition models to existing models and secondary data. This course guides the user through concepts, algorithms, and software functionalities in property modeling. The first portion of the course focuses on the use of basic geostatistical tools through data analysis. Also, premodeling processes concerned with well data preparation will be covered, the first step of which is the property modeling workflow followed by upscaling well logs to create single-property values at the well location for each cell. This technique creates hard data that will be used to populate the 3D grid with either deterministic or stochastic algorithms. The second half of the course focuses on facies and petrophysical modeling workflows using stochastic methods as well as covering the usage of kriging for continuous properties. Implementing data analysis results and using secondary data to constrain the result will also be shown.</td>
</tr>
</tbody>
</table>

**COURSE CONTENT**

- Introduction to Python Scripting
  - History and concept
  - Python programming inside Techlog software
- Introduction to the Python editor
  - Opening and running scripts
  - Programming basics
  - Python syntax and coding rules
- Application workflow interface for Python platform
  - Running your own equations in a multwell and multizone environment
- Python modules
  - Data QC and harmonization, file import (Techlog database)
  - Custom plots (Techlog platform plot)
  - Mathematical and scientific tools (NumPy and SciPy packages)
- Advanced scripting
  - Introduction to advanced basics such as multidimensional lists and dictionaries
  - Introduction to oriented object programming
- Reading and writing files
  - Text, CSV, and Excel files
  - Importing and loading data from Excel files
  - Reporting
- Creating modules and custom libraries

**AUDIENCE**

Software developers or geoscientists with basic programming skills interested in a general understanding of Python scripting in the Techlog platform software.

**PREREQUISITE**

Techlog Fundamentals course.

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**Course Title**

**Petrel Property Modeling**

**Duration**

**Skill - 3 Days**

**Description**

This course focuses on the fundamentals of modeling using the Petrel platform. The course covers basic geostatistics, data preparation, data analysis, facies, and petrophysical modeling. Attendees will learn different ways to create property models and how to condition models to existing models and secondary data. This course guides the user through concepts, algorithms, and software functionalities in property modeling. The first portion of the course focuses on the use of basic geostatistical tools through data analysis. Also, premodeling processes concerned with well data preparation will be covered, the first step of which is the property modeling workflow followed by upscaling well logs to create single-property values at the well location for each cell. This technique creates hard data that will be used to populate the 3D grid with either deterministic or stochastic algorithms. The second half of the course focuses on facies and petrophysical modeling workflows using stochastic methods as well as covering the usage of kriging for continuous properties. Implementing data analysis results and using secondary data to constrain the result will also be shown.

**COURSE CONTENT**

- Basics of uni- and bivariate geostatistics
- Data preparation, including well log editing, calculations, and upscaling for discrete and continuous data
- Facies modeling

**AUDIENCE**

Reservoir engineers or geoscientists with above average experience in the domain.

**PREREQUISITE**

Petrel Fundamentals and Petrel Reservoir Engineering or equivalent experience.

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**Course Title**

**Petrel Advanced Wells**

**Duration**

**Skill - 2 Days**

**Description**

This course builds on the Petrel Reservoir Engineering course and goes more into depth on modeling of deviated wells. The standard well modeling with the ECLIPSE simulator package and the FrontSim module treats the entire wellbore as a single entity; therefore, the model cannot take into account pressure changes along the wellbore due to friction, valves, or pumps. Such devices are often used with horizontal wells to control the inflow profile along the well trace. To model these effects, a multisegmented well model must be used. This course explains the capabilities of this well model and how to use the Petrel platform to set up the model. Methods for adding completions such as valves and pumps and making development strategies using the equipment are also covered in this course. Sector models can be useful to study portions of a reservoir. This course shows how to define sectors, select boundary conditions, and run sector models.

**COURSE CONTENT**

- Standard well model vs. the multisegmented well model
- Pressure drop along horizontal wells
- Designing horizontal wells and wells with laterals
- Setting up multisegmented wells
- Completion design for multisegmented wells
- Development strategies with group control
- Sector models

**AUDIENCE**

Reservoir engineers or geoscientists with above average experience in the domain.

**PREREQUISITE**

Petrel Fundamentals and Petrel Reservoir Engineering or equivalent experience.
### Techlog Formation Evaluation with Quanti.Elán

**Skill - 2 Days**

This course introduces attendees who are experienced log interpreters to building log interpretation models and generating solutions with the Quanti.Elán module of the Techlog platform.

**COURSE CONTENT**
- Load and quality control data (from DLIS or LAS files)
- Precomputation of critical parameters for interpretations, including mineral, rock, and fluid endpoints
- Log response equations with emphasis on neutron porosity and resistivity-based saturation equations
- Initialization and construction of formation evaluation models
- Zoning and classification groups
- Combining formation evaluation models
- Postprocessing
- Customization with python module

**AUDIENCE**
Development and exploration geologists, petrophysicists, and reservoir engineers with prior experience using Techlog software.

**PREREQUISITE**
Techlog Fundamentals course and formation evaluation experience using Techlog software.

### GeoFrame Litho ToolKit Facies Classification

**Advanced - 1 Day**

Attendees perform quick and detailed lithology estimations with the GeoFrame software Litho ToolKit collection of lithofacies tools and analysis techniques. These various techniques can be used to generate and classify lithofacies.

**COURSE CONTENT**
- Apply deterministic methods using multiwell, multiculture GeoFrame LithoQuickLook lithofacies analysis software
- Estimate missing log curves using neural network techniques
- Create multiwell facies logs using any log data as input
- Apply cutoffs on multiple curves
- Artificial neural networks (supervised and unsupervised neural network) for generating facies logs
- Multidimensional histograms
- Clustering methods

**AUDIENCE**
Development and exploration geologists.

**PREREQUISITE**
GeoFrame Fundamentals course.

### Petrel Advanced Property Modeling

**Advanced - 2 Days**

This course focuses on facies modeling, which in recent years has become the standard for guiding and constraining petrophysical models. Pixel-based and object models are demonstrated in addition to complex hierarchical models combining multiple methods. Standard facies modeling methods have their limitations in more complex depositional environments; therefore, this course will explore the more advanced property modeling tools such as the cutting-edge MPS process. Different methods for creating soft probability data using various processes to analyze data, such as trend modeling and geometrical trend modeling, exploring the relationship of secondary data to constrain models will also be covered in this course. There is a special focus on the theory supporting the multipoint statistical concept, covering the creation of good training images and how to incorporate soft probability data, vary direction, and scale in the final simulation model. In addition, this course covers the Geobody modeling tool for extracting seismic bodies and use them directly as “hard data” in the modeling process. Also, GRFS and SGS petrophysical models constrained to the previously generated facies models will be shown. Using automate property modeling workflows to update models in a simple and rapid way will be briefly covered.

**COURSE CONTENT**
- Overview of basic geostatistics
- Creating soft probability data
- Facies modeling methods with classical geostatistics
- Pixel-based and object-based facies modeling methods
- Conditioning and combining modeling methods
- Neural Network Learning Systems
- Multipoint statistics theory
- Region properties
- Conditioning and scaling of MPS models
- Creating and using seismic geobodies
- Multipoint facies simulation
- Conditioned petrophysical modeling (optional)

**AUDIENCE**
Development and exploration geologists, geophysicists, petroleum engineers, reservoir engineers and technical personnel with experience in Petrel® Property modeling.

**PREREQUISITE**
Petrel Fundamentals and Petrel Property Modeling courses or equivalent Petrel experience in addition to a general knowledge of petroleum geology.
Techlog Advanced Analysis
Advanced - 5 Days

In this course, attendees focus on advanced interpretation and processing capabilities for the management of wellbore image data, pressure data, core data, and special core data. One discovers the performance of interpretation workflows for analysis of these data as well as specialized tasks such as facies and rock type detection and propagation. In addition, attendees explore the power of the multiwell and multi-user aspects. You gain a foundation for advanced processing and analysis within the Techlog platform.

Course Content
- Work with core data 1-loading, shifting, correcting for stress, and clay closure
- Work with core data 2-upscaling, rock typing, and special core analysis with capillary pressure data
- Use saturation-height models in core and log domains
- Work with pressure data
- Manage and resolve contacts across multiple initiation regions
- Work with image data-processing, manipulating, displaying, and picking and classifying dips
- Learn thin-bed analysis techniques
- Perform multiple-component inversion

Audience
Development and exploration log analysts and petrophysicists, geologists, petroleum engineers, managers, and technical personnel with Techlog platform software experience.

Prerequisite
Techlog Fundamentals course.

Techlog Borehole Image Interpretation
Advanced - 3 Days

In this course, attendees learn advanced interpretation and processing capabilities for the management of wellbore image data and the performance of interpretation workflows for data analysis. The attendees will gain a full range of skills to manipulate, process, and use all types of borehole image data within the Techlog platform suite.

Course Content
- Load, process, and manipulate image data and core photos
- Pick dips and facies
- Interpret dips and facies

Audience
Development and exploration geologists and petrophysicists involved in wellbore image data processing and interpretation who have prior experience using Techlog platform software.

Prerequisite
Techlog Fundamentals course.

Techlog for Geologists
Advanced - 5 Days

In this course, attendees learn advanced interpretation and processing capabilities with a focus on the management of wellbore image data and the performance of interpretation workflows for analysis of these data. Topics include facies typing using neural network methods, multiwell plotting, cross section building, and mapping in the Techlog platform application. Learn to use Techlog platform geologic tools to achieve efficient data integration.

Course Content
- Load, process, and manipulate image data and core photos
- Pick dips and facies
- Interpret dips and facies
- Neural network techniques for facies prediction
- Use zone editing for field maps, kriging, and multiwell cross sections

Audience
Development and exploration geologists with prior experience using Techlog platform software.

Prerequisite
Techlog Fundamentals course.

Techlog Formation Evaluation
Advanced - 5 Days

Attendees will explore the use of the Techlog platform base modules: Teleplot, Techdata, Quanti, and Quanti. min. In this class, attendees will acquire a solid foundation in the data model within the Techlog platform application and the foundation utilities for loading, unloading, manipulating, and displaying data in the system, including core and images. Deterministic calculations and the principles behind the application workflow interface for single- and multiwell use are covered in this course in addition to studying multiple log and component inversion techniques, thin-bed analysis, and integration of different types of data to enhance the interpretation process. Attendees will also learn how to perform day-to-day tasks within the Techlog platform suite and learn advanced techniques for improving the analysis results.

Course Content
- Techlog interface and data structure
- Data management and QC
- Multicore management
- Basic plotting tools
- Workflows for deterministic evaluation using Quanti modules
- User-defined programming language
- Thin-bed analysis techniques
- Multiple-component inversion

Audience
Development and exploration log analysts and petrophysicists with limited or no experience using Techlog platform software.

Prerequisite
Techlog Fundamentals course.
<table>
<thead>
<tr>
<th>COMPETENCY LEVEL</th>
<th>Well Planning and Design</th>
<th>Drilling Technology</th>
<th>Management and Well Operations</th>
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<tbody>
<tr>
<td>ADVANCED</td>
<td>Well Integrity</td>
<td>Dynamic Pressure Drilling</td>
<td>IWCF Surface Well Control Certification</td>
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<tr>
<td>SKILL</td>
<td>Cement Integrity Assurance and Evaluation</td>
<td>Practical Directional Drilling and Surveying</td>
<td>Mud Logging - Surface Gas Measurement &amp; Fluid Characterization</td>
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<td>Well Design and Construction Engineering: Heriot-Watt University Program</td>
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<td>Drilling Optimization</td>
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<td>Drillstring Design</td>
<td>Cementing Operations</td>
<td>Horizontal, Extended Reach, and Multilateral Drilling</td>
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<td>Casing Design</td>
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<td>HPHT Operational Awareness and Drilling Challenges</td>
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<td>Deepwater Well Project and Risk Management</td>
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<td>Deepwater Drilling Design and Operations</td>
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<td>Drilling Operations Management Simulation</td>
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<td>Drilling Project and Risk Management</td>
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<td>Stuck Pipe and Fishing Operations</td>
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<td>Stuck Pipe and Hole Cleaning</td>
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<td>FOUNDATION</td>
<td>Directional Drilling and Surveying</td>
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<td>Introduction to Deepwater Rig Operations</td>
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<td>Fundamentals of Petroleum Geomechanics</td>
<td>Drill Bits and Hydraulics</td>
<td>Well Placement Fundamentals</td>
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<td>Well Control</td>
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<td>Drilling Fluids</td>
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<td>Petrophysics for Drilling Engineers</td>
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<td>Mud Logging Operations</td>
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<td>Offshore Drilling Operations</td>
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<td>Drilling Engineering</td>
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<td>AWARENESS</td>
<td>Rig Awareness and Familiarization</td>
<td>Introduction to Drilling</td>
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</table>

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
<table>
<thead>
<tr>
<th>Software Technical courses that use software</th>
<th>Includes practical sessions</th>
<th>Field trips</th>
<th>Uses simulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petrel</td>
<td>Drillbench Dynamic Wall Control Modeling Software</td>
<td>Drillbench Dynamic Hydraulics and Temperature Modeling Software</td>
<td>WELLFLO Underbalanced Hydraulics Modeling</td>
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<td>OLGA Advanced Blowout Control</td>
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<td>COURSE CONTENT</td>
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<tr>
<td><strong>Introduction to Drilling</strong></td>
<td><strong>Rig Awareness and Familiarization</strong></td>
<td><strong>Directional Drilling and Surveying</strong></td>
<td><strong>Drill Bits and Hydraulics</strong></td>
</tr>
<tr>
<td><strong>Awareness - 5 Days</strong></td>
<td><strong>Awareness - 5 Days</strong></td>
<td><strong>Foundation - 5 Days</strong></td>
<td><strong>Foundation - 2 Days</strong></td>
</tr>
<tr>
<td>If you work closely with drilling engineering, operations, or management, this course increases the attendees understanding of the concepts, terminology, and processes used in drilling a well. The course provides a complete overview of the workflow involved in the drilling of oil and gas wells, from office to wellsite. Attendees will also learn the roles and responsibilities involved in a drilling operation.</td>
<td>This unique course gives attendees an in-depth exposure to drilling rig equipment and its use with classroom instructions on drilling, cementing, and directional drilling concepts and technology. Learning is reinforced by daily trips to an actual drilling rig where attendees see firsthand the rig and drilling equipment used in well construction. Hands-on and classroom lessons are supported by interactive video training that explains the installation and use of downhole equipment and assemblies.</td>
<td>Attendees will learn the fundamentals, design considerations, and operational aspects of directional and horizontal drilling. This course will increase your understanding of the operations carried out by directional drillsers and how directional and horizontal wells are designed and drilled.</td>
<td>This course will give the attendee in-depth knowledge of the International Association of Drilling Contractors (IADC) Drillbit Classification system, nomenclature, and dull grade reporting procedures. Attendees will learn about the two major classes of drill bits commonly used in oilfield drilling and review drillbit design, drillbit cutting structures, and perform drillbit application exercises. The importance of drillbit hydraulics in the drilling process will be reviewed and the use of hydraulic calculation software/applications highlighted.</td>
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<td><strong>COURSE CONTENT</strong></td>
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<tr>
<td>General drilling operations, including drilling rig types and their uses, and</td>
<td>Life cycle of petroleum reservoir and reservoir development phases</td>
<td>Directional drilling fundamentals, applications, and limitations</td>
<td><strong>AUDIENCE</strong></td>
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<tr>
<td>drilling equipment used on the rig floor and downhole</td>
<td>Drilling operations, including drilling rig types and their uses, and drilling</td>
<td>Terminology, well objectives, and target</td>
<td>Junior drilling engineers, junior well and operations engineers, as well as other</td>
</tr>
<tr>
<td>Drilling deviated, horizontal, and multilateral wells</td>
<td>equipment used on the rig floor and downhole</td>
<td>Well path planning: Calculations and data acquisition</td>
<td>personnel involved in well planning and drilling.</td>
</tr>
<tr>
<td>Hands-on visit to a rig to inspect drilling equipment with participation in</td>
<td>Drilling deviated, horizontal, and multilateral wells</td>
<td>Measurement while drilling</td>
<td><strong>PREREQUISITE</strong></td>
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<td>some rig operations</td>
<td>Hands-on visit to a cementing and pumping unit to discuss completion, cementing,</td>
<td>Downhole equipment: Drilling tools, motors, bits, and bottomhole assemblies</td>
<td>1 to 3 years of field experience with drilling operations and basic math skills.</td>
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<tr>
<td>Wellsite operations: Drilling, logging, casing, cementing, and completions</td>
<td>Torque and drag modeling</td>
<td>Wellsite formations</td>
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<tr>
<td>Drilling kicks and well control</td>
<td>Horizontal wells: Types and planning</td>
<td>Logging, coring, and completion techniques</td>
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<tr>
<td>Real-time data collection, monitoring, and interpretation techniques used in</td>
<td>Wellbore-stability issues and hole cleaning</td>
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<td>during drilling operations</td>
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<tr>
<td><strong>AUDIENCE</strong></td>
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<td><strong>AUDIENCE</strong></td>
<td><strong>PREREQUISITE</strong></td>
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<tr>
<td>Entry-level professionals of all disciplines and nontechnical support staff.</td>
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<td>Drilling engineers, drilling supervisors, trainee drillers, rig engineers, and</td>
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<tr>
<td><strong>PREREQUISITE</strong></td>
<td>None</td>
<td>service company personnel with basic drilling engineering.</td>
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<td>None</td>
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# Drilling Engineering

## Foundation - 5 Days

In this course, attendees will be introduced to the terminology, concepts, processes, and equipment used to drill oil and gas wells. Attendees will learn rig component identification, simple rig-sizing calculations, drilling fluid properties, drillbit selection concepts, directional drilling plan definition, and drilling technologies in addition to covering the planning process followed by drilling engineers, including initiating a well plan and designing a well. The attendees will also learn the basics of cost estimation processes, fundamentals of well control, drilling tool selection, and the important standards used in the drilling industry.

### COURSE CONTENT
- Well construction: Exploration, appraisal, and development drilling
- Drilling rig components and crew roles and responsibilities
- Business of drilling, including well costing and authority for expenditure
- Operational procedures
- Risk management, hazards, and loss-prevention methods
- Drilling fundamentals
- Well design considerations, leasing, contracts, and site preparation to data requirements
- Characteristics of quality well design
- Programming and drilling operations
- Troubleshooting and prevention of common problems
- Well completion options, equipment, perforations, and data-collection tools used for well evaluation
- Well suspension and abandonment procedures

### AUDIENCE
Any E&P professional wanting to better understand the principles of drilling.

### PREREQUISITE
Engineering degree or equivalent work experience in drilling design or operations.

## Drilling Fluids

Foundation - 5 Days

This course provides attendees with a comprehensive understanding of drilling fluids and instruction on the engineering of a mud system, including both water- and oil-based mud systems.

### COURSE CONTENT
- Introduction to drilling fluids: Properties, purpose, and problems
- Regulatory compliance and environmental considerations
- Formation damage
- Inhibition
- Lubricity
- Economic restrictions
- Fluid density
- Rheological properties
- Solids control
- Waste management
- Loss control measure and troubleshooting

### AUDIENCE
Drilling engineers wanting a better understanding of drilling fluids and their use.

### PREREQUISITE
Working knowledge of drilling practices and concepts.

## Fundamentals of Petroleum Geomechanics

Foundation - 5 days

Attendees will learn the fundamentals of rock mechanics, the origin of stresses in the subsurface, and how in situ stresses can be understood from wellbore data. This course, using classroom instruction, exercises, and workshops, teaches attendees how to apply in situ stress data to critical problems in exploration and development.

### COURSE CONTENT
- Impact of geomechanics on oilfield development: Drilling, completions, and field production life
- Principal stresses, pore pressure, effective stresses, stress and strain, elasticity, yield, and failure envelopes
- Laboratory testing: Procedures, limitations, unconfined compression, triaxial compression, thick-walled-cylinder tests
- State of stress in the Earth, pore pressure, and fracture gradient
- Wellbore instability
- Mechanical earth model construction, operational aspects of wellbore stability control
- Sand production and prediction
- Reservoir geomechanics

### AUDIENCE
Technical professionals or managers concerned with wellbore stability, fracture stimulation, reservoir drainage patterns, naturally fractured reservoirs, overpressures, and fault seal analysis.

### PREREQUISITE
None.

## Introduction to Deepwater Rig Operations

Foundation - 5 Days

This course will describe the different types of deepwater drilling units, including the specific equipment requirements and techniques to spud a well. The goal of this course is to expose the attendees to brief but precise information on floating drilling rigs (semisubmersible [SS] and dynamically positioned drillship [DPDS]) and their specific equipment for drilling wells in deepwater zones. Techniques and methods employed extending from the arrival of floating drilling units on a location until the cementing of the casing will be presented. Major issues and solutions faced in deepwater drilling operations is also included as well as the environmental forces and their impacts on deepwater operations. Key learning objectives of this course include what is an SS and a DPDS with their advantages and disadvantages; description and functioning of all specific equipment deployed in deepwater operations, either on the floating rig or subsea (riser, blowout preventer [BOP], wellheads, tensioners, etc.); the different station keeping methods for maintaining a floating drilling vessel on location (mooring, dynamic positioning); and the environmental forces and their impact.

### COURSE CONTENT:
- Floating drilling units
- Vessel stability
- Mooring systems
- Dynamic positioning operations
- Riser systems
- Subsea wellheads and casing operations
- BOP equipment
- Emergency disconnect
- Plug and abandonment

### AUDIENCE
Operators, drilling supervisors, junior level staff, company representatives, new managers, drilling contractor personnel involved in drilling, marine, maintenance, supervision, management, and service company management, and team leaders.

### PREREQUISITE
Basic drilling operations knowledge and an understanding of the marine environment for drilling operations. Offshore drilling experience is beneficial.
## Mud Logging Operations

**Foundation - 5 Days**

This 5-day course consists of practical and theoretical sessions in the classroom, mud logging unit, and workshop. Experienced professionals provide in-depth details on mud logging services, coupled with hands-on practical learning centered on a state-of-the-art training environment at the Schlumberger ELC located in Melun, France. The practical sessions use the mud logging unit, acquisition sensors and sample analysis equipment, geological laboratory, and rig-based training. The course will provide a clear understanding of the primary objective of mud Logging services, which is surface measurement of drilling parameters, gas data, and geological information. The 5-day course focuses on understanding drilling operations monitored through a mud logging system, helping to understand the principle of gas measurements, and to comprehend how geological descriptions are performed together with the process of building a lithotabulic column. By the conclusion of the course, participants will have an improved understanding of the added value of mud logging data, be familiar with all elements related to data quality control, and have the skills needed to challenge the data quality. This course is only available at ELC Melun, Paris.

**COURSE CONTENT**

- Types of drilling rigs
- Primary components of offshore rigs
- Downhole drilling and downhole tools
- Overburden, pore pressure, and fracture gradient
- Well planning: True vertical depth exercise
- Drilling fluids, cementing, and well design workflow
- Casing design and well control
- Drillstring design and directional drilling
- Surveying
- Completions
- Driftstem test from mobile offshore drilling unit

**AUDIENCE**

Drilling engineers.

**PREREQUISITE**

None

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## Offshore Drilling Operations

**Foundation - 5 Days**

An introduction to offshore drilling operations, this course covers the primary drilling equipment, procedures, and design constraints and considerations unique to the offshore environment. Attendees will learn how drilling operations differ for fixed installations and mobile offshore drilling units.

**COURSE CONTENT**

- Types of drilling rigs
- Primary components of offshore rigs
- Downhole drilling and downhole tools
- Overburden, pore pressure, and fracture gradient
- Well planning: True vertical depth exercise
- Drilling fluids, cementing, and well design workflow
- Casing design and well control
- Drillstring design and directional drilling
- Surveying
- Completions
- Driftstem test from mobile offshore drilling unit

**AUDIENCE**

Drilling engineers.

**PREREQUISITE**

None

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## Petrophysics for Drilling Engineers

**Foundation - 5 Days**

This 5-day course covers the following major fields: (1) Basics of well logging, reservoir rock basics in the logging life of a well, tool conveyance, mud log, wellbore stability and filtrate diameter of invasion depth control log quality control, gamma ray, and spontaneous potential, including tool physics and applications to estimate clay volume, clay type, and formation water salinities. (2) Porosity and lithology using density and neutron tools; physics and applications. (3) Acoustic tool physics and applications for rock mechanics, wellbore stability, and secondary porosity. In addition to the applications of acoustic tools for predicting high-pressure zones. (4) Resistivity tool measurements, including tool physics of shallow Rxo, laterolog, and induction and advanced technology resistivity tools. (5) Wireline formation testing tool physics and the theory and applications of these tools to determine mobilities, reservoir pressure and fluid contacts in the reservoir. (6) MWD and LWD data acquisition data acquisition of porosity, lithology, pulsed neutron sigma, and resistivities. (7) Formation pressure geosteering basics and seismic acoustic interpretation covering the evaluation of clay volume (Vsh, Vcl) evaluation, estimating the m and n parameters in the Archie Equation, quicklook techniques to estimate the oil/water, gas/water, and oil/gas contacts, salinity estimations of formation water and filtrate water, and unmoved hydrocarbon zones plus estimation of porosity, lithology, and water saturations in clean and in shaly sands.

**COURSE CONTENT**

- Reservoir rock and life of a well
- The mud log and its applications
- basics of well logging
- Log quality control
- Resistivity measurements and the spontaneous potential applications to estimate water salinity and volume of shale
- Acoustic Log: Secondary porosity, rock mechanical properties and wellbore stability
- The Neutron Log, neutron spectroscopy and sigma neutron capture cross-section
- Basics of resistivity and the Archie Equation
- Wireline formation testing
- MWD and LWD
- Estimating the “m” and “n” parameters in the Archie equation
- Quicklook techniques

**AUDIENCE**

Drilling engineers, directional drillers, and other geoscientists associated with drilling.

**PREREQUISITE**

None

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## Well Placement Fundamentals

**Foundation - 5 Days**

This course introduces the concept of geological well placement (geosteering) and provides knowledge of the processes and techniques that can be used to successfully place high-angle and horizontal wells using geological and petrophysical data in real-time during drilling. The main purpose of high-angle and horizontal wells is to maximize reservoir contact and enhance well productivity. To plan and construct such wells requires real-time collaboration between geologists, who need quality formation evaluation data; drillers, who require considerable input from the geologists; and petrophysicists, who interpret the formation evaluation data during the drilling process to optimize well placement. This process is generally facilitated by the well placement coordinator. Various technologies involved in directional drilling, measurement, and formation evaluation while drilling are reviewed. The three different methods used to geologically place horizontal wells are introduced and the applications are discussed.

### COURSE CONTENT
- Introduction to geological well placement
- Review of reservoir geology
- Directional drilling
- MWD
- Formation evaluation and LWD
- Applications of LWD measurements in well placement
- Applying well placement methods
- Case studies illustrating the use of the three well placement methods

### AUDIENCE
Multidisciplinary asset teams of operating companies comprised mainly of drilling engineers, reservoir engineers, and geoscientists who need to make decisions regarding the applicability and benefits of implementing a geological well placement process for drilling horizontal and high-angle wellbores.

### PREREQUISITE
Geoscience or engineering degree.

## Well Control

**Foundation - 5 Days**

This course teaches the physical principles and concepts related to maintaining and regaining control of formation pressures while drilling a well.

### COURSE CONTENT
- Formation pressures and their causes
- Fracture pressure fundamentals
- Kick tolerance, causes, and warnings
- Shut-in procedures
- Industry standards and recommended practices
- Kill sheet basics and usage
- Wait-and-weight method and other well control methods
- Control of shallow gas kicks
- Blowout preventer and diverter equipment installation, operation, maintenance, and testing
- Well-control equipment limits, auxiliary units, and closing units
- Subsea equipment overview

### AUDIENCE
Persons who design, plan, and manage well drilling operations, including wellsite supervisors, drilling engineers, and drilling superintendents.

### PREREQUISITE
Minimum of 1 year drilling-related experience and basic math and science skills; participants are required to bring a hand-held calculator for in-class exercises.

## Casing Design

**Skill - 5 Days**

This course focuses on casing design from an engineering and operational perspective. Attendees are provided with design rules for a wide range of straightforward and hostile environments and also examine the nomenclature of casing design, manufacturing processes, materials, and properties. In addition, attendees review design policies and procedures; the theory of burst, collapse, and axial loadings; the theory and limitations of API specifications and connections; and special cases such as high pressure high temperature (HPHT) and sour environments.

### COURSE CONTENT
- Material properties
- API ratings and formulas
- Steel testing and triaxial loading
- Design concepts and casing design rules
- Factors affecting tubular strength
- Buckling and connections
- Casing setting depth determination
- Service life models
- Thermal and bending load determination and load cases
- Load design for burst, collapse, and axial loads

### AUDIENCE
Drilling engineers, drilling supervisors, trainee drillers, rig engineers, and service company personnel with basic drilling engineering knowledge.

### PREREQUISITE
Understanding of wellbore geometry and the basics of mechanical concepts, and basic math skills; participants are required to bring a scientific calculator to complete the in-course exercises.

## Cement Integrity Assurance and Evaluation

**Skill - 5 Days**

This course includes a detailed review of the cementing processes and parameters that ensure the integrity of the cement sheath during the life of the well. A comprehensive cement sheath evaluation section will be presented covering the various measurements and interpretation techniques as well as the factors that affect the quality of the measurements and interpretation. The course includes classroom sessions on cementing practices, log interpretation and a visit to the nearest Schlumberger facility where attendees will have the opportunity to review cement evaluation technologies. The attendees will be encouraged to bring their own examples that include all associated information such as well construction details, cementing, and log data, allowing the attendees to share their data and discuss their experiences.

### COURSE CONTENT
- Introduction to cementing
- Cementing job parameters affecting the cement integrity
- Drilling, casing, and cementing job parameters
- Review of the gas/liquid invasion process
- Introduction of well completion parameters affecting the well life
- Cement sheath mechanical properties
- Failure causes
- Cement integrity during the plug and abandon (P&A) phase
- Wireline logs typically used for cement evaluation
- New API specifications

### AUDIENCE
Drilling, production, and completion engineers.

### PREREQUISITE
Basic knowledge of cementing and logging operations.
**Cementing Operations**

**Skill - 5 Days**

The course introduces attendees to the aspects of primary, squeeze and plug cementing, and primary cementing calculations. Cement chemistry is introduced to understand the process involved in achieving a satisfactory cement job. Additives used to affect various properties of the slurry and set cement are addressed. Rheological models used during cement job design and requirements for effective mud removal will also be covered. Cementing aids and job quality evaluation methods are discussed. Classroom exercises as well as an introduction to cementing design and evaluation software are included.

**COURSE CONTENT**
- Primary cementing overview and calculations
- Cement chemistry
- Cement laboratory equipment
- Rheology
- Cement additives
- Mud removal
- Gas migration control
- Cementing temperature
- Squeeze cementing
- Cementing plugs
- Introduction and review of cementing design and evaluation software
- Special purpose cements

**AUDIENCE**
Drilling professionals with some understanding of the drilling process.

**PREREQUISITE**
Basic understanding of the oil & gas industry. Some understanding of cement use is strongly recommended. Attendees should bring a hand calculator and be prepared to perform exercises in the class.

**Deepwater Drilling Design and Operations**

**Skill - 5 Days**

This course is designed to help drilling engineering professionals understand the technologies, terminology, concepts, processes, and equipment used to drill deepwater oil and gas wells. The course follows a typical deepwater drilling program and drilling process from geology to rig selection and station keeping to conductor driving and surface casing setting followed by wellhead systems, BOP and marine riser systems to typical deepwater rig equipment. Once the drilling process and equipment is reviewed, we then look at some of the other aspects that are different for deepwater drilling technology such as well control, shallow hazards and then we move to some of the new emerging technologies such as dual gradient and managed pressure drilling. Finally we discuss some of the typical operational aspects and workover issues associated with deepwater wells.

**COURSE CONTENT**
- Drilling units
- Drilling equipment specific to deepwater drilling
- Pore pressure and fracture pressure window
- Well control
- Riser selection
- Hydrates
- Drilling fluids
- Dual gradient and managed pressure drilling
- Completions

**AUDIENCE**
Drilling professionals with well design and operations experience desiring an understanding of the challenges faced in the deepwater drilling environment.

**PREREQUISITE**
Understand basic geomechanics, drilling operations, well placement, well planning, and drilling fluids basics.

**Deepwater Well Project and Risk Management**

**Skill - 5 Days**

The main goal of the course is to highlight the critical project and risk management issues required to run deepwater well projects efficiently, safely, environmentally friendly and cost-effectively. By the end of the course, attendees will understand the key issues and principles of deepwater project management. The attendees will be able to apply the principles in practice and integrate them in the asset or project team to optimize management of the well project and manage the identified risks to maximize value. Following the deepwater well project management process from prospect evaluation through operations, attendees will develop important skills needed to drill wells in a deepwater environment. The attendees will understand the complexities of a deepwater drilling operation and will gain an understanding of issues that must be addressed when drilling deepwater wells. The attendees will also develop an understanding of the challenges, choices, and compromises that are necessary to drill deepwater wells.

**COURSE CONTENT**
- Introduction to project management
- Project setup
- Team responsibilities and decisions
- What is risk?
- Risk management
- Project plan
- Tracking progress
- Risk management in action
- Applying risk management tools
- Human factors in deepwater well projects

**AUDIENCE**
Drilling managers, operations superintendents, senior well engineers, well engineers, and wellsite leaders/supervisors involved in deepwater well projects.

**PREREQUISITE**
Foundation Drilling Engineering and Offshore Drilling Operations courses, and basic experience in well projects.

**Drilling Operations Management Simulation**

**Skill - 5 Days**

In this course, attendees will learn drilling operations using the interactive Drilling Systems Drilling Management Trainer, which simulates the environment of a team drilling a well. Through hands-on simulations, attendees learn the role and responsibilities of each member of the drilling team, including the drilling supervisor, driller, mud engineer, and the directional driller.

**COURSE CONTENT**
- Directional drilling
- Drilling fluids
- Cement
- Conductor driving
- Casing tallies, centralizers, space out
- Liner operations
- Geology
- Pressure testing
- Well control
- Fishing

**AUDIENCE**
Trainee drilling supervisors and drilling engineers.

**PREREQUISITE**
Basic understanding of drilling operations.

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
Drilling Project and Risk Management
Skill - 5 Days

Increase your understanding of the project management principles that apply to drilling operations, with a focus on the roles and responsibilities involved, including operations, personnel, administration, finance, and legal functions. Attendees will examine the critical project and risk management concerns of running drilling projects in an efficient, safe, environmentally friendly, and cost-effective manner. The attendees will apply principles of project management in practice and integrate those principles into a drilling project’s assets or project team to optimize value and reduce identified risks.

**COURSE CONTENT**
- Overview of drilling project management
- Contract models, project planning, planning software, and design
- Drilling programming
- Project finance and administration
- Supply chain management
- Reporting systems
- Project closeout
- Management systems, risk management, and risk management levels
- Health, safety, environment, and quality (HSEQ) management systems
- Operational risk assessments and analysis

**AUDIENCE**
Drilling program managers, project managers, and others with direct involvement in the planning of drilling operations.

**PREREQUISITE**
Introduction to Drilling Engineering course or equivalent work experience in drilling engineering or management.

Drillstring Design
Skill - 4 Days

Attendees will gain a comprehensive overview of how to design a drillstring as well as how to avoid operational problems and wear on equipment. Bottomhole assembly (BHA) design concepts and optimization and drilling hydraulics are investigated, with an emphasis on practical and safe operating procedures. Industry standards are used as training aids to supplement the presentation material and promote a thorough understanding of drillstring component operating limits and practices.

**COURSE CONTENT**
- Steel properties
- Axial force and buckling in submerged tubulars
- Drillpipe connections
- Drillstring design for tension and torque
- Drillstring care and inspection
- Drillstring damage and dynamics
- Wellbore stability
- Mud rheology
- Bit hydraulics
- Rotary steerable system (RSS), and motor BHA design

**AUDIENCE**
Drilling engineering staff and drilling service company personnel.

**PREREQUISITE**
Work experience in drillstring design or drilling operations.

Drilling Optimization
Skill - 5 Days

Structured to guide the attendees through the workflow to achieve optimal outcomes, or no-surprises drilling, for each phase of drilling a single well or a drilling program, this course covers specification, design, drilling, and completion. Increase your understanding of the identification, application, and implementation of drilling optimization techniques that highlight the data, calculations, and processes necessary to validate drilling successes, both qualitatively and quantitatively. The course draws upon aspects of risk management and statistical analysis as a framework for measurement and mitigation.

**COURSE CONTENT**
- Variable versus fixed risks and controllable versus uncontrollable constraints in design and implementation
- Mitigation strategies for risks and constraints, including mechanical configuration, logistics, surface and subsurface environments, and trajectory; regulatory policies
- Statistical analyses related to well construction, including probability, mean distribution, and standard deviation
- Key performance indicators (KPIs) as a means to report project progress and results
- Ensure data collection, management, and quality via data KPIs
- Single well drilling and program benchmarking
- Mechanical earth model (MEM) for planning and operations
- Optimal drilling plan designs that optimize KPIs for each drilling phase
- Real-time management of well construction performance

**AUDIENCE**
Drilling engineers.

**PREREQUISITE**
Minimum of 2 to 4 years of drilling engineering, experience in risk management or project management suggested.

Horizontal, Extended Reach, and Multilateral Drilling
Skill - 5 Days

An integrated approach to the design and drilling of horizontal, extended-reach (ER), and multilateral wells includes geologic, reservoir, drilling, completions, and production considerations. Attendees will learn the applications and limitations of ER drilling technology and the essential deliverables from each asset team member needed to implement successful ER wells.

**COURSE CONTENT**
- Directional drilling fundamentals: Applications and limitations
- Directional well planning: Positioning and coordinate systems
- Downhole equipment: Drilling tools, drilling motors, drill bits, and deflection methods
- BHA design and considerations
- Geologic considerations in ER wells
- Well profile, well path, and trajectory design
- Earth modeling and wellbore-stability matters related to ER wells
- Multilateral well introduction, well planning, and drilling operations
- Life-of-well issues for high-angle and multilateral wells
- Casing design for ER and multilateral wells

**AUDIENCE**
Drilling engineers, drilling supervisors, trained directional drillers, rig engineers, asset exploitation teams, and service company personnel.

**PREREQUISITE**
Experience in basic drilling engineering and wellsite operations, and exposure to directional drilling operations; attendees are required to bring a simple scientific calculator for in-class exercises.
This course covers the major aspects of HPHT well projects. The topics include theories, technicalities, and practicalities of HPHT wells, complete with impending risks and plausible challenges. This course is also includes case studies on both successful HPHT well projects and the errors committed in past projects with special emphasis on geopressure detection analysis that will benefit attendees. Practical exercises and assessments are included throughout this course with interactive discussion to meet the specific needs of all attendees.

**COURSE CONTENT**
- Defining and managing HPHT wells and environment
- Geophysical methods for detection and analysis of geopressure
- HPHT well logging issues
- Adoption of new technologies
- Surface facility considerations
- Downhole equipment and fluids
- Cementing challenges
- HPHT drilling procedures
- Well-control methods
- HPHT well testing

**AUDIENCE**
Well construction professionals with 5 years or more well construction experience and some background in HPHT issues.

**PREREQUISITE**
Minimum of 5 years of experience in well construction and some exposure to HPHT well issues.

**COURSE CONTENT**
- Origins of gas in mud
- Degassing process
- Different degassing techniques
- Gas analysis technology
- Gas interpretation generalities
- New technologies
- Gas corrections
- Interpretation methodologies
- Degassing case studies

**NEW**

**AUDIENCE**
Wellsite geologists and operation geologists.

**PREREQUISITE**
Mud Logging Operations course, or a respectable understanding of mud logging.

**COURSE CONTENT**
- Surveying
- Error models and the role of the Industry Steering Committee on Wellbore Survey Accuracy (ISCWSA)
- Survey corrections
- Anticollision
- Directional Calculations
- Steering the well
- Drillstring design
- Geomechanics
- Wellbore stability issues
- Hole cleaning
- Drilling test facility visit

**AUDIENCE**
Drilling engineers, drilling supervisors, and trained directional drillers.

**PREREQUISITE**
Basic drilling engineering, 1 to 3 years of wellsite experience, some previous exposure to directional drilling, and mathematical skills, particularly trigonometry.

**COURSE CONTENT**
- Wellbore designs, types, and loading of submerged tubulars
- Steel mechanics and drillstring design, including API RP 7G
- Understanding and preventing drillstring failures
- Stuck pipe mechanisms and consequences
- Predicting and preventing stuck pipe and lost circulation
- Fishing operations: Causes, prevention, tools, and operations
- Directional drilling and sidetracking in cased and open holes

**AUDIENCE**
Engineering, operations, and managerial team members interested in the practical aspects of drillstring recovery and the business implications of fishing operations.

**PREREQUISITE**
Basic understanding of drilling operations and basic math skills.
**Stuck Pipe and Hole Cleaning**

**Skill - 5 Days**

In this course on the mechanisms and causes of stuck pipe, special attention is given to understanding the impact of hole cleaning. Attendees will also learn how factors such as casing seat selection, drillstring design, drilling fluids selection, and well design can affect the likelihood of stuck pipe.

**COURSE CONTENT**
- Causes of stuck pipe; mechanisms and consequences
- Casing setting depth
- Forces acting on submersed objects
- Drillstring design
- Wellbore stability and causes of instability
- Lost circulation and its causes
- Economics of hole recovery efforts
- Drilling fluid types, selection, and fluids management
- Rheology of drilling fluids
- Mechanical techniques for hole cleaning
- Hole cleaning monitoring and management techniques

**AUDIENCE**
Field supervisors and engineers involved in drilling operations.

**PREREQUISITE**
Basic understanding of drilling operations.

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**Well Design and Construction Engineering: Heriot-Watt University Program**

**Skill - 5 Days**

Delivering an overview of the well construction process and an introduction to subsea drilling operations, the goal of this course is to provide attendees with an insight into the planning and execution of a drilling operation. Emphasis is on the conceptual design and detailed engineering design calculations involved in planning a well. This course is part of the distance learning Heriot-Watt MSc Petroleum Engineering program but is not limited to individuals who are registered for the degree course.

**Note:** To learn more about the Heriot-Watt MSc Petroleum Engineering program, visit NExTtraining.net/Masters

**COURSE CONTENT**
- Overview of drilling operations and drilling economics
- Rig components
- Drilling design and drilling bit design and selection
- Formation pressures and well control
- Principles of primary and secondary well control
- Well control procedures
- BOP equipment stack arrangements
- Design, selection, and use of drilling fluids
- Casing and casing string design, configurations, and running operations
- Cementing function, design, and properties
- Directional drilling design and equipment

**AUDIENCE**
Trainee drilling engineers, petroleum engineers, and specialist service company engineers.

**PREREQUISITE**
Drilling operations experience.

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**Dynamic Pressure Drilling**

**Advanced - 5 Days**

This course teaches attendees the principles of dynamic pressure drilling, including how and where to apply these drilling methods. The attendees will learn how to select the optimal equipment, controls, and drilling fluids needed for effective drilling in underbalanced and managed pressure drilling scenarios.

**COURSE CONTENT**
- Dynamic pressure drilling overview, applications, and techniques
- Geologic issues
- Drilling fluid selection, including underbalanced and two-phase flow considerations
- Drilling equipment selection for managed and underbalanced pressure conditions and use
- Rotating control devices (RCDs) and seal elements
- Designing for managed and underbalanced pressure conditions
- Dynamic drilling methods for offshore, including tripping methods
- Candidate selection
- Economics of dynamic pressure drilling
- Management and HSE considerations

**AUDIENCE**
Drilling professionals embarking on a dynamic pressure drilling assessment.

**PREREQUISITE**
Fundamental understanding of basic drilling technology.

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**IWCF Surface Well Control Certification**

**Advanced - 5 Days**

This course is designed to fulfill the requirements for International Well Control Forum (IWCF) surface well control qualification. It is assumed that attendees taking this course fulfill the prerequisite requirements. The course is aimed at those individuals in well-control critical positions. Course content will be taught according to the IWCF syllabus and will prepare candidates for the IWCF examinations and assessment. The assessment consists of practical assessment using simulator equipment (type of simulator dependent on location of training), principles and procedures (P&P) written examination, surface well-control equipment written examination, and IWCF certificates that are valid for 2 years.

**COURSE CONTENT**
- Fundamental principles
- Kick causes and kick indicators
- Well-control preparation and preventative measures
- Shut-in procedures and gas migration
- Driller’s, and Wait and Weight methods
- Volumetric and lubricate and bleed methods
- Well-control complications in deviated wells
- Diverter and accumulator system
- Pressure tests and choka manifold
- Flanges, ring gaskets, and BOPs
- Inside of BOPs and mud-gas separator

**AUDIENCE**
Rigsite personnel in critical well control positions and office-based engineers/supervisors who require IWCF certification.

**PREREQUISITE**
Oilfield math, knowledge of rigsite well-control systems, and either 1 to 2 years of rig experience, or one (or more) of the following: IWCF Distance Learning (Modules 1, 2, 3), IWCF Introductory Well Control NExT Well Control Overview.
Well Integrity
Advanced - 5 Days

This course teaches the monitoring and diagnosis of wellbore integrity using cased hole logging tools. Attendees will learn how to detect and identify interzone crossflow caused by uneven depletion, and leaks inside and behind the casing. Topics include evaluating cement bond quality, establishing corrosion monitoring, and verifying perforation efficiency.

COURSE CONTENT
- Spinner calibration, single-phase interpretation, and productivity index
- Leak-detection techniques and applications
- Temperature database applications
- Crossflow between zones caused by uneven depletion and prediction without well shut-in
- Temperature profiling: Optical sensors
- Cementing: Primary and remedial
- Cement bond monitoring
- Corrosion mechanisms and monitoring
- Corrosion mitigation: Cathodic protection and expandable tubulars
- Perforating: Conveyance, performance, and efficiency
- Workshop on leak detection
- Workshop on interzone crossflow

AUDIENCE
Petrophysicists and production engineers responsible for field-wide reservoir monitoring or production logging programs.

PREREQUISITE
Intermediate Production Logging and Reservoir Monitoring course, or more than 2 years of experience interpreting cased hole logs.

Petrel Well Design
Foundation - 1 Day

The purpose of this course is to introduce the well design module and the drilling functionalities in the Petrel platform. The attendees are guided through the preparation stage for data used in offset well analysis, which includes loading of drilling events, drilling logs, and using end of well reports to filter the knowledge database by, for example, data type, category, or event severity. Attendees will become familiar with the available well design approaches, including an enhanced method also used by drilling engineers. How to import trajectory and targets from third-party applications such as the Landmark EDM will also be introduced. After the planning phase, attendees will learn how real-time data acquisitions are handled in the Petrel platform.

COURSE CONTENT
- Drilling event classification and visualization
- Webmap services
- Well design
- Well path design
- Real-time data acquisition

AUDIENCE
Drillers, geologists, and petrotechnical personnel with fundamental knowledge in Petrel platform software and who need to understand well path design and optimization within the Petrel platform.

PREREQUISITE
Petrel Fundamentals course.

Drillbench Dynamic Well Control Modeling Software
Foundation - 2 Days

This 2-day course teaches the fundamentals of using the Drillbench Presmod Kick software. The course shows the attendees how to enter the required well data and how to run the dynamic well control simulations using the software. The course contains a mix of Microsoft PowerPoint slides and individual hands-on exercises to familiarize the attendees in the use of the software. At the end of the course, the attendees will be able to enter the required well data and run well control simulations using the software.

COURSE CONTENT
- Well control modeling
- Data entry into the software
- Advanced software options
- Advanced software features: Managed pressure drilling and well control simulations

AUDIENCE
Drilling engineers and drilling supervisors requiring a better and more detailed understanding of potential well control issues.

PREREQUISITE
Familiar with well control principles in addition to having an understanding of the basics of fluid and gas behavior and with circulating pressure losses and basic reservoir inflow.

Prerequisites
Petrel Fundamentals course.

Drillbench Dynamic Hydraulics and Temperature Modeling Software
Foundation - 2 Days

This 2-day course teaches the fundamentals of using the Drillbench Presmod hydrualics software. Attendees will learn how to enter the required well data and how to run the dynamic simulations with the software. The course is a mix of PowerPoint slides and individual hands-on exercises to familiarize the attendees in the use of the software. At the end of the course, the attendees will be able to enter the required well data and run simulations using the software.

COURSE CONTENT
- Hydraulics and temperature modeling introduction
- Data entry into the software
- Advanced features of the software: Hole cleaning, managed pressure drilling, and dual-gradient drilling operations

AUDIENCE
Drilling and fluid (mud) engineers dealing with drilling hydrualics calculations, drilling managers, and drilling supervisors requiring a better understanding of drill-fluid hydrualics.

PREREQUISITE
Comprehensive understanding of well design and hydrualics in addition to an understanding of the basics of drilling fluids rheology.

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
### WELLFLO Underbalanced Hydraulics Modeling

**Foundation - 2 Days**

This 2-day course teaches the fundamentals of using the Neotec WELLFLO® software. Attendees will learn how to enter the required well data and how to run underbalanced and Managed Pressure Drilling simulations with the WELLFLO software. The course is a mix of PowerPoint slides and individual hands-on exercises to teach attendees how to use the software. At the end of the course, the attendees will be able to enter the required well data and run simulations using the software.

**Course Content**

- Introduction to air-foam and underbalanced hydraulics and multiphase flow modeling
- Advanced features of the software

**Audience**

Drilling and fluid (mud) engineers planning underbalanced, or air or foam drilling operations.

**Prerequisite**

Comprehensive understanding of well design and hydraulics is required in addition to having an understanding of the basics of underbalanced drilling or air and foam drilling.

### OLGA Advanced Blowout Control

**Skill - 3 Days**

This 3-day course introduces attendees to the principles and concepts related to blowout control operations and the use of the OLGA ABC simulator software. This course provides an overview of so-called tertiary well control options and the engineering calculations required to ensure that a well kill can be achieved. This course also deals with the basics of relief well planning and dynamic well kill operations for blowout wells.

**Course Content**

- Well design modeling
- Blowout dynamics and challenges
- Relief well planning
- Dynamic well kill operations

**Audience**

Drilling engineers, wellsite supervisors, and service providers who design, plan, and manage drilling operations.

**Prerequisite**

Minimum of 5 years of drilling related experience and a solid understanding of conventional well control and fluid hydraulics principles.
<table>
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<th>Reservoir Analysis</th>
<th>Reservoir Management</th>
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<td>ADVANCED</td>
<td>Full Life Cycle Fluid Evaluation: Downhole to Laboratory</td>
<td>Data Room Management and Rapid Asset Evaluation</td>
<td><strong>Analysis of Production Performance Curves</strong></td>
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<td><strong>Production Data Analysis: Shale Gas, Tight Gas, and Coal-Bed Methane</strong></td>
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<td>Characterization, Evaluation, and Enhanced Oil Recovery in Naturally Fractured Reservoirs</td>
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<td><strong>New Advances in Well Test Interpretation</strong></td>
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<td>Resources and Reserves Evaluation</td>
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<td><strong>History Matching and Reservoir Optimization</strong></td>
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<td><strong>Assuring Flow from Pore to Process</strong></td>
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<td><strong>Analysis and Development of Tight Gas Reservoirs</strong></td>
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<td><strong>Forecasting Production and Estimating Reserves in Low-Permeability Oil and Gas Reservoirs</strong></td>
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<tr>
<td>SKILL</td>
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<td>Advanced Natural Gas Engineering</td>
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<td>Waterflooding and Applied Reservoir Simulation</td>
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<td>Oil and Gas Reserves and Evaluation II</td>
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<td>Waterflood Management</td>
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<td>Applied Geostatistics for Petroleum Engineers and Geoscientists</td>
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<td></td>
<td>Horizontal Wells, Applications, Drilling, Completion, Productivity, and Surveillance</td>
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## Reservoir Engineering

<table>
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<td><strong>Applied Reservoir Simulation</strong></td>
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<td><strong>Reservoir Simulation: Heriott-Watt University Program</strong></td>
<td><strong>Conducting an Integrated Reservoir Study</strong></td>
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<td><strong>Advanced Well Test Analysis</strong></td>
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<td><strong>Applied Core Analysis: How to Interpret Core Data</strong></td>
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<td><strong>Applied Reservoir Engineering</strong></td>
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<td><strong>Enhanced Oil Recovery Processes: Chemical, Miscible, and Thermal</strong></td>
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<td><strong>Well Test Design and Analysis</strong></td>
<td><strong>Fundamentals of Field Development Planning</strong></td>
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<td><strong>Basic Core Analysis</strong></td>
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<td><strong>PVT Properties of Reservoir Fluids</strong></td>
<td><strong>Reservoir Optimization using Applied Oilfield Manager (OFM) Software</strong></td>
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<td><strong>Oil and Gas Reserves and Evaluation I</strong></td>
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<td><strong>Principles of Reservoir Engineering: Heriot-Watt University Program</strong></td>
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<td><strong>Introduction to Reservoir Engineering</strong></td>
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<td>COMPETENCY LEVEL</td>
<td>ECLIPSE</td>
<td>Petrel</td>
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<td>ADVANCED</td>
<td>ECLIPSE Simulation of Naturally Fractured Reservoirs</td>
<td>Petrel Proxy Modeling and Optimization</td>
<td>OFM Advanced Topics</td>
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<td>ECLIPSE Thermal Reservoir Simulation</td>
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<tr>
<td>SKILL</td>
<td>ECLIPSE Equation of State and Pressure-Temperature-Volume</td>
<td>Petrel Advanced Wells</td>
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<td>ECLIPSE Advanced Topics</td>
<td>Petrel Assisted History Matching and Uncertainty Analysis</td>
<td>OFM Using Oil and Waterflood Examples (Intermediate)</td>
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<td>ECLIPSE Compositional Simulation</td>
<td>Petrel Geological Workflows and Uncertainty Analysis</td>
<td>Diagnosis and Analysis of Shale Gas Wells using OFM</td>
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<td>Petrel Reservoir Geomechanics</td>
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<td>FOUNDATION</td>
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<td>OFM Administration</td>
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<td>FrontSim Streamline Reservoir Simulation</td>
<td>Petrel Reservoir Engineering</td>
<td>OFM Fundamentals Using Gas Operations Examples</td>
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<tr>
<td></td>
<td>ECLIPSE Blackoil Reservoir Simulation</td>
<td></td>
<td>OFM Fundamentals Using Oil and Waterflood Production Examples</td>
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<tr>
<td>Software Technical courses that use software</td>
<td>Includes practical sessions</td>
<td>Field trips</td>
<td>Uses simulation</td>
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### Competency Level

- **Advanced**

### Skill

- Introduction to INTERSECT

### Foundation

- Avocet Integrated Asset Modeler Fundamentals
- PIPESIM Fundamentals

### Awareness

- Techlog Fundamentals
<table>
<thead>
<tr>
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<th>Foundation - 5 Days</th>
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<td><strong>Course Content</strong></td>
<td>Core analysis is integral to estimating fluid flow, ultimate recovery, and displacement efficiencies. This course teaches the attendees the basics of reservoir engineering. Attendees will learn the fundamental concepts of fluid flow, including laminar and non-Darcy flow in multiphase situations. Basic theory and practice of well test analysis are presented as a means for preparing input data for reservoir simulation modeling. Exercises and examples demonstrate applications to actual situations.</td>
<td>Course material focuses on the classical methods of reservoir engineering. Attendees will learn the fundamental principles of multiphase fluid flow and study fluid and rock characteristics. Case histories demonstrate engineering concepts and actual situations.</td>
<td>For a better understanding of miscible, polymer, and thermal enhanced oil recovery (EOR) processes, this course presents attendees with the theoretical and practical aspects of each process. Case studies and field examples will also be presented.</td>
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<td><strong>Reservoir types and lithologies</strong></td>
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<td><strong>Reservoir fluid properties</strong>: Pressure-volume-temperature data, specific gravity, bubblepoint pressure, gas/oil ratio, viscosity, and formulation volume factor</td>
<td><strong>Fundamentals of fluid flow in porous media</strong></td>
<td><strong>Reservoir environment and formation properties</strong></td>
<td><strong>Introduction to EOR methods</strong></td>
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<tr>
<td><strong>Darcy’s law</strong></td>
<td><strong>Darcy’s law</strong></td>
<td><strong>Reservoir pressure, determination of pressure gradients, and identification of contacts</strong></td>
<td><strong>Screening criteria and technical constraints</strong></td>
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<tr>
<td><strong>Reservoir classification and drive mechanisms</strong></td>
<td><strong>Reservoir conneate water saturation</strong></td>
<td><strong>Measurement of relative permeability</strong></td>
<td><strong>Displacement fundamentals</strong></td>
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<tr>
<td><strong>Oil and gas inflow and outflow performance</strong></td>
<td><strong>Directional permeability studies review</strong></td>
<td><strong>Reservoir fluids properties, fluid flow, and Darcy’s law</strong></td>
<td><strong>Miscible flooding: Fundamentals and applications, and miscible simulator</strong></td>
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<tr>
<td><strong>Pressure buildup analysis</strong></td>
<td><strong>Understanding of areal changes in porosity, permeability, and lithology</strong></td>
<td><strong>Principles of well testing in reservoir characterization</strong></td>
<td><strong>Polymer flooding: Applications, rheology of polymer solutions, and polymer adsorption and retention</strong></td>
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<tr>
<td><strong>Oil displacement and enhanced recovery</strong></td>
<td><strong>Calibrating and improving log interpretations</strong></td>
<td><strong>Reservoir drive mechanisms</strong></td>
<td><strong>Micellar-polymer or microemulsion flooding</strong></td>
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<tr>
<td><strong>Basic concept of reservoir simulation modules</strong></td>
<td><strong>Pore geometry and mineralogy information</strong></td>
<td><strong>Water influx</strong></td>
<td><strong>Thermal processes</strong></td>
<td></td>
</tr>
<tr>
<td><strong>AUDIENCE</strong></td>
<td><strong>Pore geometry and petrophysical rock types using high-pressure mercury porosimetry</strong></td>
<td><strong>Decline curve analysis</strong></td>
<td><strong>Simulation models as reservoir management tools</strong></td>
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</tr>
<tr>
<td>Junior-level reservoir engineers, production engineers, and development geologists wanting to learn reservoir fundamentals, monitoring, and production enhancement techniques.</td>
<td><strong>Core-based NMR overview</strong></td>
<td><strong>Determination of hydrocarbon reserves: Volumetric method</strong></td>
<td><strong>EOR performance evaluation: Field cases and exercises</strong></td>
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<tr>
<td><strong>PREREQUISITE</strong></td>
<td><strong>Aerosol balance applications</strong></td>
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<td>None</td>
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**PREREQUISITE**
Basic understanding of reservoir characterization and petrophysics and a working knowledge of Microsoft Excel® software.

**AUDIENCE**
Reservoir engineers, production engineers, and geoscientists interested in EOR or involved in EOR projects from a planning or operational perspective.

**PREREQUISITE**
Basic knowledge of reservoir engineering.

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
### Integrated Reservoir Management - Foundation - 5 Days

Course attendees will learn the basic reservoir management techniques used by asset management teams.

**Course Content**
- Reservoir management process
- Data acquisition
- Analysis and modeling
- Reservoir model
- Production operations
- Reservoir management economics
- Desktop simulation
- Case studies: new fields, mature fields, waterfloods, and enhanced oil recovery projects

**Audience**
Engineers, geoscientists, operating personnel, and other asset team members.

**Prerequisite**
Experience in oilfield and gas field operations.

### Fundamentals of Field Development Planning - Foundation - 5 Days

This field development planning course provides attendees with the fundamental approach to working with and writing an FDP. The document, which is the output of a sequence of decision- and discipline-based tasks, is designed to create a development plan. This plan is the basis for a method of developing, producing, and maintaining hydrocarbon resources, including surface design and forms an input for designing associated surface facilities. Combined documents, both subsurface and surface form the basis for financial decision. The attendees will be introduced to all these concepts as they are applied in the process of creating a development plan in relation to the reservoir life cycle.

**Course Content**
- Reservoir management process
- Reservoir management concepts and expertise sources
- The reservoir model
- Data acquisition and data use
- Data integration
- Reservoir monitoring, surveillance, and characterization
- Pressure profiling in developed reservoirs
- Field development plan
- FDP concepts, reservoir appraisal, and development planning
- Case study

**Audience**
Multidisciplinary asset teams comprised of engineers, geoscientists, and managers involved in or will be involved in developing hydrocarbon resources, other actual or potential asset team members.

**Prerequisite**
Basic knowledge of petroleum engineering.

### Natural Gas Reservoir Engineering - Foundation - 5 Days

This course covers various aspects of gas reservoir engineering, including well test analysis. Course attendees will increase their understanding of natural gas properties, and learn how to determine gas reserves using material balance calculations and perform gas deliverability and nodal analyses.

**Course Content**
- Fundamentals of gas reservoir engineering
- Properties of natural gas
- Determination of gas reserves
- Gas deliverability
- Nodal analysis
- Gas well testing

**Audience**
Reservoir engineers, production engineers, laboratory researchers, and gas field operators.

**Prerequisite**
Basic knowledge of petroleum engineering.

### Oil and Gas Reserves and Evaluation I - Foundation - 5 Days

Course emphasis is on deterministic methods of reserves estimation and evaluation. Attendees will gain a working knowledge of classifications and definitions for reserves and resources and guidelines for their application from various authorities, including SPE, WPC, AAPG, and the US SEC. Attendees will learn estimation methods and how to perform cash flow analysis, both before and after tax, as a basis for establishing value and reporting to regulatory authorities. Discussions include international contracts and reserves recognition and booking.

**Course Content**
- Definitions and classification of petroleum resources and reserves
- Industry and regulatory authority classifications and definitions
- SEC definitions
- Worldwide definitions and classifications
- Reserves estimation methods, including material balance, decline curve techniques, production data analysis, and simulation
- Reserves evaluation: Time value of money, cash flow analysis, before and after tax cash flow analysis
- Financial yardsticks and reserves reporting requirements for publicly traded companies, reserves and international contracts

**Audience**
Petroleum engineers, geologists, reserves analysts, and anyone responsible for estimation of reserves.

**Prerequisite**
Basic understanding of geology and reservoir engineering.
### Principles of Reservoir Engineering: Heriot-Watt University Program

**Foundation - 5 Days**

This course teaches the principles and basic practice of reservoir engineering. The course forms part of the Heriot-Watt MSc in petroleum engineering. The classes are available to individuals who seek to have a better understanding of the subject but who
are not registered for the degree course. To learn more about the MSc Petroleum Engineering visit: www.nexttraining.net/masters.cfm.

#### COURSE CONTENT
- Interaction of rock and fluids
- Measurement of and correlation of relative permeability
- Composition of reservoir fluids
- Introduction to fluid flow
- Development of diffusivity equation
- Overview of well testing techniques
- Use of Horner equation
- Understanding reservoir energy
- Downhole and surface fluid sampling
- Measurement of PVT parameters
- Concept of reservoir as a single tank
- Concept of transient and instantaneous pressure changes at oil-water contact
- Concept of reservoir simulation

#### AUDIENCE
Wide range of technical personnel and those starting in reservoir engineering.

#### PREREQUISITE
No basic knowledge of the subject.

### PVT Properties of Reservoir Fluids

**Foundation - 5 Days**

This course presents the newest and most accurate methods for obtaining values of reservoir fluid properties from laboratory data and correlations. Attendees will gain a better understanding of the relationships between the five reservoir fluids in addition to learning how to manage problems concerning reservoir fluid properties with increased confidence.

#### COURSE CONTENT
- Analysis of reservoir fluid properties
- Identification of the five reservoir fluids
- Compositional gradients in reservoirs
- Properties of black oils from laboratory reports and correlations (featuring recent calculation procedures and correlations)
- Field data required for use of reservoir fluid property correlations
- Properties of dry gases (featuring several recent correlations)
- Properties of wet gases and applications and computations
- Properties of retrograde gas and condensates (recent correlations)
- Condensates from laboratory reports
- Suggestions for obtaining water properties

#### AUDIENCE
Reservoir engineers, production engineers, and others involved in reservoir fluid sampling, testing, and modeling.

#### PREREQUISITE
Degree in engineering or science and experience in the petroleum industry.

### Reservoir Optimization using Applied Oilfield Manager (OFM) Software

**Foundation - 5 Days**

In this hands-on workshop, attendees will apply engineering principles in a real-world scenario and perform reservoir development exercises through multiple phases. This workshop will help attendees develop their capacity to make unique reservoir engineering decisions involving field development, and improve their skills in day-to-day use of Field Manager® well and reservoir analysis software.

#### COURSE CONTENT
- Reservoir familiarization and evaluation
- Production phase and workover candidate recognition
- Well volumetric drainage radius, horizontal well analysis, and workover follow-up
- Workover candidate recognition and waterflooding pilot analysis
- Waterflood evaluation and surveillance

#### AUDIENCE
Petroleum engineers, reservoir engineers, production enhancement engineers, geologists, and operations and business development managers interested in analyzing oil and gas performance data.

#### PREREQUISITE
Knowledge of oil and gas production, Microsoft Excel® spreadsheets, and basic algebra.

### Well Test Design and Analysis

**Foundation - 5 Days**

Gain a solid understanding of the theories underlying well test analysis and interpretation and how to design a well test to achieve specific objectives. Attendees will learn the different types of tests and techniques, both analytical and graphical, for data representation and analysis in addition to how to interpret complex data such as those from well tests in naturally fractured reservoirs, hydraulically fractured wells, horizontal wells, and gas and gas-condensate reservoirs.

#### COURSE CONTENT
- Basic concepts of reservoir performance
- Fundamental concepts of well test analysis
- Dimensionless variables, derivative analysis and diagnostic plot, type-curve matching, wellbore storage, radial flow, late-time boundary, and depletion effects
- Well test interpretation in naturally fractured reservoirs, fractured wells, and horizontal wells
- Variable rate analysis methods and multwell testing
- Well test analysis in gas reservoirs, modifications for gas and multiphase flow, and phase redistribution
- Drillstem testing, design, and analysis
- Well test design

#### AUDIENCE
Reservoir engineers, production engineers, and field personnel involved with the design and interpretation of well tests.

#### PREREQUISITE
Degree in engineering and prior experience with well testing.

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
## Advanced Well Test Analysis

**Skill – 5 Days**

In this advanced course, attendees learn how to analyze various types of pressure tests, including flow tests, buildup tests, and interference tests using the Tia’s direct synthesis (TDS) technique – an alternative to type-curve matching and regression analysis. The attendees will also gain an understanding of the complexities of interpreting pressure tests in hydraulically fractured wells, naturally fractured reservoirs, and horizontal wells. Bring your actual field data to class for interpretation using the TDS and other techniques.

### COURSE CONTENT

- Theory and applications of the pressure derivative
- TDS technique for analysis of drawdown and buildup tests, estimating average drainage area, pressure, and analysis of horizontal well tests
- Identification of flow regimes using the pressure derivative
- Characteristic pressure behavior for wells near one or multiple open and closed boundaries
- Effects of various wellbore and near-wellbore phenomena on test data
- Pressure tests in wells with vertical or inclined hydraulic fractures
- Well tests in naturally fractured reservoirs
- Conventional and advanced interpretation techniques for pressure tests in multilayered reservoirs
- Application of TDS technique to multiphase-flow tests and multirate-flow tests

### AUDIENCE

Engineers and geoscientists wanting a better understanding of well testing principles and advanced interpretation techniques for pressure transient tests.

### PREREQUISITE

Reservoir Engineering course.

## Advanced Natural Gas Engineering

**Skill – 5 Days**

This course explores the unique issues and challenges related to exploitation of natural gas, from upstream to downstream. Attendees will learn about natural gas exploration, processing, transmission, and storage and the new generation of gas-to-liquid (GTL) technologies.

### COURSE CONTENT

- Natural gas basics
- Unique issues in natural gas exploration, drilling, and well completion
- Natural gas production from vertical and horizontal wells
- Natural gas processing
- Natural gas transportation: Pipeline and compressed natural gas
- GTL technologies
- Underground natural gas storage
- Natural gas supply, alternative energy sources, and the environment
- The great energy dilemma and geopolitics
- Energy interchangeability versus inflexibility
- Alternatives to natural gas-fired electricity: coal, nuclear, wind, and solar
- Environmental impact of fossil fuels and renewable energy sources

### AUDIENCE

Geologists, engineers, managers, and technical personnel.

### PREREQUISITE

Engineering knowledge.

## Applied Core Analysis: How to Interpret Core Data

**Skill – 5 Days**

Increase your understanding of petrophysical properties as applied to the interpretation of reservoirs from a core analysis perspective. This comprehensive course provides attendees with detailed instruction on basic petrophysics, measurement methods, and the controls over porosity, permeability, fluids, wettability, and relative permeability data analysis. The attendees investigate and understand the source of petrophysical data errors through hands-on correlation of a sample log: a core dataset is analyzed and the saturation-height model is created.

### COURSE CONTENT

- Reservoir geology
- Upscaling
- Preliminary characterization using core analysis, coring methods, and fluids data
- Lithology from a facies, sedimentary structure, and core description
- Fractured systems
- Characterization of pore geometry using diagenesis interpretation
- Clays and their impact on water saturation
- Total versus effective porosity
- Petrophysical rock types and differences between fluid contacts and free water level
- Rock electrical properties and their use in water saturation equations
- Relative permeability and wettability

### AUDIENCE

Petrophysicists, geoscientists, and engineers responsible for reservoir characterization who rely on core interpretation and other integrated petrophysical data for decisions and analyses.

### PREREQUISITE

Basic understanding of geological concepts and reservoir characterization.

## Applied Geostatistics for Petroleum Engineers and Geoscientists

**Skill – 5 Days**

Your goal in this course is to produce a consistent reservoir description through integration of core, well log, and seismic data and application of geostatistical techniques. Attendees will learn the reservoir modeling workflow, from construction of the 3D static reservoir model through upscaling for dynamic reservoir simulation in addition to increasing your awareness of geostatistics and the situations that can benefit from application of geostatistical techniques. Instruction includes guidance through assembly and analysis of the required data for geostatistical techniques and the resulting numerical models.

### COURSE CONTENT

- Basic probability theory and univariate and bivariate statistics
- Geologic content of data and spatial continuity of rock properties using variogram analysis
- Estimation methods, including various types of kriging
- Simulation methods, including sequential Gaussian simulation and indicator simulation
- Advanced geostatistical techniques, including object modeling and simulated annealing
- Techniques for upscaling and data integration (3D seismic and production data)

### AUDIENCE

Practicing reservoir engineers, production engineers, and geoscientists working as a part of an integrated reservoir management team.

### PREREQUISITE

Knowledge of basic mathematics.
### Applied Reservoir Engineering

**Skill - 5 Days**

<table>
<thead>
<tr>
<th>COURSE CONTENT</th>
<th>AUDIENCE</th>
<th>PREREQUISITE</th>
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<tbody>
<tr>
<td>- Petroleum geology and formation evaluation</td>
<td>Engineers responsible for routine reservoir characterization and management.</td>
<td>Minimum 2-year degree in engineering.</td>
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<td>- Volumetric reserves estimates</td>
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<tr>
<td>- Rock and fluid properties</td>
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<td>- Geostatistics</td>
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<td>- Well performance, deliverability, and testing</td>
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<td>- Pressure transient testing of oil and gas wells</td>
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<td>- Productivity of horizontal wells</td>
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<td>- Gas and water coning in vertical and horizontal wells</td>
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<td>- Decline curve analysis</td>
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<td>- Reservoir drive mechanisms and producing characteristics</td>
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<td>- Material balance calculations</td>
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<td>- History matching and uncertainty assessment</td>
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<tr>
<td>- Displacement of oil and gas</td>
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<tr>
<td>- Introduction to waterflooding and enhanced oil recovery</td>
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### Applied Reservoir Simulation

**Skill - 5 Days**

<table>
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<tr>
<th>COURSE CONTENT</th>
<th>AUDIENCE</th>
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<tbody>
<tr>
<td>- Development of reservoir simulation programs is the focus of this comprehensive course. Attendees will learn about model selection, data preparation, and grid design, as well as techniques for model calibration. Discussion includes advanced concepts such as “pseudo” relative permeability and capillary pressure. This course will increase your understanding of the role of simulation in reservoir management by studying the limitations and structural aspects of the models as well as upscaling and simulation techniques. Tutorials include use of ECLIPSE® simulator software but prior experience with this simulator is not required.</td>
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### Conducting an Integrated Reservoir Study

**Skill - 5 Days**

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<th>COURSE CONTENT</th>
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<tbody>
<tr>
<td>- In this course, attendees conduct an integrated reservoir study for the purpose of optimizing a reservoir depletion plan or instituting EOR operations. Attendees will understand the data that are required and the workflow that should be followed to ensure a successful evaluation in addition to learning techniques to characterize hydrocarbon reservoirs, build a static reservoir model, and import the static model into a reservoir simulator. Discussion includes procedures for integrated reservoir evaluation and how to improve production rates, ultimate recovery, and field economics by identifying potential for infill drilling, recognizing bypassed hydrocarbons, and improving EOR process efficiency.</td>
<td>Geoscientists and petroleum engineers responsible for conducting comprehensive reservoir studies.</td>
<td>Basic understanding of petroleum engineering and geologic concepts.</td>
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<tr>
<td>- Course content includes objectives of integrated reservoir studies, flow scale considerations for data management, reservoir characterization and building blocks of the static model, Seismic data and well logs, Structural compartments, Fractured reservoir in situ stress, Fluid contact determination: Well logs, capillary pressure, and seismic attributes, Reservoir heterogeneity, Sedimentary facies analysis.</td>
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Visit NExTtraining.net/classes for the latest calendar or to register for a course.
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<thead>
<tr>
<th>Formation Testing: Wireline and LWD</th>
<th>Horizontal Wells, Applications, Drilling, Completion, Productivity, and Surveillance</th>
<th>Oil and Gas Reserves and Evaluation II</th>
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<tbody>
<tr>
<td>Skill - 5 Days</td>
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**Formation Testing: Wireline and LWD**

This 5-day course consists of theoretical and practical classroom sessions with the last day devoted to wireline, LWD and PVT laboratory visits to observe formation testing (FT) tools and PVT laboratory facilities and experiments. Presentations on the tools, operations, and the latest interpretation methods are also a part of this course. The attendees will also have various practical exposure sessions with real data and InSitu Pro® real-time quality control and interpretation software (each participant should bring his own Windows based PC). This course consists of 50% classroom and 50% practical with exercises and laboratory visits.

**COURSE CONTENT**

- FT applications
- Pressure surveys and gradient analysis
- Sampling and downhole fluid analysis
- FT pressure transients in-situ stress testing

**AUDIENCE**

Reservoir engineers, geoscientists, operations geologists, and well log witnesses with little or no prior knowledge of formation testing services.

**PREREQUISITE**

Familiar with basics of reservoir engineering and formation evaluation concepts.

**Horizontal Wells, Applications, Drilling, Completion, Productivity, and Surveillance**

This course is structured to increase the attendee’s understanding of all aspects of horizontal wells and their applications. Attendees will learn multidisciplinary applications and principles of horizontal wells as you study related reservoir engineering, drilling, and completion topics.

**COURSE CONTENT**

- Horizontal well applications: drilling and completion, drilling risk, geosteering, and logging while drilling
- Horizontal well productivity: steady-state approximations, productivity index, flow regimes, anisotropy, formation damage, skin factor, slanted wells versus horizontal wells
- Applications of horizontal wells and models: coning problems, gas reservoirs, fractured wells, fractured reservoirs

**AUDIENCE**

Reservoir engineers and production engineers responsible for recommendations and evaluations of horizontal wells.

**PREREQUISITE**

Basic understanding of reservoir engineering and pressure transient analysis.

**Oil and Gas Reserves and Evaluation II**

This course will increase the attendee’s understanding of probabilistic methods for reserves estimation and the risk and uncertainties in evaluation economics. Material includes an overview on reserves and resources with definitions and classifications. Attendees will gain exposure to important background material from statistics and probability techniques with applications to expected value, probability trees, and simulation. Instruction includes an introduction to economic evaluation of reserves evaluation and the probabilistic estimation procedures commonly used in various countries. Through spreadsheet exercises, attendees gain a deeper understanding of important concepts and learn to handle complex scenarios.

**COURSE CONTENT**

- Reserves and resources: classifications and definitions, probabilistic reserves techniques
- Statistics and probability
- Expected value and probability trees
- Monte Carlo simulation: application to reserve estimation and evaluation

**AUDIENCE**

Petroleum engineers, geologists, reserves analysts, and others responsible for estimation of reserves.

**PREREQUISITE**

Basic understanding of geology, reservoir engineering, and petroleum economics.
Reservoir Management and Monitoring

This course covers the basic techniques used in modern reservoir management and related reservoir monitoring. The reservoir management process includes data analysis, reservoir dynamic modeling, production operations, surface facilities, and related project evaluation and economics. The general aspects of reservoir monitoring and planning are also covered.

**COURSE CONTENT**
- Reservoir management process
- Reservoir model
- Production operations
- Surface facilities
- Project evaluation
- Economics
- Project selection and revision
- Overview of reservoir monitoring
- Saturation monitoring
- Quick data analysis methods

**AUDIENCE**
Engineers, geoscientists, operating personnel, other actual or potential asset team members.

**PREREQUISITE**
The course is meant for engineers, geoscientists and operating personnel, basic knowledge and experience in the related field is required.

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Reservoir Simulation: Heriot-Watt University Program

This course provides a recap of some of the basic concepts in reservoir engineering required to perform reservoir fluid flow calculations, and includes examples of the types of calculation that may be performed and when these calculations are required. The principles of how to define the material balance and flow calculations is established in addition to methods for solving the pressure equations. Practical issues, including gridding, defining and controlling wells and upscaling, are also introduced. This course forms part of the Heriot-Watt Distance Learning MSc Petroleum Engineering. Attendees who seek to better understand the subject but who are not registered for the degree course are invited to attend. To learn more about the MSc Petroleum Engineering visit: www.nexttraining.net/masters.cfm

**COURSE CONTENT**
- Introduction and case studies
- Basic concepts in reservoir engineering
- Reservoir simulation model setup
- Gridding and well modeling
- Flow equations
- Reservoir simulation numerical methods
- Permeability upscaling
- Petrophysical input

**AUDIENCE**
Technical staff members.

**PREREQUISITE**
None

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Waterflood Management

For efficient asset management, the attendees will gain a better understanding of waterfloods and the distribution of immiscible fluids in a reservoir, the process of immiscible fluid displacement in a reservoir, waterflood patterns, and the effect of pattern selection and orientation on flood performance. Attendees will learn to predict waterflood performance using classical prediction methods.

**COURSE CONTENT**
- General waterfloods
- Effects of drive mechanisms on waterfloods
- Rock properties and waterfloods
- Drainage process
- Capillary pressure
- Displacement processes and linear fractional flow theory
- Buckley-Leverett frontal advance model, Welge prediction method
- Analysis of waterflood pattern mobility ratio
- Pattern configurations
- Waterflood performance efficiencies and predictions
- Prediction methods: Stiles, Craig-Geffen-Morse, and Dykstra-Parsons
- Simulation of waterflood and practical guidelines for reservoir simulators
- Simulation of waterflood using small- and large-scale models for calibration
- Waterflood field examples and project presentations

**AUDIENCE**
Engineers responsible for evaluation of the economics, production potential, and waterflood design for reservoirs under waterflood or candidates for waterflood.

**PREREQUISITE**
General knowledge of fluid and rock properties and fluid flow in porous media.

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Waterflooding and Applied Reservoir Simulation

This course will help attendees improve their understanding of waterflooding and immiscible fluids distribution in a reservoir, the process of immiscible fluid displacement in a reservoir, waterflood pattern options and the selection effect, and an introduction to flood performance. Attendees will improve the ability to predict waterflood performance by applying classical waterflood prediction methods.

**COURSE CONTENT**
- Waterflooding goals and performance measurements
- Displacement processes
- Welge’s method for analyzing waterflood patterns
- Waterflood performance efficiencies
- Predicting waterflood performance using various methods
- Applications of reservoir simulation
- Effect of time and space discretization
- How to recognize problems
- Preprocessing and postprocessing
- Small- and large-scale models
- Calibration (history matching)
- Selecting variables (history matching)
- Sensitivity analysis
- Reservoir simulation procedures
- Waterflood field examples

**AUDIENCE**
Engineers who are interested to evaluate the economics, production potential, and waterflood design for reservoirs being waterflooded or are potential waterflood candidates.

**PREREQUISITE**
Reservoir engineering background.
### Well Testing Operations

**Skill - 5 Days**

This course consists of several theoretical sessions with exposure to professionals providing presentations on testing tools and operations. The attendees will also have various practical exposure sessions on the flow loop and hands-on sessions using the tools in the workshops, including the subsea tower for practical demonstration of the subsea equipment. An introduction to well testing equipment and instrumentation, control, condition, monitor, measure, and sample the fluids that are produced from the reservoir during the production testing process are included in the course. The course will provide a clear understanding of the primary objectives of surface and downhole well testing; i.e., to assess well productivity by measuring the gas, oil, and water flow rates from the well under controlled production conditions. Also, attendees will receive instruction on the safe handling of the produced effluents (solids, liquids, and gases) at high pressures and temperatures, which is a key objective and concern within the well testing operations. This safe handling is achieved by design of equipment and operations, including safety margins and protective equipment to guarantee the safety of the employees and integrity of the involved facilities and the environment.

**COURSE CONTENT**
- Well testing objectives
- Surface well testing
- Testing data acquisition
- Fluid sampling and analysis
- Drillstem testing
- Subsea landing string systems
- Basics of well testing interpretation

**AUDIENCE**
Senior reservoir engineers.

**PREREQUISITE**
Prior knowledge of basic well testing operations and well testing interpretation.

### Analysis and Development of Tight Gas Reservoirs

**Advanced - 5 Days**

This overview of tight gas reservoirs covers their evaluation, completion, stimulation, and development. Material encompasses geologic characteristics, formation evaluation, estimation of reserves and well performance, hydraulic fracture treatment design and execution, and field development considerations.

**COURSE CONTENT**
- Introduction to tight gas reservoirs
- Formation evaluation
- Statistical correlations
- Well testing
- Estimation of reserves and prediction of performance
- Well completions and workovers
- Hydraulic fracture treatment design and execution
- Field development considerations, strategies, and economics
- Critical parameters
- Infill potential

**AUDIENCE**
Reservoir engineers and production engineers responsible for optimizing recovery from tight gas reservoirs.

**PREREQUISITE**
Understanding of petroleum engineering and a strong background in production or operations.

### Analysis of Production Performance Curves

**Advanced - 4 Days**

In this workshop on classic and current decline curve analysis methods, attendees learn both theory and applications to single- and dual-fluid production systems. The attendees will explore methods to amend a nonconverging production curve, forcing it to the economic limit, and learn how to reinterpretize decline curves in addition to studying methods for material balance time and real-time relationships, analysis of performance histories, generation of relative permeability ratios from field data, and the derivative approach to determine whether water breakthrough is from coning or behind pipe.

**COURSE CONTENT**
- Decline curve analysis
- Arps curves: nominal and continuous exponential declines
- Performance curves: exponential, hyperbolic, and harmonic declines
- Fetkovich, Arps, and transient type curves
- Interpretation of field curves for reservoir characterization
- Pseudosteady-state flow equation
- Blasingame-Lee solution
- Production performance plots

**AUDIENCE**
Engineers, geoscientists, and industry professionals interested in analyzing oil and gas performance data.

**PREREQUISITE**
Some knowledge of oil and gas production, Excel spreadsheets, and basic algebra.

### Assuring Flow from Pore to Process

**Advanced - 3 Days**

From this course on flow assurance, attendees will gain an advanced understanding of fluid flow through a series of interconnected systems from the reservoir to surface facilities, and the prevention and mitigation of common flow impediments. The attendees will learn best practices from worldwide field examples, as well as how to design fit-for-purpose flow assurance solutions.

**COURSE CONTENT**
- Key flow assurance issues
- Technologies for capture and characterization of fluid samples
- Methodologies for measurement, modeling, and management of inorganic and organic solids
- Fluid flow and heat-transfer characteristics and their importance in design of subsea architecture, modal selection, and liquids management
- Processes of fluid flow integration, heat transfer, and solids

**AUDIENCE**
Engineers and technical staff responsible for well surveillance, production optimization, or completion design.

**PREREQUISITE**
Working knowledge of well production behaviors, basic reservoir engineering principles, and surface facilities; exposure to well completion design, nodal analysis, and stimulation processes.
Characterization, Evaluation, and Enhanced Oil Recovery in Naturally Fractured Reservoirs  
Advanced - 5 Days

This course will update attendee knowledge on techniques for an integrated study of naturally fractured reservoirs, including characterization, experimentation, and integration of information to determine the best process options. Attendees will examine examples from ongoing CO2 pilots to reinforce their understanding of naturally fractured reservoirs. The attendees will also learn to use core laboratory measurements of imbibition, capillary pressure, and wettability at reservoir conditions; history-matched laboratory measurements for upscaling to reservoir geometry, and wettability data for prediction of waterflood performance in addition to analyzing reservoir performance during water injection from laboratory experiments of forced and free-fall gravity drainage with CO2, and use commercial simulators to match reservoir performance using precisely measured lab and field data.

COURSE CONTENT
- Characterization of naturally fractured reservoirs
- Geologic and petrophysical analysis of reservoir cores
- Screening reservoir data for waterflood and gas injection-well candidates
- Core-log integration and reservoir characterization
- Development of specific algorithms for log evaluation (identification of pay zones and water saturation in the pay)
- Fracture identification (natural or coring-induced) and characterization
- Well test analysis and analysis of inflow performance in horizontal wells
- Imbibition, capillary pressure, interfacial tension, and wettability determination
- Scaling laboratory results to predict waterflood response
- Numerical simulation of waterflooding
- Phase behavior and minimum miscibility pressure determination
- Gas injection experiments in fractured systems
- Evaluation, scaling, and design of gas injection results
- Case histories: Midale CO2 piloting and Wellman Unit CO2 flood

AUDIENCE
Reservoir engineers, geoscientists, operating personnel, and other asset team members involved in reservoir management.

PREREQUISITE
Experience in oilfield and gas field operations and knowledge of naturally fractured reservoirs.

Data Room Management and Rapid Asset Evaluation  
Advanced - 3 Days

This course provides E&P professionals and stakeholders in the oil and gas investment sector with an understanding of how to obtain the most out of data rooms to present a reasonable evaluation to the decision makers in the shortest time frame possible. Learning objectives include knowledge and application levels and attendees will take away workflows from this course to streamline their data room processes, ensure essential data are gathered, and quickly evaluate opportunities while avoiding some of the pitfalls that exist in the assessments of oil and gas opportunities.

COURSE CONTENT
- Data room overview
- Setting up a data room
- Data room workflow
- Eight key provisions in a confidentiality agreement
- Brokers and fees
- Company needs from its data room team
- Selecting the appropriate team
- Role of the data room team leader
- Hierarchy of data requirements
- Due diligence
- Quick economic evaluation
- Introducing risk and uncertainty into our evaluation workflow

AUDIENCE
E&P executives and managers, geoscientists, reservoir engineers, investors, auditors, bankers, and government officials involved in the technical and economic valuation of international oil and gas exploration and production opportunities.

PREREQUISITE
Knowledge of petroleum E&P, reserves, and evaluation.

History Matching and Reservoir Optimization  
Advanced - 5 Days

Production data are incorporated into high-resolution reservoir models through conventional and fast flow simulation techniques such as streamline models. In this course, attendees will learn different history-matching workflows and their merits, including assisted and automatic history matching, in addition to exploring the many forms of production data, pressure transient test, tracer test, multiphase production history, and interpreted 4D seismic information. Field examples illustrate the advantages and limitations of these techniques.

COURSE CONTENT
- History matching: broad perspectives and current status
- History-matching workflows
- Production data integration: background and theory
- Flow simulation through geologic models: streamline approach
- Streamline-based production data integration
- Assisted history matching and inverse modeling with finite-difference models
- History matching: field applications
- Experimental design: background and applications
- Recent developments in history matching: ensemble Kalman filter and Markov chain Monte Carlo

AUDIENCE
Practicing geoscientists and engineers, especially those involved in reservoir simulation.

PREREQUISITE
Knowledge of basic mathematics, petroleum geology, reservoir engineering, and petrophysics, plus elemental software skills.

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
**Forecasting Production and Estimating Reserves in Low-Permeability Oil and Gas Reservoirs**

**COURSE CONTENT**
- Reserves reporting requirements
- Production forecasting and reserves estimates in unconventional reservoirs

**AUDIENCE**
Petroleum engineers, geologists, reservoir analysts, and any others whose job responsibilities or professional interest include the estimation of reserves.

**PREREQUISITE**
Engineering and sciences principles in addition to a basic understanding of geology and reservoir engineering.

**Advanced - 1 Day**

This 1-day workshop provides a brief overview of systematic procedures for forecasting production and estimating reserves in individual wells in low-permeability oil and gas reservoirs, including shale plays. The workshop will provide background material leading to understanding of forecasting methods, and will concentrate on traditional (Arps) decline models and more recent models designed to provide improved forecast accuracy during the long-duration transient flow periods (usually linear flow) associated with low-permeability, hydraulically fractured horizontal wells. Applications of the theory will be illustrated with in-class exercises.

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**Full Life Cycle Fluid Evaluation: Downhole to Laboratory**

**Advanced - 5 Days**

Advanced-level instruction focuses on technologies for characterization of reservoir fluids in situ and methods for capture of a representative sample. Attendees will learn the importance of proper sample handling and the procedures that define fluid properties (vapor-liquid equilibrium phase envelopes, gravimetric fluid properties, and hydrocarbon solids) and rheological transport characteristics. Hands-on demonstrations include developing mathematical models using equations of state (EOS) for fluid PVT analysis, and hydrocarbon solids phase boundaries for applications in reservoir simulations, production modeling, and surface processing.

**COURSE CONTENT**
- Physics of reservoir fluids, including origin of fluid gradients, and reservoir compartmentalization
- Downhole fluid-analysis technology: monitoring mud filtrate contamination, live fluid analysis, component analysis, and in situ analysis
- Sample quality control and reservoir characterization workflow examples
- New developments in EOS for in situ crude oil
- Methods for determining reservoir connectivity
- Openhole sampling technologies, including MDT® modular formation dynamics tester
- Visit to a technology or operations center for physical demonstration of downhole sampling and analysis tools (location dependent)
- Cased hole sampling during well or production testing and laboratory fluid characterization technologies
- Workflows to develop thermodynamic and transport characteristic models
- Fundamentals of lab characterization of hydrocarbon solids (asphaltene, wax, hydrate)
- Visit to fluids and flow assurance analysis center for physical demonstration of equipment and measurement methods (location dependent)

**AUDIENCE**
Members of multidisciplinary teams, including petrophysicists and engineers, who need an advanced understanding of fluid properties from sample acquisition to modeling.

**PREREQUISITE**
Strong understanding of fluid property principles and modeling.
# RESERVOIR ENGINEERING

## New Advances in Well Test Interpretation

**Advanced - 5 Days**

Structured for an understanding of well test analysis fundamentals, this course also introduces attendees to recent advances in well test interpretation. The attendees will study methodologies for systematic interpretation, and learn through hands-on exercises and practical problem-solving sessions.

**COURSE CONTENT**
- Well test analysis and interpretation fundamentals
- Well testing in complex systems
- Well testing in different depositional and tectonic environments
- Well testing in reservoirs formed by deposition in fluvial environments

**AUDIENCE**
Reservoir engineers, production engineers, and field personnel involved with well test design and interpretation.

**PREREQUISITE**
Knowledge of transient well testing nomenclature.

## Production Data Analysis: Shale Gas, Tight Gas, and Coal-Bed Methane

**Advanced - 3 Days**

This course is designed to implement a comprehensive learning module of production data interpretation and analysis, including the principles of production fundamentals, technologies, and workflows with applications and field examples for unconventional reservoirs. Production analysis requires handling and conditioning large volumes of multiple source, multiple frequency data, identifying and synchronizing events, and assigning the appropriate production rate to each event. These critical steps enable production engineers to make efficient interpretation and analysis of the data and to optimize well productivity using advanced methodologies.

**COURSE CONTENT**
- Science: foundational understanding of principles and governing factors of production
- Technologies: exposure to sensor technologies and tools necessary for data conditioning
- Workflows: skills to apply methodologies and workflows to enable data interpretation and analysis

**AUDIENCE**
Practicing reservoir, production, and facilities engineers and engineering and asset managers.

**PREREQUISITE**
4-year geoscience/engineering degree.

## Resources and Reserves Evaluation

**Advanced - 5 Days**

This course presents advanced techniques for reserves estimation and addresses the difference in classification of resources and reserves. Attendees will learn definitions of reserves and resources and guidelines for their estimation from various regulatory and industry authorities, including SPE, WPC, AAPG, and the US SEC. Attendees will discover the latest and most accurate methods for estimating reserves, both deterministic and probabilistic, and gain a thorough understanding of various reserves levels and their equivalence in both systems, including proved, proved plus probable, and proved plus probable plus possible.

**COURSE CONTENT**
- Basic definitions and classifications
- Statistics and probabilities
- Simulation
- Probability and uncertainty
- Expected value, and expected value and decision trees
- Utility theory
- Unconventional resources
- Definition and classification of reserves
- Time value of money
- Before-tax and after-tax cash flows
- Decline curves
- Volumes
- Material balance
- Economic yardsticks
- Choosing investments
- International contracts
- Field examples

**AUDIENCE**
Petroleum engineers, geologists, reserves analysts, and others involved in estimation of reserves.

**PREREQUISITE**
Degree in engineering or geoscience, and knowledge of reservoir engineering and petroleum geology.

## Techlog Fundamentals

**Awareness - 5 Days**

The Techlog platform interactive suite brings all of the petrophysical and geological data together. Attendees will learn the fundamentals of this application and its Techplot, Techdata, and Quanti base modules. In addition, the use of the data model within the Techlog application and the foundation utilities for loading, unloading, manipulating, and displaying data in the system, including core and images will be explained. The course topics include deterministic calculations and the principles behind the application workflow interface for single- and multiwell use.

**COURSE CONTENT**
- Techlog platform interface and data structure
- Data management and QC techniques
- Multiwell management
- Basic plotting tools
- Workflows for deterministic evaluation using Quanti module
- User-defined programming language
- Advanced Techlog platform modules

**AUDIENCE**
Development and exploration log analysts and petrophysicists, geologists, petroleum engineers, managers, and technical personnel with no prior experience using Techlog platform software.

**PREREQUISITE**
None

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
Avocet Integrated Asset Modeler Fundamentals

Foundation - 5 Days

The course focuses on use of the Avocet platform to integrate the reservoir with the surface models. Instruction includes software installation.

COURSE CONTENT
- Overview of key reservoir network coupling fundamentals
- Coupling reservoirs to networks
- Running time-based simulations
- Connecting models
- Adding a Microsoft Excel planning, risk, and reserves software model to a flow diagram
- Evaluating economics with Merak software models
- Transferring compositions

AUDIENCE
Anyone wanting to integrate reservoirs with surface models using the Avocet platform.

PREREQUISITE
Production, reservoir, or process engineering background with knowledge of either ECLIPSE or PIPESIM.

ECLIPSE Applied Reservoir Simulation Fundamentals

Foundation - 5 Days

In this overview of the history and theory of reservoir simulation, attendees study the critical appraisal of input data, computational requirements, dual porosity, group controls, condensate behavior, history-matching, and production forecasting. Other topics can be included by prior arrangement. Hands-on exercises using small-scale simulation models improve your understanding of reservoir mechanics and appraisal of input data. The attendees are encouraged to present reservoir models for analysis and discussion.

COURSE CONTENT
- Simulation equations
- Data analysis
- Fine-grid and small-scale models
- Coarse-grid and full-field models
- Simulation study plan and design
- Compositional reservoir aspects
- Fractured reservoir concepts

AUDIENCE
Reservoir engineers, geoscientists, and other technically trained individuals interested in learning the fundamentals of ECLIPSE simulator software.

PREREQUISITE
Reservoir engineering background.

ECLIPSE Blackoil Reservoir Simulation

Foundation - 5 Days

The focus of this course is on learning the ECLIPSE Blackoil reservoir simulator software, rather than simulation methodology. This fully implicit, three-phase, 3D, general-purpose black-oil simulator includes several advanced features of ECLIPSE simulator software.

COURSE CONTENT
- Overview of how a simulator initializes and executes
- Block-centered and corner-point grid geometries
- Rock and fluid properties
- Allocation of initial pressure and saturation distribution
- Aquifer definition
- Control wells under history-matching and production regime
- ECLIPSE Blackoil simulator file structure
- Input rules
- Specifying and editing input and output data
- Building and executing a simulation model
- Analysis of results through postprocessing

AUDIENCE
Reservoir engineers, geoscientists, and other technically trained individuals interested in learning the ECLIPSE Blackoil simulator.

PREREQUISITE
ECLIPSE Applied Reservoir Simulation Fundamentals course and background in reservoir engineering.

FrontSim Streamline Reservoir Simulation

Foundation - 3 Days

The ECLIPSE FrontSim streamline black oil simulator is a three-phase, 3D simulator that models multiphase fluid flow along streamlines. Attendees will learn how to visualize the dominant flow paths and depict fluid flow behavior within complex geology, then transfer this knowledge into ECLIPSE simulator applications. This course emphasizes the use of the software rather than the methodology of simulation studies.

COURSE CONTENT
- ECLIPSE FrontSim simulator fundamentals
- Front-tracking and tracer simulation
- Compressibility and changing streamlines
- Finite-difference and saturation solvers
- Gravity and segregation
- Pressures grids and velocity fields
- Fluids, rocks, and model initialization
- End-point scaling
- 3-phase black-oil models
- Aquifers, wells, and history matching
- Forecasts and waterflood optimization

AUDIENCE
Reservoir engineers, geoscientists, and technically trained individuals interested in learning reservoir simulation using the ECLIPSE FrontSim simulator.

PREREQUISITE
Reservoir engineering background and ECLIPSE Applied Reservoir Simulation Fundamentals course.
This course is designed to introduce the application of MEPO to reservoir engineers and asset teams involved with related disciplines. The course will cover workflow processes for several concrete application scenarios using industry standard design and optimization techniques in reservoir simulation. Following an introduction to the basic functionality of the tool and project structure, the course attendees will be given a brief summary of terminology and concepts in uncertainty modeling, assisted history-matching, and production forecasting, followed by presentation and hands-on experience gained by working with the application of MEPO. Practical exercises include performing uncertainty analyses as well as investigating the influence of various parameters on reservoir modeling and alternative development strategies. The remainder of the course is dedicated to principles and practice of MEPO with a focus on history-matching tasks and uncertainty quantification. Significant emphasis will be placed on design, execution, and postprocessing of reservoir simulation runs. Using carefully selected example cases and exercises, the attendees will gain an understanding of methods and modeling techniques that will enable them to make use of MEPO in their routine tasks.

**COURSE CONTENT**
- Project creation
- Project filters
- Project configuration: OFM software workspace customization
- Base map customization
- Shared workspaces
- OFM software tools and settings
- GIS maps
- Map based representations
- Tabular plots through line graphs to GIS
- Graphical display features ranging from primary and derived performance parameters
- Summary reports
- Set of reference points
- Review project data and check for missing values
- Use filters to screen out unwanted entities for analysis
- Group project data at multiple levels
- Create calculated fields and calculated variables
- Create single- and multiple-well plots
- Create and format well and field summary reports
- Export reports and table data to other applications
- Share workspaces
- Workflow examples and best practice

**AUDIENCE**
Reservoir engineers.

**PREREQUISITE**
None

This course will take the attendees through a series of hands-on exercises spanning project creation, project configuration, and workspace customization. This course is designed for technical support personnel rather than end users, and is therefore focused on the OFM software underlying structure rather than its analytical functionalities.

The OFM software provides a cost-effective and integrated environment in which to accomplish complex workflows, in addition to forecasting analysis and visualization of reservoir and production data. OFM software enables early detection of production problems and their possible causes, allowing engineers to manage a larger number of wells in less time and unlocking the asset to produce at full potential.

**COURSE CONTENT**
- Project creation
- Project filters
- Project configuration: OFM software workspace customization
- Base map customization
- Shared workspaces
- OFM software tools and settings
- GIS maps
- Map based representations
- Tabular plots through line graphs to GIS
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- Create and format well and field summary reports
- Export reports and table data to other applications
- Share workspaces
- Workflow examples and best practice

**AUDIENCE**
Anyone who needs to configure or support OFM software for end users.

**PREREQUISITE**
None

This course introduces attendees to the primary functionalities of the OFM software by allowing the attendees to interact with a preprepared gas well operations project. The flow of the course centers on the attendee acting as a member of a fictional engineering team, charged with accomplishing a number of common tasks using the OFM software suite. The course covers each of the required tasks. In accomplishing the tasks, the attendees are exposed to the range of common features of the software application. During the course, the attendees will learn how to use the OFM software as a quality assurance tool, seeking deficiencies in the data before using the project data to illustrate primary and derived performance parameters. The course also covers graphical display features ranging from tabular plots through line graphs to GIS map-based representations.

**COURSE CONTENT**
- A brief walkthrough of a fully functioning project
- Review project data and check for missing values
- Use filters to screen out unwanted entities for analysis
- Group project data at multiple levels
- Create calculated fields and calculated variables
- Create single- and multiple-well plots
- Create and format well and field summary reports
- Export reports and table data to other applications
- Share workspaces
- Workflow examples and best practice

**AUDIENCE**
Anyone responsible for setting up and maintaining a project using OFM software.

**PREREQUISITE**
None
<table>
<thead>
<tr>
<th>Course Title</th>
<th>Duration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petrel Reservoir Engineering</td>
<td>3 Days</td>
<td>This course enables attendees to prepare and run a Petrel platform model for reservoir simulation in ECLIPSE, ECLIPSE FrontSim, and INTERSECT simulator software. In this course, attendees will build a 3D simulation model inside the Petrel platform based on a geological input data, wellbore and well control rules, create black oil fluid models and rock physics functions, and submit the model to the simulators. In addition, practical application of most Petrel platform simulation processes will be discussed and illustrated in the exercises. Overall, pre-processing and post-processing of simulation data will be done within the Petrel platform environment.</td>
</tr>
<tr>
<td>Petrel Well Design</td>
<td>1 Day</td>
<td>The purpose of this course is to introduce the well design module and the drilling functionalities in the Petrel platform. The attendees are guided through the process facilities and well design approaches, including an enhanced method also used by drilling engineers. How to import trajectory and targets from third-party applications such as the Landmark EDM will also be introduced. After the planning phase, attendees will learn how real-time data acquisitions are handled in the Petrel platform.</td>
</tr>
<tr>
<td>PIPESIM Fundamentals</td>
<td>2 Days</td>
<td>In this course, attendees explore the PIPESIM flow simulator, which provides steady-state, multiphase flow simulation for oil and gas production systems. Individual PIPESIM modules are used for a wide range of analyses, including well modeling, nodal analysis, field planning, artificial lift optimization, and pipeline and process facilities modeling. A major feature of PIPESIM simulator software is the system integration and openness that allows users to develop a Total Production System Model. The attendees will gain a general understanding of how PIPESIM simulator software is used to design and optimize total production systems from the reservoir to the final processing delivery point.</td>
</tr>
<tr>
<td>Diagnosis and Analysis of Shale Gas Wells using OFM</td>
<td>2 Days</td>
<td>This course provides tools and procedures for analyzing production data from shale gas wells. The attendees will learn to use diagnostic plots and special analysis techniques to forecast production. Attendees will also learn screening methods for selecting workover candidates.</td>
</tr>
</tbody>
</table>

**COURSE CONTENT**

- Simulation case setup
- Initialization and volume calculation
- Simulation run and results viewing
- History matching and prediction
- Well engineering
- Upscaling and advanced corner point gridding

**AUDIENCE**

Development and exploration geologists, geophysicists, petroleum engineers, managers, reservoir engineers, and technical personnel with prior experience in Petrel platform software.

**PREREQUISITE**

Petrol Fundamentals course or equivalent Petrel experience, and general knowledge of reservoir engineering or petroleum geology and geophysics.

**COURSE CONTENT**

- Drilling event classification and visualization
- Webmap services
- Well design
- Well path design
- Real-time data acquisition

**AUDIENCE**

Drilling engineers, geologists, and petrotechnical personnel with fundamental knowledge in Petrel platform software and who need to understand well path design and optimization within the Petrel platform.

**PREREQUISITE**

Petrel Fundamentals course.

**COURSE CONTENT**

- Analyze well performance
- Design of models for pipeline and process facilities
- Perform nodal analysis
- Develop black-oil and compositional fluid models
- Select multiphase flow correlations
- Surface network models

**AUDIENCE**

Anyone wanting to learn steady-state, multiphase flow simulation for oil and gas production systems to analyze well performance, model pipelines and facilities, and perform nodal analysis using PIPESIM simulator software.

**PREREQUISITE**

None
## Course Content

### ECLIPSE Advanced Topics
- **Skill - 5 Days**

The ECLIPSE simulator software suite provides solutions for the entire spectrum of reservoir simulation, offering numerical simulation techniques for all types of reservoirs and all degrees of complexity. If you are an experienced simulation engineer ready to advance your knowledge of ECLIPSE simulator software, this course is structured for you. Because of the wide range of topics available, please specify the subjects of particular interest when registering.

**COURSE CONTENT**
- Initialization and end-point scaling
- Modeling horizontal wells
- Modeling downhole inflow control devices using multisegmented wells
- Well and group controls
- Gas lift optimization
- Amalgamation of surface facilities using reservoir coupling
- Network modeling
- Flux boundary and pressure boundary conditions
- Convergence issues
- Actions and user-defined parameters
- Gas supply contract modeling (optional)
- Refinement and coarsening of local grids (optional)

**AUDIENCE**
Reservoir engineers experienced in working with ECLIPSE simulator software and wanting to learn advanced simulation techniques.

**PREREQUISITE**
ECLIPSE Blackoil Reservoir Simulation course or experience as a simulation engineer, and ECLIPSE Applied Reservoir Simulation Fundamentals course.

### ECLIPSE Compositional Simulation
- **Skill - 5 Days**

In this course on the ECLIPSE Compositional finite-difference simulator, attendees will learn how to study complex hydrocarbon behavior problems and compositional changes that occur in geologically complex reservoirs when the hydrocarbon is condensate or when crude oil is volatile.

**COURSE CONTENT**
- Black-oil and compositional models: Definitions, equations, assumptions, approximations, and unknowns
- PVT practices and phase behaviors
- Structure and keywords
- Miscible, immiscible, and water-alternating-gas (WAG) displacement of an oil and gas injection into condensates
- Use of ECLIPSE PVTi and ECLIPSE Compositional simulator to model slim-tube displacements
- Full-field compositional models
- First contact miscibility
- Condensing gas drive and vaporizing gas drive
- Thermodynamics
- Solution scheme
- Flash calculation
- EOS
- Viscosity correlations
- Characterization and component lumping
- Surface tension effects
- Near-critical oil and gas relative permeability
- Standard laboratory experiments
- Diffusion processes in compositional simulation
- Numerical dispersion and grid orientation nine-point scheme
- Perform gas-water and CO₂ water solubility modeling
- Tracer tracking of compositional components

**AUDIENCE**
Reservoir engineers experienced in or wanting to learn compositional simulation using the ECLIPSE Compositional simulator.

**PREREQUISITE**
Knowledge of PVT or EOS modeling; reservoir engineering background or familiarity with ECLIPSE Blackoil simulator.

### ECLIPSE Equation of State and Pressure-Temperature-Volume
- **Skill - 5 Days**

The ECLIPSE PVTi reservoir simulation software is an EOS program for generating and analyzing PVT data based on measurements of petroleum mixtures. Attendees will use the software to analyze laboratory-derived PVT information and generate input data for ECLIPSE simulators. This course will increase the attendee’s understanding of the wide range of EOS models and facilities available to group or pseudobase fluid components automatically.

**COURSE CONTENT**
- Properties of pure substances and mixtures
- Petroleum fluid phase behavior
- PVT reports
- Quality-check of laboratory measurements
- EOS models
- Pseudo component splitting and grouping
- Simulate experiments with ECLIPSE PVTi
- Tuning EOS parameters using regression techniques
- PVT tables as input to ECLIPSE simulators
- Principles of miscible flooding

**AUDIENCE**
Reservoir engineers interested in generating and analyzing PVT data.

**PREREQUISITE**
Reservoir engineering background and familiarity with reservoir simulation.

### Introduction to INTERSECT
- **Skill - 2 Days**

The INTERSECT Reservoir Simulation course introduces reservoir engineers to methods of constructing simulation models using INTERSECT simulator software. The training discusses the main features of the INTERSECT simulator relative to working with input data from the Petrel platform or ECLIPSE simulator. Along the way, attendees will also be exposed to the basic features of the INTERSECT simulator. The course incorporates information about using Petrel pre- and post processors as the primary front-end for the INTERSECT simulator.

**COURSE CONTENT**
- Overview of reservoir simulation using the INTERSECT simulator
- Data creation through the Petrel Reservoir Engineering application
- Data editing using the ECLIPSE INTERSECT Migrator
- Field management
- Improving simulator performance
- Important behavioral differences in ECLIPSE and INTERSECT simulator software

**AUDIENCE**
Reservoir engineers working on simulation studies.

**PREREQUISITE**
Background in reservoir engineering.
OFM Waterflood Analysis

Skill - 1 Day

In this course, attendees learn to employ the OFM software to automatically or graphically define waterflood patterns using production and reservoir data. The attendees will learn to combine this information with pressure data and PVT algorithms to determine reservoir volumes and voidage in addition to gaining experience in setting up patterns and performing analyses on a water flood project.

COURSE CONTENT
- Configuration of static and dynamic patterns
- Use of pressure and PVT data
- Loading of reservoir property data
- Review of overall waterflood performance
- Analysis of waterflood by pattern
- Calculation of voidage replacement ratios, comparison by pattern
- Creation of grid maps by well and pattern
- Creation of waterflood control diagnostic and Hall plots
- Estimating pattern configurations and pattern outlines

AUDIENCE
Anyone wanting experience in setting up patterns and performing analyses on a waterflood project in OFM software.

PREREQUISITE
OFM software proficiency or OFM Fundamentals course.

OFM Using Oil & Waterflood Examples (Intermediate)

Skill - 3 Days

This course extends the materials covered in the OFM software fundamentals course and introduces two key areas of functionality: forecasting and mapping. The course introduces the attendees to a wide variety of map-based visualizations—bubble, grid, contour, scatter, and surface maps. In forecasting the OFM software offers a highly interactive module for the user to history match and subsequently forecast production. The widely used Arps technique is covered, and attendees create forecasts using a variety of assumptions. This course introduces PVT as a way of achieving this goal. Pattern creation and management techniques are now possible. A range of diagnostic techniques is introduced as a means of illustrating the underlying capabilities of the application.

COURSE CONTENT
- Introducing PVT by various methods
- Creating waterflood patterns
- Configuring OFM software for pattern-based calculations
- Pattern diagnostics
- Mapper applications
- Bubble, grid, and contour map
- Scatter and map XY plots
- Forecasting and forecast scenarios
- History match techniques
- Ratio and calculated forecasts and reports

AUDIENCE
Development geoscientists, development reservoir engineers, production engineers.

PREREQUISITE
OFM software knowledge and/or the OFM Fundamentals course.

Petrel Advanced Wells

Skill - 2 Days

This course builds on the Petrel Reservoir Engineering course and goes more into depth on modeling of deviated wells. The standard well modeling with the ECLIPSE simulator and the FrontSim module treats the entire wellbore as a single entity; therefore, the model cannot take into account pressure changes along the wellbore due to friction, valves, or pumps. Such devices are often used with horizontal wells to control the inflow profile along the well trace.

To model these effects, a multisegmented well model must be used. This course explains the capabilities of this well model and how to use the Petrel platform to set up the model. Methods for adding completions such as valves and pumps and making development strategies using the equipment are also covered in this course. Sector models can be useful to study portions of a reservoir.

This course shows how to define sectors, select boundary conditions, and run sector models.

COURSE CONTENT
- Standard well model versus the multisegmented well model
- Pressure drop along horizontal wells
- Designing horizontal wells and wells with laterals
- Setting up multisegmented wells
- Completion design for multisegmented wells
- Development strategies with group control
- Sector models

AUDIENCE
Reservoir engineers or geoscientists with above average experience in the domain.

PREREQUISITE
Petrel Fundamentals and Petrel Reservoir Engineering or equivalent experience.

Petrel Assisted History Matching and Uncertainty Analysis

Skill - 2 Days

This course builds on the Petrel* Reservoir Engineering course and focuses on how to use the Petrel platform for sensitivity and uncertainty studies. These studies involve how to run the simulations as well as how to use the tools that the Petrel platform offers for results viewing, including histograms, tornado plots, spreadsheets, and line vectors.

The course begins with some basic concepts of uncertainty and how they are interpreted in the Petrel platform software. Next, performing a sensitivity study once the uncertain input parameters are identified will be presented; i.e., the course guides the attendees through setting input distributions, sampling input from those distributions, and running the resulting simulation cases. In the simplest context, the Petrel platform establishes a workflow that allows for running a sensitivity or uncertainty study in a few clicks. Occasionally, the default workflows might require being customized to meet the user’s needs. The course will introduce a number of ways to add functionality to the basic workflows to meet the user’s specific needs for defining input or reporting results.

COURSE CONTENT
- The uncertainty and optimization process
- The workflow editor
- Basic concepts in statistics
- Visualize results from a sensitivity or uncertainty study
- Customize prepared workflows in Petrel software to meet user needs

AUDIENCE
Reservoir engineers, geologists, geophysicists with previous reservoir engineering knowledge.

PREREQUISITE
Petrel Reservoir Engineering course or equivalent Petrel experience.
This two-fold course aims to give the audience insight into the Workflow editor and the Uncertainty and Optimization process in Petrel platform software with a focus on geological modeling. During the first day, the course will focus on how to use predefined workflows and how to create your own workflows for batch processing and operations, in addition to setting up, editing, and repeating processes with new data for a complete and standardized reservoir modeling workflow. To take full advantage of the uncertainty handling in the Petrel platform, the attendee will need to have an understanding of the Workflow editor module, which is the cornerstone of the Uncertainty and Optimization process. The attendee will be also given some examples on geological workflows. On day two, this course will focus on understanding sensitivities and uncertainties of a base case volumetric reservoir model. Structural uncertainties related to surfaces will be explored, as well as stochastic parameters related to the property model. Also, the uncertainty related to the contacts defining the volume case will be examined.

**COURSE CONTENT**
- Workflow Editor interface and logic
- Running predefined workflows
- Creating user-defined workflows
- Updating 3D models with new input data
- Becoming familiar with the Uncertainty and Optimization process
- Sensitivity and uncertainty analysis setup
- Well log interpretation uncertainty
- Structural uncertainty
- Fluid contact uncertainty
- Property uncertainty

**AUDIENCE**
Reservoir, development, and exploration geologists, petrophysicists, and technical personnel experienced with the Petrel platform.

**PREREQUISITE**
Petrel Fundamentals course and the Petrel Geology course.

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This course introduces reservoir engineers and consultants to some basic concepts in geomechanics and the Petrel platform product. Attendees will learn how to incorporate data about geomechanical effects into reservoir models of well production behavior. In addition to introducing geomechanics concepts, this course presents the types of data used for geomechanical modeling in the petroleum industry, and some of the geomechanical effects observed in oil and gas reservoirs and the subsurface during hydrocarbon production. The course also includes how to build reservoir models that show geomechanical effects such as pressure, stress, and strain, as well as data on reservoir flow, illustrating the effects over time, and how to build reservoir geomechanical models using the Petrel platform.

**COURSE CONTENT**
- Fundamentals of geomechanics
- Petroleum geomechanics and reservoir geomechanics
- The use of Petrel platform geomechanics software

**AUDIENCE**
Reservoir engineers and geotechnical consultants.

**PREREQUISITE**
Petrel platform and ECLIPSE simulator software.

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This workshop course covers oil recovery mechanisms and numerical simulation issues in fractured reservoirs. Attendees will have an overview of fractured reservoirs and how to build and run simulations with a compositional simulator. Conversion of single porosity dataset to dual porosity will be covered. Approximately half the course is devoted to problem solving in a workshop format using related software applications.

**COURSE CONTENT**
- Fundamentals of fractured reservoirs
- Fracture-network development and Simulation of fractured reservoirs
- Well testing in fractured reservoirs
- Comparison of single- and dual-porosity well tests
- Oil recovery mechanisms in fractured reservoirs
- Calculation of gravity imbibitions and drainage
- Dual-porosity and dual-permeability systems
- Viscous displacement option
- Matrix relative permeability modifications
- Diffusion in black oil simulation
- Discretized matrix model
- Alternate gravity drainage model
- Conductive faults
- Grid generation in fractured reservoirs
- Diffusion in compositional simulation
- Simulation of triple-porosity systems

**AUDIENCE**
Reservoir engineers interested in learning numerical simulation of fractured reservoirs using ECLIPSE simulators.

**PREREQUISITE**
Experience with ECLIPSE single-porosity simulations.

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Thermal recovery methods are typically used in heavy oil reservoirs where the oil viscosity is high at reservoir temperatures but reduces as the temperature increases. Attendees will learn how to use the ECLIPSE Thermal simulator to extend the ECLIPSE Blackoil simulator to study problems such as steam injection, hot fluid or gas injection, wellbore heaters, and simple combustion.

**COURSE CONTENT**
- PVT practices and phase behavior concepts of heavy oils
- Worldwide thermal recovery processes and screening criteria
- Key features of thermal reservoir simulation
- Equations in ECLIPSE Thermal simulator software
- Steam-assisted gravity drainage recovery and the multi-augmented well model
- Simulation of foamy oil
- Structure requirements and keywords for ECLIPSE Thermal simulator software

**AUDIENCE**
Reservoir engineers interested in learning simulation of thermal processes using ECLIPSE Thermal simulator.

**PREREQUISITE**
Experience with the ECLIPSE Blackoil simulator.

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Visit NExTtraining.net/classes for the latest calendar or to register for a course.
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<thead>
<tr>
<th>MEPO Advanced</th>
<th>OFM Advanced Topics</th>
<th>Petrel Proxy Modeling and Optimization</th>
<th>Techlog Formation Evaluation</th>
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<tr>
<td>Advanced - 2 Days</td>
<td>Advanced - 1 Day</td>
<td>Advanced - 2 Days</td>
<td>Advanced - 5 Days</td>
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**MEPO Advanced**

This course has been designed to introduce some advanced capabilities of the MEPO optimizer software to reservoir engineers and asset teams involved with related disciplines. The uncertainty parameter is very important with respect to defining distributions and also maintaining correlation among them when they are changing individually. During the history match session, data quality control, ranking parameters for history matching, and a structured workflow example will be presented. Proxy modeling techniques will be discussed. Production optimization will also be covered, in addition to spreadsheet mapping, NPV calculation, dynamic scheduling of infill wells, and constraint handling. All of these subsections will be practiced by running a tutorial. The remainder of the course is dedicated to reviewing new MEPO optimizer options practice on more applied tasks and emphasis on the use of several MEPO optimizer applications. Using a carefully selected example cases and exercises, the attendees will gain an understanding of methods and modeling techniques that will enable them to make use of the MEPO optimizer in their routine tasks.

**COURSE CONTENT**

- Study of workspaces
- Links to external applications
- Reviews of forecast results
- Advanced table types, including foreign key and lookup
- Introduction to PVT functionality
- Creation of user functions
- Making the base map a dynamic tool
- Techniques for creating continuous pressure data streams
- Creation and analysis of waterflood patterns
- Generation of waterflood-specific analyses (e.g., voidage replacement ratio)
- Injection-well specific analysis (Hall plot)

**AUDIENCE**

Anyone interested in learning more advanced and effective ways to work with an OFM project using common workflows.

**PREREQUISITE**

OFM proficiency or OFM Fundamentals course.

**OFM Advanced Topics**

This course focuses on topics outside the range of features common to day-to-day use of the OFM+ well and reservoir analysis software but that are valuable to the end user. Attendees will learn significantly more effective ways to work with an OFM project, including examining common workflows using OFM software.

**COURSE CONTENT**

- Study of workspaces
- Links to external applications
- Reviews of forecast results
- Advanced table types, including foreign key and lookup
- Introduction to PVT functionality
- Creation of user functions
- Making the base map a dynamic tool
- Techniques for creating continuous pressure data streams
- Creation and analysis of waterflood patterns
- Generation of waterflood-specific analyses (e.g., voidage replacement ratio)
- Injection-well specific analysis (Hall plot)

**AUDIENCE**

Anyone interested in learning more advanced and effective ways to work with an OFM project using common workflows.

**PREREQUISITE**

OFM proficiency or OFM Fundamentals course.

**Petrel Proxy Modeling and Optimization**

This course covers how to begin using experimental designs with the Petrel platform. Because running simulations is computer processing unit (CPU) intensive, there is a long tradition for designing computer experiments to reduce the number of runs necessary in assessing the primary relations between input parameters and computed response. In the Petrel platform, several tools are available that assist the user in making surrogate models – proxy models – that can mimic the simulation model and that are inexpensive to evaluate. These models can be useful in sensitivity studies, development scenario assessments, and in optimization operations; e.g., completion attribute design. This course is workflow based in which previous Petrel platform knowledge is used to solve the tasks described.

**COURSE CONTENT**

- The Uncertainty and optimization process
- Proxy models and their creation
- Analysis of input data
- Using proxy models for sensitivity and uncertainty workflows
- Optimization operations set up and run
- Optimization using a proxy

**AUDIENCE**

Experienced reservoir engineers, reservoir geologists, and geophysicists with solid reservoir engineering knowledge.

**PREREQUISITE**

Petrel Assisted History Matching and Uncertainty Analysis course or equivalent Petrel experience.

**Techlog Formation Evaluation**

Attendees will explore the use of the Techlog platform base modules: Techplot, Techdata, Quanti, and Quanti. min. In this class, attendees will acquire a solid foundation in the data model within the Techlog application and the foundation utilities for loading, unloading, manipulating, and displaying data in the system, including core and images. Deterministic calculations and the principles behind the application workflow interface for single- and multiwell use are covered in this course in addition to studying multiple log and component inversion techniques, thin-bed analysis, and integration of different types of data to enhance the interpretation process. Attendees will also learn how to perform day-to-day tasks within the Techlog platform suite and learn advanced techniques for improving the analysis results.

**COURSE CONTENT**

- Techlog platform interface and data structure
- Data management and QC
- Multiwell management
- Basic plotting tools
- Workflows for deterministic evaluation using Quanti modules
- User-defined programming language
- Thin-bed analysis techniques
- Multiple-component inversion

**AUDIENCE**

Development and exploration log analysts and petrophysicists with limited or no experience using Techlog platform software.

**PREREQUISITE**

Techlog Fundamentals course.
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<th>Well Intervention</th>
<th>Well Performance and Completions</th>
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<td>Assuring Flow from Pore to Process</td>
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<td>Full Life-Cycle Fluid Evaluation: Downhole to Laboratory</td>
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<td>Advanced Production Data Analysis and Nodal Analysis</td>
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<td>Applied Production Logging and Reservoir Monitoring</td>
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<td>SKILL</td>
<td>Advanced Gas Lift Design and Troubleshooting</td>
<td>Hydraulic Fracture Treatment Design and Quality Control</td>
<td>Advanced Nodal Analysis for Production Engineers</td>
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<td>High Gas-Oil Ratio Well Liquid UnLoading</td>
<td>Acid Stimulation Techniques</td>
<td>Subsurface Surface Production Optimization</td>
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<td>Introduction to High-Temperature ESP Applications</td>
<td>Fishing, Perforating and other Slickline Applications</td>
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<td>Electric Submersible Pumps: Applications Engineering</td>
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<td>Design, Diagnosis and Optimization of Gas Lift Systems</td>
<td>Formation Damage and Mitigation</td>
<td>Oilfield Water Management</td>
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<td>Sucker Rod Pumps - Application Engineering</td>
<td>Advanced Slickline Operations</td>
<td>Production Technology: Heriot-Watt University Program</td>
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<tr>
<td>FOUNDATION</td>
<td>Artificial Lift Technology</td>
<td>Hydraulic Fracturing</td>
<td>Basic Production Logging</td>
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<td>Integrated Production and Well Operations Modeling Using a Physical Simulator</td>
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<td>Workovers and Completions</td>
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<td>Slickline Operations</td>
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<td>Nodal Analysis: Subsurface Operations</td>
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<td>General Production Engineering</td>
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<td>Introduction to Flow Assurance</td>
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<td>SOFTWARE</td>
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<tr>
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<tr>
<td>Diagnosis and Analysis of Shale Gas Wells using OFM</td>
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<td>PIPESIM Artificial Lift Design and Optimization</td>
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<td>OFM Waterflood Analysis</td>
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<td>OFM Using Oil and Waterflood Examples (Intermediate)</td>
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<td>PIPESIM Gas Field Production Operations</td>
<td>Avocet Integrated Asset Modeler Fundamentals</td>
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<tr>
<td>OFM Fundamentals Using Gas Operations Examples</td>
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<td>OLGA Well Dynamics</td>
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<td>OFM Fundamentals Using Oil and Waterflood Production Examples</td>
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Software Technical courses that use software Includes practical sessions Field trips Uses simulation
<table>
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<tr>
<th>Course</th>
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<th>Foundation - 5 Days</th>
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<tbody>
<tr>
<td>Introduction to Production Engineering</td>
<td>This course focuses on the basics on production engineering that attendees need to improve their asset team interactions. The attendees will learn about the role of production engineering in building capacity and maximizing production performance using tools including well testing, nodal analysis, and artificial lift. This engineering overview covers the equipment and techniques that production engineers employ both downhole and on the surface.</td>
<td>Overview of production engineering</td>
<td>Reservoir fundamentals and nodal analysis</td>
<td>Well testing</td>
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<tr>
<td>Artificial Lift Technology</td>
<td>This introductory course will increase the attendee's knowledge of artificial lift methods and the factors that affect optimal designs and operations, including fluid properties and multiphase flow regimes. An overview of lift techniques, technologies, and equipment also covers alternate deployment scenarios and multisensor applications for surveillance and optimization. Attendees will learn strategies and best practices for field production optimization and when and how nodal systems analysis can be applied to lift performance optimization.</td>
<td>Fluid flow fundamentals</td>
<td>Blackoil PVT</td>
<td>Inflow performance</td>
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<tr>
<td>Basic Production Logging</td>
<td>Production logging tools have specific uses as well as limitations. Attendees will learn the various applications for these tools, the interpretation assumptions that are integral to their designs, and how log quality is affected by the acquisition process. Hands-on demonstrations teach the fundamentals of production log interpretation, and an in-class workshop focuses on the interpretation of single- and two-phase flow. Discussion includes use of these logs for measurement of three-phase flow.</td>
<td>Inflow and outflow performance and productivity index for oil wells and gas wells</td>
<td>Tool conveyance using tractors and coiled tubing</td>
<td>Depth control in cased wells using gamma ray and casing collar locator data</td>
</tr>
<tr>
<td>Completion and Production Engineering</td>
<td>This course covers the role of the well, how its production performance can impact the larger integrated production system, and considerations for completion design. Attendees will learn the selection criteria for the main completion components, including the field operational and ongoing production management concerns. Hands-on exercises demonstrate the factors that affect well flow behavior and productivity.</td>
<td>Integrated production systems: Completion methods, engineering, exploitation, and reservoir classification based on the fluid types</td>
<td>Flow behavior: Flow in porous media, well deliverability, completion effects, flow in pipes, choke performance, and systems analysis</td>
<td>Design considerations: Tubing, tubing loads and movement, tubular connections, and casing</td>
</tr>
<tr>
<td><strong>AUDIENCE</strong></td>
<td>Anyone involved with well surveillance, maximizing recovery, or identifying production problems in artificially lifted wells.</td>
<td>Geoscientists or engineers responsible for interpreting production logs.</td>
<td>Geoscientists, engineers, and managers seeking a greater understanding of well completions and production performance.</td>
<td>Minimum of 2 years of E&amp;P experience in subsurface engineering, operations, or management.</td>
</tr>
<tr>
<td><strong>PREREQUISITE</strong></td>
<td>None</td>
<td>None</td>
<td>Engineering or geosciences degree recommended as this course deals with the production logging physics.</td>
<td></td>
</tr>
</tbody>
</table>
General Production Engineering | Hydraulic Fracturing | Integrated Production and Well Operations Modeling Using a Physical Simulator | Introduction to Flow Assurance

**Foundation - 5 Days**

This course introduces the attendees to production technology, reservoir fundamentals, formation damage mechanisms, and nodal analysis. Attendees will learn about types of completions—and optimal selection based on producing scenarios—and types of perforation systems and their selection. Reviews cover lower and upper completion components and associated accessories, plus acidizing, fracturing, slickline, coiled tubing, and surface facilities.

**COURSE CONTENT**
- Fluid and rock properties
- Reservoir drive mechanisms
- Nodal analysis
- Completion design
- Perforating
- Sand control
- Hydraulic fracturing
- Wireline well operations
- Scale cleanout with coiled tubing
- Surface facilities engineering considerations

**AUDIENCE**
Anyone looking for an overview of the practical aspects of field development planning.

**PREREQUISITE**
Basic understanding of field operations.

This course is designed to increase your understanding of hydraulic fracturing. The course material covers factors that contribute to successful fracturing operations, including rock properties and treatment design and parameters. Attendees will learn how to plan and execute the job, and then evaluate the results.

**COURSE CONTENT**
- Candidate selection
- Principles of rock mechanics
- Fracture mapping, microfracturing testing, minifracturing testing
- Designing hydraulic fractures
- Fracturing fluids
- Proppant
- Fracturing high-permeability formations
- Planning and executing fracturing operations
- Evaluating hydraulic fracture treatments
- New developments in hydraulic fracturing

**AUDIENCE**
Engineers and field personnel responsible for the design and execution of hydraulic fracture treatments.

**PREREQUISITE**
Basic understanding of production, intervention operations, and reservoir engineering.

In this course, an oil well simulator is used to detail many of the operations that take place in a well. This course/workshop consists of theoretical (50%) and practical (50%) sessions with experienced professionals. The attendees will simulate the operation of different artificial lift systems used to produce oil (electic submersible pumps [ESP], gas lift, progressive cavity pumps) under several operating conditions and their effects on the production system. Water and air are used to simulate two-phase flow (oil and gas). The standard configuration of the oilwell simulator uses an ESP with a variable speed drive, allowing for variation of the pump speed. This feature is used to optimize production and well performance. A workover operation can be performed by changing the artificial lift system from ESP to gas lift. The configuration of the oilwell laboratory allows for visualization of the reservoir, wellbore, flow lines, choke performance, and most common artificial lift systems. Additionally, the effects of damage removal, pump speed, gas injection rates, and down hole pressure can be analyzed to generate optimization opportunities.

**COURSE CONTENT**
- Oilwell operations
- Inflow performance relationships
- Permeability
- Nodal analysis
- Well completions
- Choke
- Artificial and gas lift
- ESPs
- Hydraulic pumps
- Fluid flow
- Formation damage
- Fluid mechanics

**AUDIENCE**
Technicians, supervisors, or engineers with little or no previous oilwell operations knowledge.

**PREREQUISITE**
None.

This course introduces attendees to the main types and causes of flow impediments along with the methods and technologies commonly applied for their prevention, control, and remediation. The course will increase your understanding of the main problems associated with flow assurance, including asphaltenes, paraffins, emulsion, scales, sand, slugging, corrosion, and hydrates. Learn which technologies and techniques to use for specific problem environments and the advantages and disadvantages of each. Attendees will identify the types and causes of flow impediment and the methods or technologies that should be applied for the prevention, control, and remediation of these flow impediments.

**COURSE CONTENT**
- Flow assurance principles and fundamentals
- Inorganic scale: Deposition principles, prediction, modeling, management program design, and scale prevention
- Hydrates: Deposition principle, impact, hydrate detection, control, and remediation
- Paraffins (wax): Deposition principle, properties, factors affecting deposition, operational problems, control, and remediation
- Asphaltenes: Dye properties, deposition mechanism, modeling, effect of variables, operational problems, prevention, and remediation
- Emulsions: Crude oil natural surfactants, characteristics, and treatments
- Corrosion: Factors influencing oilfield corrosion and their control

**AUDIENCE**
Engineers responsible for assessing, diagnosing, or troubleshooting flow assurance problems in an operational or design capacity.

**PREREQUISITE**
General knowledge of production systems and surface operations.
## Production Engineering

### Nodal Analysis: Subsurface Operations

**Foundation - 3 Days**

This course covers predicting the rate at which a well should be capable of producing, given reservoir and fluid properties, wellbore configuration, and flowing wellhead pressure. Attendees will learn how to identify which of the components in the reservoir, completion, and wellbore system are restricting performances; analyze production data to find permeability, skin factor, and drainage area; forecast future performance from historical production trends and known reservoir properties. Attendees will also develop skills necessary for the design, operation, and optimization of oil and gas surface production facilities.

**COURSE CONTENT**
- Fluid properties
- Permeability, skin factor, and drainage area
- Production optimization

**AUDIENCE**
Technologists and production engineers.

**PREREQUISITE**
None

### Slickline Operations

**Foundation - 5 Days**

This course consists of a theoretical sessions in the classroom with experienced professionals who will present slickline tool principles and operations. The attendees will also have various practical exposure sessions using the slickline well/pad and have hands-on sessions using the slickline tools in the workshop. The course is 50% classroom and 50% practical in the workshop and worksite pad, including access to an actual well. The course will include a detailed introduction to slickline equipment and instrumentation used to control, condition, and monitor downhole operations. This course will provide a clear understanding of the primary operations and need for a slickline in the oil and gas industry.

**COURSE CONTENT**
- Slickline background
- Well completions
- Slickline units and powerpacks (zones)
- Pressure-control equipment
- Basic toolstring components
- Basic service and remedial tools
- Running and pulling tools
- Locks, standing valves, and landing nipples
- Running, setting, equalizing, and pulling process
- SSDS and shifting tools
- Changing gas lift mandrels (demonstration)
- Running slickline equipment in a well

**AUDIENCE**
Technicians, supervisors, or engineers with little or no previous slickline knowledge.

**PREREQUISITE**
Familiar with basic well completions and general well intervention operations.

### Workovers and Completions

**Foundation - 5 Days**

Learn the role of engineers and field operators in planning and executing workover operations. This course provides in-depth information on the impact of workovers and completion design in maximizing field production and increasing recoverable reserves. The course also emphasizes the importance of a team concept as a determining factor in operations success. Attendees will gain a greater understanding of how to apply advanced technologies to designing and executing workover jobs, and how to select the best operations method to perform the task in the safest, most efficient manner.

**COURSE CONTENT**
- Workover and completion methodology: Risk management, well problems, and well control
- Completion considerations: Cement bond logs, perforations, and fracture gradient
- Sand control management, cement squeeze jobs, and acid treatments
- Rigless workovers, coiled tubing operations, and fishing
- Completion management, operations in open and cased holes, and artificial lift systems

**AUDIENCE**
Engineers, operations personnel, and managers working with or directing multidisciplinary teams responsible for well workovers or interventions.

**PREREQUISITE**
Minimum of 5 years of experience in oil and gas engineering or operations in the upstream industry.

### Acid Stimulation Techniques

**Skill - 5 Days**

This course covers the cause and identification of formation damage during drilling, cementing, perforating, producing, and workover operations. Attendees will learn about the impact of formation damage on well performance and how to gauge the effectiveness of acid stimulation treatments, technically and economically.

**COURSE CONTENT**
- Formation damage mechanisms and their identification
- Skin
- Acids and additives used in matrix stimulation
- Acid reactions in carbonates and sandstones
- Acid treatment design
- Acid displacement
- Laboratory tests
- Acidizing gravel packs
- Acid fracturing design
- Quality assurance

**AUDIENCE**
Technical staff responsible for assessing underperforming wells or designing acid treatments.

**PREREQUISITE**
Basic understanding of petroleum engineering.

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Visit NExTtraining.net/classes for the latest calendar or to register for a course.
Advanced Slickline Operations | Advanced Gas Lift Design & Troubleshooting | Advanced Nodal Analysis for Production Engineers | Design, Diagnosis and Optimization of Gas Lift Systems

**Skill - 5 Days**

The course consists of theoretical sessions in the classroom delivered by experienced professionals who will present slickline tool principles and operations. The attendees will also have various practical exposure sessions using the slickline well/pad and having hands on sessions using the slickline tools in the workshop. This course consists of 50% classroom and 50% practical in the workshop and website pad, including access to an actual well.

**COURSE CONTENT**
- Pressure control equipment
- Gas lift equipment
- Fishing and other slickline applications

**AUDIENCE**
Technicians, supervisors, or engineers with previous slickline experience.

**PREREQUISITE**
Familiarity with slickline applications, equipment, and operations. Attendees must have worked with Slickline Operations, either as equipment operators or as operations supervisors.

**Advanced Gas Lift Design & Troubleshooting**

This course will help the attendees learn the best method for selecting the proper type of artificial lift. The course will provide the attendees with details on gas lift systems and different design methods, in addition designing the valve spacings and basis for selecting different valves. The course will also introduce the optimum unloading procedures for gas lift wells to minimize risk and save operation time and how to optimize the gas lift well production and combine continuous and intermittent gas lift systems. Troubleshooting new and old gas lift wells will be covered in the course through the use of case examples.

**COURSE CONTENT**
- System nodal analysis
- Multwell systems
- Artificial lift methods, advantages, and limitations
- Gas lift technology and process
- Types of gas lift systems
- Gas lift equipment
- Fundamentals of gas lift design
- Troubleshooting gas lift wells
- Production optimization

**AUDIENCE**
Production engineers, managers, and production technicians (office and fields) who have experience with artificial lift and gas lift systems.

**PREREQUISITE**
None

**Advanced Nodal Analysis for Production Engineers**

Based on data from a material balance or the actual well production, this course helps attendees learn how it is possible to predict the future production behavior of a well as a function of time. The course will also help the attendees in the proper selection of design variables such as tubing sizes, or in making the decision to install or not any particular artificial lift system. Unlike conventional nodal analysis, all decisions from a sensitivity analysis are carried out and planned in the future in consideration of the reservoir pressure changes that occur with time.

**COURSE CONTENT**
- Diffusivity equation
- Diffusivity equation solutions
- Production system analysis
- Well performance equations for oil and gas wells
- Well completion effects
- Multiphase flow analysis
- Sensitivity analysis using conventional nodal technique
- Forecast well production performance
- Decline curve analysis types
- Suitable production system design

**AUDIENCE**
Production engineers and reservoir engineers with a basic knowledge in this area who are involved in the monitoring and performance of oil and gas wells.

**PREREQUISITE**
None

**Design, Diagnosis and Optimization of Gas Lift Systems**

All facets of gas lift design and optimization are presented, including basic principles, equipment selection, gas lift types, and monitoring. Attendees will learn how to design and analyze continuous or intermittent gas lift systems for fast, safety-oriented solutions to increase or optimize oil production.

**COURSE CONTENT**
- Gas lift concepts, advantages, and disadvantages
- Gas lift surface and downhole equipment
- Valve mechanics: principles of operation and classification of gas lift valves
- Valve opening and closing forces and shop calibration
- Design of a continuous gas lift installation
- Nodal analysis, curve determination of minimum gradient, and gas static pressure gradient
- Mandrel spacing and selection of operating and discharge valves
- Overview of intermittent gas lift methods
- Design of an intermittent gas lift installation
- Conventional and unconventional methods: principle applications and advantages

**AUDIENCE**
Technical staff with basic knowledge of gas lift who are involved in the design, optimization, and monitoring of gas lift installations.

**PREREQUISITE**
Basic knowledge of well modeling and nodal analysis, and basic computer skills to complete in-class exercises.
### Electric Submersible Pumps: Application Engineering

**Skill - 5 Days**

Designed for technical staffs who want both theoretical and practical knowledge about the advantages and limitations of ESPs, this course includes design, optimization, and diagnosis of wells producing with ESPs. Attendees gain a solid understanding of ESP technology and its applications, as well as of the pump components and their functions. Specific instruction is given on the affinity laws for centrifugal pumps, downhole gas separators, and gas handlers. Reviews include both standard and nonstandard applications of ESP technology.

**COURSE CONTENT**
- Review of artificial lift systems
- Standard and nonstandard ESP applications
- Reservoir dynamics: Inflow performance relationship and total dynamic head
- Description of downhole equipment
- Pump selection and dimensioning
- Physical limits
- Nodal analysis
- Surface equipment
- Alternatives to standard means of deployment

**AUDIENCE**
Technical staff involved in production optimization using ESP technology.

**PREREQUISITE**
Basic understanding of production engineering, production field experience, or experience with ESPs.

### Fishing, Perforating and other Slickline Applications

**Skill - 5 Days**

This course takes a practical approach to special slickline applications and detailed descriptions of downhole tools. Included in the course are procedures and tools for fishing and perforating, types of landing nipples, shifting tools, plugs, circulating devices, procedures, and kickover tools for installing/retrieving GLM valves, and subsurface safety valves.

**COURSE CONTENT**
- Review of basic slickline tools and operations
- Shifting tools
- Circulation devices
- Gas lift tools and valves
- Subsurface safety valves
- Slickline hardware review
- Running plugs and safety valves
- Fishing tools
- Braided line and pressure equipment
- Downhole measurements and new developments

**AUDIENCE**
Slickline operators and supervisors, as well as other personnel involved in slickline operations.

**PREREQUISITE**
Basic understanding of well interventions and rigless interventions in general and in particular, with slickline operations.

### Formation Damage and Mitigation

**Skill - 5 Days**

This course covers formation damage mechanisms and the methods used for mitigation. Also included are the topics of matrix treatments and hydraulic fracturing. The damage mitigation in carbonates is also presented with an overview of acidizing.

**COURSE CONTENT**
- Introduction
- Problem diagnosis and well intervention
- Acidizing candidate selection
- Fracturing high-permeability formations
- Acidizing carbonates

**AUDIENCE**
Production, drilling, reservoir engineers, and other field personnel who require an introduction to wellbore damage mechanisms and mitigation methods.

**PREREQUISITE**
Bachelor degree in a technical discipline. Oilfield operations experience is not essential but would be beneficial.

### High Gas/Oil Ratio Well Liquid Unloading

**Skill - 5 Days**

The course provides attendees with a basic understanding of gas well liquid unloading, including the use of standard artificial lift technology to assist in unloading and in alternative foaming agent methods. The attendees will use practical examples to enhance your understanding of the gas well liquid unloading processes.

**COURSE CONTENT**
- Hydrocarbon physical properties: Two-phase flow basics
- Well inflow performance
- Nodal analysis
- Artificial lift selection
- Sucker rod pumps
- Progressive cavity pumps
- Electric submersible pumps
- Gas lift
- Gas well liquid unloading applications: Intermittent gas lift, plunger lift, velocity strings, and injection of surfactants (foaming agents)

**AUDIENCE**
Anyone involved in gas production treatment, handling, or marketing who wants to understand high gas/oil ratio wells.

**PREREQUISITE**
Basic understanding of well completions and operations.
Hydraulic Fracture Treatment Design and Quality Control

Skill - 5 Days

This course presents the basic principles of hydraulic fracture treatment design and optimization, including application of fracture models. Focus is on the use of a pseudo-3D fracture simulator to design the optimal treatment pumping schedule for both low- and high-permeability wells. Attendees will learn how to select the appropriate fluid and proppant for specific reservoir conditions and field operations, and how to establish quality control for treatment operations.

COURSE CONTENT
- Critical parameters in hydraulic fracture treatment design
- Fracture modeling
- Fracture optimization
- Fracture fluids and proppants
- Minifrac analysis
- Fracture treatment execution
- Fracture treatment evaluation
- Supervision of fracturing operations

AUDIENCE
Engineers and field personnel responsible for the design and execution of hydraulic fracture treatments.

PREREQUISITE
Basic understanding of production, intervention operations, and reservoir engineering.

Introduction to High-Temperature ESP Applications

Skill - 2 Days

This course is designed to provide an introduction to the ESP and its applications in high-temperature environments. The specific functions of the ESP components are covered in this course in addition to basic application engineering principles, operating practices, and troubleshooting. The ESP is considered to be an effective and economical means of lifting large fluid volumes from significant depths under a variety of well conditions. Experience gained over many years of ESP operation and the continuous evolution of technology has expanded the operational capabilities of ESPs. In particular, ESPs are widely used for the production of fluids from steam-assisted gravity drainage (SAGD) well pairs and other applications that require a reliable pumping system in high-temperature wellbores. Knowledge gained in the classroom is reinforced with practical demonstrations of the technology and components in the workshop by observing actual equipment being assembled and tested.

COURSE CONTENT
- ESP overview
- Component review
- Pumps
- Intakes and gas separators
- Motor, protector, and power cables
- Electrical surface equipment
- High-temperature technology
- Application Engineering and ESP design
- Operation and troubleshooting
- Dismantle inspection failure analysis

AUDIENCE
Engineers, field supervisors, operators, and electricians involved in the application and operation of ESPs.

PREREQUISITE
Basic knowledge of production engineering, operator experience, and/or field electrical experience.

Oilfield Water Management

Skill - 5 Days

This course covers the entire oilfield water cycle with an emphasis on the subsurface aspects, including producer performance with water injector performance water sweep in the reservoir. A review of surface treatment of produced water, injection water, or disposal fundamental concepts are introduced so that attendees are able to analyze water aspects of field performance and select suitable solutions. The course presentations are intended to persuade the attendees to think about the issues and contribute with their own experience. Furthermore, the attendees are encouraged to bring their own water challenges for discussion in class. A field case history of the Aquarius field is used throughout the course so that attendees gain experience through hands-on analysis and design in all aspects of the water cycle.

COURSE CONTENT
- Introduction to the water cycle
- Reservoir issues
- Aquarius reservoir, producing and injection wells, and facilities exercises
- Water problem types
- Nodal analysis for water
- Producing wells diagnostic methods and solutions
- Injection mechanisms, problem types, and solutions
- Produced fluids
- Water quality for injection or disposal
- Facilities solutions
- Risk and economics for selecting optimal solutions

AUDIENCE
Production and reservoir engineers interested in improving the water management of fields.

PREREQUISITE
Basic geological and reservoir concepts and proficient in the use of Microsoft Excel program.

Production Technology: Heriot-Watt University Program

Skill - 5 Days

In this course, attendees will gain an insight into the role of the production engineer, well productivity fundamentals, and basic operational issues. Course material introduces production technologies as an aid to the field development process and explains important concepts in reservoir and well productivity optimization.

COURSE CONTENT
- Introduction to production technology, reservoir production concepts, reservoir-drive mechanisms, and composite production systems
- Inflow performance relationship, tubing performance relationship, and flow through chokes
- Wellbore completion concepts, multiple-zone completions, and completion equipment
- Wireline services, perforation systems, and completion practices
- Well intervention, well problems, and well abandonment
- Advanced well systems

AUDIENCE
Production engineers, petroleum engineers and service company engineers seeking a better understanding of applied production technology.

PREREQUISITE
Experience with well operations and well engineering.
PRODUCTION ENGINEERING

Sand Control
Skill - 5 Days

To increase your understanding of sand control, this course encompasses sand control concepts and design as well as methodologies for selection of optimal techniques. Attendees will learn best practices for sand control in horizontal drainholes and water injectors, sand management, quality control procedures for job execution, and postjob evaluation.

COURSE CONTENT
- Basic rock mechanics
- Sand prediction
- Methods for sand control
- Sand management
- Gravel-pack design
- Screenless methods
- High-rate water pack
- Frac pack
- Sand control job execution and evaluation

AUDIENCE
Engineers responsible for sand control design and execution.

PREREQUISITE
Engineering degree or equivalent experience with sand control operations.

Sucker Rod Pumps—Application Engineering
Skill - 5 Days

This course will allow the attendants to acquire a solid knowledge of sucker rod pumps (SRP), their applications, and a detailed description and function of each SRP component. The basics of reservoir inflow performance, artificial lift systems, standard and special applications, system components, design, diagnosis, troubleshooting, and optimization are also presented. A set of practical examples and problems are solved in class. The SRP is considered to be the most popular artificial lift method worldwide. Its applications include low-downhole pressure wells, slim holes, multiple completions, high-temperature, and viscous oil. The SRP companies have improved the operation of the entire system, including pumpoff controllers, improved gas separation, gas and solids handling pumps, and optimization using surface and bottomhole cards. Because of its wide operation range and adaptability to other wells with minimum cost make the SRP become an economically attractive solution for oilfield development.

COURSE CONTENT
- Oil production introduction, basic definitions, concepts, and role of artificial lift systems
- Artificial lift systems overview
- Well inflow performance
- Advantages and limitations of the SRP method
- Descriptions and functions of surface equipment
- Descriptions and functions of subsurface equipment
- Calculation and sizing using recommended practices API RP 11L method
- Description and analysis of the rod string behavior
- Comprehensive design and selection of subsurface and surface components
- Comprehensive discussion and analysis of dynamometer cards

AUDIENCE
Production engineers, technologists, and others involved in production optimization; specifically, individuals who want to gain more SRP knowledge.

PREREQUISITE
None

Subsurface-Surface Production Optimization
Skill - 5 Days

From this overview of the production system from reservoir to separator, attendees learn to optimize the process using an integrated approach, including nodal analysis and identification of major pressure losses. In hands-on in-class exercises, the attendees will use specialized software to identify constraints and propose recommendations for production optimization.

COURSE CONTENT
- Overview of production system from reservoir to surface: Production system and process, well completions, lift methods, gathering systems, and separation systems
- Nodal analysis: Main pressure-drop components, inflow performance relationship, completion, tubing system graph, and gas well production behavior
- Subsurface-surface production operation: Integrated vision, procedures, best practices, identification of restrictions and corrective actions, production optimization using automation technology, and performance management
- Integrated production systems, software and tools focusing on performance modeling, technology trends, and integrated information management for control, monitoring, and automation

AUDIENCE
Reservoir and production engineers involved in improving field performance through identification and remediation of underperforming wells.

PREREQUISITE
Solid understanding of steady-state and pseudosteady-state forms of Darcy’s law; basic understanding of well test analysis, including ability to identify the early and middle time regions on a log-log plot; Horner graph analysis (for permeability and skin factor).

Advanced Production Data Analysis and Nodal Analysis
Advanced - 5 Days

In this course, attendees will learn how to predict theoretical well production rates using well measurements and how to identify constraints that impact performance in the reservoir, completion, and wellbore system. The attendees will also learn how to analyze production data to find permeability, skin factor, and drainage area and to forecast future performance based on historical production trends and known reservoir properties.

COURSE CONTENT
- Inflow performance in oil wells
- Transient inflow performance relationship curves
- Pressure drop across the completion
- Systems analysis graph
- Production data analysis
- Transient flow
- Material balance for various reservoirs
- Transient versus steady-state flow
- Estimates of skin factor and permeability from transient flow
- Estimates of drainage area from pseudosteady-state flow

AUDIENCE
Reservoir and production engineers involved in improving field performance through identification and remediation of underperforming wells.

PREREQUISITE
Solid understanding of steady-state and pseudosteady-state forms of Darcy’s law; basic understanding of well test analysis, including ability to identify the early and middle time regions on a log-log plot; Horner graph analysis (for permeability and skin factor).
### Applied Production Logging and Reservoir Monitoring
**Advanced - 5 Days**

Encompassing advanced techniques for production logging and reservoir monitoring, this course teaches attendees the design of a data-acquisition program for evaluation of wellbore or reservoir behavior based on field development objectives. Hands-on examples demonstrate in-depth log interpretation techniques for resistivity measurements acquired behind casing, three-phase flow in horizontal wells, and fluid saturations. The attendees will learn quicklook techniques for log quality control as well as how to plan and integrate multisource data for a more complete evaluation.

**COURSE CONTENT**
- Inflow performance and productivity index for oil wells and gas wells
- Outflow performance: Matching inflow with outflow to optimize well productivity
- Flow regimes in vertical, deviated, and horizontal wells
- Slippage velocities in vertical and deviated wells
- Various techniques of measuring of oil, water, and gas velocities: Spinners, oxygen activation, phase velocity logging, and gas bubble velocity
- Measurement of three-phase holdups using electrical and optical sensors
- Spinner calibrations in vertical, deviated, and horizontal wells to obtain fluid velocities and hence production rates
- Three-phase production logging in horizontal wells
- Physics of pulsed neutron logging: Principle of the minitron for neutron generation
- Pulsed neutron logging in capture mode
- Pulsed neutron logging in carbon/oxygen ratio mode: Development of database charts to obtain water saturation and water holdup
- Slimhole induction logging in plastic (nonconductive) casings
- Acquisition of pressure data and formation fluid samples behind casing
- Workshop on use of capture and modes for evaluating water and gas saturations
- Workshop on interpreting resistivity logging measurements acquired behind casing
- Workshop on production logging in horizontal wells with three-phase flow

**AUDIENCE**
Professionals with geoscience background and minimum of 2 years of exposure to field production.

**PREREQUISITE**
More than 2 years of experience interpreting reservoir monitoring logs (attendees are encouraged to bring difficult log examples for in-class discussion and interpretation).

### Assuring Flow from Pore to Process
**Advanced - 3 Days**

From this course on flow assurance, attendees will gain an advanced understanding of fluid flow through a series of interconnected systems from the reservoir to surface facilities, and the prevention and mitigation of common flow impediments. The attendees will learn best practices from worldwide field examples, as well as how to design fit-for-purpose flow assurance solutions.

**COURSE CONTENT**
- Key flow assurance issues
- Technologies for capture and characterization of fluid samples
- Methodologies for measurement, modeling, and management of inorganic and organic solids
- Fluid flow and heat-transfer characteristics and their importance in design of subsea architecture, model selection, and liquids management
- Processes of fluid flow integration, heat transfer, and solids

**AUDIENCE**
Engineers and technical staff responsible for well surveillance, production optimization, or completion design.

**PREREQUISITE**
Working knowledge of well production behaviors, basic reservoir engineering principles, and surface facilities; exposure to well completion design, nodal analysis, and stimulation processes.

### Electric Submersible Pumps - Advanced
**Advanced - 5 Days**

In-depth instruction focuses on the benefits and limitations of ESPs in challenging production environments. Attendees will learn design of ESP systems for special applications, including production of viscous oil, production of oil with high gas content or solids, and production from dual completions. Hands-on exercises include generation of pump curves (head versus flow rate) for several pump speeds.

**COURSE CONTENT**
- Study of reservoir performance
- Generation of centrifugal pump curves
- Standard and nonstandard applications
- Affinity laws and nodal analysis
- ESP design for highly deviated wells and wells with high-gas content
- Review of viscous fluids and emulsion applications
- ESP troubleshooting
- Techniques for production through annular space and fluids recirculation

**AUDIENCE**
Production professionals involved in production optimization with ESP technology.

**PREREQUISITE**
ESP Applications Engineering course or field ESP experience.
**PRODUCTION ENGINEERING**

**Full Life Cycle Fluid Evaluation: Downhole to Laboratory**

**Advanced - 5 Days**

Advanced-level instruction focuses on technologies for characterization of reservoir fluids in situ and methods for capture of a representative sample. Attendees will learn the importance of proper sample handling and the procedures that define fluid properties (vapor-liquid equilibrium phase envelopes, gravimetric fluid properties, and hydrocarbon solids) and rheological transport characteristics. Hands-on demonstrations include developing mathematical models using EOS for fluid PVT analysis, and hydrocarbon solids phase boundaries for applications in reservoir simulations, production modeling, and surface processing.

**COURSE CONTENT**

- Physics of reservoir fluids, including origin of fluid gradients, and reservoir compartmentalization
- Downhole fluid-analysis technology: Monitoring mud-filtrate contamination, live fluid analysis, component analysis, and in situ analysis
- Sample quality control and reservoir characterization workflow examples
- New developments in EOS for in situ crude oil
- Methods for determining reservoir connectivity
- Openhole sampling technologies, including MDT tester

- Visit to a technology or operations center for physical demonstration of downhole sampling and analysis tools (location dependent)
- Cased hole sampling during well or production testing and laboratory fluid characterization technologies
- Workflows to develop thermodynamic and transport characteristic models
- Fundamentals of lab characterization of hydrocarbon solids (asphaltene, wax, hydrate)
- Visit to fluids and flow assurance analysis center for physical demonstration of equipment and measurement methods (location dependent)

**AUDIENCE**

Members of multidisciplinary teams, including petrophysicists and engineers, who need an advanced understanding of fluid properties from sample acquisition to modeling.

**PREREQUISITE**

Strong understanding of fluid property principles and modeling.

**Production Data Analysis: Shale Gas, Tight Gas, and Coal-Bed Methane**

**Advanced - 3 Days**

This course is designed to implement a comprehensive learning module of production data interpretation and analysis, including the principles of production fundamentals, technologies, and workflows with applications and field examples for unconventional resources. Production analysis requires handling and conditioning large volumes of multiple source, multiple frequency data, identifying and synchronizing events, and assigning the appropriate production rate to each event. These critical steps enable production engineers to make efficient interpretation and analysis of the data and to optimize well productivity using advanced methodologies.

**COURSE CONTENT**

- Science: Foundational understanding of principles and governing factors of production
- Technologies: Exposure to sensor technologies and tools necessary for data conditioning
- Workflows: Skills to apply methodologies and workflows to enable data interpretation and analysis

**AUDIENCE**

Practicing reservoir, production, and facilities engineers and engineering and asset managers.

**PREREQUISITE**

4-year geoscience/engineering degree.

**Avocet Integrated Asset Modeler Fundamentals**

**Foundation - 5 Days**

The course focuses on use of Avocet platform to integrate the reservoir with the surface models. Instruction includes software installation.

**COURSE CONTENT**

- Overview of key reservoir network coupling fundamentals
- Coupling reservoirs to networks
- Running time-based simulations
- Connecting models
- Adding a Microsoft Excel planning, risk, and reserves software model to a flow diagram
- Evaluating economics with Merak software models
- Transferring compositions

**AUDIENCE**

Anyone wanting to integrate reservoirs with surface models using Avocet software platform.

**PREREQUISITE**

Production, reservoir, or process engineer with a knowledge of either ECLIPSE or PIPESIM simulator software.
This course introduces attendees to the primary functionalities of the OFM software by allowing the attendees to interact with a prepared gas well operations project. The flow of the course centers on the attendee acting as a member of a fictional engineering team, charged with accomplishing a number of common tasks using the OFM software suite. The course covers each of the required tasks. In accomplishing the tasks, the attendees are exposed to the range of common features of the software application. During the course, the attendees will learn how to use the OFM software as a quality assurance tool, seeking deficiencies in the data before using the project data to illustrate primary and derived performance parameters. The course also covers graphical display features, ranging from tabular plots through line graphs to GIS map-based representations.

**COURSE CONTENT**
- Brief walkthrough of a fully functioning project to provide quick set of reference points
- Review project data and check for missing values
- Use filters to screen out unwanted entities for analysis
- Group project data at multiple levels
- Create calculated fields and calculated variables
- Create single- and multiple-well plots
- Create and format well and field summary reports
- Export reports and table data to other applications

**AUDIENCE**
Anyone who needs to configure or support OFM software for end users.

**PREREQUISITE**
None
OLGA simulator well modeling

Select multiphase flow correlations

Rate inverse plot

Estimation of recovery

Electric submersible pump modeling

Restimulation candidate screening

Model water separation, injection

Model centrifugal and reciprocating

Navigate the PIPESIM simulator user

Develop black oil and compositional

Model gas wells, including various

Model a transmission network

PVT aspects in OLGA simulation and

Compare the relative benefits of push

Numerical solution scheme and

Artificial lift modeling with the OLGA

Well model building in the OLGA

OLGA simulator well modeling capability

OLGA simulator well modeling capability

The OLGA simulator model and its execution

Numerical solution scheme and sectioning principles

PVT aspects in OLGA simulation and PVtSim OLGA interface

Well model building in the OLGA simulator

Artificial lift modeling with the OLGA simulator

Mud and well engineering fluid modeling and applications

Steady-state simulation and parametric study

Shut-in and start-up

Simple gas-lift modeling

Electric submersible pump modeling

Wellbore cleanup

Blowout and well kill (optional)

Production and well performance engineers involved with offshore well operations.

No previous OLGA simulator experience is necessary, but knowledge of well performance and multiphase flow modeling would be advantageous.

In this course, attendees explore the PIPESIM simulator, which provides steady-state, multiphase flow simulation for oil and gas production systems. Individual PIPESIM modules are used for a wide range of analyses, including well modeling, nodal analysis, field planning, artificial lift optimization, and pipeline and process facilities modeling. A major feature of the PIPESIM simulator is the system integration and openness that allows users to develop a Total Production System Model. The attendees will gain a general understanding of how PIPESIM simulator software is used to design and optimize total production systems from the reservoir to the final processing delivery point.

This course covers the use of the PIPESIM steady-state multiphase simulator for designing and modeling gas production systems operations. Practical and comprehensive problems will be presented, discussed, and analyzed throughout the course.

- Navigate the PIPESIM simulator user interface
- Troubleshoot and debottleneck network models
- Model gas wells, including various completion models
- Match inflow performance to test data
- Model water separation, injection into a salt water disposal well, and wellhead or manifold production sources
- Construct a compositional fluid model
- Predict gas hydrate formation, erosion, corrosion, and liquid loading in gas wells
- Model centrifugal and reciprocating gas compressors
- Compare the relative benefits of push versus pull compression
- Estimate the required slug catcher size
- Model a transmission network

Anyone wanting to learn steady-state, multiphase flow simulation for oil and gas production systems to analyze well performance, model pipelines and facilities, and perform nodal analysis using PIPESIM simulator software.

None

Anyone who needs to analyze production data from shale gas wells.

OFM software proficiency or OFM Fundamentals course.

Flow regimes in unconventional reservoirs

Basics of hydraulic fracturing

Graphical analysis tools

Beta value plot

Rate cumulative ratio plot

Rate inverse plot

Rate time plot

Production forecasting

Estimation of recovery

Restimulation candidate screening

Production engineers, facilities engineers, and field production operations engineers.

General petroleum engineering knowledge as well as elemental software skills.
### OFM Using Oil and Waterflood Examples (Intermediate)

**Skill - 3 Days**

This course extends the materials covered in the OFM software fundamentals course and introduces two key areas of functionality: forecasting and mapping. The course introduces the attendees to a wide variety of map-based visualizations—bubble, grid, contour, scatter, and surface maps. In forecasting the OFM software offers a highly interactive module for the user to history match and subsequently forecast production. The widely used Arps technique is covered, and attendees create forecasts using a variety of assumptions. In addition to single-phase (oil, gas) forecasts, the course covers ratio forecasts. Additional techniques such as calculated forecasts, together with how to generate effective use of the results are explained. Although plots and reports are valid utilities for monitoring and surveillance, presenting data and calculation results in the form of a map is infinitely more effective. Vast amounts of information can be absorbed very quickly. Waterflooding is a universally popular method of secondary recovery. For waterflood operations, all calculations need to be made on a reservoir volume basis. This course introduces PVT as a way of achieving this goal. Pattern creation and management techniques are now possible. A range of diagnostic techniques is introduced as a means of illustrating the underlying capabilities of the application.

**COURSE CONTENT**
- Introducing PVT by various methods
- Creating waterflood patterns
- Configuring OFM software for pattern-based calculations
- Pattern diagnostics
- Mapper applications
- Bubble, grid, and contour map
- Scatter and map XY plots
- Forecasting and forecast scenarios
- History-match techniques
- Ratio and calculated forecasts and reports

**AUDIENCE**
Development geoscientists, development reservoir engineers, and production engineers.

**PREREQUISITE**
OFM software knowledge or the OFM Fundamentals course.

### Petrel Well Deliverability

**Skill - 1 Day**

This course builds on the Petrel platform reservoir engineering course and is an extension of the well modeling environment within the Petrel platform software suite. The course provides support for existing reservoir engineering workflows such as development strategy and field management. Two main production workflows are discussed in the course: performance table collection and nodal analysis simulation. Attendees will learn how to use reservoir simulated variables as input data for creating performance tables and running a nodal analysis case. The integration of production simulated variables to support reservoir engineering workflows will be demonstrated by creating performance (VFP) tables within the Petrel suite and associating the results with the development strategy process. In this way, an integrated reservoir-production engineering cycle is completed without leaving the Petrel platform environment. The attendees will also learn how to use nodal analysis simulation to introduce several inflow performance relationship models for pressure and temperature traverse. When running the nodal analysis case, attendees will learn how to create profile plots, such as liquid holdup, erosional velocity ratio, fluid mean velocity, and so forth.

**COURSE CONTENT**
- Well deliverability module
- IPR model manager and supported flow correlations.
- Petrel platform well model optimization by creating a single-flow path model
- IPR model manager
- Fluid properties for better understanding of input data
- Hydraulic (VFP) tables
- VFP tables association with a development strategy
- Nodal analysis case and display nodal charts
- Profile spreadsheets and derived logs generated from nodal analysis through Petrel platform software
- Well models importing from PIP

**AUDIENCE**
Development and exploration geologists, geophysicists, geochemists, petroleum engineers, managers, reservoir engineers, and other technical staff.

**PREREQUISITE**
Petrel Fundamentals course in addition to Petrel Reservoir Engineering course or equivalent experience.
**COURSE CONTENT**

- Introduction to PVT functionality
- Study of workspaces
- Skills for creating continuous waterflood patterns
- Analysis of gas lift design
- Slug mitigation by control
- Analysis of flow assurance by pattern
- Use of pressure and PVT data
- Calculations of voidage replacement ratios
- Creation of grid maps by well and pattern
- Creation of a waterflood diagnostic and Hall plot
- Estimating pattern configurations and pattern outlines

**AUDIENCE**

Anyone involved in evaluating artificial lift options, optimizing gas lift allocation, and performing ESP design using PIPESIM simulator software.

**PREREQUISITE**

- PIPESIM Fundamentals course or working knowledge of PIPESIM simulator software.

**COURSE CONTENT**

- Conceptual design for deepwater development
- Subsea tieback design
- Inflow performance evaluation
- Analysis of gas lift design
- ESP design
- Multiphase booster performance
- Field performance forecast
- Optimization of gas lift allocation

**AUDIENCE**

Anyone involved in evaluating artificial lift options, optimizing gas lift allocation, and performing ESP design using PIPESIM simulator software.

**PREREQUISITE**

- OFM proficiency or OFM Fundamentals course.

**COURSE CONTENT**

- Use of pressure and PVT data
- Calculations of voidage replacement ratios
- Creation of grid maps by well and pattern
- Creation of a waterflood diagnostic and Hall plot
- Estimating pattern configurations and pattern outlines

**AUDIENCE**

Anyone involved in evaluating artificial lift options, optimizing gas lift allocation, and performing ESP design using PIPESIM simulator software.

**PREREQUISITE**

- PIPESIM Fundamentals course or working knowledge of PIPESIM simulator software.

**COURSE CONTENT**

- Study of workspaces
- Links to external applications
- Reviews of forecast results
- Advanced table types, including foreign key and lookup
- Introduction to PVT functionality
- Creation of user functions
- Making the base map a dynamic tool
- Techniques for creating continuous pressure data streams
- Creation and analysis of waterflood patterns
- Generation of waterflood-specific analyses (e.g., voidage replacement ratio)
- Injection well-specific analysis (Hall plot)

**AUDIENCE**

Anyone interested in learning more advanced and effective ways to work with an OFM software project using common workflows.

**PREREQUISITE**

- OFM software proficiency or OFM Fundamentals course.

**COURSE CONTENT**

- Fluids and compositional tracking with OLGA simulator GUI and PVTsim analysis
- Pipeline profile modeling
- Liquid surges and controller basics
- General guide to separator modeling and sizing
- Hydrates and MEG tracking
- Slug mitigation by control
- Gas lifting
- Well-flowline-riser shut-in and cool-down with hydrate inhibition
- Wax deposition, pigging, and dead-oil circulation
- Overpressure protection
- Water hammer

**AUDIENCE**

Experienced OLGA simulator users who are interested in learning about advanced applications of the OLGA simulator to flow assurance and modeling of more complex systems within the software.

**PREREQUISITE**

- OLGA Flow Assurance course and preferably previous project experience with OLGA software.

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
The EOR program from NExT is fast-track training for experienced reservoir and simulation engineers who have limited expertise on EOR processes, including EOR mechanisms, experimental analyses, and field implementations. This training focuses on miscible, immiscible, chemical, and thermal processes for clastics and nonfractured carbonates and can include applications of the Petrel platform and ECLIPSE software to those processes.
### INFORMATION MANAGEMENT

#### COMPETENCY LEVEL

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<thead>
<tr>
<th>Competency Level</th>
<th>Corporate Data Management and Integration</th>
<th>Project Data Management</th>
<th>Data Quality Management</th>
<th>Unstructured Information Management</th>
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<tbody>
<tr>
<td><strong>ADVANCED</strong></td>
<td>ProSource Front Office Administration</td>
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<td>eSearch Administration</td>
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<td>ProSource Framework Advanced</td>
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<td>ProSource Logs Advanced</td>
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<td>ProSource Enterprise Advanced</td>
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<td>ProSource Seismic Advanced</td>
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<tr>
<td><strong>SKILL</strong></td>
<td>ProSource Front Office Fundamentals</td>
<td>Studio Manager</td>
<td>InnerLogix DQM Intermediate</td>
<td>eSearch Intermediate</td>
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<td>ProSource Logs Fundamentals</td>
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<td><strong>FOUNDATION</strong></td>
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<td>GeoFrame IESX Seismic Data Loading and Data Management</td>
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<td>eSearch Fundamentals</td>
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<td></td>
<td>GeoFrame Charisma Seismic Data Loading and Data Management</td>
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<td>GeoFrame Administration</td>
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<tr>
<td><strong>AWARENESS</strong></td>
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<td>InnerLogix DQM Solution Workshop</td>
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</table>
InnerLogix DQM Solution Workshop

Awareness - 1 Day

This course teaches the attendees the fundamentals of data quality management using InnerLogix data quality management (DQM) solution. Through a series of software demonstrations, attendees will learn how the software can automate and manually control data quality control processes to address data management challenges. The DQM Solution Workshop provides an opportunity for attendees to learn about the relevance and impact of DQM in the petroleum industry and how DQM can be implemented within their organization to generate a positive impact in productivity.

During this workshop, attendees will also have the opportunity to learn about InnerLogix management solution, a specialized software technology designed for the petroleum industry’s E&P data. This is a strategic and necessary tool for supporting the DQM implementation process. Participants will see InnerLogix DQM solution in action by working through a variety of demonstration scenarios. The course illustrates automated and manual data quality control processes in the context of relevant petroleum industry data management challenges.

**COURSE CONTENT**
- DQM methodology
- InnerLogix management solution tools and technology
- InnerLogix management solution DQM solution workshop
- DQM implementation situations
- References and DQM pilots

**AUDIENCE**
Corporate managers, data management professionals, DBAs, IT professionals, and domain experts: Geotechnicians, Geoscientists, and Petroleum Engineers.

**PREREQUISITE**
Basic understanding of the E&P industry and its information management challenges.

eSearch Fundamentals

Foundation - 1 Day

This course teaches the attendees how to use eSearch Asset Management software for browsing and ordering covering both physical and digital assets. Attendees are introduced to the system architecture, components, data model organizational structure, and the graphic user interface and tools available in eSearch. Attendees are also guided through the different techniques to find cataloged assets, including generation of reports, ordering and borrowing assets.

**COURSE CONTENT**
- Interfaces
- Ordering
- Central management of local assets
- Barcode scans
- Bulk edits
- Browsing of documents and attachments
- Custody activity reports

**AUDIENCE**
Data and information management professionals, data loaders, data managers, database and IT administrators, and petrotechnical staff.

**PREREQUISITE**
None

GeoFrame Administration

Foundation - 5 Days

Administration fundamentals for GeoFrame software including installation, configuration, and maintenance. Attendees will also receive an introduction to the Oracle® database management system and its relationship to the GeoFrame software system.

**COURSE CONTENT**
- Installation and administration of GeoFrame software
- Configuration of printers and plotters
- Management of licenses
- Addition of users and disks
- Archival and deletion of projects
- Basic Oracle administration
- Starting and stopping the database
- Backup and recovery
- SQL statements related to GeoFrame software projects
- Relational database basics, design of models, and terminology
- SQL language elements
- SQL Plus environmental and basic commands
- Oracle server architecture

**AUDIENCE**
GeoFrame software database administrators and application support staff.

**PREREQUISITE**
GeoFrame Fundamentals course.

GeoFrame Charisma Seismic Data Loading and Data Management

Foundation - 2 Days

In this course, attendees will learn the fundamentals of loading 2D and 3D seismic data into the Charisma seismic interpretation module of the GeoFrame software application.

**COURSE CONTENT**
- Creating new projects
- Creating surveys within the project
- Loading navigation data from ASCII files and directly from SEG Y trace headers
- Loading 2D and 3D seismic data from SEG Y tapes
- Creating subprojects for sharing seismic data
- Generating time slices and crosslines from a 3D volume
- Backing up and restoring seismic and horizon data

**AUDIENCE**
GeoFrame and Charisma interpretation software users and support staff.

**PREREQUISITE**
GeoFrame Fundamentals course.
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<tr>
<th>INFORMATION MANAGEMENT</th>
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**GeoFrame IESX Seismic Data Loading and Data Management**

**ProSource Framework Fundamentals**

- Foundation - 2 Days
- In this course, attendees will learn to load 2D and 3D seismic data for use in the IESX* 2D/3D/4D seismic interpretation software. The attendees will learn how to manage and quality control IESX data and how to troubleshoot data problems.

**COURSE CONTENT**
- Create new projects
- Preview 2D and 3D seismic headers and data
- Load 2D seismic data and station locations
- Load 3D seismic data and generate time slices and surface slices
- Load cartographic data with Tobin format
- Manage data with IESX DataManager system

**AUDIENCE**
GeoFrame software and IESX Interpretation application users and support staff.

**PREREQUISITE**
GeoFrame Fundamentals course.

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**InnerLogix DQM Intermediate**

- Skill - 3 Days
- InnerLogix DQM Intermediate course provides a practical approach to the implementation of automated and manual quality control workflows using InnerLogix software technology and following the DQM methodology.

**COURSE CONTENT**
- Use and value of quality data for trusted analyses and decisions in the industry
- Use of DataLogic toolset to manually analyze, assess, and correct E&P data
- Use of QCLogic and QCAlign (QCPro tools) to automate the assessment, correction, and synchronization of E&P data
- Rule sets for data quality assessment and correction using QC RulesEditor
- Use of ILXAdmin to perform administration tasks, create QCProjects, data links, and run jobs
- Analysis of data quality results and defects using QC Analyst
- Web-based reports of quality scores using QC Summary

**AUDIENCE**
Corporate data managers, data management professionals, DBAs, IT professionals, and domain experts: Geotechnicians, Geoscientists, and Petroleum Engineers.

**PREREQUISITE**
Basic understanding of the E&P industry and its information management challenges.

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**ProSource Enterprise Fundamentals**

- Skill - 3 Days
- This course teaches attendees the fundamentals of and workflows for the ProSource data management and delivery system, which leverages the Seabed* E&P open data model and database system to extend the functionalities of the ProSource data management application. The attendees will receive an overview of the functionalities and the procedures needed to execute specific workflows of data loading, validation, and QC, exporting data, and using utilities. An introduction to the Seabed data model explains its use in the ProSource Enterprise application. Attendees will learn how to use the ProSource application to manage data and understand the architecture supporting the application. Lessons and exercises are designed in a workflow fashion, focusing on practical user needs that let you apply your new skills immediately.

**COURSE CONTENT**
- ProSource Enterprise architecture and integration strategy
- Integrating different data types visually using different data viewers
- Access and browse the Seabed data model and other data sources
- Loading data using a variety of loader functions
- Browsing and validating data
- Exporting data from the Seabed data model to different formats
- Perform data transfers between ProSource Enterprise and GeoFrame/OpenWorks* software
- Using the tools to manipulate and ensure data quality

**AUDIENCE**
Data and information management professionals, data loaders, data managers, and database and IT administrators.

**PREREQUISITE**
ProSource Framework Fundamentals course or working knowledge of ProSource software.

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Visit NExTtraining.net/classes for the latest calendar or to register for a course.
<table>
<thead>
<tr>
<th>Course</th>
<th>Skill</th>
<th>Content</th>
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</table>
| **ProSource Front Office Fundamentals**    | - 2 Days | This course introduces attendees to ProSource data management and delivery system Front Office, an easy-to-use web-based application that provides workflow-based data delivery in two important methods. These methods are efficiently delivering log data directly into the Petrel platform and Techlog platform projects by means of plug-ins, allowing users to search and visualize exporting data from the ProSource system through a lightweight web interface. The ProSource Front Office package interfaces with ProSource Logs, ProSource Enterprise, and ProSource Seismic software systems. COURSE CONTENT  
  - Initiate the ProSource Front Office system and navigate the interface  
  - Search for and browse well information, deviation surveys, markers, perforations, checkshot surveys, core intervals, VSP surveys, and seismic data  
  - Interrelationship of ProSource Front Office windows software  
  - Use a variety of features in different windows, including map, log viewer, log pass viewer, EBBCDIC header and the visualization and rotation of 3D deviation graphics  
  - Export log data into standard format (LAS/LIS/DLIS)  
  - Download well, VSP, and seismic data files and associated documents  
  - Transfer data to Petrel platform suite and Techlog software using the associated ProSource Front Office plug-in  
  - Log data and associated documents data submission from ProSource Front Office software to ProSource Logs systems  
  - End-user workflows  
  AUDIENCE  
  Geoscientists, petroleum engineers, data managers, and technical IT personnel with data management delivery responsibilities.  
  PREREQUISITE  
  General understanding of data delivery and data flow processes required to perform petroleum subsurface interpretation studies. |
| **ProSource Logs Fundamentals**             | - 2 Days | This course teaches attendees the fundamental concepts and workflows required to manage the full lifecycle of well logs data using the functionalities of ProSource Logs technology and Seabed E&P open data model. Attendees will get an overview of the functionalities and the procedures needed to execute specific workflows of browsing, data loading, validation, quality control and exporting of well logs data in various industry standard formats.  
  COURSE CONTENT  
  - ProSource Logs architecture and application interface  
  - ProSource Logs file formats  
  - Load, quality control and validate various well log data  
  - Automated batch loading configuration  
  - Browse data using tabular or graphical viewers  
  - Create various reports in user-defined templates  
  - Export data in standard formats and manage temporary files  
  - Manage and search for electronic documents  
  AUDIENCE  
  This course is intended for petro-technical data administrators, data loaders, data managers and geoscientists involved with corporate well logs data who require understanding about the functionalities and workflows supported by ProSource Logs.  
  PREREQUISITE  
  ProSource Framework Fundamentals course or working knowledge of ProSource software. |
| **ProSource Seismic Fundamentals**          | - 3 Days | This course presents the fundamental concepts and workflows for ProSource Seismic, which is a part of ProSource E&P data management and delivery system. Attendees will learn how to manage seismic and navigation data along with related documents in seismic archive and in the interpretation projects, using the common ProSource interface for accessing and managing the archive. The course is an overview of the functionalities and the procedures needed when executing the workflows of seismic data loading, validations, quality control, viewing, and exporting. Lessons and exercises focus on practical applications and help participants apply new skills immediately.  
  COURSE CONTENT  
  - Overview of geodetics concepts, navigation and seismic data formats, numbering systems and basics of 2D and 3D seismic surveys  
  - Common workflows of ProSource Seismic for data loading, searching, browsing, viewing, selecting and exporting  
  - Scan, edit, and quality control seismic trace header data  
  - Load navigation data, seismic data, tape index data, and scanning seismic data available in interpretation projects  
  - Various data export workflows, inclusive data export from seismic archive to interpretation projects, and data transfer from project to project  
  - Use ProSource Seismic utilities and set up user accounts for various types of workflows  
  AUDIENCE  
  This course is intended for petro-technical data administrators, data loaders, data managers and geoscientists involved with corporate seismic data who require understanding about the functionalities and workflows supported by ProSource Seismic.  
  PREREQUISITE  
  ProSource Framework Fundamentals course or a working knowledge of ProSource software. |
| **Studio Manager**                          | - 3 Days | This course introduces attendees to Studio E&P knowledge environment which allows data managers to effectively support and manage Petrel platform users and projects. The Studio Manager provides applications that allow for administering, browsing, correcting, and organizing E&P data. Data managers can quickly validate the state of their Studio environment—to determine the status of various repositories, review recent user activity, and identify and complete critical data-management tasks. High-level information enables quick access to key indicators and intelligence on the repository to which the user is connected. In this course, attendees will learn how to use Studio Manager as the single application to manage data in the Studio database for Petrel users, implement and manage collaboration workflows across teams, and apply data management best practices.  
  COURSE CONTENT  
  - Introduction to Studio knowledge environment and Studio Manager  
  - Create repositories, users, roles, data environments, manage indexes, quality tags, coordinate reference systems and filters  
  - Import data with the globally unique identifier (GUID) concept, general transfer rules, transfer messages, data loading in Petrel platform software and data transfer to Studio database, and match rules implementation  
  - Identify data issues, manage user attributes, manage global well logs, and find and correct data  
  - Make repository copies, snapshots, backup, and recovery and review application logs  
  - Overview of Studio database installation, uninstallation, upgrade, and index migration  
  AUDIENCE  
  Data managers or data administrators and Petrel platform users with data management responsibilities.  
  PREREQUISITE  
  Petrel Fundamentals or equivalent experience. |
In this course, attendees will learn advanced data processing capabilities for physical and digital asset management using the eSearch &P Physical Asset System in addition to discovering the key differences between the web and desktop user interfaces and their relevant features applied to asset management workflows. Attendees will also review the ordering and borrowing processes from the physical asset administrator point of view as well as gain understanding of how to perform advanced data loading and edits, including the loading and manipulation of attachments. The attendees will learn how to perform different day-to-day data maintenance tasks and produce asset management reports.

**COURSE CONTENT**
- Desktop and web application interfaces and the key functional components and differences
- Physical assets ordering, borrowing, and custody activity processes
- Bulk data loading, bulk edits, and attachment loading of physical assets information
- Physical assets data maintenance tasks, including insert, copy, amend, and delete records
- Physical asset management reports in various formats

**AUDIENCE**
Data loaders, data managers, and warehouse administrators.

**PREREQUISITE**
eSearch Fundamentals course and a general knowledge of physical asset management.

In this course, attendees will learn how to administer and manage the eSearch application server and data model. They will explore how to perform advanced administration workflows and system configurations including data modeling, reference lists creation, attachment storage manipulation, users and security profile creation and management. How to achieve external search configuration, produce system reports, perform language customization, use the administration toolkit, configure and manage retention (disposal) policies will be reviewed.

**COURSE CONTENT**
- Organizational structure and the data model creation process
- Configuration settings for a new customer
- Security model requirements and functional components
- Web administration functionalities
- Built-in system reports and the Administration toolkit utility
- Retention policies and events management

**AUDIENCE**
Professionals who participate in IT Software Application and Database Management, Database Administrators, Data Managers.

**PREREQUISITE**
eSearch Fundamentals course.

This course provides attendees with an overview and understanding of the tasks required to administer and configure the ProSource &P data management system and the Seabed &P open data and delivery model and database. The course details the procedures needed to administer and create various Seabed accounts, manage advanced data loading scenarios, create custom coordinate systems, synchronize existing projects, extend the Seabed data model, and configure miscellaneous parameters like reports, job scheduler, etc. This course will help the attendees design advanced data loading and validation workflows for any custom &P data needs.

**COURSE CONTENT**
- Outline ProSource Enterprise architecture and application interface to access data
- Describe various roles that control data access and validation
- Summarize Seabed database administration, including procedures to extend the Seabed data model
- Create projects, dictionaries, interfaces, and staging areas (temporary areas used during data loading)
- Create control files to support customized data loading scenarios
- Coordinate system considerations during data loading
- Summarize utilities and configurations to synchronize projects (data copy/update)
- Creation of customized Excel reports
- Manage temporary files created during loading/exporting and their cleanup
- Configure job scheduler, e-mail notifications (used during loading/exporting) and license parameters

**AUDIENCE**
Petrotechnical data administrators, data loaders, data managers and any other data management professional who will be responsible for configuring, personalizing and administering ProSource Framework environment.

**PREREQUISITE**
ProSource Enterprise Fundamentals course or a basic working experience of ProSource Enterprise system.

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
ProSource Front Office Administration

Advanced - 3 Days

This course provides attendees with details and an understanding of the tasks required to administer and configure the ProSource Front Office data management and delivery system. The course covers details of the procedures needed to administer user accounts, projects, maps, modules (wells, logs, and seismic), and reports.

COURSE CONTENT

- Outline ProSource Front Office architecture and application interface to access data
- Create and configure user and project
- Configure map
- Summarize the concept and configure the data scope restriction
- Create and configure report
- Create and configure a new form/window

AUDIENCE

Petroleum data administrators, data loaders, data managers, and technical IT personnel with Data Management delivery responsibilities.

PREREQUISITE

ProSource Front Office Fundamentals course or working experience with ProSource Front Office software.

ProSource Logs Advanced

Advanced - 3 Days

This course provides attendees with details and an understanding of the tasks required to administer and configure the ProSource Logs. The course details the procedures needed to administer and create various Seabed E&P open data model and database accounts, control data access (entitlements) to different groups of users, synchronize existing projects, configure default values for data loader and exporter, configure multiple storage directories to eliminate disk space issues during data loading, and configure miscellaneous parameters like reports, job scheduler, etc. This course will help attendees design advanced data loading and validation workflows for well log data manipulation needs.

COURSE CONTENT

- Outline Seabed database administration, including creation of projects, dictionaries, interfaces, and staging areas (temporary areas used during data loading)
- Configure access to distributed installations (ProSource system/Seabed database) by means of a single ProSource application interface
- Describe various roles that control data access and validation
- Outline utilities and configurations required to control data access to various user groups (entitlements) and to synchronize projects (Data Copy/Update)
- Describe associate documents (e.g., core images, survey reports) with additional nodes in the ProSource tree (e.g., VSP survey, data files)
- Configure default rules to maintain database integrity during loading
- Manage default properties for loading and exporting industry standard well log formats (DLIS, LIS, LAS)
- Outline administration procedures to create custom Excel reports, manage temporary files (created during loading/exporting), configure job scheduler, e-mail notifications, and license parameters

AUDIENCE

This course is intended for petroleum data administrators, data loaders, data managers, and any other data management professionals.

PREREQUISITE

ProSource Logs Fundamentals course or working experience with ProSource Logs System.

ProSource Seismic Advanced

Advanced - 3 Days

This course presents attendees with the advanced concepts and workflows for ProSource* Seismic module, which is a module of the ProSource E&P data management system. The attendees will learn how to manage seismic and navigation data along with related documents in seismic archives and in the interpretation projects using the common ProSource interface for accessing and managing the archives. The training is an overview of functionalities for advanced data export workflows and the procedures needed to configure, administer, and troubleshoot the ProSource Seismic module. Attendees will be shown how to efficiently use ProSource Seismic module for managing seismic data. Lessons and exercises focus on practical applications and help attendees apply new skills immediately.

COURSE CONTENT

- Create ProSource users and assign application roles to users
- Manage information about application users using the Business Associates submodel
- Export data using spatial entitlements and various techniques for spatial data cutting workflows
- Perform administrative tasks, including but not limited to setting up e-mail notifications, configuring and managing distributor, coordinate reference system (CRS) aliases and export jobs
- Explore the ProSource Seismic data model and use it for quality control and troubleshooting
- Configure the ProSource Seismic module using the Information Management Administrator console

AUDIENCE

Petroleum data administrators, data loaders, data managers, and any other data management professionals involved with corporate seismic data that need a deeper understanding of the ProSource Seismic configuration, administration, and advanced workflows.

PREREQUISITE

ProSource Seismic Fundamentals course or working experience in ProSource Seismic software in addition to a general knowledge and understanding of concepts related to the Linux operating system and Oracle databases.
Enabling innovation

- Faster development
- Immediate deployment of new science
- Seamless integration of your intellectual property into the Petrel platform workflows
## Ocean Software Development Framework Fundamentals for Petrel

**Techlog Python**

<table>
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This course is designed to introduce attendees to programming basic and advanced scripts in the Techlog platform. The attendees will learn how to create, edit, open, and run scripts in a Techlog platform workflow. Topics include Python syntax and programming skills, Python and Techlog platform modules (libraries), and advance scripting including reading and writing and creating Techlog modules.

**COURSE CONTENT**

- Introduction to Python scripting
  - History and concept
  - Python programming inside Techlog software
- Introduction to the Python editor
  - Opening and running scripts
  - Programming basics
  - Python syntax and coding rules
- Application workflow interface for the Python platform
  - Running your own equations in a multwell and multizone environment
- Python modules
  - Data QC and harmonization, file import (Techlog database)
  - Custom plots (Techlog platform plot)
  - Mathematical and scientific tools (NumPy and SciPy packages)
- Advanced scripting
  - Introduction to advanced basics such as multidimensional lists and dictionaries
  - Introduction to oriented object programming
- Reading and writing files
  - Text, CSV, and Excel files
  - Importing and loading data from Excel files
- Reporting
  - Creating modules and custom libraries

**AUDIENCE**

Software developers, engineers or geoscientists with basic programming skills interested in gaining a general understanding of the Ocean framework for the Petrel platform.

**PREREQUISITE**

Attendees should be familiar and comfortable with Windows environment and Microsoft Visual Studio development environment, and should have good knowledge of object-oriented programming/object-oriented design (OOP/OOD) concepts and programming experience with .NET and C#. Knowledge of Petrel Workflow Tools is useful but not required.

### Open Inventor .NET: 3D Visualization for Ocean

**Skill - 3 Days**

This course, taught by an expert in Open Inventor™ from the Visualization Sciences Group (VSG) is structured for programmers writing. It introduces the attendees to advanced techniques for rendering custom domain objects using the Ocean software development kit. Demonstrations of VSG tools help attendees develop 3D scene graphs.

**COURSE CONTENT**

- Scene creation and interaction
- Debugging a 3D scene
- Actions
- Sensors
- Performance tuning
- Custom visualization
- Extensions

**AUDIENCE**

Programmers familiar with the Ocean software development kit who are writing plug-ins for the Petrel platform.

**PREREQUISITE**

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<th>Surface Facilities Engineer</th>
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<td>FOUNDATION</td>
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<td>Introduction to HYSYS Software in Oil and Gas Processing</td>
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<td>Risk and Reliability Engineering</td>
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<td>Maintenance Integrated Planning</td>
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<td>Selection, Operation, and Maintenance of Pumps, Compressors, and Prime Movers</td>
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<td>Maintenance and Reliability</td>
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## SURFACE FACILITIES DESIGN AND ENGINEERING

### SOFTWARE

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*Technical courses that use software includes practical sessions, field trips, and uses simulation*
**Surface Facilities Design and Engineering**

**Introduction to Surface Facilities**

**Awareness - 5 Days**

Structured to provide attendees with the fundamentals of surface facilities, this course covers the production process from the wellhead to custody transfer. Topics include production surface facilities systems, including gathering, separation, production treatment, metering systems, and process equipment. The attendees will learn about applied flow assurance and how produced fluids are converted to saleable products.

**Course Content**
- Field development overview
- Well flow control and safety system
- Gathering system
- Fluid separation system
- Oil treatment
- Water treatment
- Gas treatment
- Flow assurance overview
- Custody transfer and measurements
- Process equipment

**Audience**
Engineers and geoscientists involved in field development or production of oil and gas.

**Prerequisite**
Minimum of 2-year technical degree or equivalent experience.

**Offshore Facilities**

**Awareness - 5 Days**

This course provides attendees with an overview of the topside and subsea facilities used in offshore oil and gas fields. The attendees will learn how offshore production facilities are designed and operated and how recent technologies are applied in addition learning how the production facilities change with water depth and the producing constraints that drive those changes. Course discussion includes the evolution of subsea facilities with the increasing number of deepwater developments.

**Course Content**
- Offshore facilities classification according to depth
- Shallow-water production facilities and deepwater facilities
- Fixed platforms
- Floating production systems
- Subsea systems: Technological development and trends and production systems
- Structural considerations in offshore facilities
- Environmental, geographical, and soil considerations
- Offshore facility layouts and construction engineering
- Evolution of the Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms (API RP 2A)
- Digital oilfield production monitoring, control, and optimization technologies

**Audience**
Engineers responsible for or involved with offshore production operations or surveillance looking for an introduction to offshore facilities.

**Prerequisite**
Basic knowledge of production systems.

**Crude Oil and Water Treatment**

**Foundation - 5 Days**

This course covers oil and water-treating equipment, design, and operations encompassing the theories, technologies, and examples. Attendees will learn the primary challenges faced in crude oil handling, including emulsion formation (both theoretical and actual examples), stabilization, and the mechanism and technology used to destabilize and separate water from oil in addition to the use of desalting technologies and processes to bring produced fluids to required oil specifications. The attendees will learn about the technologies, processes, and operational conditions employed to treat produced water to required specifications.

**Course Content**
- Oil treatment fundamentals
- Emulsion theory
- Crude oil dehydration equipment
- Crude oil desalting
- Water treatment

**Audience**
Surface facilities operation and design engineers, production chemists, flow assurance engineers, and production engineers wanting a better understanding of the treatment fundamentals for oil and water.

**Prerequisite**
Basic knowledge of oil and gas production systems and crude oil properties.

**Gas Processing and Conditioning**

**Foundation - 5 Days**

This course covers the major technical aspects of gas processing and conditioning. Attendees will obtain an overview of the fundamentals and tools used to determine the main properties of natural gas as they relate to gas separation, dehydration, sweetening, measurement, and transportation. The course focuses on plant and equipment design and operations and includes in-class exercises for the identification of key variables for optimal designs and operations.

**Course Content**
- Natural gas properties and behavior
- Water-hydrocarbon behavior and the effect of contaminants (H₂S, CO₂)
- Hydrates: Problem, deposition site, impact, composition and structure, conditions of formation; hydrate detection, control, and remediation
- Gas separation: Principles, types, multistage process, condensate stabilization, and multistage separators
- Gas sweetening: Processes, designs, and operating aspects
- Gas dehydration: Common operational problems and possible solutions
- Gas measurements
- Gas transportation system
- New developments and emerging technologies
- Commercial issues
- Technological challenges for natural gas production

**Audience**
Engineers, gas plant managers, and supervisors responsible for gas processing operations or design.

**Prerequisite**
General knowledge of oil and gas production systems.
## HAZOP/HAZID and SIL

**Course: HAZOP/HAZID and SIL**

This course provides attendees with a working approach to Hazard Operability (HAZOP) practices and procedures. In this course, attendees will learn how to apply the techniques of HAZOP analysis, including the tips, tricks, and secrets analysts use to implement and maintain efficient operation procedures. The course material also covers the tools needed for hazard identification, including root cause identification and the application of redundant system layers for protection, prevention, and mitigation. The attendees will learn how conduct hazard analysis to qualify and quantify risk and the probability of associated failures.

**Course Content**
- HAZOP methods and applications
- Hazard Identification (HAZID) and mitigation strategies
- Hazard analysis and probability determination
- Risk analysis and failure considerations
- Safety integrity level assessment

**Audience**
Engineers, safety and environmental personnel, plant operators, area managers, and maintenance personnel.

**Prerequisite**
Surface Facility Production Operations course.

## Health, Safety, and Environment in Exploration and Production

**Course: Health, Safety, and Environment in Exploration and Production**

This course presents comprehensive HSE methods and tools used for development of risk management processes. Attendees will learn how to improve the safety of operating conditions at production facilities, minimize the risk in emergency situations, and establish proactive mitigation strategies.

**Course Content**
- Risk management: Basic definitions, occupational health plan, risk recognition, unsafe act, and risk-generating source
- Risk evaluation objectives
- Risk analysis and determination
- Sampling strategy, plan, and methods
- Sample analysis: Direct-measurement tools and continuous sample analysis
- Risk control
- Risks at work administration
- Accidents: Causes, results, and occupational and disease management
- HAZID: HAZOP analysis, qualitative methods for risk analysis, human error analysis, accident scenarios, natural threats, and preparation for emergencies
- Case identification and evaluation and emergency control

**Audience**
Engineers and HSE specialists interested in establishing systematic HSE procedures.

**Prerequisite**
Basic knowledge of exploration, development, and production operations.

## Introduction to HYSYS Software in Oil and Gas Processing

**Course: Introduction to HYSYS Software in Oil and Gas Processing**

In this course you will learn how to use HYSYS® Aspen Technology software to model different oil and gas processes for the design analysis and to evaluate the performance of existing oil and gas facilities, process equipment and plants. Attendees will complete the preliminary process flow diagrams, mass and energy balance, and equipment sizing based on HYSYS operations, and extension objects that allow custom unit operations, kinetic reactions, and property packages to be incorporated into HYSYS Simulation.

The attendees will also learn how to build, navigate and optimize process simulations using HYSYS software.

**Course Content**
- HYSYS software overview and applications
- Fluid package, package and transport properties
- Oil and gas properties simulation using HYSYS
- Process flow diagrams in HYSYS software
- Material and energy stream
- Oil, gas, and water separators and system component simulations
- Oil and gas separation systems simulations
- Process optimization case studies

**Audience**
Process engineers, mechanical engineers, instrumentation and control engineers, surface facilities, project engineers (Special instructions: Company represented by the attendees must have HYSYS software licenses).

**Prerequisite**
None

## Introduction to Flow Assurance

**Course: Introduction to Flow Assurance**

This course introduces attendees to the main types and causes of flow impediments along with the methods and technologies commonly applied for their prevention, control, and remediation. Increase your understanding of the main problems associated with flow assurance, including asphaltanes, paraffins, emulsion, scales, sand, slugging, corrosion, and hydrates. The attendees will learn which technologies and techniques to use for specific problem environments and the advantages and disadvantages of each in addition to learning how to identify the types and causes of flow impediment and the methods or technologies that should be applied for the prevention, control, and remediation of these flow impediments.

**Course Content**
- Flow assurance principles and fundamentals
- Inorganic scale: Deposition principles, prediction, modeling, management program design, and scale prevention
- Hydrates: Deposition principle, impact, hydrate detection, control, and remediation
- Paraffins (wax): Deposition principle, properties, factors affecting deposition, operational problems, control, and remediation
- Asphaltanes: Key properties, deposition mechanism, modeling, effect of variables, operational problems, prevention, and remediation
- Emulsions: Crude oil natural surfactants, characteristics, and treatments
- Corrosion: Factors influencing oilfield corrosion and their control

**Audience**
Engineers responsible for assessing, diagnosing, or troubleshooting flow assurance problems in an operational or design capacity.

**Prerequisite**
General knowledge of production systems and surface operations.
This course introduces classic and current techniques for maintenance and reliability decision making. Attendees will learn to apply a reliability probabilistic approach, conduct cost-benefit analysis, and implement predictive maintenance activities. The course focus is on the information typically available in most operations and how it can be used to conduct failure analysis. The attendees will learn how to apply maintenance and reliability concepts to generate a well-planned predictive maintenance program in addition to increasing their knowledge of information and reliability methods that can be used to create a prognosis of equipment components, equipment, plants, and assets for any subsurface-surface production system or subsystem.

**COURSE CONTENT**
- Maintenance: Philosophy and types
- Preventive maintenance plan
- Work request, work order, maintenance forms, and reports
- Maintenance system design
- Reliability: Engineering, availability, durability, and maintainability
- Types of failure
- Reliability: Block analysis; series, parallel, and combination systems
- Principles of failure mode and effects analysis
- Risk-based inspection principles
- Reliability-centered maintenance principles
- Risk-cost benefit model definitions
- Reliability strategy and methodology selection

**AUDIENCE**
Maintenance managers, operations personnel, and engineers interested in assessing maintenance reliability or establishing procedures for reliability assurance.

**PREREQUISITE**
Basic knowledge of production surface facilities.

In this course, attendees learn to establish strategic plans for maintenance cost control and create cost classification structures based on their asset or company strategy. The attendees will learn how to identify cost-control weak spots in an asset or operation and generate the information required to support cost-based decisions.

**COURSE CONTENT**
- Maintenance cost causes
- Maintenance cost classification
- Reliability tools for maintenance cost control
- Maintenance value chain
- Maintenance cost control: Budget and estimations
- Feasibility studies
- Planning tasks and their costs
- Activity-based costs
- Real-world case studies

**AUDIENCE**
Maintenance personnel responsible for cost-control procedures, monitoring, or decisions.

**PREREQUISITE**
Basic knowledge of maintenance and reliability engineering.

This course teaches an integrated approach to the maintenance planning process. Attendees learn how to apply techniques and tools to develop a strategy for maintenance organization and use cost-risk-benefit analyses to maximize value creation and quantify uncertainty.

**COURSE CONTENT**
- World-class maintenance
- Maintenance value chain and responsibilities
- Maintenance engineering
- Maintenance planning and programming execution
- Risk in maintenance planning
- Maintenance control planning
- Strategic direction of maintenance tasks
- Risk definition
- Uncertainty quantification and propagation
- Generic strategy
- Maintenance planning (portfolio matrices) definition

**AUDIENCE**
Engineers, planners, and managers responsible for maintenance program planning or implementation.

**PREREQUISITE**
Introduction to Maintenance and Reliability course or equivalent experience.
### Risk and Reliability Engineering
**Foundation - 5 Days**

Reliability and risk analyses can be applied to surface facilities production systems to qualify and quantify risks at all levels: one piece of equipment, one process, or a complete system. Attendees will learn to apply these analyses to forecast failures and calculate the associated economic impact. This course focuses on practical application of theoretical techniques through real-world in-class exercises.

**COURSE CONTENT**
- Risk analysis and reliability engineering
- Uncertainty determination and management and deterministic and probabilistic models
- Integrated reliability analysis
- Statistics for risk and reliability analysis
- Use of tools (RARE™ and Crystal Ball™) for goodness-of-fit tests and Monte Carlo simulation
- Reliability, availability, and maintainability analysis for repairable equipment
- Methods for availability and calculation of expected number of failure events for repairable equipment
- Forecasting failures and availability of an ESP installation
- Principles of economic analysis: Projected cash flow, discount rate, net present value (deterministic model and probabilistic model)
- Risk analysis: Dimensioning risk for undesirable events, qualitative and semi-quantitative methods for risk analysis, quantitative risk analysis and ESP installation example
- Determining risk mitigation actions
- Risk and profitability matrix

**AUDIENCE**
Engineers responsible for assessing, quantifying, or predicting failures in production operations equipment or facilities.

**PREREQUISITE**
General knowledge of maintenance and reliability concepts.

### Selection, Operation and Maintenance of Pumps, Compressor, and Prime Movers
**Foundation - 5 Days**

Structured to provide the basics of equipment selection, operation, and maintenance, this course also covers the basic theory of fluid mechanics, including cavitation, surge, networking of pumps and compressors, and maintenance strategy.

**COURSE CONTENT**
- Pump classifications, operations, and troubleshooting
- Dynamic pump construction and calculations
- Cavitation and performance curves
- Fundamentals and classification of compressor
- Operation, maintenance, and troubleshooting of reciprocal and centrifugal compressors
- Seal systems
- Prime mover equipment
- Gas turbines
- Electrical motors and diesel engines
- Types of maintenance and maintenance tools

**AUDIENCE**
Oil, gas, and petrochemical maintenance staff.

**PREREQUISITE**
Basic understanding of surface facilities equipment and operations.

### Surface Facility Production Operations
**Foundation - 5 Days**

Field development processes are closely associated with surface facilities engineering processes, gathering systems, and fluid treatment, transportation, measurement, and storage. This course focuses on the physical characteristics of natural gas and oil and their effects on separation, treatment, and measurement. Exercises include the design and operation of surface production equipment and processes.

**COURSE CONTENT**
- Asset development and life cycle
- Properties of production fluids
- Effects of fluid properties on production system
- Principles of operation
- Manifold and gathering systems and flowlines
- Fluid flow: Single phase and multiphase (correlations, flow pattern, and pressure drops)
- Piping: Design, operations, and purposes
- Separators: Two and three phases, horizontal or vertical, and separation stages
- Gas conditioning: Dehydration and sweetening
- Oil treatment: Fundamentals, dehydration, desalting, emulsion, equipment, and operations
- Water treatment: Properties of produced water, equipment, technologies, treatment processes and chemicals
- Corrosion considerations: Internal (CO₂, H₂S, oxygen, material selection, mitigation) and external (material selection and mitigation)

**AUDIENCE**
Engineers and managers wanting to understand production operations facilities from an engineering perspective.

**PREREQUISITE**
Basic knowledge of production systems and hydrocarbon properties.

### Utilities: Design and Operations
**Foundation - 10 Days**

This comprehensive course encompasses a large number of different types of utility systems: water, steam, air, nitrogen, fuel, electric power, flare and vent, drain, water treatment, storage, and loading. For each type of utility, the attendees will learn about the relevant support systems, layout, design, reliability, key specifications, and applications.

**COURSE CONTENT**
- Service, cooling, fresh, potable, and demineralized water
- Air systems and nitrogen systems
- Design drawings: Sample process and instrumentation, utility flow, and process layout
- Specifications: Mechanical drawings and datasheets
- Fuel, electric power, and emergency power systems
- Flare and vent systems
- Drain systems
- Water treatment systems
- Support systems and components
- Designs, equipment, and technologies
- Operation, maintenance, and safety

**AUDIENCE**
Process engineers, mechanical engineers, electrical engineers, instrumentation and control engineers, and surface facilities project engineers.

**PREREQUISITE**
Basic understanding of production facilities and operations.
Automation, Instrumentation, Measurements, and Process Control

Skill - 5 Days

Attendees will gain theoretical and practical knowledge on how to use automation, instrumentation, control, and metering technologies to increase efficiency and safety of operations and productivity of the production process.

COURSE CONTENT

- Subsurface-surface automation concept
- Process control: Centralized control, optimization, integration
- Telecommunication
- Value creation quantification
- Inline production optimization
- Automated well tests
- Bottomhole sensors and intelligent wells
- Inline optimizers
- Diagnosis and optimization of integrated system
- Technological solutions and automation platforms
- Standards and recommended practices

AUDIENCE

Production engineers, facilities engineers, or operations engineers looking for practical exposure to automation and control concepts and techniques.

PREREQUISITE

Basic knowledge of the production system, process instrumentation, and control metering principles.

Condition-Based Maintenance for Static and Rotating Equipments

Skill - 5 Days

The course provides attendees with a methodology to establish, revise, and optimize the systems controlling static and rotating equipment using condition-based maintenance (predictive maintenance), algorithms, and processes. Course emphasis is on the use of proactive monitoring combined with technical and financial constraints to ensure the operational reliability required by the production system. Through exercises derived from real-world projects, attendees will practice these techniques.

COURSE CONTENT

- Maintenance practices, paradigms, value chain, and expenses
- Benefits of condition-based maintenance
- Handling information to modify maintenance plan and improve decisions
- Techniques for condition-monitoring maintenance in rotation equipment
- Monitoring techniques
- Dynamic monitoring on rotating equipment
- Integrating inspection techniques
- Condition monitoring in static equipment
- Cost-risk-benefit procedure for condition-based maintenance plan
- Economic justification of condition-based maintenance plan

AUDIENCE

Maintenance and reliability engineers, and surface production engineers responsible for maintaining rotating or static equipment.

PREREQUISITE

Basic knowledge of maintenance and reliability engineering.

Failure Mode Effect Analysis Applied to Production Operations

Skill - 5 Days

Failure mode and effects analysis (FMEA) is used to assess the potential for equipment failures and problematic events in a process and to qualify their effects. Course emphasis is on the practical aspects of the techniques for optimization of production operations.

COURSE CONTENT

- Criticality analysis
- FMEA: Types of analysis, functional approach, applications
- Application of FMEA to subsurface-surface systems
- Root-cause analysis
- Risk-based inspection
- Reliability, availability, and maintainability analysis

AUDIENCE

Surface facilities engineers, production engineers and managers, and maintenance and reliability engineers.

PREREQUISITE

Basic knowledge of reliability engineering and oil and gas production systems.

Heavy Oil Transportation and Processing

Skill - 5 Days

This heavy and extra-heavy oil introductory course focuses on the storage, transport, and treatment and encompasses the technology analysis for transportation. Attendees will learn how to assess the flow of heavy oil in a gathering system and techniques for mitigating flow problems inherent to heavy oil operations by using modeling software, develop gathering scenarios and model transportation issues.

COURSE CONTENT

- Heavy oil production system, nodal analysis, flow of fluids, and surface processing
- Isothermal flow in pipelines, and incompressible single-phase flow
- Temperature profiles in pipelines
- Crude oil diluents and hydraulic analysis to determine optimal volumes
- Diluents impact on density, viscosity, pressure requirement
- Terrain topography effect on heavy oil transport, including water as conveyance medium
- Gas-liquid flow in a gathering system, correlations
- Structure of gathering network and basic equations

AUDIENCE

Engineers and production managers interested in heavy oil gathering and transportation.

PREREQUISITE

Basic knowledge of hydrocarbon properties, fluid flow, production surface facilities design and operations.

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
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Learn to identify, select, and apply maintenance indicator, or KPIs, which ensure effective maintenance management, maximize equipment performance, and clearly communicate the current status to all decision makers. Attendees will learn to understand the common indicators, what they can tell the user, and the value they bring. Discussion includes the importance of composite KPIs and how to select the right mix of indicators.

**COURSE CONTENT**
- Maintenance: Definition, evolution, and classification of standardized indicators (types and application)
- Data selection and analysis for KPIs
- Efficiency indicators: Mean time between failure, mean time to repair, availability, and reliability
- Performance indicators: Absenteeism, overtime, contracted manpower, training, and training plan
- Costs and safety indicators
- Economic indicators: NPV and return on investment (ROI)
- Maintenance indicators: How to make it run
- Analysis of actual cases
- Deviation analysis

**AUDIENCE**
Engineers, managers, or planners responsible for maintenance or production processes.

**PREREQUISITE**
Knowledge of maintenance and reliability engineering.

**COURSE CONTENT**
- Single-phase fluid
- Pressure drop equations and correlations for single phase flow
- Multiphase flow
- Fluid flow modeling software
- Multiphase flow operational considerations
- Multiphase flow metering

**AUDIENCE**
Production engineers and facilities engineers.

**PREREQUISITE**
A basic understanding of surface facilities production systems and fluid hydrodynamics.

In this course, attendees will learn the theory of multiphase flow and how to calculate the pressure drops in single-phase, dual-phase (gas and liquid), and multiphase flow systems. Attendees will also learn how to conduct flow pattern predictions, evaluate the effects of slugging and transient flow, and gain exposure to fluid flow modeling software.

**COURSE CONTENT**
- Impact of corrosion in production systems
- Corrosion principles and classification
- CO₂ and H₂S corrosion
- Corrosion inhibitor mechanisms, guidelines, and selection
- Corrosion prediction: Application to actual cases
- Corrosion monitoring
- Guidelines for material selection
- Pipeline external corrosion: External protection and National Association of Corrosion Engineers recommended practices
- Risk-based inspections
- Actual study cases

**AUDIENCE**
Engineers wanting a better understanding of corrosion and its management in oil and gas production systems.

**PREREQUISITE**
Basic knowledge of corrosion and production systems.

In this course, attendees receive an introduction to the mechanisms and causes of corrosion in oil and gas production systems and the appropriate methods for monitoring and control. The attendees will learn to identify the corrosion mechanism and estimate and predict the corrosion rates in addition to understanding how to select materials based on the corrosion environment, evaluate and select corrosion inhibitors, and elaborate on a corrosion management plan for pipelines.

**COURSE CONTENT**
- Programmed plant shutdown management (maintenance turnaround management)
- Types of plant shutdowns
- Top-down review of the macrofunctions in plant shutdown planning
- Barriers to and key factors for the success of a plant shutdown
- Methods to manage a programmed plant shutdown
- First stage: Integrated strategy (actual cases)
- Second stage: Development of scope of work (actual cases)
- Third stage: Execution of plant shutdown (actual cases)
- Fourth stage: Plant shutdown closeout (actual cases)

**AUDIENCE**
Engineers, planners, supervisors, and managers responsible for plant turnaround planning or implementation who need a systematic methodology for plant turnaround management.

**PREREQUISITE**
Strong knowledge of maintenance and reliability engineering.
An introduction to subsea production system facilities, this course takes the attendee from conceptual design to operation. The attendees will learn about the latest facility designs and implementations, their advantages and disadvantages, and the rapidly changing trends of future technologies.

**COURSE CONTENT**
- SPS concepts, definitions, and commonly used architectures
- General design requirements and drivers
- SPS equipment, selection, and operation
- Flow lines
- Flow assurance
- Maintenance and repair
- Subsea well intervention
- Digital oil field
- Production monitoring, control, and optimization technology
- Data acquisition and data management
- Discussion of integrated systems and examples

**AUDIENCE**
Engineers involved with subsea facilities design or operations who want to learn about evolving subsea facility technologies.

**PREREQUISITE**
General knowledge of oil and gas production systems and offshore production systems.

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From this overview of the production system from reservoir to separator, attendees learn to optimize the process using an integrated approach, including nodal analysis and identification of major pressure losses. In hands-on in-class exercises, the attendees will use specialized software to identify constraints and propose recommendations for production optimization.

**COURSE CONTENT**
- Production system overview from reservoir to surface: Production system and process, well completions, lift methods, gathering systems, and separation systems
- Nodal analysis: Main pressure-drop components, inflow performance relationship, completion, tubing system graph, and gas well production behavior
- Subsurface-surface production operation: Integrated vision, procedures, best practices, identification of restrictions and corrective actions, production optimization using automation technology, and performance management
- Subsurface-surface production operations: Software and tools for performance modeling, technology trends, and integrated information management for control, monitoring, and automation

**AUDIENCE**
Engineers responsible for production optimization and tasked with evaluating a subsurface network and surface system as one integrated system.

**PREREQUISITE**
Knowledge of the production system from subsurface to surface.

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From this course on flow assurance, attendees gain an advanced understanding of fluid flow through a series of interconnected systems from the reservoir to surface facilities, and the prevention and mitigation of common flow impediments. The attendees will learn best practices from worldwide field examples, as well as how to design fit-for-purpose flow assurance solutions.

**COURSE CONTENT**
- Key flow assurance issues
- Technologies for capture and characterization of fluid samples
- Methodologies for measurement, modeling, and management of inorganic and organic solids
- Fluid flow and heat-transfer characteristics and their importance in design of subsea architecture, model selection, and liquids management
- Processes of fluid flow integration, heat transfer, and solids

**AUDIENCE**
Engineers and technical staff responsible for well surveillance, production optimization, or completion design.

**PREREQUISITE**
Working knowledge of well production behaviors, basic reservoir engineering principles, and surface facilities; exposure to well completion design, nodal analysis, and stimulation processes.

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Attendees will learn how to use the flexibility of the Avocet software platform Volumes Manager module to build custom solutions for managing production information. The attendees will understand how to deploy and configure the software for all types of operational settings: conventional land, offshore; deep offshore, floating production, storage, and offloading vessels, coalbed methane, SAGD, and heavy oil. This course will increase your understanding of features for data entry, visualization and computation of production, allocation of fluids, and operational and regulatory reporting.

**COURSE CONTENT**
- Facility setup, completions, wells, equipment, and other processes
- Organizational and other hierarchies using links
- Allocation networks
- Data loaders
- Calculations and allocation processes
- Disconnected data collection setup
- Security definition
- Reports through Microsoft SQL Server reporting services

Note: This course can be customized to include training on the Avocet Volumes Manager System Development Kit, which covers advanced implementation and configuration topics, such as modifying the transaction system, adding new screens, setting up unit conversions, localizing the software, and setting up reporting views.

**AUDIENCE**
Anyone wanting to configure or administer an Avocet Volumes Manager system for end users.

**PREREQUISITE**
Avocet Volumes Manager for End Users course or equivalent.
Avocet Volumes Manager for End Users

Foundation - 3 Days

Attendees will learn how to apply the flexibility of the Avocet software platform Volumes Manager module for entering, managing, and reporting production information. The attendees will also learn how to validate and allocate production data in all types of operational settings: conventional land, offshore; deep offshore; floating production, storage, and offloading vessels, coalbed methane, SAGD, and heavy oil. This course will increase your understanding of features for data entry, visualization and computation of production, allocation of fluids, and operational and regulatory reporting.

COURSE CONTENT

- Browsing and navigating through the application
- Data entry using the application on a disconnected device
- Checking for data errors and validating data
- Loading data from external sources
- Visualizing networks
- Calculating and allocation processes
- Reporting

AUDIENCE

Anyone wanting to use a fully configured Avocet Volumes Manager system module for data entry, visualization and computation of production, allocation of fluids, and operational and regulatory reporting.

PREREQUISITE

None

Avocet Integrated Asset Modeler Fundamentals

Foundation - 5 Days

The course focuses on using the Avocet software platform Integrated Asset Modeler module to integrate the reservoir with the surface models. The course also includes software installation instruction.

COURSE CONTENT

- Overview of key reservoir network coupling fundamentals
- Coupling reservoirs to networks
- Running time-based simulations
- Connecting models
- Adding a Microsoft Excel model to a flow diagram
- Evaluating economics with Merak software Peep models
- Transferring compositions

AUDIENCE

Anyone wanting to integrate reservoirs with surface models using Avocet Integrated Asset Modeler module.

PREREQUISITE

None

OLGA Flow Assurance

Foundation - 3 Days

This 3-day course is intended to turn a beginner into an OLGA simulator user, capable of running realistic flow assurance tasks. A mixture of lectures and hands-on exercises helps attendees understand flow assurance challenges, the fundamentals of multiphase pipeline thermo-hydraulics, and how to apply the OLGA simulator in realistic flow assurance issues. The exercises are conducted using the OLGA GUI. All major features of the GUI are covered, including model building, case runs, parametric studies, and effective post-processing. Fluid property tables for the OLGA simulator are generated with the PVTsim third-party compositional PVT analysis and characterization software. Our experienced instructors focus on teaching the attendees how to turn data into an acceptable and effective OLGA model and how to perform simulations.

COURSE CONTENT

- Basic multiphase production hydraulics and thermal issues
- Introduction to OLGA simulator topology and basic assumptions
- Introduction to PVTsims software
- Flow assurance issues for oil and gas-condensate production
- Terrain slugging mitigation, hydrodynamic slugging and OLGA slug tracking
- Shut-in, cool-down, startup, and depressurization of a well-flowline-riser configuration
- Building a simulation model with minimum information
- Gas condensate pipeline-modeling characteristic steady-state behavior, pigging, turnaround, ramp up, three-phase flow, separator with level control

AUDIENCE

Beginner to intermediate OLGA simulator user, prospective OLGA simulator licensees, and the design or operations professional interested in exploring the uses and capabilities of multiphase transient simulations.

PREREQUISITE

No previous experience with OLGA software is necessary, but a general knowledge of pipe flow and thermodynamics is an advantage.

OLGA Well Dynamics

Foundation - 5 Days

This 5-day course is intended to train the attendees who work with production and well performance to use the OLGA simulator to simulate the flow transients in the wells and production systems. This course is very suitable for engineers who would like to simulate the offshore well operation scenarios. The course has a good balance in content between the well flow dynamics and the hands-on OLGA simulator skill learning. This course also helps the new OLGA beginners to quickly grasp the “dynamic” concept, gain basic skills to use OLGA simulator independently, and lay a solid foundation for building up advanced modeling capabilities.

COURSE CONTENT

- OLGA simulator well modeling capability
- The OLGA simulator model and its execution
- Numerical solution scheme and sectioning principles
- PVT aspects in OLGA simulation and PVTsims OLGA interface
- Well model building in the OLGA simulator
- Artificial lift modeling with OLGA simulator software
- Mud and well engineering fluid modeling and applications
- Steady-state simulation and parametric study
- Shut-in and startup
- Simple gas-lift modeling
- Electric submersible pump modeling
- Wellbore cleanup
- Blowout and well kill (optional)

AUDIENCE

Production and well performance engineers, especially suitable for offshore well operation scenarios.

PREREQUISITE

No previous OLGA simulator experience is necessary, but knowledge of well performance and multiphase flow modeling advantageous.
**SURFACE FACILITIES DESIGN AND ENGINEERING**

### PIPESIM Gas Field Production Operations

**Foundation – 2 Days**

This course covers the use of the PIPESIM production system analysis software steady-state multiphase simulator for designing and modeling gas production systems operations. Practical and comprehensive problems will be presented, discussed, and analyzed throughout the course.

**COURSE CONTENT**
- Navigate the PIPESIM simulator user interface
- Troubleshoot and debottleneck network models
- Model gas wells, including various completion models
- Match inflow performance to test data
- Model water separation, injection into a salt water disposal well, and wellhead or manifold production sources
- Construct a compositional fluid model
- Predict gas hydrate formation, erosion, corrosion, and liquid loading in gas wells
- Model centrifugal and reciprocating gas compressors
- Compare the relative benefits of push vs. pull compression
- Estimate the required slug catcher size
- Model a transmission network

**AUDIENCE**
Production engineers, facilities engineers, field production operations engineers.

**PREREQUISITE**
General petroleum engineering knowledge as well as elemental software skills.

### PIPESIM Fundamentals

**Foundation – 2 Days**

In this course, attendees explore the PIPESIM production system analysis simulator software which provides steady-state, multiphase flow simulation for oil and gas production systems. Individual PIPESIM modules are used for a wide range of analyses, including well modeling, nodal analysis, field planning, artificial lift optimization, and pipeline and process facilities modeling. A major feature of PIPESIM software is the system integration and openness that allows users to develop a Total Production System Model. The attendees will gain a general understanding of how PIPESIM software is used to design and optimize total production systems from the reservoir to the final processing delivery point.

**COURSE CONTENT**
- Analyze well performance
- Design of models for pipeline and process facilities
- Perform nodal analysis
- Develop blackoil and compositional fluid models
- Select multiphase flow correlations
- Surface network model

**AUDIENCE**
Anyone who needs to learn steady-state, multiphase flow simulation for oil and gas production systems to analyze well performance, model pipelines and facilities, and perform nodal analysis using PIPESIM software.

**PREREQUISITE**
None

### Avocet Workflow Manager—Level 1

**Skill – 3 Days**

Increase your understanding of how the Avocet software platform Workflow Manager module integrates various data sources (including real-time surveillance data) to the engineer’s desktop, providing a platform for automating engineering processes from calculations to workflows. Attendees will learn how to set up the Avocet Workflow Manager to act as a real-time enabler by providing cleansed, aggregated, and preprocessed production data for use by other applications such as Avocet Data Manager and OFM well and reservoir analysis software.

Note: Avocet Workflow Manager includes the functionality previously available in the DECIDE® data mining based production optimization software.

**COURSE CONTENT**
- Workflow fundamentals and terminology
- Installation and deployment
- Licensing options
- SQL Server configuration
- Data model and advanced data acquisition settings
- Recommended backup and restore practices
- Data acquisition strategies
- Raw data cleansing and aggregation

**AUDIENCE**
Anyone wanting to learn advanced workflow configurations in the Avocet Workflow Builder module.

**PREREQUISITE**
Avocet Workflow Builder and Avocet Workflow Manager—Level 1 courses.

### Avocet Workflow Manager—Level 2

**Advanced – 2 Days**

This advanced course teaches workflow developers how to design and deploy automated workflows for data collection, cleansing, and automated calculation using the Avocet software platform. Attendees will learn how to quickly diagnose workflow problems and best practices and pitfalls for combining tasks. Instruction on user management and how to secure data from unwanted while granting access to validated users.

**COURSE CONTENT**
- Workflow fundamentals and terminology
- Managing and scheduling workflows
- Constructing or editing a workflow
- Using tasks in workflows
- Troubleshooting strategies
- Administering users and access privileges
- Viewing and manually editing data

**AUDIENCE**
Anyone wanting to learn advanced workflow configurations in the Avocet Workflow Builder module.

**PREREQUISITE**
Avocet Workflow Builder and Avocet Workflow Manager—Level 1 courses.
OLGA Advanced Flow Assurance

Advanced - 3 Days

This course mixes lectures and hands-on exercises to help attendees understand the OLGA software background and widen the scope of applications of transient multiphase simulations for flow assurance. The exercises are conducted within the frame of the OLGA GUI. All major features of the GUI are covered, including model building, case runs, parametric studies, and postprocessing. The PVTsim software is used to generate hydrate curves and wax tables.

COURSE CONTENT
- Fluids and compositional tracking with OLGA simulator and PVTsim software
- Pipeline profile modeling
- Liquid surges and controller basics
- General guide to separator modeling and sizing
- Hydrates and MEG tracking
- Slug mitigation by control
- Gas lifting
- Well-flowline-riser shut-in and cool-down with hydrate inhibition
- Wax deposition, pigging, and dead-oil circulation
- Overpressure protection
- Water hammer

AUDIENCE
Experienced OLGA simulator users who are interested in learning about advanced applications for flow assurance and modeling of more complex systems within the software.

PREREQUISITE
OLGA Flow Assurance course and preferably previous project experience with OLGA software.

NExT offers a wide range of training related to maintenance and reliability design, facility engineering, and facility operations and maintenance, as well as technician and operator training.
## TECHNICIAN AND OPERATOR TRAINING

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<th>Process Operation</th>
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<td>Reliability for O&amp;M</td>
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<td>Oilfield Corrosion Management</td>
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<td>HAZOP/HAZID and SIL</td>
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<td>Hazard and Operability</td>
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<td>Safety Systems</td>
<td>Rotating Equipment Operations and Maintenance</td>
<td>Generator Control</td>
<td>Rotating Electrical Systems and Equipment</td>
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<td>Export System Operations</td>
<td>Pipelines Operation and Maintenance</td>
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<td>Control Systems and Equipment</td>
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<td>Gas Processing and Conditioning</td>
<td>Water Treatment Operations</td>
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<td>Electrical Protection Systems and Equipment</td>
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<td>Water Treatment</td>
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<td>Vessels</td>
<td>Communication Systems</td>
<td>Low Voltage Distribution Systems and Equipment</td>
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<td>Oil processing Operations</td>
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<td>Control Systems</td>
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<tr>
<td></td>
<td>Piping and Pipeline Design, Maintenance and Operation</td>
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**AWARENESS**

- HSE in Exploration and Production
- Introduction to Surface Facilities

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
### Introduction to Surface Facilities

**Awareness - 5 Days**
Structured to provide attendees with the fundamentals of surface facilities, this course covers the production process from the wellhead to custody transfer. Topics include production surface facilities systems, including gathering, separation, production treatment, metering systems, and process equipment. The attendees will learn about applied flow assurance and how produced fluids are converted to saleable products.

**COURSE CONTENT**
- Field development overview
- Well flow control and safety system
- Gathering system
- Fluid separation system
- Oil treatment
- Water treatment
- Gas treatment
- Flow assurance overview
- Custody transfer and measurements
- Process equipment

**AUDIENCE**
Engineers and geoscientists involved in field development or production of oil and gas.

**PREREQUISITE**
Minimum of 2-year technical degree or equivalent experience.

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### Communication Systems

**Foundation - 5 Days**
This course provides the attendees with the tools required to understand, operate, and maintain the communication systems used in the oil and gas industry. The course presents case histories to give the attendees an insight to the communication systems.

**COURSE CONTENT**
- Communication concepts and overview
- Instrument communications techniques and protocols
- Signal transmission systems
- Communications signals and converters
- Industrial networks and telemetry systems
- Remote terminal units and MTU
- Local area network (LAN) and radio communications
- Optical fiber and wireless field networks
- Troubleshooting industrial networks and field buses
- Supervisory control and data acquisition

**AUDIENCE**
Instrumentation and control technicians and operators, facilities operators, and supervisors.

**PREREQUISITE**
Basic skills about control systems and control theory.

### Control Systems

**Foundation - 4 Days**
This course provides the attendees with the fundamental of programmable logic controllers (PLCs) and distributed control systems (DCSs). By the conclusion of this course, the attendees will be able to understand the PLC and DCS architecture and tasks that technicians should perform.

**COURSE CONTENT**
- Control theory
- PLCs and DCSs
- Basic PLC programming
- PLC maintenance and troubleshooting
- DCS input/output troubleshooting procedures and practices

**AUDIENCE**
Instrumentation and control technicians and operators, facilities operators, and supervisors.

**PREREQUISITE**
Basic understanding of the oil and gas production system.

### Control Systems and Equipment

**Foundation - 4 Days**
This course provides the attendees with component, equipment, and circuit knowledge used to control electrical equipment operations. The course focuses on the physical, operating, and troubleshooting characteristics of the electrical control systems.

**COURSE CONTENT**
- Electrical control system basics
- Control and switching of programmable logic controllers
- Distributed control systems
- Electrical motor control

**AUDIENCE**
Electrical technicians and operators.

**PREREQUISITE**
Basic knowledge of electric systems.
### Electrical Protection Systems and Equipment

**Foundation - 4 Days**

This course provides the attendees with knowledge, methodologies, and tools for electrical safety and equipment. The attendees will be exposed to theory, practical activities, exercises, and analysis of actual examples. After completing this course, the attendees will be able to apply the knowledge they gained in correct ways.

**COURSE CONTENT**
- Importance of electrical safety
- Fundamental safety requirements and safe operation guidelines
- Electrical accident causes
- Electrical fire prevention practices
- Standard safety and warning symbols
- Lockout/tag out system
- Recognizing and evaluating hazards
- Safe work practices
- Voltage ranges, nature of operations, and level of operations in electrical domains
- Electrical safety, grounding, and bonding
- Operational and safety features of switch equipment

**AUDIENCE**
Electrical technicians and operators.

**PREREQUISITE**
Familiar with electrical systems.

### Export System Operations

**Foundation - 3 Days**

This course provides attendees with an understanding of the export system tank farm operation, methods of gauging tanks, flow measuring and metering systems, and emergency of oil spills.

**COURSE CONTENT**
- General description of the export system
- Crude oil storage tank types and operations
- Methods for gauging tanks
- Flow measurement and metering systems
- Marine terminal loading and Schlumberger production management operation
- Oil spill emergencies

**AUDIENCE**
Production surface facilities operator and technicians, process operator and technicians, and production supervisors.

**PREREQUISITE**
Some familiarity with surface facilities production systems.

### Firefighting and Safety

**Foundation - 3 Days**

This course provides the attendees with necessary knowledge required to understand the requirements for the safe and efficient operation of fire protection systems.

**COURSE CONTENT**
- Piping and instrumentation diagrams and piping isometrics used in firefighting system
- Major equipment design specifications
- Controls associated with firefighting systems
- Installation, repair, operation, and maintenance of fire protection systems
- Fire detection systems

**AUDIENCE**
Operation technicians/operators, supervisors, mechanical technicians/operators/supervisors, maintenance technicians, and pipeline operators.

**PREREQUISITE**
Some familiarity with production surface facilities.

### Flare System Operations

**Foundation - 2 Days**

This course provides a comprehensive overview the flare and vent systems as well as the operations, inspection, and maintenance for oil and gas processing facilities.

**COURSE CONTENT**
- Flare system
- Vent system

**AUDIENCE**
Production surface facilities operator and technicians, process operator and technicians, and production supervisors.

**PREREQUISITE**
Some familiarity with surface facilities production systems.
### Gas Processing and Conditioning

**Foundation - 5 Days**

This course covers the major technical aspects of gas processing and conditioning. Attendees will obtain an overview of the fundamentals and tools used to determine the main properties of natural gas as they relate to gas separation, dehydration, sweetening, measurement, and transportation. The course focuses on plant and equipment design and operations and includes in-class exercises for the identification of key variables for optimal designs and operations.

**COURSE CONTENT**
- Natural gas properties and behavior
- Water-hydrocarbon behavior and the effect of contaminants (H₂S, CO₂)
- Hydrates: Problem, deposition site, impact, composition and structure, conditions of formation, hydrate detection, control, and remediation
- Gas separation: Principles, types, multistage process, condensate stabilization, and multiphase separators
- Gas sweetening: Processes, designs, and operating aspects
- Gas dehydration: Common operational problems and possible solutions
- Gas measurements
- Gas transportation system
- New developments and emerging technologies
- Commercial issues
- Technological challenges for natural gas production

**AUDIENCE**
Engineers, gas plant managers, and supervisors responsible for gas processing operations or design.

**PREREQUISITE**
General knowledge of oil and gas production systems.

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### Gas Processing Operations

**Foundation - 5 Days**

This course provides the knowledge needed for the attendees to understand the principles of operations and troubleshooting gas processing systems.

**COURSE CONTENT**
- Gas chemistry
- Gas properties
- Gas specifications
- Liquid extraction
- Gas dehydration
- Gas sweetening
- Gas processing facilities startups and shutdowns

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### Generator Control

**Foundation - 2 Days**

This course provides the attendees with the knowledge and skills necessary to understand how to operate and maintain the control and protection of power generators.

**COURSE CONTENT**
- Generator construction
- Supporting equipment for the generator
- Generator control system
- Voltage regulators
- Generator protection
- Generator control system maintenance

**AUDIENCE**
Production operators and technicians, instrumentation technicians, mechanical technicians, and production supervisors.

**PREREQUISITE**
Basic knowledge of instrumentation and control.

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### Heat Exchangers

**Foundation - 5 Days**

This course provides the attendees with a general understanding of the use and operation of various types of heat exchangers. Maintenance problems and troubleshooting procedures associated with heat exchangers are also examined. The course also focuses on the heat transfer equipment operations, enabling attendees to gain an understanding in how to achieve optimum equipment performance.

**COURSE CONTENT**
- Heat exchanger overview
- Shell and tube heat exchanger
- Air fin (fin fin) cooler
- Water cooling systems
- Chillers
- Primary cleaning methods for heat exchangers
- Heat exchanger startup and shutdown operations
- Heat exchanger maintenance and repairs

**AUDIENCE**
Operation technicians/operators/supervisors, mechanical technicians/operators/supervisors, maintenance technicians, and pipeline operators.

**PREREQUISITE**
Familiarity with production surface facilities.
<table>
<thead>
<tr>
<th>Course Title</th>
<th>Foundation - 3 Days</th>
<th>Foundation - 3 Days</th>
<th>Foundation - 5 Days</th>
<th>Foundation - 5 Days</th>
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<tbody>
<tr>
<td>High-Voltage Distribution Systems and Equipment</td>
<td>This course provides the attendees with an understanding of high-voltage (HV) electrical distribution systems to ensure the interrupted supply of power to their facilities. The courses covers in detail the main installation, operation, troubleshooting, and maintenance of the components associated with HV distribution systems.</td>
<td>Course Content</td>
<td>Risk management: Basic definitions, occupational health plan, risk recognition, unsafe act, and risk-generating source</td>
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</tr>
<tr>
<td>HSE in Exploration and Production</td>
<td>This course presents comprehensive HSE methods and tools used for development of risk management processes. Attendees will learn how to improve the safety of operating conditions at production facilities, minimize the risk in emergency situations, and establish proactive mitigation strategies.</td>
<td>Course Content</td>
<td>Risk evaluation objectives</td>
<td>Risk evaluation objectives</td>
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<tr>
<td>Instrumentation and Control Basics</td>
<td>This course focuses on instrumentation and control of pressure, temperature, flow, level, density, flow, control valve, and field data acquisition systems. Attendees will learn basic working principles, in addition to the measuring devices, their operation, and specifications.</td>
<td>Course Content</td>
<td>Pressure measurement instruments, classifications, and principles</td>
<td>Pressure measurement instruments, classifications, and principles</td>
</tr>
<tr>
<td>Introduction to Flow Assurance</td>
<td>This course introduces attendees to the main types and causes of flow impediments along with the methods and technologies commonly applied for their prevention, control, and remediation. Increase your understanding of the main problems associated with flow assurance, including asphaltenes, paraffins, emulsion, scales, sand, slugging, corrosion, and hydrates. The attendees will learn which technologies and techniques to use for specific problem environments and the advantages and disadvantages of each in addition to learning how to identify the types and causes of flow impediment and the methods or technologies that should be applied for the prevention, control, and remediation of these flow impediments.</td>
<td>Course Content</td>
<td>Flow rate (liquid and gas) instruments classifications, principles, and operations</td>
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</tbody>
</table>

**Audience**
- Electrical technicians and operators.

**Prerequisite**
- Basic knowledge of electric systems.

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
## Low-Voltage Distribution Systems and Equipment

**Foundation - 3 Days**

This course provides the attendees with LV electrical distribution system knowledge to ensure the interrupted supply of power to their facilities. The course covers the function, architecture, installation, operation, troubleshooting, and maintenance of the components associated with LV distribution systems.

**COURSE CONTENT**
- LV distribution systems
- LV systems designs
- LV switching gear
- LV electrical operating equipment
- LV operations
- LV distribution systems maintenance
- Testing and metering equipment
- LV distribution systems monitoring and operations testing
- LV systems safe operating

**AUDIENCE**
Electrical technicians and operators.

**PREREQUISITE**
Basic knowledge of electric systems.

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## Oil Processing and Conditioning

**Foundation - 10 Days**

This course focuses on the attendee developing an understanding of the concept of oil production and processing system from the wellhead to the delivery of a specification crude oil product. The attendees will learn how to select and evaluate processes and equipment used to meet fluid specifications, apply physical and thermodynamic property correlations and principles to the design and evaluation of oil production and processing facilities, perform equipment sizing calculations for major production facility equipment, and evaluate processing configurations for different applications.

**COURSE CONTENT**
- Oil production and processing basic concepts
- Upstream oil production operations overview
- Separation equipment and phase separation of gas, oil, and water
- Oil treatment basic concepts
- Dehydration equipment and variables affecting crude oil dehydration
- Oil heaters, applications, and design procedures
- Crude oil desalting principles, equipment, technology, operation, and design considerations
- Crude stabilization and sweetening, processing configuration, and operation and design considerations
- Crude oil storage tanks and vapor recovery unit, processing, operations, and design considerations
- Processing configuration evaluation for different applications
- Field trip

**AUDIENCE**
Process engineers, mechanical engineers, instrumentation and control engineers, and surface facilities project engineers.

**PREREQUISITE**
Familiarity with surface facilities production systems.

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## Oil Processing Operations

**Foundation - 5 Days**

This course provides the necessary knowledge for the attendees to understand the principles of operations and troubleshooting oil processing systems.

**COURSE CONTENT**
- Oil treatment basic concepts
- Oil dehydration
- Desalting equipment
- Oil stabilization
- Oil storage
- Oil treatment facilities startups and shutdowns

**AUDIENCE**
Production surface facilities operators and technicians, process operators and technicians, and production supervisors.

**PREREQUISITE**
Basic knowledge of the oil and gas industry.

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## Pipelines Operation and Maintenance

**Foundation - 5 Days**

This course provides the attendees with the knowledge of key elements that are required to construct, commission, operate, and maintain a pipeline. The course also contains information regarding the importance of adhering to international and national codes and standards in connection with construction, operation, and maintenance of pipelines.

**COURSE CONTENT**
- Routine field and facility operations
- Abnormal operating conditions
- Pipeline pigging
- Hot tapping and stopping
- Pipeline preparation for repair
- Pipeline shutdown and startup planning
- Internal corrosion monitoring

**AUDIENCE**
Operation technicians/operators, mechanical technicians/operators/supervisors, maintenance technicians, and pipeline operators.

**PREREQUISITE**
Familiarity with oil and gas production surface facilities.
### Piping and Pipeline Design, Maintenance, and Operation

**Foundation - 5 Days**

This course provides a comprehensive understanding of the essentials of pipeline design, operations, maintenance, and management. Attendees will learn to design a gathering network, calculate pressure drop, determine fluid pattern, and optimize the network arrangement. The attendees will use a gathering network simulator (PIPESIM flow simulator or equivalent) to demonstrate the optimum operating and design conditions for a system. This course will add to your knowledge of the practical considerations for pipeline networks, including design, regulatory requirements and classifications, material selection, and corrosion considerations in addition to increasing your awareness of pipeline monitoring, fit-for-purpose evaluations, risk analysis, and predictive and preventative maintenance.

#### COURSE CONTENT
- Fluid flow: Single phase and multiphase
- Software for gathering network simulation
- Pipeline surveys
- Pipeline codes, legislation, and classifications
- Pipeline designs
- Material characteristics and selection
- Pipeline construction and commissioning
- Pipeline external protection
- Pigging
- Pipeline integrity management and maintenance

#### AUDIENCE
Engineers and managers who design, operate, or monitor pipelines.

#### PREREQUISITE
Familiarity with oil and gas production system, flow of fluids, API 5L standard, and ASME 31.3, 31.4 and 31.8 standards.

### Power Generation Systems and Equipment

**Foundation - 4 Days**

The course provides the attendees with fundamental knowledge of power generation systems, technology, functionality, and operation of the main components.

#### COURSE CONTENT
- Main generating unit
- Emergency generating systems
- Uninterruptible power systems
- Generators
- Emergency generators
- Generator synchronization

#### AUDIENCE
Electrical technicians and operators.

#### PREREQUISITE
Basic knowledge of electric systems.

### Process Control Systems

**Foundation - 5 Days**

This course provides attendees with general information on process control principles, methodologies and tools of the instrumentation and control system.

#### COURSE CONTENT
- Process control variables
- Elements of a process control system
- Process and instrumentation drawings
- Control elements
- Process control system primary element
- ISA symbols
- Control valves
- Controlled and manipulated variables
- Set point, measurement, error, output, and disturbances
- Controller tuning

#### AUDIENCE
Instrumentation and control technicians and operators, facilities operators, and supervisors.

#### PREREQUISITE
Familiarity with production surface facilities.

### Process Variable Measurements and Control Equipment

**Foundation - 3 Days**

This course provides attendees with the basic knowledge of the oil and gas process variables measurement and control equipment. The course also includes the operation principles of several measurement devices.

#### COURSE CONTENT
- Measurement systems
- Process variables
- Pressure and differential pressure measuring instrumentation
- Level measuring instrumentation
- Flow measuring instrumentation
- Flow measurement fundamentals
- Temperature measuring instrumentation
- Drawings and symbols
- Process control

#### AUDIENCE
Instrumentation and control technicians and operators, facilities operators, and supervisors.

#### PREREQUISITE
Familiarity with production surface facilities operations.
<table>
<thead>
<tr>
<th>Course</th>
<th>Duration</th>
<th>Description</th>
</tr>
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</table>
| Rotating Equipment and Maintenance         | Foundation - 4 Days | This course is designed to provide attendees with an in-depth perspective of泵 and compressor technology in terms of operation and maintenance. Topics covered include pump types and terminology, centrifugal and positive-displacement pumps, packing, mechanical seals and sealing systems, bearings, couplings and other vital components. In addition, various pump and compressor types will be examined to see how they perform in their respective operating systems and advantages/disadvantages of various pump types will be discussed. Pump and compressors operation, troubleshooting, and maintenance will also be covered in depth. COURSE CONTENT
- Pumps
- Pump types and terminology
- Centrifugal pump operation and maintenance
- Positive displacement pump operation and maintenance
- Centrifugal compressor operation and maintenance
- Reciprocating compressor operation and maintenance AUDIENCE
Operation technicians/operators/supervisors, mechanical technicians/operators/supervisors, and maintenance technicians. PREREQUISITE
Familiarity with oil and surface facilities production systems. |
| Rotary Equipment Design and Operations     | Foundation - 5 Days | The course covers rotating and static equipment and systems for oil and gas facilities, codes and standards applicable to rotating and static equipment systems, different rotating and static equipment types and functions, varieties of mechanical drivers and driven equipment, and interfaces with process, electrical, and structural systems. COURSE CONTENT
- Introduction to centrifugal pumps
- Introduction to gas compressors
- Centrifugal compressors
- Introduction to electric motors
- Introduction to gas turbines
- Auxiliary and protection systems
- Rotating equipment applications in upstream AUDIENCE
Mechanical engineers, surface facilities engineers, construction engineers, and project engineers. PREREQUISITE
Basic understanding of the oil and gas industry. |
| Rotating Electrical Systems and Equipment  | Foundation - 5 Days | This course provides general information on and operation of direct current (DC) and alternating current (AC) motors. The attendees will gain an understanding of the different types of motors and drives, learn how to identify the main operation variables, monitor the efficiency, electronic power control, motor testing, and troubleshoot motor problems. COURSE CONTENT
- DC motors
- AC motors
- AC variable speed drives (VSD)
- VSD settings and troubleshooting AUDIENCE
Electrical technicians and operators. PREREQUISITE
Familiarity with production surface facilities. |
| Safety Systems                              | Foundation - 3 Days | This course provides the attendees with principles, requirements, activities, and actions for the safe operation of production surface facilities. COURSE CONTENT
- Shutdown system
- Emergency Shutdown
- Pressure relief
- Fire and gas
- Process safety AUDIENCE
Production surface facilities operators and technicians, process operators and technicians, and production supervisors. PREREQUISITE
Familiarity with surface facilities production systems. |
## Separation Process Operations

### Foundation - 5 Days

This course provides the necessary information for the attendees to understand the principles of operations and troubleshooting oil-/gas-/water-separation systems.

**COURSE CONTENT**
- Separation principles
- Separator types
- Separation system operation principles
- Startup and shutdown procedures
- PFD and P&ID
- Separation simulation
- Separation system operations and troubleshooting

**AUDIENCE**
Production surface facilities operators and technicians, process operators and technicians, and production supervisors.

**PREREQUISITE**
Familiarity with the oil and gas industry.

## Static Equipment Design and Operation

### Foundation - 5 Days

This course provides comprehensive understanding of static equipment design and operation concepts and practices. Design fundamentals, standards, criteria, and operating practices are discussed to familiarize attendees with procedures for designs, operating support, and specifications for process plant equipment and oil and gas production facilities.

**COURSE CONTENT**
- Pressure vessels
- Separators
- Crude oil storage tanks, types, and operation
- Dehydrator
- Sweetener unit
- Heat exchangers
- Air cooler
- Heater

**AUDIENCE**
Process engineers, mechanical engineers, surface facilities production operation engineers, and surface facilities project engineers.

**PREREQUISITE**
Basic knowledge of the oil and gas industry.

## Utilities Operations

### Foundation - 5 Days

This course provides the necessary information for the attendees to gain an understanding of the principles of operations and troubleshooting utilities systems.

**COURSE CONTENT**
- Service water and cooling water systems
- Freshwater, potable water, and demineralized water systems
- Steam systems
- Fire water systems
- Air and nitrogen supply systems
- Fuel systems
- Drain systems

**AUDIENCE**
Production surface facilities operators and technicians, process operators and technicians, and supervisors.

**PREREQUISITE**
Familiarity with surface facilities production systems.

## Utilities: Design and Operations

### Foundation - 10 Days

This comprehensive course encompasses a large number of different types of utility systems: water, steam, air, nitrogen, fuel, electric power, flare and vent, drain, water treatment, storage, and loading. For each type of utility, instruction covers the relevant support systems, layout, design, reliability, key specifications, and applications.

**COURSE CONTENT**
- Service water and cooling water systems
- Freshwater, potable water, and demineralized water systems
- Air systems and nitrogen systems
- Fuel systems
- Electric power and emergency power systems
- Flare and vent systems
- Drain systems
- Water treatment systems
- Support systems and components
- Designs, equipment, technologies
- Operation, maintenance, and safety

**AUDIENCE**
Process engineers, mechanical engineers, electrical engineers, instrumentation and control engineers, and surface facilities project engineers.

**PREREQUISITE**
Basic understanding of production facilities and operations.
**Valves Operation and Maintenance**

Foundation - 3 Days  

This course provides the attendees with the knowledge of key elements for valve operators and maintenance and the requirements for their inspection and maintenance. The course content includes typical valve operations for gate valves, globe valves, ball valves, needle valves, plug valves, diaphragm valves, control valves, safety valves, relief valves, check valves, and documentation of maintenance.

**COURSE CONTENT**
- Valve functions, classifications, types, working principles, and maintenance procedures
- Lubrication equipment basic operations
- Different types of valve operations and applications
- Valve problems, pressure testing, repairs, and solutions
- Inspecting and testing regulators, relief valves, and control valves
- Monitor regulator system advantages
- Regulators and relief valves common defects
- Regulator, relief valve, and control valve inspections
- Valve actuators and accessories
- Noise phenomena in control valves

**AUDIENCE**
Operation technicians/operators/supervisors, mechanical technicians/operators/supervisors, maintenance technicians, pipeline operators, and instrumentation and control technicians.

**PREREQUISITE**
Familiarity with production surface facilities.

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<table>
<thead>
<tr>
<th>Vessels</th>
<th>Water Treatment</th>
<th>Water Treatment Operations</th>
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<tbody>
<tr>
<td>Foundation - 4 Days</td>
<td>Foundation - 5 Days</td>
<td>Foundation - 3 Days</td>
</tr>
</tbody>
</table>

This course provides the attendees with a general understanding of the use and operation of various types of vessels. Maintenance problems and troubleshooting procedures associated with the operation of vessels are also examined in this course.

**COURSE CONTENT**
- Vessel types used in oil and gas industry
- Vessel design consideration
- Testing the vessels
- Inspection of vessels
- Vessel maintenance
- NDE on vessels
- Pressure vessels
- Oil and gas separators
- Boilers

**AUDIENCE**
Operation technicians/operators/supervisors, mechanical technicians/operators/supervisors, and maintenance technicians.

**PREREQUISITE**
Basic knowledge of the oil and gas processing facilities.

The attendees will be exposed to water treating equipment design and operations. The course provides theories, technologies, processes, and operational conditions needed to achieve the required specifications for the produced water. A case study will also be presented.

**COURSE CONTENT**
- Properties of produced water
- Environmental regulations
- Water treatment equipment descriptions, applications, and technology
- Water treatment processes and equipment
- Plate coalescence equipment
- Cross flow and mixed flow separators
- Flotation units and hydrocyclones fundamentals, units, and descriptions
- Water deoxygenation processes
- Fieldtrip

**AUDIENCE**
Process engineers, production operations, facilities engineers, and instrumentation and control engineers.

**PREREQUISITE**
Knowledge of production fluid properties.

This course provides attendees with the necessary information to understand the principles of operation and troubleshooting of water treatment systems.

**COURSE CONTENT**
- Water chemistry
- Water properties
- Water specifications for disposal or injection
- Water treatment processes
- Quality control
- Environmental regulations
- De-oiling processes
- Polishing treatments
- Chemicals

**AUDIENCE**
Production surface facilities operators and technicians, process operators and technicians, and production supervisors.

**PREREQUISITE**
Familiarity with surface production facilities.
### Cathodic Protection
**Skill - 5 Days**

This course is designed to provide the theoretical basis and the practical ability necessary to operate and maintain cathodic protection (CP) systems in the oil and gas surface production facilities, with particular reference to the safeguarding of tanks and pipelines. The course provides the attendees with the various factors that impact the performance of these systems.

**COURSE CONTENT**
- CP principles
- CP methods
- CP criteria
- Sacrificial anode CP
- Impressed current CP
- CP routine maintenance
- CP monitoring

**AUDIENCE**
Electrical engineers and technicians, corrosion engineers and technicians, facilities operators, and supervisors.

**PREREQUISITE**
Basic understanding of oil and gas industry.

### Control Room
**Skill - 3 Days**

This course provides attendees with the knowledge and practical skills for control room operators to carry out integrated operational activities in a safe manner within their normal work location.

**COURSE CONTENT**
- Integrated process systems for remote-control operation
- Remote control of integrated process systems
- Shut down remote integrated process systems
- Isolation of plant and equipment for maintenance
- Monitor and maintain health, environment, and safety systems
- Control emergencies and critical situations
- Emergency response
- Alarm management and interpretation
- Emergency shutdown and blow-down systems
- Fire and gas detection systems
- Hydrocarbon gas detection
- Process and utilities monitoring

**AUDIENCE**
Production surface facilities operators and technicians, process operators and technicians, and production supervisors.

**PREREQUISITE**
Knowledge of production surface facilities operations.

### Electrical Submersible Pumps
**Skill - 3 Days**

This course provides attendees with the concepts, operation maintenance, and troubleshooting of the ESP. The attendees will learn how to identify and understand the functions of each element of the ESP and the parameters to troubleshoot.

**COURSE CONTENT**
- ESPs overview
- ESP general description
- Subsurface equipment
- Surface equipment
- Variable speed drive
- ESP troubleshooting parameters

**AUDIENCE**
Production operators and technicians, electrical technicians, mechanical technicians, and production supervisors.

**PREREQUISITE**
Basic knowledge of oil and gas production systems.

### Equipment Inspection and Maintenance
**Skill - 5 Days**

This course provides the knowledge and tools for systematic care, inspection, and maintenance of equipment to ensure a serviceable condition and to detect failures before they become major repairs, thereby extending serviceable life. The course also provides attendees with the proper way to prepare maintenance execution plans and the factors that affect the inspection and maintenance activities.

**COURSE CONTENT**
- Corrective maintenance
- Scheduled shutdown maintenance
- Preventive maintenance
- Predictive maintenance
- Operator maintenance
- Nondestructive test
- Monitoring system
- Maintenance safety

**AUDIENCE**
Production operators and technicians, electrical technicians, mechanical technicians, and production supervisors.

**PREREQUISITE**
Basic knowledge of process equipment.
Failure Mode Effect Analysis Applied to Production Operations

Skill - 5 Days

This course provides the attendees with the significant aspects and considerations to conduct an efficient HAZOP assessment. At the completion of the course, attendees will have a good understanding of the HAZOP risk assessment technique and will be able to apply it.

COURSE CONTENT
- What is a HAZOP?
- The need for HAZOP
- Scope
- Limitations
- Information required
- HAZOP method
- HAZOP study cases

AUDIENCE
Surface facilities engineers, production engineers and managers, and maintenance and reliability engineers.

PREREQUISITE
Basic knowledge of reliability engineering and oil and gas production systems.

Hazard and Operability
Skill - 3 Days

This course provides a working approach to HAZOP practices and procedures for attendees who are responsible for ensuring the safety of process operations from design through daily operations. In this course, attendees will learn how to apply the techniques of HAZOP analysis, including the tips, tricks, and secrets analysts use to implement and maintain efficient operation procedures. Course material also covers the tools needed for HAZID, including root-cause identification and the application of redundant system layers for protection, prevention, and mitigation. Attendees will also learn how conduct hazard analysis to qualify and quantify risk and the probability of associated failures.

COURSE CONTENT
- HAZOP methods and applications
- HAZID and mitigation strategies
- Hazard analysis and probability determination
- Risk analysis and failure considerations
- Safety integrity level (SIL) assessment

AUDIENCE
Engineers, safety and environmental personnel, plant operators, area managers, and maintenance personnel.

PREREQUISITE
Surface Facility Production Operations course.

HAZOP/HAZID AND SIL
Skill - 5 Days

This course provides a working approach to HAZOP practices and procedures for attendees who are responsible for ensuring the safety of process operations from design through daily operations. In this course, attendees will learn how to apply the techniques of HAZOP analysis, including the tips, tricks, and secrets analysts use to implement and maintain efficient operation procedures. Course material also covers the tools needed for HAZID, including root-cause identification and the application of redundant system layers for protection, prevention, and mitigation. Attendees will also learn how conduct hazard analysis to qualify and quantify risk and the probability of associated failures.

COURSE CONTENT
- Heavy oil production system, nodal analysis, flow of fluids, and surface processing
- Isothermal flow in pipelines and incompressible single-phase flow
- Temperature profiles in pipelines
- Crude oil diluents and hydraulic analysis to determine optimal volumes
- Diluents impact on density, viscosity, pressure requirement
- Terrain topography effect on heavy oil transport, including water as conveyance medium
- Gas-liquid flow in a gathering system, correlations
- Structure of gathering network and basic equations

AUDIENCE
Engineers and production managers interested in heavy oil gathering and transportation.

PREREQUISITE
Basic knowledge of hydrocarbon properties, fluid flow, production surface facilities design and operations.
Hydraulic Control Panels

Skill - 2 Days

This course provides the attendees with the knowledge and skills needed to understand how to operate, under normal and abnormal conditions, troubleshoot, and maintain a hydraulic control panel.

COURSE CONTENT
- Hydraulic control panel purpose
- Hydraulic control panel typical configuration
- Hydraulic control panel startup
- Hydraulic control panel in normal condition
- Hydraulic control panel in a shutdown condition
- Hydraulic control panel troubleshooting
- Preventive and corrective maintenance

AUDIENCE
Production operators and technicians, electrical technicians, mechanical technicians, and production supervisors.

PREREQUISITE
Basic knowledge of instrumentation and control.

Automation, Instrumentation, Measurements, and Process Control

Skill - 5 Days

Attendees will gain theoretical and practical knowledge on how to use automation, instrumentation, control, and metering technologies to increase efficiency and safety of operations and productivity of the production process.

COURSE CONTENT
- Subsurface-surface automation concept
- Process control: Centralized control, optimization, integration
- Telecommunication
- Value creation quantification
- Inline production optimization
- Automated well tests
- Bottomhole sensors and intelligent wells
- Inline optimizers
- Diagnosis and optimization of integrated system
- Technological solutions and automation platforms
- Standards and recommended practices

AUDIENCE
Production engineers, facilities engineers, or operations engineers looking for practical exposure to automation and control concepts and techniques.

PREREQUISITE
Basic knowledge of the production system, process instrumentation, and control metering principles.

Oilfield Corrosion Management

Skill - 5 Days

In this course, attendees receive an introduction to the mechanisms and causes of corrosion in oil and gas production systems and the appropriate methods for monitoring and control. The attendees will learn to identify the corrosion mechanism and estimate and predict the corrosion rates in addition to understanding how to select materials based on the corrosion environment, evaluate and select corrosion inhibitors, and elaborate on a corrosion management plan for pipelines.

COURSE CONTENT
- Impact of corrosion in production systems
- Corrosion principles and classification
- CO₂ and H₂S corrosion
- Corrosion- inhibitor mechanisms, guidelines, and selection
- Corrosion prediction: Application to actual cases
- Corrosion monitoring
- Guidelines for material selection
- Pipeline external corrosion: External protection and National Association of Corrosion Engineers recommended practices
- Risk-based inspections
- Actual study cases

AUDIENCE
Engineers wanting a better understanding of corrosion and its management in oil and gas production systems.

PREREQUISITE
Basic knowledge of corrosion and production systems.

Problem Solving

Skill - 3 Days

This course provides the attendees with the knowledge and skills to understand root cause analysis (RCA) of the problem and reduce its occurrence in similar situations. The course includes several methodologies to approach and solve problems.

COURSE CONTENT
- Definitions and purposes of solving problems
- Basic principles of RCA
- Problem definitions
- Solving problem methodologies
- Pareto and stratification
- The 5 “Whys”?
- The Ishikawa (fishbone) diagram
- Causal mapping
- Time line (event diagram and causal factors)
- Task analysis
- Fault tree
- Cause and effect

AUDIENCE
Production operators and technicians, electrical technicians, mechanical technicians, and production supervisors.

PREREQUISITE
Basic knowledge of the oil and gas production system.
Process Safeguarding (Flare, ESO, Vent, Depressurizing Fire and Gas)

Skill – 5 Days

This course provides the necessary knowledge and tools that can be applied to prevent fires, explosions, and accidental releases at oil and gas processing facilities. The aim of this course is to help attendees develop fundamental competencies related to process safeguarding as it applies to the upstream oil and gas industry.

COURSE CONTENT

- Relief systems
- Flare systems
- Vent systems
- Shutdown systems
- Emergency shutdown
- Safety instrumented systems
- Fire and gas systems

AUDIENCE

Surface facilities production and operations engineers, production managers, process engineers, and instrumentation and control engineers.

PREREQUISITE

Basic understanding of oil and gas industry.

Reliability for O&M

Skill – 4 Days

This course provides the attendees with a comprehensive and practical introduction of the concept, methodologies, technologies, and philosophies of reliability applied to the oil and gas industry equipment.

COURSE CONTENT

- The importance of reliability
- Definitions of reliability
- Reliability function
- Failure analysis methodologies
- Critical analysis
- Risk-based inspection
- Reliability-centered maintenance
- Risk analysis
- Condition monitoring

AUDIENCE

Production operators and technicians, electrical technicians, mechanical technicians, and production supervisors.

PREREQUISITE

Basic knowledge of process equipment used in production systems.

Rotating and Reciprocating Equipment Control and Protection

Skill – 3 Days

This course provides the attendees with the fundamentals of compressor control that includes starting devices, overload protection, high-pressure and low-pressure protection, and surge control need for the efficient operation of compressor control.

COURSE CONTENT

- Compressor control
- Control strategy
- System considerations
- Electrical and electronic controls
- Pneumatic controls
- Manual controls
- Sensor classification
- Sensor types
- Loading and unloading
- Capacity control
- Surge control
- Special compressor controls

AUDIENCE

Mechanical, instrumentation, and control technicians and operators.

PREREQUISITE

Familiarity with compressors and oil and gas production surface facilities.

Subsea Control Systems

Skill – 3 Days

This course provides the attendees with in-depth information about subsea control systems. This course also improves the understanding of the subsea control system platform, the functions, and monitoring of the subsea equipment and activities.

COURSE CONTENT

- Subsea control system overview
- Subsea control system basics
- Subsea control system types
- Hydraulic system
- Electrical and hydraulic distribution
- Subsea electrical connectors
- Subsea equipment
- Subsea valves and actuators
- Instrumentation and sensors
- Communications equipment

AUDIENCE

Subsea technicians and operators, instrumentation and control technicians and operators, and production operation supervisors.

PREREQUISITE

Basic knowledge of the oil and gas production system and instrumentation and control.
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<td>A Strategic Approach to Oil and Gas Exploration</td>
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<tr>
<td>AWARENESS</td>
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**Project Management for Team Members**

**Awareness – 2 Days**

This course, delivered by a PMI education provider will provide attendees with the basic knowledge and skills required to successfully participate in an oil and gas project. This awareness course is designed to provide attendees with an introduction to the concepts of project management. As such, this course provides a good basis for any person seeking future career advancement as a team leader or project manager. It also establishes a common language, thus, facilitating moves across segments or departments. The case studies for applying the project management methodology will use oil and gas examples, and can be tailored (for an additional fee) to specific needs within a customer. The studies will begin with correctly defining the project, including scope and requirements, and extend to planning, implementing the plan and finally, closing out the project. The course follows the guidelines established by the PMI and their PMBOK Guide. The course uses a combination of teaching components to ensure delegates absorb both the theory and the practical application of the topics.

**COURSE CONTENT**

- Define a project and project management
- Define the difference between projects and operational work
- Explain the relationship of the project management Triple Constraint triangle
- Identify the key components of the project life cycle and expectations of team members in each phase
- Identify project stakeholders and their contributions
- Define roles and responsibilities of project team members
- Explain why we apply project management best practices
- Develop a high-level work plan, including project activities and effort estimates

**AUDIENCE**

Anyone with a minimal background in project management or someone who desires an increased understanding of how to participate successfully in a project.

**PREREQUISITE**

None.

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**Communication and Presentation Skills for Project Managers**

**Foundation – 5 Days**

This course will provide knowledge and understanding of the importance of communications and presentation skills to a project’s success. The Harvard Business Review lists “effectively speaking in public” as the number one criteria for career advancement. In a survey of project managers all across the globe, the number one factor they said predicted a successful project was communications: Between the customer and the project team members themselves. This course will answer these questions: Why isn’t good project management enough? Why are project communications so important? What happens if you ignore project communications? What is business project management? The course will provide attendees with an understanding of these concepts: Preparing leadership for their role using communications; writing the project charter case for change; report writing; presentations related to the project for executives, managers, users, and other stakeholders.

**COURSE CONTENT**

- Linking projects to the business strategy
- Developing a communications plan for the project
- Using communications to handle project risks
- Using communications in preparing operations to accept the project deliverables
- Four presentation rules
  - Guidelines for preparing and using visual aids
  - Logistics
  - Organizing for a team presentation

**AUDIENCE**

More experienced project managers who want to raise the level of their success in projects by developing and delivering more compelling and precise communications and presentations.

**PREREQUISITE**

Some project management experience desired.

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**Knowledge Management**

**Foundation – 4 Days**

This 4-day classroom training course is conducted in a workshop format (i.e., with significant audience participation, usually in the form of small breakout groups). The course presents the various aspects of knowledge management (KM), as it relates to the specific knowledge capture and sharing needs of the oil and gas industry. Emphasis is on the current convergence of knowledge management, electronic collaboration, and social networking as applied in the enterprise context. The course addresses the methods and tools that maximize the retention of retiring employees’ knowledge. By the end of the course, the attendees will be able to develop a strategy and a roadmap for effective KM in their respective organizations; they will understand the benefits and challenges of each aspect of KM; they will have a more “holistic” view of KM than the vendor-driven view that prevailed in past years; and they will understand the relative priorities of people, process and tools in implementing the strategy.

**COURSE CONTENT**

- Motivating employees to share and reuse knowledge
- People aspect of KM
- Document management and introduction to taxonomy
- Introduction to “Enterprise 2.0” concepts
- Managing social networking risks

**AUDIENCE**

Knowledge management program managers, leaders of communities of practice (CoPs) or similar efforts, information technology leaders, including CIOs, concerned with the selection and deployment of methods and tools for knowledge retention and collaboration and human resource and education professionals whose role includes assessing the knowledge assets and needs of the organization, tailoring training programs, and creating programs to retain the knowledge of retiring employees.

**PREREQUISITE**

Basic understanding of the demographics of an enterprise in terms of level of expertise, familiarity with traditional computer tools for collaboration (e-mail, shared document repositories, etc.), and active participation in social networks.
### First-Time Leadership and Supervision

**Foundation - 5 Days**

As international companies move toward a flatter, team-based structure, supervisors and team leaders are combining a leadership role with full-time operational responsibilities. This course develops core leadership and supervisory skills in people who are new to these demanding roles.

**COURSE CONTENT**
- Preparing for smooth transitions into leadership
- Assessing your leadership capabilities, challenges, and potential growth areas
- Managing yourself and your time to achieve goals
- SMART goals and action plans
- Communication techniques
- Team spirit and motivational skills
- Developing delegation skills and plans
- Coaching plans and techniques to improve performance
- Problem-solving and decision-making techniques
- Managing conflict and stress constructively

**AUDIENCE**
New leaders and supervisors or those preparing for management.

**PREREQUISITE**
None

### Oil and Gas Asset Management

**Foundation - 5 Days**

Attendees will gain an understanding of the entire oil company decision-making process from initial new country entry strategy to field abandonment. This course addresses the technical and business challenges as well as the interactions with fiscal and government bodies. Topics include VOI in various aspects from exploration to production as well as the typical business and economics frameworks for oil companies.

**COURSE CONTENT**
- Worldwide oil and gas supply and demand, reserves, and production
- Exploration phase of the E&P life cycle
- Economics, financial planning, appraisal, and field development planning
- Industry challenges and tough problems by region and geography
- Review of independent and national oil companies
- Prospect risks and calculation of expected monetary value
- Reservoir drive mechanisms, recovery factors, and production profiles
- Well planning process, drilling problems, and solutions
- Rig types and selection, site preparation, drilling systems and equipment, drilling techniques, and casing and cementing
- Production operations
- Economic and planning scenarios reflecting investment criteria, risk analysis, decision trees, and VOI
- Review of oilfield development project

**AUDIENCE**
Anyone wanting an increased understanding of the management of E&P assets such as properties and fields.

**PREREQUISITE**
None

### Microsoft Project for Oil and Gas

**Foundation - 3 Days**

This software course is designed to familiarize the attendees with the basic goals and approach of Microsoft® (MS) Project 2010 for oil and gas project management.

The course will demonstrate that MS Project is designed to align with all the essential elements of a structured project. The MS Project is built as a tool for project managers and covers almost all the aspects of the PMBOK Guide from the PMI. The course will include exercises and oil and gas case studies for application of the concepts.

**COURSE CONTENT**
- Conceptual background
- Navigating within MS Project
- Setting the project basic parameters
- Entering scope, time, resource, and cost information into MS Project
- Managing and tracking tasks

**AUDIENCE**
Be familiar with the fundamentals of project management and have a need for a laptop tool for managing project scope, time, and costs.

**PREREQUISITE**
None

### Personal Breakthrough Impact

**Foundation - 3 Days**

This course will help attendees begin to understand their strengths and natural talents and how to capitalize on them. Attendees will also better understand motivational drivers and energy drainers and in turn, enable the attendees to develop a personal strategy for action. Being effective and having an impact helps to increase productivity and overall job satisfaction whether in an offshore or onshore environment, in addition to having a major impact on health and safety in the workplace. Effectiveness with others always starts with "self-effectiveness." and self-effectiveness starts with self-awareness. An enhanced self-awareness is also key to "understanding" others and to develop a communication and influence approach that works and produces the best results.

**COURSE CONTENT**
- Gain insights into strengths and liabilities
- Master a powerful vocabulary for greater personal influence and impact
- Explore the latest tools, tips, and practical techniques for achieving excellent results
- Understand the importance of personal impact and influence on others
- Evaluate your personal impact strategy approach take actions to strengthen it

**AUDIENCE**
Individual contributors, project members, first-time managers.

**PREREQUISITE**
None
## Management and Leadership

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<th>Project Management</th>
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<th>The Wellsite Coach</th>
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<td><strong>Foundation - 5 Days</strong></td>
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<td><strong>Skill - 5 Days</strong></td>
<td><strong>Skill - 3 Days</strong></td>
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<tr>
<td>In this course, attendees will gain in-depth and comprehensive exposure to the key skills and knowledge they need for effective project management as described in the Association for Project Management's “APM Body of Knowledge” and the PMI’s “A Guide to the Project Management Body of Knowledge.” Course instruction is through a combination of lectures, practical exercises, and interactive sessions. The attendees draw upon their own experiences and real-world examples to enhance the learning experience. The topics, disciplines, and enabling skills are progressively built upon and linked to the development of case studies in a team environment. This course, taught by a PMI registered education provider, prepares the attendees for the PMP certification examination.</td>
<td>This course provides the attendees with fundamental knowledge and skills required to successfully manage all types of projects. The application of standard project management methodology is enhanced with the use of attendee case studies and practical exercises, including a project simulation. The course follows the guidelines established by PMI and their PMBOK. The course will provide the attendees with the ability to apply project management best practices in initiating, planning, executing, and closing a project, develop a project charter, perform a stakeholder analysis and develop a communications plan, develop a project plan, schedule, develop a risk analysis and complete a risk register, use effective techniques for controlling project change, and use effective techniques for monitoring a project. This course satisfies PMI’s PMP 35-hour training certification requirement and is delivered by a PMI registered education provider.</td>
<td>This course provides attendees with the knowledge and skills required to successfully pass the PMI PMP exam. The course will improve knowledge of project management and the understanding of its nine knowledge areas of project management. Attendees will also learn the interaction of the 42 process elements using the five process groups of project management and understand other significant topics covered on the PMP exam. This course follows the flow of project management, including the 42 process interaction charts. All of the materials used in this course are cross-referenced to the PMBOK Guide, contains our two-page process flow diagram of the major project management element interactions and our five-pages of PMP formulas, their purposes, and how to interpret the results. The course provides attendees with a PMP Application spreadsheet to assist with the complicated PMP application information requirements, includes our proven approach to a post-PMP course study regimen, discusses exam taking methodologies, provides over 500 flash cards covering acronyms, glossary definitions, process element definitions, knowledge areas, and process groups. The course provides PMP sample exams containing over 1,000 questions to prepare the attendee for the PMP exam.</td>
<td>This course covers methods for a manager to obtain the best out of people in terms of performance and at the same time contribute to their growth and development. Using a wellsight coaching methodology is more and more widespread as a tool to help these results; however, building a real coaching culture results in a need to reexamine some of the limiting beliefs and focus on key skills and reflexes. Not all situations that a manager is confronted with demand a coaching approach when other interactions can yield better results. More and more, we see in today’s fast-paced environment, the role of managers/leaders is to combine three separate roles: expert in their domain, manager to manage people and processes, and coach to help others unlock their potential and contribute to the success of the team. Traditionally in the oil and gas sector, the emphasis has been focused solely on the first two points and very little focus on coaching.</td>
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<td><strong>COURSE CONTENT</strong></td>
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<tr>
<td>- Project financial appraisal</td>
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<td>- The “art” of effective coaching</td>
<td>- The “art” of effective coaching</td>
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<tr>
<td>- Scope management, including work definition</td>
<td>- Time management: Planning and scheduling</td>
<td>- Master a powerful vocabulary for greater results through people</td>
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<tr>
<td>- Cost management: Monitoring and control</td>
<td>- Risk management</td>
<td>- Explore the latest tools, tips, and practical techniques for achieving greater results</td>
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<tr>
<td>- Procurement and contracts</td>
<td>- Alliances and partners</td>
<td>- Understand when to use coaching as a way to develop others</td>
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<tr>
<td>- Quality</td>
<td>- Human resources management</td>
<td>- Evaluate your personal coaching approach and develop actions to improve it</td>
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<td>- Project success and failure</td>
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<tr>
<td>Project engineers, supervisors, and project leaders seeking to increase their knowledge of project management.</td>
<td>Current (or future) project managers who desire an increased understanding of how to successfully manage a project based on the PMI® Project Management Methodology.</td>
<td>Managers working offshore/onshore with a need to empower and develop their staff more effectively using wellsight coaching.</td>
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<tr>
<td>Course Title</td>
<td>Skill Duration</td>
<td>Description</td>
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| Advances in Information Technology for Oil and Gas                          | Skill - 3 Days | The goal of this course is to enable oil industry CIOs and their staffs to create and successfully manage an innovation portfolio that brings the business benefits of emerging information technologies to their companies. This program is a 3-day classroom training course presented in a workshop format (i.e., with significant attendee participation, usually in the form of small breakout groups). At the conclusion of the course, the attendees will be able to make decisions on which technologies to introduce, when, and how, including how to present the benefits of the proposed technologies in terms of business impact. COURSE CONTENT  
- Role of IT in the enterprise – strategic vs. tactical  
- IT innovation consequences  
- The IT innovation life cycle  
- IT portfolio management  
- Innovation governance: Budgeting and screening projects  
- Emerging IT overview  
- Overview of emerging technologies  
- Collaboration: definition and overview  
- The convergence of collaboration, knowledge management, and social media  
- Addressing data challenges  
- Infrastructure challenges and opportunities: mobility, location awareness, and the “Bring Your Own Device” trend  
AUDIENCE  
CIOs, chief technology officers (CTOs), and potential chief financial officers or chief executive officers (CEOs), in addition to (especially in companies with significant information assets, or suppliers of information services to O&G companies) direct reports to the CIOs and CTOs.  
PREREQUISITE  
Good understanding of the typical current IT portfolio content, including business systems, how they are integrated, and the infrastructure on which they run. Each attendee should also understand his or her organization’s business objectives. |
| Applied Project Management— Oil and Gas                                     | Skill - 5 Days | The focus of this course is delivery of project management techniques for estimating, planning, managing, and controlling an oil and gas project. It extends to identification, assessment, and control of qualitative risks, as well as quantitative risk analysis using the basics of probability. Delivered in a workshop style, the course combines lectures on how to develop relevant estimates, plans, and risk analysis with the course case study project. The workshop format can be adapted to develop estimates, plans, and risk analyses as deliverables for client-specific projects. All terms and techniques used are compatible with the PMI’s “A Guide to the Project Management Body of Knowledge.” COURSE CONTENT  
- Terms, processes, and stage gate reviews in capital value process  
- PMI processes for management of oil and gas projects  
- Decision-support reports and documents  
- Defining and estimating activities through the project life cycle  
- Scope management and work breakdown structures  
- Use MS Project in project planning and control  
- Setting up basic project cost and progress recording  
- Standard software for risk management and quantitative risk assessments  
- Risk mitigation strategies, preliminary contingency levels, and critical variables  
- Monte Carlo methods and expected monetary outcome  
- Risk, earned value and risk-based forecasts  
- Stakeholder analysis and management skills  
- Project and baseline reviews  
AUDIENCE  
Managers and other professionals working in international or multicultural environments who want to improve skills in business communication.  
PREREQUISITE  
None |
| Contracts, Procurements, and Partnering                                    | Skill - 3 Days | In this course, attendees receive a comprehensive overview of the key phases and elements that make up contract procurement and partnering. The focus of this course is on project-based environments. Attendees will gain a thorough foundation in the basics of contracts, types of contracts and their applications, and their relative strengths and weaknesses in addition to learning how to use e-procurement tools, the savings that can be realized from them, and where they fit into the overall procurement strategy. COURSE CONTENT  
- Alliances and partnering  
- Contracts  
- Contract structure  
- Tender process  
- Standard forms of contracts  
- Effective contract negotiation  
- Supply chain management  
- Contract administration  
- Dispute resolution  
AUDIENCE  
 Anyone involved in contracts or partnering.  
PREREQUISITE  
None |
| International Business Communication Skills                                | Skill - 5 Days | This course will help the attendees achieve business goals by improving their international business communication and influencing skills. The attendees will learn to identify the cross-cultural communication skills required by international managers, to assess these skills and opportunities for development, and to apply key principles for more successful communication, both verbal and written. The course will increase the attendee’s effectiveness in leading and participating in international business meetings, writing proposals and reports that influence clients and colleagues toward a desired point of view, and deliver successful business presentations to an international audience. COURSE CONTENT  
- Understanding communication  
- Effective verbal communication  
- Effective writing skills  
- International presentation skills  
- Practice in performing presentations (exercise)  
AUDIENCE  
Managers and other professionals working in international or multicultural environments who want to improve skills in business communication.  
PREREQUISITE  
None |
<p>| Visit NExTtraining.net/classes for the latest calendar or to register for a course. | | |</p>
<table>
<thead>
<tr>
<th><strong>International Management Skills</strong></th>
<th><strong>International Oil and Gas Exploitation Contracts</strong></th>
<th><strong>Negotiation Skills for the Oil and Gas Industry</strong></th>
<th><strong>Powerful Technical Presentations</strong></th>
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<tbody>
<tr>
<td><strong>Skill - 5 Days</strong></td>
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<td><strong>Skill - 3 Days</strong></td>
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<tr>
<td>Designed to improve international management skills, this course enables attendees to identify the competencies required for international managers and assess their own competence in personal effectiveness and relationship management. The attendees will learn to improve skills in critical areas such as motivation, cross-cultural communication, team management, delegation, coaching, conflict management, and change management.</td>
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<tr>
<td><strong>COURSE CONTENT</strong></td>
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<tr>
<td>International management</td>
<td>Structures and benefits of different types of international contracts</td>
<td>Negotiation as a process: Key steps</td>
<td>Conducting an audience analysis</td>
</tr>
<tr>
<td>Using scenarios: Strength, weakness, opportunities, and threats analysis and specific, measurable, attainable, realistic, and timely goals and action planning</td>
<td>Key elements of oil and gas exploitation contracts</td>
<td>Preparation checklist, preparing tactics, and knowing your subject and counterpart</td>
<td>Planning an engaging introduction</td>
</tr>
<tr>
<td>Communication and influencing</td>
<td>Structuring contracts to meet specific needs</td>
<td>Importance of initiation</td>
<td>Developing a strategy for the presentation focus to match the audience</td>
</tr>
<tr>
<td>Situational team leadership</td>
<td>Needs and expectations of national and international oil and gas companies</td>
<td>Presentation after initiation and before bargaining</td>
<td>Closing the presentation powerfully</td>
</tr>
<tr>
<td>Top 10 tips for team leaders</td>
<td>Nonfinancial elements and their impact on economics and profitability</td>
<td>Communication and human behavior in negotiations</td>
<td>Delivering a polished presentation</td>
</tr>
<tr>
<td>Performance reviews</td>
<td>Identifying and managing risks and opportunities in the contract terms</td>
<td>Seven steps to effective communication</td>
<td>Using visual aids to add power and polish to the presentation</td>
</tr>
<tr>
<td>Managing people through change</td>
<td>Differentiating oil and gas exploitation and marketing issues in gas contracts</td>
<td>Verbal and nonverbal communication and how to listen</td>
<td>Using the same techniques for a team presentation</td>
</tr>
<tr>
<td>International manager career development</td>
<td>Modeling changing parameters in a typical production sharing contract</td>
<td>Dealing with different personalities, handling international negotiations, and impact of cultural differences</td>
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<tr>
<td>Planning for future self-development</td>
<td><strong>AUDIENCE</strong></td>
<td>Overview of bargaining and presentation</td>
<td><strong>PREREQUISITE</strong></td>
</tr>
<tr>
<td>Managers and professionals working in an international or multicultural environment.</td>
<td>Oil and gas company personnel at all levels and in all disciplines, including business development, contract negotiations, business analysis, strategic planning, joint venture representation, and petroleum project investment.</td>
<td>Getting concessions and closing the deal</td>
<td>Microsoft PowerPoint® knowledge and experience.</td>
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<td><strong>PREREQUISITE</strong></td>
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<tr>
<td>First-Time Leadership and Supervision course.</td>
<td>None</td>
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</table>

This training course will help attendees develop their speaking ability through refining the content, polishing verbal skills, improving body language skills, and channeling nervous energy. The training gives the attendee the confidence and tools to prepare and succeed at any technical speaking occasion through the use of instructor-led coaching and video feedback of their presentations. The Harvard Business Review listed “effectively speaking in public” as the number one criteria for career advancement. In the mind of the audience, the ability to speak effectively reflects the professional’s ability to think logically, indicates their status and education, and summarizes their competence.

**COURSE CONTENT**
- Conducting an audience analysis
- Planning an engaging introduction
- Developing a strategy for the presentation focus to match the audience
- Closing the presentation powerfully
- Delivering a polished presentation
- Using visual aids to add power and polish to the presentation
- Using the same techniques for a team presentation

**AUDIENCE**
Technical professionals who want to raise their level of success in presentations by developing and delivering more compelling and powerful presentations.

**PREREQUISITE**
Microsoft PowerPoint® knowledge and experience.
Supply Chain Strategy | Tendering and Technical Bidding | A Strategic Approach to Oil and Gas Exploration | Becoming an Inspirational Leader in Oil and Gas

Skill - 5 Days | Skill - 4 Days | Advanced - 3 Days | Advanced - 3 Days

Attendees will learn to develop procurement and supply chain management (SCM) strategy that can make valuable quantifiable contributions to their company’s performance. This practical course shows the attendees how to adopt a best practices model and outlines the latest thinking in upstream petroleum industry procurement. Course topics include development and implementation of an effective procurement strategy, planning that reduces the overall cost of purchasing, and management to deliver maximum value at minimum cost.

**COURSE CONTENT**
- Contract as legal instrument, investment tool, and management control tool
- What can go wrong in contracting
- Roles of contract policies and procedures
- Best practice procurement process
- Illustrations and benefits of SCM
- Scopes of work and the 10 golden rules
- Alternative tendering strategies
- Contract strategies and how to develop them
- Contract risk assessment and its importance
- Types of contracts and preparation of contractor selection criteria
- Tender preparation, issue, and evaluation
- Preparing the contract and managing the contractor using a performance review process

**AUDIENCE**
Personnel of all levels and in all disciplines who have responsibility for, and involvement in, the entire procurement process; line operational managers and specialists (the end users), as well as contract managers and contract specialists.

**PREREQUISITE**
None

This course covers the key aspects of technical bidding and tendering in the context of project management. Attendees will learn about business performance, the tender process, contracts, and quantitative methods, including those for procurement.

**COURSE CONTENT**
- Analyzing specifications
- Developing clarifications
- Estimating, planning, and risk assessment
- Collaborative working
- Preparing bid plan
- Bid compilation
- Pricing
- Adjusting and confirming bid plan
- Presentation of final proposal
- Postbid review

**AUDIENCE**
Engineering and project managers; construction managers; project, construction, and discipline engineers; contracts, procurement, and cost engineers; business development executives; tender managers; and accounting supervisors.

**PREREQUISITE**
Basic understanding of the business process.

This course focuses on understanding the use of strategic planning to optimize the probability of success in oil and gas exploration. The course includes Recognizing the need for strategic change and developing options to respond to changing business environments in addition to implementing new strategic directions and managing and monitoring performance.

**COURSE CONTENT**
- Strategic change and organization life cycle
- Identify the key ingredients for winning strategies
- Exploration life cycle
- Exploration value chain
- Portfolio management – managing exposure
- Exploration process
  - Delivering strategic change, organization, and performance
  - People development
  - Technology
  - Monitoring and reviewing performance

**AUDIENCE**
Geologists, geophysicists, team leaders, and managers.

**PREREQUISITE**
None

This course will help attendees identify what is in it for them, how to inspire others, and why do others want to follow you and “go the extra mile.” As a business leader in the oil and gas sector, attendees always have a need to stay far ahead of competition. One way is to become an inspirational leader, but how do you inspire others? What kind of leadership do people respond to? And how can you improve the quality of leadership in your business? The best leaders promote a culture where their people value themselves, each other, their organization and customers. Everyone understands how their work makes a difference and this helps to build a commitment to higher standards where everybody is always looking to do things better. Inspirational leadership is not a “gift of nature,” but instead, it requires awareness and practice.

**COURSE CONTENT**
- Insights into the “art” of inspirational leadership
- Master a powerful vocabulary that leads to greater results through people
- Latest tools, tips, and practical techniques in achieving great results
- Importance of inspiration as a way to engage others
- Personal leadership style and developing actions to improve it

**AUDIENCE**
Middle and senior managers interested in taking their teams to the next level in performance and impact.

**PREREQUISITE**
None

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
### Project Risk Analysis and Management

**Advanced - 4 Days**

Uncertainty is inherent in all projects and operations, particularly in technical, financial, schedule, legal, and quality arenas. This course presents the attendees with techniques used in the identification, assessment, and control of uncertainties in a project-based enterprise. Attendees will learn about risk analysis and management as a field of expertise focused on the systematic and comprehensive analysis of uncertainty.

**COURSE CONTENT**
- Risk analysis process and stages of risk life cycle
- Exposure, impact, and probability assessment
- Risk identification process
- Mitigation strategies
- Using Microsoft Excel and @Risk™ for project risk analysis
- Case study analysis: Resetting probability parameters

**AUDIENCE**
Anyone wanting to increase skills in project risk management.

**PREREQUISITE**
None

### Strategic Project Management

**Advanced - 5 Days**

All aspects of project management are presented for both greenfield and brownfield environments. Theory is combined with the practice of key skills in a program designed to develop and improve the attendee's performance in a project management team. Attendees will review capital, operations, and maintenance projects in addition to earning up to 37 PDUs for PMI certification.

**COURSE CONTENT**
- Project execution
- Strategy issues
- Project scope, value, and time management
- Project integration and context
- Procurement management (including contracts)
- Risk management
- Value improvement practices and constructability
- Project quality, communications, and human resources management

**AUDIENCE**
Experienced project managers or professionals responsible for managing projects and wanting to learn advanced techniques.

**PREREQUISITE**
Project management experience and the Project Management course.
### ECONOMICS AND FINANCE

<table>
<thead>
<tr>
<th>COMPETENCY LEVEL</th>
<th>Petroleum Economics</th>
<th>Accounting and Finance</th>
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<tr>
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<td><strong>SKILL</strong></td>
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<td>Risk, Uncertainty and Decisions in E&amp;P Projects</td>
<td>Auditing in the E&amp;P Industry</td>
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<tr>
<td>Economics of Deepwater Projects</td>
<td>Exploration and Production Accounting Level 3</td>
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<td>Economics of Unconventional Resources</td>
<td>Exploration and Production Accounting Level 2</td>
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<td>Economics of Petroleum Exploration</td>
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<td>Petroleum Economics: Heriot-Watt University Program</td>
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<td><strong>FOUNDATION</strong></td>
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<td>Petroleum Decision and Risk Analysis</td>
<td>Exploration and Production Accounting Level 1</td>
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<tr>
<td>Petroleum Economics</td>
<td>Mastering Finance for Nonfinancial Oil and Gas Personnel</td>
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<p>| <strong>AWARENESS</strong> |                     |                        |
| Introduction to Petroleum Economics | Introduction to Finance and Accounting in Oil and Gas |</p>
<table>
<thead>
<tr>
<th>SOFTWARE</th>
<th>ECONOMICS AND FINANCE</th>
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<tr>
<td>Merak</td>
<td>GeoX</td>
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<tr>
<td>Enterprise Planning</td>
<td>Advanced Risk and Resource Assessment</td>
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<td>Capital Planning Fundamentals</td>
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<tr>
<td>Merak Peep Fiscal Model Library Fundamentals</td>
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<tr>
<td>Peep Advanced</td>
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<td>VOLTS Reserves Management Fundamentals</td>
<td>GeoX Basic Risk and Resource Assessment</td>
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<tr>
<td>Decision Tool Kit Fundamentals</td>
<td>GeoX Prospect Assessment Concepts and Applications</td>
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<tr>
<td>Peep Fundamentals and Merak Peep Decline Fundamentals Combined Course</td>
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<tr>
<td>Peep Decline Fundamentals</td>
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<td>Peep Fundamentals</td>
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## ECONOMICS AND FINANCE

### Introduction to Petroleum Economics

**Awareness - 2 Days**

This blended-learning class is an excellent introduction for the attendees to the fundamentals of petroleum economics, including revenue, expenditures, fiscal systems, risk analysis, and investment analysis. The blended-learning experience includes questions and answers from learning material, exercises, class discussions, team presentations, and an interactive challenge.

**COURSE CONTENT**
- Cash flow basics
- Calculating revenue
- Estimating expenditures
- Fiscal systems
- Risk analysis
- Investment analysis
- Petroleum economics challenge (interactive exercise)

**AUDIENCE**
Nonfinancial professionals of all levels from technical and nontechnical backgrounds.

**PREREQUISITE**
None

### Introduction to Finance and Accounting in Oil and Gas

**Awareness - 3 Days**

This 3-day course will attendees who do not have a financial background to understand the basic principles, theory, and practice of financial reporting and analysis in the upstream oil and gas industry. Course attendees will learn the sources and uses of accounting and financial information and understand the differences between cash flow for project economics and accounting profit. Basic oil and gas industry accounting policies will be presented, as well as the general budgeting and financial processes of a typical international oil company.

**COURSE CONTENT**
- Sources and uses of financial information and data
- Financial information for decision-making
- Basic financial principles such as the balance sheet and profit and loss
- Cash flow and profit
- Control cash flow
- Techniques for measuring financial performance
- Oil and gas accounting and budget preparation and control
- Role of financial planning
- Operating budget versus capital budget
- Prepare and control a budget

**AUDIENCE**
Anyone desiring an introduction to basic financial practices and principles in the oil and gas industry.

**PREREQUISITE**
None

### Exploration and Production Accounting - Level 1

**Foundation - 3 Days**

This introductory-level course delivers a comprehensive overview of international accounting and finance practices in the E&P industry. It is particularly suitable for finance personnel who are new to the industry or those who want a broader understanding of oil and gas financial policy; joint ventures, and cost-control topic areas. Topics include industry accounting policies and practices; an introduction to managing project, development, and operating costs; the accounting and financial management implications of exploring for and producing oil and gas; and the background and accounting treatment of financial issues that are unique to the E&P industry.

**COURSE CONTENT**
- Sources and uses of financial information
- Understanding financial information
- Cash flow and profit
- Measuring financial performance
- Accounting practices and policies
- Budget preparation and control
- Effects of taxation

**AUDIENCE**
Anyone wanting a better understanding of finance and budgeting.

**PREREQUISITE**
None

### Mastering Finance for Nonfinancial Oil and Gas Personnel

**Foundation - 2 Days**

This course, designed for personnel who do not have a financial background, presents the basic principles, theory, and practice of financial reporting and analysis as they apply to the oil and gas industry. Attendees will learn how to interpret, understand, and act on financial information as well as how to develop effective decision-making skills in addition to increasing your understanding of financial management elements that are specific to the oil and gas industry and key E&P accounting topics, including depreciation, reserves, decommissioning, and asset impairment tests.

**COURSE CONTENT**
- Sources and uses of financial information
- Understanding financial information
- Cash flow and profit
- Measuring financial performance
- Accounting practices and policies
- Budget preparation and control
- Effects of taxation

**AUDIENCE**
Anyone wanting a better understanding of finance and budgeting.

**PREREQUISITE**
None

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
# Petroleum Decision and Risk Analysis

**Foundation - 3 Days**

Attendees will learn multiple approaches to modeling decisions for oil and gas projects. This course highlights a proven process and technology for decision analysis used by companies worldwide. An overview includes fundamentals and examples of decision analysis, discussion of uncertainties and risk, and various ways to incorporate them in oil and gas project evaluations. Discussions cover the use of sensitivities, decision trees, and value of information in both deterministic and probabilistic approaches to evaluating oil and gas projects.

**COURSE CONTENT**
- Decision and risk analysis, including decision criteria
- Decisions: How to address them and more importantly, how not to address them
- Essentials of uncertainty, risk, probability, and statistics, including choosing distribution types and eliminating bias
- Decision analysis process
- Modeling upstream oil and gas decisions
- Analyzing decisions and making recommendations
- Key uncertainties
- Simple decision models with deterministic analysis
- Complex decision models with probabilistic analysis
- Case studies
- Group problem

**AUDIENCE**
Geoscientists, engineers, commercial team members, or anyone wanting to incorporate uncertainty and risk into models of oil and gas decisions.

**PREREQUISITE**
Petroleum Economics course with some experience in project decision making and risk analysis.

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# Petroleum Economics

**Foundation - 4 Days**

The course teaches the fundamentals of petroleum economics as applied to selecting oil and gas projects, including a review of the time value of money concepts.

**COURSE CONTENT**
- Introduction to petroleum economics
- Forecasting production volumes
- Entering and using product prices
- Calculating royalty and interest
- Operating expenses, capital investments, depreciation, and taxes
- Inflation, escalation, and discounting
- Cash flow, economic indicators, and net present value
- Worldwide fiscal systems
- Incremental analysis
- Project selection

**AUDIENCE**
Anyone wanting a fundamental knowledge of petroleum.

**PREREQUISITE**
None

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# Auditing in the E&P Industry

**Skill - 5 Days**

An intensive training program designed to improve auditing skills; this course enhances the attendee’s understanding of audit principles and practices that are unique to the E&P business. Attendees will learn how to apply a structured methodology for conducting internal, production-sharing, and joint venture audits, implement a multidiscipline team approach to audits, and adopt a model of audit best practices.

**COURSE CONTENT**
- Audit definitions and types of audits
- Audit principles, techniques, planning, risk, and interviews
- Audit process
- Audit techniques, such as creating flowcharts
- Audit testing, sampling, and reporting
- Internal auditing controls
- Operational and contract audits
- Joint venture auditing and adopting best practices
- Audit meetings and closeouts
- Audit issues and accounting procedures for production-sharing contracts

**AUDIENCE**
Anyone working in the upstream oil and gas industry wanting to learn about or update auditing techniques, as well as professional accountants with a background in statutory audit who want to learn about internal and joint venture audits.

**PREREQUISITE**
None

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# Economics of Deepwater Projects

**Foundation - 4 Days**

This 3-day course is for attendees who already have some experience running project economics in the oil and gas industry but would like to learn how to model and evaluate the economics of deepwater development projects. An overview of the exploration, development, and production processes involved in deepwater projects will be presented. An evaluation model and method for evaluating deepwater projects will then be presented and discussed using supporting case studies. Attendees will learn how to incorporate common technical and nontechnical risks and uncertainties to arrive at a complete evaluation of the economics of deepwater projects.

**COURSE CONTENT**
- Framework for deepwater economic evaluations
- Decision framework of deepwater projects
- Development schedule and cash flow
- Deepwater decision analysis
- Decision analysis structure
- Risk identification and incorporation
- Decision trees

**AUDIENCE**
Engineers, economists, managers, or other technical staff with experience in project economics who want to learn how to model and evaluate the economics of deepwater projects.

**PREREQUISITE**
Experience with petroleum economics or equivalent.

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**Skill - 3 Days**

This 3-day course is for attendees who already have some experience running project economics in the oil and gas industry but would like to learn how to model and evaluate the economics of deepwater development projects. An overview of the exploration, development, and production processes involved in deepwater projects will be presented. An evaluation model and method for evaluating deepwater projects will then be presented and discussed using supporting case studies. Attendees will learn how to incorporate common technical and nontechnical risks and uncertainties to arrive at a complete evaluation of the economics of deepwater projects.

**COURSE CONTENT**
- Framework for deepwater economic evaluations
- Decision framework of deepwater projects
- Development schedule and cash flow
- Deepwater decision analysis
- Decision analysis structure
- Risk identification and incorporation
- Decision trees

**AUDIENCE**
Engineers, economists, managers, or other technical staff with experience in project economics who want to learn how to model and evaluate the economics of deepwater projects.

**PREREQUISITE**
Experience with petroleum economics or equivalent.
### Economics of Petroleum Exploration
**Skill** – 5 Days

This course focuses on the business side of exploration; i.e., how does a company decide whether to move forward with a particular project? Attendees will learn how a structured decision analysis and portfolio optimization process uses the hydrocarbon volumes and risk analyses provided by exploration geoscientists to identify the projects with the best economic potential.

**Course Content**
- Business side of exploration
- Comparison of exploration projects under different fiscal regimes
- Role of project economics
- Calculation of cash flow and NPV
- Worldwide fiscal regimes and their impact on exploration
- Probabilities, risk, and project risk assessment
- Fundamentals of decision analysis and decision trees
- Expected monetary value
- Value of information
- Comparative analysis of multiple projects
- Strategy and portfolio analysis

**Audience**
Exploration geoscientists and managers wanting to understand economics of petroleum exploration.

**Prerequisite**
Basic petroleum geology and petroleum systems.

### Economics of Unconventional Resources
**Skill** – 4 Days

This course, particularly suitable for attendees involved with shale gas and coalbed methane, presents a probabilistic approach that can be immediately implemented for economic evaluation of unconventional gas resources. Case studies highlight the technology and workflows that can help reduce the uncertainty in your evaluations. Course material includes an overview of worldwide unconventional activity, discussion of technical and development uncertainties, and the use of a decision analysis process including sensitivities, decision trees, and value of information.

**Course Content**
- Worldwide unconventional gas activity
- Impact of unconventional gas projects on company portfolio
- Uncertainty and risk analysis
- Technical and development uncertainties and risks
- Strategies and technologies to minimize uncertainty and risk
- Value of information during pilot and appraisal phases
- Decision analysis process
- Building economic cases and decision models
- Considerations and options for modeling
- Multiple decision analyses (exercise)
- Break-even price, hurdle rate, and other metrics
- Case studies and practice problems

**Audience**
Geoscientists, engineers, commercial team members, or managers wanting to model and analyze the business impact of unconventional resources.

**Prerequisite**
Experience with petroleum economics theory and applied software use.

### Exploration and Production Accounting - Level 2
**Skill** – 5 Days

Increase your knowledge and understanding of international E&P finance and accounting to an intermediate level. An in-depth examination of international practices and current developments, this course covers a broad range of relevant topics. Attendees are encouraged to challenge existing methods as a basis for reviewing procedures and introducing improvements in your workplace.

**Course Content**
- Regulation of oil and gas company accounting
- Impairment or ceiling tests
- Accounting disclosures, financing arrangements, sales revenue, and taxes
- International accounting standards
- State frameworks for control and exploitation of petroleum reserves
- Production-sharing contracts and their accounting practices
- Joint venture cash management, billing, and cost allocations
- Materials and inventory accounting
- Cost control
- Departmental and corporate budgets

**Audience**
E&P accounting professionals wanting to gain advanced skills.

**Prerequisite**
Exploration and Production Accounting - Level 1.

### Exploration and Production Accounting - Level 3
**Skill** – 5 Days

This highly interactive 5-day workshop is for attendees who want to take their E&P accounting skills to an advanced level. The course focuses on highly realistic E&P company scenarios and a computer-based simulation to plan, record, and report company progress through international E&P activities. Teams participate in the financial management of these activities, including operator and non-operator accounting, recording of transactions, updating of financial statements, and analysis of company performance.

**Course Content**
- Review budgets, enter billings into accounting system, and prepare financial statements for new exploration joint venture
- Account for development costs; sales revenues; depletion, depreciation, and amortization (DD&A); a decommissioning provision; and production under terms of tax-based fiscal arrangement
- Prepare cash calls and billings, and maintain operator accounting records for your company as an operator of a new venture
- Prepare financial statements reflecting the change in accounting policy from full cost to the successful efforts method
- Account for company participation in a new venture under a production-sharing contract
- Perform a test and account for the result of falling oil price on reserves
- Adjust company portfolio of assets for a farmout
- Prepare a briefing for your CEO’s meeting with investment analysts on company performance and financial status

**Audience**
Professionals wanting advanced skills in E&P accounting.

**Prerequisite**
Exploration and Production Accounting - Level 1 and Level 2 courses, and experience working with spreadsheet techniques; participants must furnish their own computers preinstalled with Microsoft Excel software.

Visit [NExTtraining.net/classes](http://NExTtraining.net/classes) for the latest calendar or to register for a course.
Petroleum Economics:
Heriot-Watt University Program

Skill - 5 Days
This course is part of the Heriot-Watt University Distance Learning Masters of Petroleum Engineering program. It is intended to give a broad understanding of the economics evaluation of petroleum projects. This course does not prescribe a particular method or process, but rather focuses on the ideas and principles, which may become incorporated into corporate procedures. Petroleum investment is very long term and subject to considerable risk, and some of these issues are identified and reviewed. Classes may be attended by individuals who seek to better understand the subject but are not registered for the degree course. To find out more about the Masters of Petroleum Engineering visit:
www.nexttraining.net/masters.cfm.

COURSE CONTENT
- Introduction to the economic and financial aspects of the industry
- Fundamental concepts of evaluation methods
- Time value of money
- Discounting
- Compounding
- Discount rate and inflation
- Project parameters
- Cash flow modeling
- Cost per barrel measures
- Discounted measures
- Applications
- The role of government licensing
- Taxation
- Financial risk management

AUDIENCE
Technical and nonfinancial staff members.

PREREQUISITE
None.

Risk, Uncertainty and Decisions in E&P Projects

Skill - 5 Days
Understand why projects can fail due to adverse events with geologic, technical, commercial, or contractual origins. In this course, attendees will increase their understanding of how risk and uncertainty impact the decisions on which projects they select, how to develop them, and how these decisions affect their economic performance. Improving the quality of decisions is the main goal of this course; not just understanding risk and uncertainty for their own sake. Probabilistic concepts and tools are used to describe projects with risk and uncertainty to give a better understanding of the principles and tools underlying these concepts.

COURSE CONTENT
- Probability overview and simple exploration economics
- Dependencies
- Decision analysis
- Decision trees, Bayes formula, and the value of information
- Describing uncertainty
- Components of accuracy
- Monte Carlo analysis and its application
- Correlations and regressions
- Geostatistics: Stationary assumptions, variograms, kriging, cokriging, filtering, and multiple realizations

AUDIENCE
E&P professionals involved in data analysis and interpretation, including geologists, geophysicists, and reservoir engineers active in exploration, appraisal, field development, reserves estimation, or economics; decision makers interested in learning more about decision analysis.

PREREQUISITE
Exposure to basic statistics and a working knowledge of Microsoft Excel worksheets.

Portfolio Management

Advanced - 4 Days
Course attendees will learn about portfolio theory and its incorporation into the process of upstream oil and gas corporate planning. The course material focuses on proven processes and technologies for portfolio optimization used by companies worldwide. Topics include important concepts and processes for portfolio analysis, including an easy-to-follow process for analysis to meet business unit or corporate goals, and workflows to model the business and decide which wells to drill, projects to undertake, or properties to acquire.

COURSE CONTENT
- Portfolio theory, analysis, and optimization
- Portfolio management workflows and implementations in E&P
- Corporate metrics, corporate strategies, and impact of risk and uncertainty in portfolio management
- Workflows related to business analysis, strategy development, and portfolio optimization
- Portfolio analysis process and analysis versus optimization
- Business rules and project dependencies
- Modeling and testing of different strategies
- Analysis and comparisons of different portfolios
- Using charts and grids to answer critical business questions
- Group problem (exercise)

AUDIENCE
Current or potential business unit or corporate planners wanting to understand and model the financial performance of an organization.

PREREQUISITE
Introduction to Petroleum Economics course and experience in project economics.

GeoX Basic Risk and Resource Assessment

Foundation - 2 Days
This 2-day course provides attendees with an overview of the concepts of prospect assessment, and prepares them to assess both simple and complex prospects using the GeoX software. The course combines lectures, exercises using manual calculations, and exercises using GeoX software to illustrate assessment concepts and their applications. A real-world multiple segment prospect is evaluated from a simple deterministic analysis of a single zone to a complex probabilistic evaluation that considers segment relationships. Attendees will evaluate the prospect using realistic descriptions of risk and uncertainty.

COURSE CONTENT
- Single-zone
  - Segment definition
  - Volumetric uncertainty
  - Play and local risks
  - Correlations
  - Results and analysis
  - Alternative volume methods
  - Multiple scenarios

Prospects (multiple zones)
- Independent segments
- Risk dependencies
- Correlations between segments
- Fluid communication
- Results and analysis

AUDIENCE
Geologists, geophysicists, and reservoir engineers involved with prospect assessment.

PREREQUISITE
None.
Merak Decision Tool Kit Fundamentals

Foundation - 1 Day

The Merak Decision Tool Kit module provides a consistent method for risk analysis so that the user can compare opportunities and quantify risk and uncertainty. Course attendees will obtain an understanding of risk exposure at the asset and corporate level and enable them to avoid underestimating risk and overestimating the value of investments.

COURSE CONTENT
- Using tornado charts and the Merak Peep application to build a decision tree
- Modeling simple decisions
- Complex decision trees
- Dependent probabilities
- Information value

AUDIENCE
Anyone wanting to learn effective use of the Merak Decision Tool Kit module.

PREREQUISITE
Merak Peep Fundamentals course and an understanding of basic risk analysis concepts such as sensitivity analysis and expected value.

Merak Peep Decline Fundamentals

Foundation - 1 Day

Increase your production forecasting expertise with this course on intuitive production decline analysis workflows. Attendees will learn how to use the Merak Peep Decline module to save time, reduce duplication of effort, and tie seamlessly into their economic analysis. Attendees will better understand how this tool facilitates basic decline analysis and forecasts of production and remaining reserves.

COURSE CONTENT
- Maintaining current in-house and vendor data to understand production levels
- Fine-tuning estimates of remaining reserves
- Keeping updated historical data ready for reporting and retrieval
- Creating plots and reports based on different analysis options
- Setting up preferences to customize forecasting workflow
- Importing and exporting production history
- Creating groups and summary wells to better manage well data
- Forecasting production rates and volumes
- Linking wells to economic cases for rapid assessment of production value
- Basic decline analysis, rate-time curves, and cumulative curves

AUDIENCE
Anyone wanting to improve skills and understanding of basic decline analysis techniques and theory.

PREREQUISITE
Understanding of basic decline analysis techniques and theory.

Merak Peep Fundamentals

Foundation - 2 Days

Designed to deliver Merak Peep module fundamentals, this course material focuses on the functionality of this petroleum economic evaluation program. Attendees will learn to navigate efficiently through the case document, edit existing data, and analyze economic runs.

COURSE CONTENT
- Preferences for customized views and calculation parameters
- Workflows to create, edit, and copy economic case documents
- Essential economic inputs: Production, price, ownership, provincial royalties, state taxes, international tax regimes, operating costs, and capital
- Filters and user parameters to sort large volumes of data
- Use of Merak Peep Scenario Manager for rapid sensitivity analysis
- Consolidations to value workovers and aggregate projects
- Batch processes to edit or report multiple cases at once and calculate price sensitivity

AUDIENCE
Anyone wanting to develop or improve their skills and understanding of project economics involving Merak Peep software.

PREREQUISITE
Petroleum Economics Fundamentals course or experience with petroleum economics.

Merak Peep Fundamentals and Merak Peep Decline Fundamentals Combined Course

Foundation - 3 Days

Attendees in this course will explore the functionality of Merak Peep (petroleum economic evaluation program) and decline analysis module. These software packages allow for navigating efficiently through the case document, edit existing data, and analyze economic runs.

COURSE CONTENT
- Create, edit, and copy economic case documents
- Review essential economic inputs
- Create filters and user parameters to easily sort large data volumes
- Use batch processes to edit or report multiple cases simultaneously and calculate price sensitivity

Merak Peep Decline Fundamentals

Foundation - 1 Day

Maintain current in-house and vendor data to understand production levels

COURSE CONTENT
- Import and export production history
- Create groups and summary wells to better manage well data
- Forecast production rates and volumes
- Perform basic decline analysis-rate/time curves and cumulative curves

AUDIENCE
Anyone needing to develop or improve their skill and understanding of project economics and decline curve analysis performed with the Merak Peep and Peep Decline modules.

PREREQUISITE
Petroleum Economics Fundamentals or equivalent knowledge in addition to an understanding of basic decline analysis techniques and theory.
### Merak VOLTS Reserves Management Fundamentals

**Foundation - 2 Days**

The Merak VOLTS volume tracking and reporting module provides both management flexibility and data security. In this class, attendees will learn to use the Merak VOLTS module to manage worldwide reserves and resources information and facilitate analysis of corporate value. Discussion includes an overview of technical volumes, which are based on analytical estimation methods and technical reservoir parameters.

**COURSE CONTENT**
- Calculating value of reserves and resources
- Updating production data and forecasts
- Monitoring reservoirs to QC production predictions
- Reports for regulation requirements
- Entering technical volumes and lease information
- Linking a well for historical production using Merak Decline or Merak VOLTS modules
- Change records and their approvals
- Batch processes (creating reservoirs, reporting, balancing)
- Reporting of reserves and resources
- Scenarios

**AUDIENCE**
Anyone wanting to develop or improve skills and understanding of Merak VOLTS module.

**PREREQUISITE**
None

### GeoX Prospect Assessment Concepts and Applications

**Foundation - 3 Days**

This 3-day course provides attendees with an overview of prospect assessment concepts and applications, and prepares them to assess both simple and complex prospects using the GeoX software. The course combines lectures, exercises using manual calculations, and exercises using the GeoX software suite to illustrate assessment concepts and their application.

The 3-day course goes into more detail on basic assessment concepts than the 2-day introduction to GeoX in GeoX Basic Risk and Resource Assessment course, which focuses primarily on tool functionality.

**COURSE CONTENT**
- Segments
- Segment definition
- Segment volumetrics
- Volumetric uncertainty
- Segment risk
- Multiple segment prospects
- Independent segments
- Risk dependencies
- Correlations between segments
- Fluid communication

**AUDIENCE**
Geologists, geophysicists, and reservoir engineers involved with prospect assessment.

**PREREQUISITE**
None

### Merak Capital Planning Fundamentals

**Skill - 3 Days**

Attendees will learn how to use portfolio management as the link between strategy and opportunity. The analysis performed in Merak Capital Planning strategic portfolio management module will enable the attendees to understand their options and explore alternatives using consistent tools and processes. This course will review the basics of E&P corporate planning and the role of risk and uncertainty in portfolio management, and understand the role a solution like the Merak Capital Planning module plays within a corporate portfolio management workflow.

**COURSE CONTENT**
- Creating comprehensive business strategies with optimal portfolio solutions
- Using charting and analysis tools to examine portfolio solutions
- Viewing deterministic or stochastic project or portfolio data
- Setting up business rules and goals
- Generating portfolio solutions for various objectives
- Generating project economics through Merak Peep and Merak Results Broker modules
- Loading Microsoft Excel results data through the Merak Results Broker module

**AUDIENCE**
Anyone responsible for portfolio analysis or management using the Merak Capital Planning module, including those wanting to understand the role of portfolio management in E&P.

**PREREQUISITE**
Merak Peep Fundamentals course.

### Merak Decision Tool Kit and Merak Peep Monte Carlo

**Skill - 1 Day**

In this course, attendees will work in the Merak Peep and Merak Decision Tool Kit modules to explore the principles of Monte Carlo analyses and how to apply them to project evaluations.

**COURSE CONTENT**
- Deterministic analysis versus Monte Carlo analysis
- Random walks and their input parameters
- Correlations
- Use of report settings
- Visual Monte Carlo trees
- Choice and chance nodes

**AUDIENCE**
Merak Peep module users responsible for preparing or modifying Merak Peep models using the Merak Fiscal Model Library application.

**PREREQUISITE**
Merak Peep Fundamentals course, Merak Decision Tool Kit Fundamentals course, and an understanding of basic Monte Carlo theory.
<table>
<thead>
<tr>
<th>Course</th>
<th>Skill</th>
<th>Description</th>
<th>Audience</th>
<th>Prerequisite</th>
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</thead>
<tbody>
<tr>
<td>Merak Peep Advanced</td>
<td>1 Day</td>
<td>Attendees will learn to use Merak Fiscal Model Library (FML) module to its full advantage by understanding the reporting and comparative capabilities within and between the different fiscal regimes, whether exploring a new area or analyzing projects close to home.</td>
<td>Anyone wanting to improve Merak Peep skills beyond the fundamental level or to evaluate multiple projects using Merak Peep software.</td>
<td>Merak Peep Fundamentals course.</td>
</tr>
<tr>
<td>Merak Peep Fiscal Model Library Fundamentals</td>
<td>4 Days</td>
<td>Course content: Standard reports, Reporting batch rollup, Filters, groups, and hierarchies to sort and organize data, Advanced batch functionality to perform mass edits, Running scripts to perform multiple edits simultaneously, Using performing result set searches and rollup reporting to calculate specific or aggregate results, Consolidating complex royalty and other calculations, Scheduler tool for linking cases sequentially.</td>
<td>Anyone who uses the Merak Peep Fiscal Model Library for a project evaluation.</td>
<td>None.</td>
</tr>
<tr>
<td>GeoX Advanced Risk and Resource Assessment</td>
<td>1 Day</td>
<td>This course combines a review of the basic methodology for evaluating multiple compartment/zone prospects with hands-on assessment of real-world cases using GeoX software. Topics covered in this course include a shared risk and dependency group approach to modeling multisegment prospects plus volumetric correlations and multiple scenarios.</td>
<td>Geologists, geophysicists, and reservoir engineers familiar with basic prospect assessment principles.</td>
<td>None.</td>
</tr>
<tr>
<td>Merak Enterprise Planning Advanced</td>
<td>5 Days</td>
<td>The Merak Enterprise Planning module provides a comprehensive environment for a living business plan; use it to shift from static, lengthy annual planning to more dynamic, event-driven or evergreen planning. In this course, attendees will learn to generate the contextual planning information their organization requires and how this information is captured in an open and accessible format. Materials include setup of scheduled, standardized, and enterprise-scale calculations to support timely synchronization of multiple disparate data sources.</td>
<td>Anyone responsible for business planning using results from multiple software tools and processes, and administrators who support engineering and corporate planning workflows across an enterprise.</td>
<td>Merak Peep Software Advanced course and an intermediate understanding of multiple data sources, data cubes, and calculation servers.</td>
</tr>
</tbody>
</table>
### WHICH COURSE IS RIGHT FOR ME?

NExT’s courses are organized into a convenient table by their technical discipline grouping and match the intended audience.

**AWARENESS:** Tailored for nontechnical professionals who need an overview of technical topics and broad understanding of a domain or software applications.

**FOUNDATION:** Geared to technical professionals, including engineers, geoscientists, or operations personnel, who need an introduction to technical theory, techniques, or applied software use. Foundation courses frequently include exercises that require advanced understanding or abilities in math and physics.

**SKILL:** Designed for practicing technical professionals who are experienced in the technical discipline and software or are seeking to cross train.

**ADVANCED:** Engineered for experienced professionals who need to focus on new techniques and problems.
## Deepwater Exploration and Production

<table>
<thead>
<tr>
<th>Competency Level</th>
<th>Reservoir Characterization</th>
<th>Drilling</th>
<th>Production</th>
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<tr>
<td><strong>Skill</strong></td>
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<tr>
<td>Deepwater Seismic Interpretation</td>
<td>Field Trip: Delta-Slope-Turbidite Deposition and Synsedimentary Deformation, County Clare, Ireland</td>
<td>Deepwater Well Project and Risk Management</td>
<td>Economics of Deepwater Projects</td>
</tr>
<tr>
<td>Deepwater Sedimentary Systems: Exploration and Production</td>
<td>Field Trip: Depositional Environments from Slope Aprons to Tropical Reefs, Tabernas and Sorbas Basins, Spain</td>
<td>Deepwater Drilling Design and Operations</td>
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<tr>
<td>Sedimentology and Depositional Environments of Deepwater Deposits</td>
<td>Field Trip: Permian Basin Floor Fan Systems of Karoo, South Africa</td>
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<td>HPHT Operational Awareness and Drilling Challenges</td>
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<tr>
<td>Deepwater Petroleum Systems: Fundamentals and Applications</td>
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<tr>
<td><strong>Foundation</strong></td>
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<tr>
<td>Deepwater Reservoirs</td>
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<tr>
<td>Introduction to Deepwater Rig Operations</td>
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<td></td>
<td>Production Systems and Subsea Technologies</td>
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</tbody>
</table>

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
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<tr>
<th>SOFTWARE</th>
<th>DEEPWATER EXPLORATION AND PRODUCTION</th>
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<tbody>
<tr>
<td></td>
<td>ECLIPSE</td>
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<tr>
<td>COMPETENCY LEVEL</td>
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<tr>
<td>SKILL</td>
<td></td>
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<tr>
<td>FOUNDATION</td>
<td></td>
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<tr>
<td>OLGA Advanced Blowout Control</td>
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<tr>
<td>PIPESIM Artificial Lift Design and Optimization</td>
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<td>OLGA Flow Assurance</td>
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<tr>
<td>Drillbench Dynamic Well Control Modeling Software</td>
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<tr>
<td>OLGA Well Dynamics</td>
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<tr>
<td>Drillbench Dynamic Hydraulics and Temperature Modeling Software</td>
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</table>

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DEEPWATER EXPLORATION AND PRODUCTION

Deepwater Reservoirs

Foundation – 5 Days

This in-depth course provides the process sedimentology background required to understand deepwater systems and to recognize sediment gravity flows on subsurface datasets. Course participants will be able to:

- Differentiate between mass transport complexes, sediment gravity flows, and contours and predict net: gross values for each in seismic data
- Differentiate between channels, lobes, mass transport complexes, and contoured deposits on well logs
- Identify processes responsible for sedimentary structures, bedforms, and lithology and use these to determine deposition environments and lateral continuity of reservoirs from core samples
- Correlate reservoir sandstones using concepts developed by Mike Gardner in the Brushy Canyon formation of the southwestern U.S. The course also builds on several outcrop analogs, including the Ross formation of Ireland

COURSE CONTENT

- Company-specific case studies
- Course manuals, including seismic data, well logs, core photos, and other handouts

AUDIENCE

Geoscientists who wish to understand deepwater reservoirs.

PREREQUISITE

Basic knowledge and understanding of geology.

Introduction to Deepwater Rig Operations

Foundation – 5 Days

This course will describe the different types of deepwater drilling units, including the specific equipment requirements and techniques to spud a well. The goal of this course is to expose the attendees to brief but precise information on floating drilling rigs, SS and DPDS, and their specific equipment for drilling wells in deepwater zones. Techniques and methods employed extending from the arrival of floating drilling units on a location until the cementing of the casing will be presented. Major issues and solutions faced in deepwater drilling operations is also included as well as the environmental forces and their impacts on deepwater operations. Key learning objectives of this course include what is an SS and a DPDS with their advantages and disadvantages; description and functioning of all specific equipment deployed in deepwater operations, either on the floating rig or subsea (riser, BOP, wellheads, tensioners etc.); the different station keeping methods for maintaining a floating drilling vessel on location (mooring, dynamic positioning); and the environmental forces and their impact.

COURSE CONTENT

- Floating drilling units
- Vessel stability
- Mooring systems
- Dynamic positioning operations
- Riser systems
- Subsea wellheads and casing operations
- BOP equipment
- Emergency disconnect
- Plug and abandonment

AUDIENCE

Operators, drilling supervisors, junior level staff, company representatives, new managers, drilling contractor personnel involved in drilling, marine, maintenance, supervision, management, and service company management, and team leaders.

PREREQUISITE

Basic drilling operations knowledge and an understanding of the marine environment for drilling operations. Offshore drilling experience is beneficial.

Production Systems and Subsea Technologies

Foundation – 5 Days

An introduction to SPS and facilities, this course takes the attendees from conceptual design to operation. The attendees will learn about the latest facility designs and implementations, their advantages and disadvantages, and the rapidly changing trends of future technologies.

COURSE CONTENT

- SPS concepts, definitions, and commonly used architectures
- General design requirements and drivers
- SPS equipment, selection, and operation
- Flow lines and flow assurance
- Facility maintenance and repair
- Subsea well intervention
- Digital oil field
- Production monitoring, control, and optimization technology
- Data acquisition and data management
- Integrated systems
- Discussion and integrated system examples

AUDIENCE

Engineers involved with subsea facilities design or operations who want to learn about evolving subsea facility technologies.

PREREQUISITE

General knowledge of oil and gas production systems and offshore production systems.

Deepwater Drilling Design and Operations

Skill – 5 Days

This course is designed to help drilling engineering professionals understand the technologies, terminology, concepts, processes, and equipment used to drill deepwater oil and gas wells. The course follows a typical deepwater drilling program and drilling process from geology to rig selection and station keeping to conductor driving and surface casing setting followed by wellhead systems, BOP and marine riser systems to typical deepwater rig equipment. Once the drilling process and equipment is reviewed, we then look at some of the other aspects that are different for deepwater drilling technology such as well control, shallow hazards and then we move to some of the new emerging technologies such as dual gradient and managed pressure drilling. Finally we discuss some of the typical operational aspects and workover issues associated with deepwater wells.

COURSE CONTENT

- Drilling units
- Drilling equipment specific to deepwater drilling
- Pore pressure and fracture pressure window
- Well control
- Riser selection
- Hydrates
- Drilling fluids
- Dual gradient and managed pressure drilling
- Completions

AUDIENCE

Drilling professionals with well design and operations experience desiring an understanding of the challenges faced in the deepwater drilling environment.

PREREQUISITE

Understand basic geomechanics, drilling operations, well placement, well planning, and drilling fluids basics.

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
## Deepwater Well Project and Risk Management

**Skill - 5 Days**

The main goal of the course is to highlight the critical project and risk management issues required to run deepwater well projects efficiently, safely, environmentally friendly and cost-effectively. By the end of the course, attendees will understand the key issues and principles of deepwater project management. The attendees will be able to apply the principles in practice and integrate them in the asset project or project team to optimize management of the well project and manage the identified risks to maximize value. Following the deepwater well project management process from prospect evaluation through operations, attendees will develop important skills needed to drill wells in a deepwater environment. The attendees will understand the complexities of a deepwater drilling operation and will gain an understanding of issues that must be addressed when drilling deepwater wells. The attendees will also develop an understanding of the challenges, choices, and compromises that are necessary to drill deepwater wells.

**COURSE CONTENT**
- Introduction to project management
- Project setup
- Team responsibilities and decisions
- What is risk?
- Risk management
- Project plan
- Tracking progress
- Risk management in action
- Applying risk management tools
- Human factors in deepwater well projects

**AUDIENCE**
Drilling managers, operations superintendents, senior well engineers, well engineers, and wellsite leaders/supervisors involved in deepwater well projects.

**PREREQUISITE**
Foundation Drilling Engineering and Offshore Drilling Operations courses, and basic experience in well projects.

## Deepwater Petroleum Systems: Fundamentals and Applications

**Skill - 5 Days**

This course covers the fundamentals of PSA with an emphasis on deepwater applications. PSA, a relatively new specialization in the field of petroleum geology, is an investigation in the generation of hydrocarbons in the subsurface and constructing the filling history of existing oil and gas accumulations, aiming to quantify the charge risk of undrilled prospects.

Deepwater environments present the petroleum system analyst with a number of specific challenges because source rocks are typically beyond the reach of the drill bit and oil-to-source rock correlations are complicated by oil transformation processes such as remigration and biodegradation.

Following a 3-day introduction to the PSA fundamentals, case histories from the Gulf of Mexico, offshore West Africa, and the Mediterranean are presented. Special attention is given to geochemical well evaluations, which form an essential part of PSA, not only in deepwater environments but also for the evaluation of unconventional hydrocarbons such as shale gas and basin center gas.

**COURSE CONTENT**
- Source rocks
- Burial, temperature, maturity
- Petroleum geochemistry
- Deepwater well evaluations
- Applications

**AUDIENCE**
Geoscientists working in (deepwater) exploration and their direct supervisors in addition to reservoir engineers, petrophysicists, and prospect portfolio analysts.

**PREREQUISITE**
Basic geology and chemistry understanding, but not essential.

## Deepwater Sedimentary Systems: Exploration and Production

**Skill - 3 Days**

Addressing the complexities of deep marine systems, this course teaches attendees how these facies evolved on the slope and in the open ocean, how they build into distinctive architectural elements, and how to recognize them. The course covers how to analyze and interpret seismic records, seafloor images, well logs (including borehole image logs), core materials, and outcrop characteristics of deepwater reservoir components with an emphasis on internal architecture as related to reservoir performance. Attendees will perform hands-on case studies of deepwater plays from around the world, illustrating characteristics unique to their exploration, appraisal, development, and reservoir management.

**COURSE CONTENT**
- Deepwater overview and building blocks
- Downslope, along-slope, and open-ocean systems
- Archetypal elements: Nature and recognition
- Channel style and geometry
- Lobes, mounds, and sheets
- Deepwater massive sands
- Thin-bedded turbidites
- Deepwater drilling, seismic sequence stratigraphy, and deepwater plays review
- Subsurface models

**AUDIENCE**
Geologists, geophysicists, and petroleum engineers involved in exploration and development of deepwater plays and project managers of deepwater plays and reservoir production.

**PREREQUISITE**
Basic petroleum geology, basic stratigraphy, and basic sedimentology.

## Deepwater Seismic Interpretation

**Skill - 5 Days**

This course focuses on the interpretation of seismic data and the delicate construction of seismic maps in the deepwater realm, with emphasis on proximal, intermediate, and distal marine reservoirs. The attendees will learn how acquisition and processing of 2D and 3D data relate to the practical use of the extensive and growing deepwater databases in addition to studying seismic velocities, depth conversion, comparisons of 2D and 3D data, and the principles of 4D and 4C seismology. This knowledge will improve their understanding of how 3D dataset time slices and amplitude and phase attributes can be applied for better reservoir characterizations. Complete hands-on mapping problems and exercises are included that explore geophysical exploration and development mapping in deepwater areas.

**COURSE CONTENT**
- Seismic interpretation concepts, acquisition, and processing workflows
- Deepwater petroleum geology provinces and world distribution of deepwater basins
- Exploration and production in deepwater
- Seismic stratigraphic mapping in deepwater and ultra-deepwater
- Deepwater reservoir stratigraphy, turbidities and mapping techniques
- Time and depth map contouring in deepwater
- Seismic velocities: Average, interval, NMO, rms, and Dix equation
- Depth conversion techniques and precision: PSTM and PSDM
- Deepwater reservoir interpretation techniques
- Comparative interpretation of poststack and prestack time migration and interpretation
- Deepwater prospects risks and project economics

**AUDIENCE**
Geologists, geophysicists, and engineers wanting a better understanding seismic interpretation in deepwater environments.

**PREREQUISITE**
Intermediate understanding and experience of seismic interpretation techniques.
Field Trip: Delta-Slope-Turbidite Deposition and Synsedimentary Deformation: County Clare, Ireland

Skill - 6 days

Using seismic scale cliff exposures of Namurian strata, this course will focus on depositional complexities and syndepositional deformation structures that characterize delta-slope-turbidite successions. Structures include 200-m high cliffs of the carboniferous strata of Clare currently undergoing intensive research and recently highlighted in a journal article. The strata comprise some of the most spectacular sedimentary geology in western Europe, displaying a wide range of delta, slope, and turbidite facies and sequences, enabling reconstruction of the infilling of a major northern Europe basin. Cyclicity of the deltaic succession is thought to have driven eustatic sea-level changes, resulting in extensive flooding surfaces overlain by fossiliferous marine bands and in major palaeovalley fill sandbodies. The deltaic intervals show abundant soft-sediment deformation, e.g. growth faults, mud diapirs, and sand volcanoes. The course will include at least one boat trip to view key cliff exposures. The course base is Kilkee, County Clare.

COURSE CONTENT

- Introduce the local stratigraphy and setting
- Mouth bar sands
- Penetrative mud diapir, flooding surfaces, and marine bands
- General basin content, and Ross formation turbidites
- Turbidite facies, including channels and megafaults
- Bridges, major slump sheets, turbidite channels, and sand volcanoes
- Boat trip to view Ross formation in sea cliffs between Carrigaholt and Loop Head and possible boat trip to view basal Clare shales and Ross formation base

Field Trip: Depositional Environments from Slope Aprons to Tropical Reefs - Tabernas and Sorbas Basins, Spain

Skill - 5 Days

This 5-day field course offers attendees an extensive series of outcrop examinations, field-based correlations, reservoir descriptions, instructions, and exercises. The course aims to familiarize the attendees with the stratigraphy, shape, and scale of depositional bodies in small active Neogene basins. The value of sequence stratigraphic approaches, palaeobathymetric analyses, and structural setting of the basin on predicting the large-scale character of the late Miocene deposits will be addressed in an appraisal and development context. Outcrop studies will illustrate the types of geological heterogeneity that occur in such sequences and show the geological processes responsible for these different hierarchical scales of variability. Relaxed team exercises at the outcrops will enhance knowledge transfer.

COURSE CONTENT

- Introduction to the Paleocene to Pleistocene infill of the Tabernas basin
- Assessing mass flow processes and deposits in the basal succession

AUDIENCE

Petroleum geologists, general geologists, sedimentologists, reservoir modellers, and reservoir engineers.

PREREQUISITE

None

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<th>Field Trip: Depositional Environments from Slope Aprons to Tropical Reefs - Tabernas and Sorbas Basins, Spain</th>
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## Economics of Deepwater Projects

**Skill – 3 Days**

This 3-day course is for attendees who already have some experience running project economics in the oil and gas industry but would like to learn how to model and evaluate the economics of deepwater development projects. An overview of the exploration, development, and production processes involved in deepwater projects will be presented. An evaluation model and method for evaluating deepwater projects will then be presented and discussed using supporting case studies. Attendees will learn how to incorporate common technical and nontechnical risks and uncertainties to arrive at a complete evaluation of the economics of deepwater projects.

**COURSE CONTENT**
- Framework for deepwater economic evaluations
- Decision framework of deepwater projects
- Development schedule and cash flow
- Deepwater decision analysis
- Decision analysis structure
- Risk identification and incorporation
- Decision trees

**AUDIENCE**
Engineers, economists, managers, or other technical staff with experience in project economics who want to learn how to model and evaluate the economics of deepwater projects.

**PREREQUISITE**
Experience with petroleum economics or equivalent.

## Field Trip: Permian Basin Floor Fan Systems of Karoo, South Africa

**Skill – 6 Days**

**COURSE CONTENT**
- Ordovician to Devonian succession
- Overview of Western basin margin and its development
- Channel geometries, levees, collapse structures, paleoflow relationships, and thin-bedded overbank deposits
- Study internal architecture, sedimentary structures, and Fan 3 sheet sands
- Lobe architecture, bed-elements-lobe associations, local channelization, and linked debrites
- Inverdoorn core workshop, logs and borehole images, and comparison with outcrops
- Using well data and outcrop analogues for reservoir modeling
- New information from cores/logs not observed in outcrops
- Hike entire sedimentary succession from basin floor fans to slope deposits, shelf edge, transition, and prodelta deposits

**AUDIENCE**
Petroleum geologists, general geologists, sedimentologists, reservoir modelers, reservoir engineers, and seismic interpreters.

**PREREQUISITE**
None.

## HPHT Operational Awareness and Drilling Challenges

**Skill – 5 Days**

This course covers the major aspects of HPHT well projects. The topics include theories, technicalities, and practicalities of HPHT wells, with complete with impending risks and plausible challenges. This course is also includes case studies on both successful HPHT well projects and the errors committed in past projects with special emphasis on geopressure detection analysis that will benefit attendees. Practical exercises and assessments are included throughout this course with interactive discussion to meet the specific needs of all attendees.

**COURSE CONTENT**
- Defining and managing HPHT wells and environment
- Geophysical methods for detection and analysis of geopressure
- HPHT well logging issues
- Adoption of new technologies
- Surface facility considerations
- Downhole equipment and fluids
- Cementing challenges
- HPHT drilling procedures
- Well-control methods
- HPHT well testing

**AUDIENCE**
Geologists

**PREREQUISITE**
Reasonable knowledge of petroleum geology.

## Sedimentology and Depositional Environments of Deepwater Deposits

**Skill – 5 Days**

This 5-day course covers the theory and application of sedimentology and depositional environments of deepwater deposits. The course consists of an extensive series of topic-related modules in addition to workshops on attendee datasets.

**COURSE CONTENT**
- Lecture modules supported and complemented by a number of paper-based exercises mostly built around correlation problems
- Full set of lecture materials and exercises and the book “Petroleum Systems of Deepwater Settings” by P. Weimer and R.M. Slatt given to each attendee [subject to availability from the publishers and to timely advice by the client on the required number of copies]

**AUDIENCE**
Geologists

**PREREQUISITE**
Reasonable knowledge of petroleum geology.
## Drillbench Dynamic Well Control Modeling Software

**Foundation - 2 Days**

This 2-day course teaches the fundamentals of using the Drillbench Presmod software. The course shows the attendees how to enter the required well data and how to run the dynamic well control simulations using the software. The course contains a mix of Microsoft PowerPoint slides and individual hands-on exercises to teach the attendees how to use the software. At the end of the course, the attendees will be able to enter the required well data and run well control simulations using the software.

### COURSE CONTENT

- Well control modeling
- Data entry into the software
- Advanced software options
- Advanced software features: Managed pressure drilling and well control simulations

### AUDIENCE

Drilling engineers and drilling supervisors requiring a better and a more detailed understanding of potential well control issues.

### PREREQUISITE

Familiar with well control principles in addition to having an understanding of the basics of fluid and gas behavior and with circulating pressure losses and basic reservoir inflow.

## Drillbench Dynamic Hydraulics and Temperature Modeling Software

**Foundation - 2 Days**

This 2-day course teaches the fundamentals of using the Drillbench Presmod hydraulics software. Attendees will learn how to enter the required well data and how to run the dynamic simulations with the software. The course is a mix of Microsoft PowerPoint slides and individual hands-on exercises to familiarize the attendees in the use of the software. At the end of the course, the attendees will be able to enter the required well data and run simulations using the software.

### COURSE CONTENT

- Hydraulics and temperature modeling introduction
- Data entry into the software
- Advanced features of the software: Hole cleaning, managed pressure drilling, and dual-gradient drilling operations

### AUDIENCE

Drilling and fluid (mud) engineers dealing with drilling hydraulics calculations, drilling managers, and drilling supervisors requiring a better understanding of drilling fluid hydraulics.

### PREREQUISITE

Comprehensive understanding of well design and hydraulics in addition to an understanding of the basics of drilling fluids rheology.

## OLGA Flow Assurance

**Foundation - 3 Days**

This 3-day flow assurance with the OLGA multiphase flow simulator course is intended to turn the beginner into an OLGA simulator user, capable of running realistic flow assurance tasks. A mixture of lectures and hands-on exercises helps the attendees understand the flow assurance challenges, the fundamentals of multiphase pipeline thermo-hydraulics, and how to apply OLGA in realistic flow assurance issues. The exercises are conducted using the OLGA GUI. All major features of the GUI are covered, including model building, case runs, parametric studies, and effective postprocessing. Fluid property tables for the OLGA simulator are generated with PVtsim third-party compositional pressure-volume-temperature compositional analysis. Our experienced instructors focus on teaching attendees how to turn data into a high-quality and effective OLGA model and how to perform simulations.

### COURSE CONTENT

- Basic multiphase production hydraulics and thermal issues
- Introduction to OLGA topology and basic assumptions
- Introduction to PVtsim analysis
- Flow assurance issues for oil and gas-condensate production
- Terrain slugging mitigation, hydrodynamic slugging, and OLGA slug tracking
- Shut-in, cool-down, start-up and depressurization of a well-flowline-riser configuration
- Building a simulation model with minimum information
- Gas condensate pipeline-modeling: characteristic steady-state behavior, pigging, turndown, ramp-up, three-phase flow, separator with level control

### AUDIENCE

Beginner to intermediate OLGA simulator user, prospective OLGA simulator licensee, and the design or operations professional interested in exploring the uses and capabilities of multiphase transient simulations.

### PREREQUISITE

No previous experience with the OLGA simulator is necessary, but a general knowledge of pipe flow and thermodynamics would be advantageous.

## OLGA Well Dynamics

**Foundation - 5 Days**

This 5-day course is intended to train engineers who work with production and well performance in the use of OLGA multiphase pipeline and transient modeling to simulate the flow transients in wells and production systems. These are engineers who have a need to simulate the offshore well operation scenarios. The course has a good balance in content between the well flow dynamics and the hands-on OLGA skill learning. This course also helps those attendees who are new OLGA simulator users to quickly grasp the “dynamic” concept, gain basic skills to use the OLGA simulator independently, and lay a solid foundation for building advanced modeling capabilities.

### COURSE CONTENT

- Introduction to OLGA simulator capability for well modeling
- The OLGA simulator model and its execution
- PVT aspects in OLGA simulation and PVtsim OLGA interface
- Well model injectivity model building the OLGA simulator
- Artificial lift (ESP/gas-lift) modeling with the OLGA simulator
- Mud and well engineering fluid modeling and applications
- Well operation scenarios included in the exercises
- Simple gas-lift modeling
- Well-pipeline integrated modeling for slugging simulation
- Advanced gas-lift modeling, including unloading simulations

### AUDIENCE

Production and well performance engineers involved with offshore well operations.

### PREREQUISITE

No previous OLGA experience is necessary, but knowledge of well performance and multiphase flow modeling would be advantageous.

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
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<td><strong>Skill – 3 Days</strong></td>
<td><strong>NEW Skill – Days</strong></td>
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The INTERSECT Reservoir Simulation course introduces reservoir engineers to methods of constructing simulation models using INTERSECT next generation reservoir simulation software. The training discusses the main features of the INTERSECT simulator relative to working with input data from the Petrel platform or ECLIPSE simulator. Along the way, attendees will also be exposed to the basic features of the INTERSECT simulator. The course incorporates information about using Petrel pre- and post-processors as the primary front-end for the INTERSECT simulator.

**COURSE CONTENT**
- Overview of reservoir simulation using the INTERSECT simulator
- Data creation through the Petrel Reservoir Engineering application
- Data editing using the ECLIPSE INTERSECT Migrator
- Field management
- Improving simulator performance
- Important behavioral differences in ECLIPSE and INTERSECT software

**AUDIENCE**
Reservoir engineers working on simulation studies.

**PREREQUISITE**
Background in reservoir engineering.

This 3-day course introduces attendees to the principles and concepts related to blowout control operations and the use of the OLGA ABC software. This course provides an overview of so-called tertiary well control options and the engineering calculations required to ensure that a well kill can be achieved. This course also deals with the basics of relief well planning and dynamic well kill operations for blowout wells.

**COURSE CONTENT**
- Well design modeling
- Blowout dynamics and challenges
- Relief well planning
- Dynamic well kill operations

**AUDIENCE**
Drilling engineers, wellsite supervisors, and service providers who design, plan, and manage drilling operations.

**PREREQUISITE**
Minimum of 5 years of drilling related experience and a solid understanding of conventional well control and fluid hydraulics principles.

In this 3-day course, the attendee will learn to use the Petrel E&P software platform Petroleum Systems Quick Look and Play to Prospect Risk modules. The course attendees will undertake play evaluation exercises that integrate all the petroleum system elements into geologically based objectives and documented results that can be used to understand and rank the opportunities. How to use the software tools and develop a better understanding of the fundamentals of play and prospect evaluation are also included in the course in addition to the reasons why an integrated approach results in better evaluations and better exploration success.

**COURSE CONTENT**
- Attendance will evaluate a concession area using the Petrel workflow tools. Beginning with the initial exploration data, the attendees will learn to combine results from petroleum systems modeling with their play fairway maps and transform these into play chance maps. They will also learn to use the results from this analysis to make probabilistic volumetric and chance of success assessment of their prospects that have a clear link back to the play evaluation and petroleum system analysis. Lastly, the attendees will learn how to keep their play and prospect evaluation live and usable whenever new understanding or data becomes available.

**AUDIENCE**
Geoscientists working with prospect exploration fundamentals and workflows who need to learn how to perform them using the Petrel E&P software platform.

**PREREQUISITE**
Ideally, Petrel Fundamentals course, and should be able to work with the Petrel processes, input, and Windows tabs. Skills in Petrel seismic interpretation, property modeling, well correlation are not required.

**NEW Skill – Days**

Using the PIPESIM production system analysis software, attendees will learn to evaluate artificial lift options for the conceptual design of a deepwater field development. The attendees will also learn how to optimize gas lift allocation for a field on the basis of current operating conditions and constraints.

**COURSE CONTENT**
- Conceptual design for deepwater development
- Subsea tieback design
- Inflow performance evaluation
- Analysis of gas lift design
- ESP design
- Multiphase booster performance
- Field performance forecast
- Optimization of gas lift allocation

**AUDIENCE**
Anyone involved in evaluating artificial lift options, optimize gas lift allocation, and perform ESP design using PIPESIM simulator software.

**PREREQUISITE**
PIPESIM Fundamentals course or a working knowledge of PIPESIM simulator software.
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<th>COMPETENCY LEVEL</th>
<th>SOFTWARE</th>
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<tr>
<td>Geomechanics</td>
<td>Petrel</td>
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**ADVANCED**

- Seismic Geomechanics
- Pore Pressure Prediction Methods

**SKILL**

- Intermediate Petroleum Geomechanics
- Geomechanics Applications in Coalbed Methane
- Geomechanics Applications in Shale Gas
- Geomechanics Applications in Heavy Oil

**FOUNDATION**

- Fundamentals of Petroleum Geomechanics
Fast track your asset team development

The NExT Subsurface Integration program develops the reservoir characterization skills of an asset team. Through world-class, hands-on instruction and mentoring, teams solve complex reservoir problems using the data from their organization’s fields.

This multiweek program guides students through the evaluation workflows necessary to understand their field. Students learn how to integrate available data sources to build a static reservoir model based in petrophysics. Through learning-by-doing, students identify bypassed potential in existing fields and investment potential in new areas.

Purpose built for each team and their fields, the NExT Subsurface Integration program provides an immersive learning environment. Based on 40 years of proven experience, the program fast tracks the development of each student.

Learning objectives:

- Conduct log analysis while learning the limits of borehole acquisition methods
- Evaluate the effects of depositional environments upon reservoir geometry and quality
- Determine the porosity, permeability, saturation, and stress-dependent parameters that affect reservoir performance
- Integrate wellbore data to build a reservoir model
- Identify rock types and flow units
- Understand and apply subsurface integration practices
- Learn and use software tools for reservoir analysis and modeling – Petrel

Immersive Training Delivers

- Practical reservoir characterization skills
- Solutions to complex reservoir problems
- Enhanced asset team efficiency
<table>
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<th>Audience</th>
<th>Prerequisite</th>
<th>Course Content</th>
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<tbody>
<tr>
<td>in Coalbed Methane</td>
<td></td>
<td>fracture stimulation, reservoir drainage patterns, naturally fractured reservoirs, overpressures, and fault seal analysis.</td>
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</tbody>
</table>
## Intermediate Petroleum Geomechanics

**Skill – 5 Days**

This course opens with a brief review of the principles of elastic and isotropic behaviors of rock, fundamentals of geomechanics, earth stresses, and mechanical earth models, and then moves to more advanced topics. Attendees will learn the impact of reversible and nonreversible geomechanical behavior on drilling, stimulation, sand production, and injection operations in addition to investigating anisotropy, its nature and effect on geomechanics, and its significance and influence on wall construction and field development. The attendees will obtain a better understanding of the mechanics of salt, its short-term and long-term behavior, and the impacts on drilling subsalt and pre-salt.

**COURSE CONTENT**
- Importance of reversible and nonreversible behaviors of rocks for well construction and field development
- Significance of anisotropic behavior of rocks when considering mechanical properties and stresses
- Challenges in drilling salt and consequent field development, mitigation, and management measures

**AUDIENCE**
Geologists, geophysicists, geomechanics, drilling, production, completion, and reservoir engineers, and exploration supervisors and managers involved with geomechanics challenges of field development.

**PREREQUISITE**
Fundamentals of Petroleum Geomechanics course or a strong understanding of geomechanics fundamentals.

## Pore Pressure Prediction Methods

**Advanced – 3 Days**

A predrill estimate of formation pore pressure is a key requirement for successful exploration and drilling. This course teaches attendees the basics of formation pore pressure, including techniques for predicting formation pressure, analyzing pore pressure data, detecting and collecting pressure data, and understanding normal-, over-, and under pressured environments. Practical analysis exercises reinforce the presentations.

**COURSE CONTENT**
- Formation pore pressure fundamentals
- Pore pressure estimation techniques
- Pore pressure prediction impact on exploration and drilling success
- Pressure distribution concepts and application
- Fluid migration model background and development
- Hands-on pore pressure data analysis

**AUDIENCE**
Geoscientists and engineers wanting an understanding of the impact of pore pressure on drilling, wellbore stability, and reservoir management.

## Seismic Geomechanics

**Advanced - 1 Day**

In this advanced course, attendees are introduced to the workflows available to build and run calibrated reservoir geomechanical models that maximize use of 3D and 4D seismic data. Rock physics, relating the state of stress in the Earth with the propagation velocity of seismic waves, forms the link between seismic observations and the geomechanical model. Discussions of this link include both experimental data and the theoretical viewpoint. The attendees will learn how a combination of 3D geomechanical models, coupled with flow models calibrated with 3D and 4D seismic data, can increase their understanding of the reservoir depletion processes and the stress state in the reservoir and surrounding rocks.

**COURSE CONTENT**
- Overview of workflows available to build, run, and calibrate reservoir geomechanical models that maximize use of 3D and 4D seismic data
- Workflow applications to field development and reservoir management
- Workflow limitations
- Advanced workflows and techniques for design of reservoir management strategies

**AUDIENCE**
Multidisciplinary asset team members, including geologists, geophysicists, asset managers, and reservoir, drilling, production, and completion engineers.

**PREREQUISITE**
Bachelor’s degree in engineering or geosciences.

## Petrel Reservoir Geomechanics

**Skill - 2 Days**

This course introduces reservoir engineers and consultants to some basic concepts in geomechanics and the Petrel platform product. Attendees will learn how to incorporate data about geomechanical effects into reservoir models of well production behavior. In addition to introducing geomechanics concepts, this course presents the types of data used for geomechanical modeling in the petroleum industry, and some of the geomechanical effects observed in oil and gas reservoirs and the subsurface during hydrocarbon production. The course also includes how to build reservoir models that show geomechanical effects such as pressure, stress, and strain, as well as data on reservoir flow, illustrating the effects over time, and how to build reservoir geomechanical models using the Petrel software platform.

**COURSE CONTENT**
- Fundamentals of geomechanics
- Petroleum geomechanics and reservoir geomechanics
- The use of Petrel geomechanics software

**AUDIENCE**
Reservoir engineers and geotechnical consultants.

**PREREQUISITE**
Petrel reservoir engineering software and ECLIPSE reservoir simulation software.
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<thead>
<tr>
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<th>Tight Gas</th>
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<tr>
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<td>Production Data Analysis: Shale Gas, Tight Gas and Coalbed Methane</td>
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<tr>
<td>SKILL</td>
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<td>Geomechanics Applications in Shale Gas</td>
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<td>Geomechanics Applications in Shale Gas</td>
<td>Geomechanics Applications in Heavy Oil</td>
<td>Shale Oil Fundamentals</td>
</tr>
<tr>
<td>FOUNDATION</td>
<td>Introduction to the Geology of Coalbed Methane</td>
<td>Introduction to Unconventional Reservoirs - Shale Gas and Liquids Characterization and Production</td>
<td>Heavy Oil Exploitation</td>
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## UNCONVENTIONAL RESOURCES

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<td>Petroleum Systems Modeling for Shale Plays</td>
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<td>Diagnosis and Analysis of Shale Gas Wells using OFM</td>
<td>ECLIPSE Thermal Reservoir Simulation</td>
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</table>
# UNCONVENTIONAL RESOURCES

## Heavy Oil Exploitation

**Foundation - 5 Days**

This foundation course covers the full E&P life cycle with major focus on the challenges in exploitation. The course introduces attendees to the applications of various key technologies and their interpretations, along with systematic workflows and field examples. Attendees will learn ways to reduce the lifting cost and make heavy oil more economically viable assets.

### COURSE CONTENT

- Heavy oils: Definition, geologic features, technologies and workflows for sampling and phase behavior characterization, and production challenges.
- Recovery methodologies: Nonthermal and thermal, toe-to-heel air injection with and without solid catalyst, and steam-solvent-based hybrid processes.
- Nonthermal and thermal simulation processes.
- Completions types and requirements for thermal recovery processes, sand control and management techniques.
- Production techniques and lift methods.
- Surface processing and upgrading schemes, transportation methodologies, storage practices.

### AUDIENCE

Multidisciplinary asset team members, including geologists, geophysicists, asset managers, and reservoir, drilling, production, completion, and facilities engineers.

### PREREQUISITE

Bachelor’s degree in engineering or geosciences.

## Introduction to Unconventional Reservoirs - Shale Gas and Liquids Characterization and Production

**Foundation - 5 Days**

Unconventional gas and liquids resources are evolving as a major source of energy not only in the US, but world-wide. In this course, attendees are provided with a thorough discussion of the major unconventional gas and liquids resources along with the geological and petrophysical uniqueness. Attendees will learn the methods for identifying, characterizing, developing and performing assessments on these resources.

### COURSE CONTENT

- General overview of shale reservoirs—geology, core, ingredients of productive reservoir, stress and stimulation.
- Fundamentals of shale petrophysical evaluation. Focus on creation of general, accurate ELANPlus petrophysical model.
- Essentials of far-field and near-field stress in an anisotropic formation. Demonstrate stress calculations and relevance to well optimization.
- Overview of liquid-producing shales.
- Basics of production mechanisms.
- Demonstration of calculations of producible hydrocarbon volumes and pay identification.

### AUDIENCE

Engineers, geoscientists, financial decision makers and managers who want to have a basic understanding of unconventional shale liquids and gas resources and how they are effectively exploited.

### PREREQUISITE

Knowledge of general sciences and fundamentals of geosciences and engineering.

## Economics of Unconventional Resources

**Skill - 4 Days**

This course, particularly suitable for attendees involved with shale gas and coalbed methane, presents a probabilistic approach that can be immediately implemented for economic evaluation of unconventional gas resources. Case studies highlight the technology and workflows that can help reduce the uncertainty in your evaluations. Course material includes an overview of worldwide unconventional activity, discussion of technical and development uncertainties, and the use of a decision analysis process including sensitivities, decision trees, and value of information.

### COURSE CONTENT

- Worldwide unconventional gas activity.
- Impact of unconventional gas projects on company portfolio.
- Uncertainty and risk analysis.
- Technical and development uncertainties and risks.
- Strategies and technologies to minimize uncertainty and risk.
- Value of information during pilot and appraisal phases.
- Decision analysis process.
- Building economic cases and decision models.
- Considerations and options for modeling.
- Multiple decision analyses (exercise).
- Break-even price, hurdle rate, and other metrics.
- Case studies and practice problems.

### AUDIENCE

Geoscientists, engineers, commercial team members, or managers wanting to model and analyze the business impact of unconventional resources.

### PREREQUISITE

Experience with petroleum economics theory and applied software use.
## Introduction to the Geology of Coalbed Methane (Foundation - 3 Days)

This course reviews (1) CBM origins, (2) controls on CBM occurrence and production, (3) methods of assessing CBM resources and producibility in various geologic settings, (4) controls on coalbed gas composition, (5) influences on permeability and production rates, (6) hydrologic issues and water production, and (7) methods of drilling, completing, and stimulating CBM wells. In the US, CBM accounts for approximately 10% of both natural gas production and reserves. Internationally, however, CBM plays a much less important role in meeting energy demands, even in countries where coal and CBM are abundant.

Examples from several basins will be presented to clarify controls on CBM occurrence and producibility and to demonstrate the origins of highly productive CBM fairways or sweetspots. The properties of contrasting coalbed gas systems (i.e., thermogenic vs. biogenic system and water-productive and water-free systems) will be described in terms of their origins, gas resources, and CBM play characteristics. Drilling, completion, and stimulation of CBM wells are considerations in relation to geologic controls of best engineering practices. Understanding these factors can facilitate development of CBM resources from diverse physical settings.

### Course Content
- **COURSE CONTENT**
  - Coal depositional systems
  - Resource delineation questions
  - Structural settings
  - Maceral types and reservoir fluid composition
  - Coalbed gas origins and coal thermal maturity
  - Coalbed permeability
  - Hydrologic analysis
  - Coal tonnage estimating and coalbed gas volumes
  - Coalbed gas drilling, completions, and production methods
  - Coalbed gas stimulation, and completion advisor
  - Water-lift methods for coalbed gas wells
  - Water disposal methods
  - Coalbed gas exploration models

### Audience
Reservoir and production engineers, geoscientists, and technical managers responsible for making exploration and development decisions and optimizing recovery from coalbed methane reservoirs.

### Prerequisite
Basic knowledge of petroleum geology and engineering principles.

## Geomechanics Applications in Coalbed Methane (Skill - 2 Days)

Explore the aspects of geomechanics for CBM recovery that can result in better field development and operational decisions. A unique feature of this course is the unified geomechanics approach that combines theoretical, laboratory (core testing), and field aspects for effective exploitation of these unconventional reservoirs. Course material covers the fundamentals of geomechanics as applied to coal, cleats, and natural fractures and their influence on drilling, wellbore stability, and stimulation. Attendees will learn the critical elements in designing coalbed completions and the geomechanical aspects for CBM enhanced recovery efforts and CO₂ sequestration.

### Course Content
- **COURSE CONTENT**
  - Fundamentals of geomechanics: Stress and strain, mechanical properties, in situ stresses, principle of effective stress, computation of mechanical properties and strength parameters from logs, and calibration with static properties.
  - Coal characteristics: Coal structure characterization, effect of coal cleats and natural fractures on mechanical properties, strength and stresses, and evaluation of coal mechanical properties and strength from core data.
  - Wellbore stability in coal: Borehole stresses and near-wellbore mechanics.
  - Coal stimulation: Basics of fracture gradient and hydraulic fracturing.
  - Common completion techniques.
  - Geomechanical impacts on CBM enhanced recovery projects and CO₂ sequestration.

### Audience
Engineers, geoscientists, and technologists involved in exploration, drilling, completions, and production in unconventional reservoirs; asset and technical managers.

### Prerequisite
Bachelor’s degree in engineering or geosciences.

## Geomechanics Applications in Heavy Oil (Skill - 3 Days)

Structured to help engineers and geoscientists make informed decisions on development strategies and operations in heavy oil sands, the course material presents the essential geomechanics aspects employed in thermal-based recovery operations. Attendees will learn how to build MEMs and the advantages of coupling geomechanics models with reservoir models. The attendees will also learn about the geomechanical effects that can result from SAGD projects and keep up to date with technologies and tools for monitoring the integrity of the reservoir and the caprock.

### Course Content
- **COURSE CONTENT**
  - Basic principles of rock mechanics.
  - In-depth discussion of earth stresses.
  - Types of rock failures and their causes.
  - MEMs.
  - Caprock integrity analysis to assess hydraulic and mechanical integrity.
  - Workflow for coupled reservoir-geomechanics modeling.
  - Reservoir monitoring.

### Audience
Engineers, geoscientists, and technologists involved in exploration, drilling, completion, and production in unconventional reservoirs; asset and technical managers.

### Prerequisite
Bachelor’s degree in engineering or geosciences.
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This course presents the fundamentals of geomechanics as they apply to exploitation of shale gas reservoirs. The course combines theoretical, laboratory (core testing), and field aspects, resulting in a consolidated approach to understanding the optimal methodologies and technologies for efficient recovery of these resources. Field examples from unconventional reservoirs reinforce the attendee’s understanding of these fundamentals and their applications.

**COURSE CONTENT**
- Fundamentals of geomechanics in unconventional reservoirs
- Shale heterogeneity evaluation
- Review of workflows using geomechanics principles
- Design of data-acquisition programs for effective geomechanics analyses
- Workflows for estimation of anisotropic parameters using acoustic azimuthal anisotropy
- Mechanical earth models and tight rock analyses
- Key geomechanical elements affecting hydraulic fracture stimulation design
- Completion

**AUDIENCE**
Engineers, geoscientists, and technologists involved in exploration, drilling, completions, and production in unconventional reservoirs.

**PREREQUISITE**
Bachelor’s degree in engineering or geosciences.

This introductory heavy and extra-heavy oil course focuses on storage, transport, and treatment and encompasses the technology analysis for transportation. Attendees will learn how to assess the flow of heavy oil in a gathering system and techniques for mitigating flow problems inherent to heavy oil operations in addition to using modeling software, developing gathering scenarios, and modeling transportation issues.

**COURSE CONTENT**
- Heavy oil production system, nodal analysis, flow of fluids, and surface processing
- Isothermal flow in pipeline, incompressible single-phase flow
- Temperature profiles in pipelines
- Crude oil diluents and hydraulic analysis to determine optimal volumes
- Diluent impacts on density, viscosity, pressure requirement
- Terrain topography effect on heavy oil transport, including water as conveyance medium
- Gas-liquid flow in a gathering system, correlations
- Structure of gathering network and basic equations

**AUDIENCE**
Engineers and production managers interested in heavy oil gathering and transportation.

**PREREQUISITE**
Basic knowledge of hydrocarbon properties, fluid flow, and production surface facilities design and operations.

This course is designed to cover the typical workflow performed during the exploration, development, and exploitation of a shale reservoir play.

The attendee will learn about the integration of disciplines important in studying shales. This workflow has been developed based on experience in multiple shale plays in North America and will be referred to as the “Shale Operating Cycle.” This cycle is composed of the following phases: the exploration phase, pilot project phase, appraisal phase, factory mode phase, and reassessment phase. The ultimate goal of the investigation into each shale reservoir is to develop an understanding of the geologic factors that control production from the shale reservoir and then determine the best methods for producing them.

**COURSE CONTENT**
- Unconventional reservoirs overview
- Shale basics
- Geoscience, geochemical, and geomechanical considerations
- Shale exploration projects and considerations
- Reconnaissance methods
- Screening and ranking shale plays
- Mineralogy, porosity, and permeability determination
- Reservoir evaluation tools
- Fracture characterization, prediction, and detection methods
- Hydraulic fracturing, horizontal borehole, lateral landing, completion, and environmental considerations

**AUDIENCE**
Geoscientists, engineers, and managers wishing to know about shale oil exploration and development.

**PREREQUISITE**
None

Applications-oriented, this course presents interpretation guidelines to evaluate prospective source rocks and define petroleum systems. Attendees will learn about some of the main applications of geochemistry to reduce the risk in E&P: total organic carbon, rock-evaluation pyrolysis, vitrinite reflectance, thermal alteration index, kerogen elemental analysis, geochemical logs and maps, reconstructed generative potential calculations, and gas chromatography.

**COURSE CONTENT**
- Fundamentals of petroleum geochemistry
- Basic geochemical measurements and interpretation pitfalls
- Construction of the original petroleum generative potential of spent source rock
- Identification and quantification of elements and processes that control petroleum systems
- Collection of oil and rock samples and evaluation of data quality
- Use of biomarkers and isotopes to correlate oils and source rocks and assess thermal maturity and biodegradation

**AUDIENCE**
Exploration and development geologists, geochemical coordinators, managers, and geoscientists who require more knowledge about petroleum systems, petroleum geochemistry, and basin modeling.

**PREREQUISITE**
Knowledge of basic petroleum geology and petroleum systems.
UNCONVENTIONAL RESOURCES

Production Forecasting and Reserves Estimates in Unconventional Reservoirs with Workshop

Skill - 2 Days

This 2-day workshop will provide attendees with an overview of systematic procedures for forecasting production from individual wells in low-permeability oil and gas reservoirs, with an emphasis on shale plays. The workshop will provide background material leading to an understanding of forecasting methods, and will concentrate on traditional (Arps equation) decline models and more recent models designed to provide forecasts with improved accuracy during the long-duration transient flow periods (usually linear flow) associated with low-permeability, hydraulically fractured wells. Applications of the theory will be illustrated with in-class exercises.

COURSE CONTENT
- Production forecasting and reserves estimates in unconventional reservoirs
- Fluid flow theory
- Transient radial and linear flow
- Depth of investigation
- Decline curve analysis using Arps decline model
- Production forecasting and reserves estimates in unconventional reservoirs
- Advanced decline curve analysis
- Combination transient-BDF models
- Ideal forecasting model

AUDIENCE
Petroleum engineers, geologists, reserves analysts and anyone whose job responsibilities or professional interest include the reserves estimation.

PREREQUISITE
Basic understanding of geology and reservoir engineering.

Shale Plays Evaluation: Finding Production Sweet Spots

Advanced - 4 Days

Shale gas reservoirs have distinct characteristics that require specific evaluation techniques. In this course, attendees will learn the geologic, geophysical, and petrophysical attributes of these reservoirs, including the origin and accumulation of the natural gas. The attendees will gain exposure to the methods and workflows for identifying, characterizing, and developing shale gas reservoirs. Instruction includes field examples that deliver a foundation for understanding the exploration, appraisal, and location of production sweet spots for development. Course exercises demonstrate how to assess economic viability of assets.

COURSE CONTENT
- Unconventional versus conventional reservoirs
- Geologic, geochemical, and geomechanical considerations in exploitation
- Role of geomechanics in basin modeling, petroleum systems analysis, and risk assessment
- Development of MEEs, including thickness, depth, pressure, and gas storage capacity
- Formation evaluation methodologies: Mineralogy, porosity, permeability, free and total gas quantification, adsorbed gas
- Correlation of wireline logs, borehole images, microseismic analysis, and wireline formation tests
- In situ permeability and determination of permeability anisotropy
- Calculations of gas in place
- Key criteria governing wellbore placement, including drainage areas and borehole spacing
- Penetration of production sweet spots and their economics
- Statistical drilling and sweet spot drilling

AUDIENCE
Reservoir engineers and production engineers responsible for optimizing recovery from tight gas reservoirs.

PREREQUISITE
Understanding of petroleum engineering and a strong background in production or operations.

Analysis and Development of Tight Gas Reservoirs

Advanced - 5 Days

This overview of tight gas reservoirs covers their evaluation, completion, stimulation, and development. Material encompasses geologic characteristics, formation evaluation, estimation of reserves and well performance, hydraulic fracture treatment design and execution, and field development considerations.

COURSE CONTENT
- Introduction to tight gas reservoirs
- Formation evaluation
- Statistical correlations
- Well testing
- Estimation of reserves and prediction of performance
- Well completions and workovers
- Hydraulic fracture treatment design and execution
- Field development considerations, strategies, and economics
- Critical parameters
- Infill potential

AUDIENCE
Operating company multidisciplinary asset team members, engineers, geoscientists, financial decision-makers, and resource managers.

PREREQUISITE
Bachelor’s degree in geosciences.
UNCONVENTIONAL RESOURCES

Production Data Analysis: Shale Gas, Tight Gas, and Coalbed Methane
Advanced - 3 Days
This course is designed to implement a comprehensive learning module of production data interpretation and analysis, including the principles of production fundamentals, technologies, and workflows with applications and field examples for unconventional resources. Production analysis requires handling and conditioning large volumes of multiple source, multiple frequency data, identifying and synchronizing events, and assigning the appropriate production rate to each event. These critical steps enable production engineers to make efficient interpretation and analysis of the data and to optimize well productivity using advanced methodologies.

COURSE CONTENT
- Science: Foundational understanding of principles and governing factors of production
- Technologies: Exposure to sensor technologies and tools necessary for data conditioning
- Workflows: Skills to apply methodologies and workflows to enable data interpretation and analysis

AUDIENCE
Practicing reservoir, production, and facilities engineers and engineering and asset managers.

PREREQUISITE
4-year geoscience/engineering degree.

Shale Plays Production: Exploiting Production Sweet Spots
Advanced - 4 Days
According to some industry forecasters, the E&P gas boom is just beginning. In this course, the focus is on the engineering aspects of exploiting shale gas reservoirs. Attendees will gain an understanding of the methods and workflows for characterizing and developing these unconventional resources, including reservoir evaluation, well architecture and placement, completions, hydraulic fracture treatments, and production. The course also includes the fundamentals of the asset exploitation life cycle. Instruction includes field examples and in-class exercises on the economic viability of these assets.

COURSE CONTENT
- Unconventional versus conventional reservoirs
- In-depth discussion of shale gas and shale oil reservoirs: Evaluation methodologies and workflows; basic geologic, geophysical, petrophysical, and geomechanical considerations
- Introduction to drilling operations and to methodologies and workflows for well architecture, construction, and placement
- Best practices: Well completions, stimulation strategies, operations, and evaluations
- Production and field redevelopment strategies to maintain economic production

AUDIENCE
Operating company multidisciplinary personnel, including asset team members, engineers, geoscientists, financial decision-makers, and resource managers.

PREREQUISITE
Bachelor’s degree in engineering or geosciences.

Unconventional Gas Reservoirs: Focus on Coalbed Methane and Introductions to Shale and Tight Sand Reservoirs
Advanced - 5 Days
This course, with its emphasis on coalbed methane reservoirs and overview of shale gas and tight gas sand reservoirs, covers the critical aspects of these three unconventional resources. Attendees will learn the role that natural fractures play in fluid flow from these typically low-permeability formations in addition to learning the optimal drilling, completion, and stimulation practices for production from these reservoirs.

COURSE CONTENT
- Unconventional gas: Origins in self-sourcing reservoirs, thermal maturation, and hydrocarbon generation
- Thermogenic versus biogenic self-sourcing gas reservoirs, controls on gas occurrence and producibility
- Role of natural fractures in unconventional gas production, review of hydrology role in water production and management
- Drilling, completion, and stimulation practices with a focus on mature US basins
- Examples of mature unconventional gas plays around the world

AUDIENCE
Multidisciplinary asset team members, geologists, geophysicists, reservoir drilling, production, completion, and facilities engineers, and managers.

PREREQUISITE
Bachelor’s degree in engineering or geosciences, or experience in exploitation of unconventional gas reservoirs.

Visit NExTtraining.net/classes for the latest calendar or to register for a course.
Diagnosis and Analysis of Shale Gas Wells using OFM

Skill - 2 Days

This course provides tools and procedures for analyzing production data from shale gas wells. The attendees will learn to use diagnostic plots and special analysis techniques to forecast production. Attendees will also learn screening methods for selecting workover candidates.

COURSE CONTENT
- Flow regimes in unconventional reservoirs
- Basics of hydraulic fracturing
- Graphical analysis tools
- Beta value plot
- Rate cumulative ratio plot
- Rate inverse plot
- Rate time plot
- Production forecasting
- Estimation of recovery
- Restimulation candidate screening

AUDIENCE
Anyone who needs to analyze production data from shale gas wells.

PREREQUISITE
OFM software proficiency or OFM Fundamentals course.

Petrel Reservoir Geomechanics

Skill - 2 Days

This course introduces reservoir engineers and consultants to some basic concepts in geomechanics and the Petrel platform. Attendees will learn how to incorporate data about geomechanical effects into reservoir models of well production behavior.

In addition to introducing geomechanics concepts, this course presents the types of data used for geomechanical modeling in the petroleum industry, and some of the geomechanical effects observed in oil and gas reservoirs and the subsurface during hydrocarbon production. The course also includes how to build reservoir models that show geomechanical effects such as pressure, stress, and strain, as well as data on reservoir flow, illustrating the effects over time, and how to build reservoir geomechanical models using the Petrel software platform.

COURSE CONTENT
- Fundamentals of geomechanics
- Petroleum geomechanics and reservoir geomechanics
- The use of Petrel geomechanics software

AUDIENCE
Reservoir engineers and geotechnical consultants.

PREREQUISITE
Petrel reservoir engineering software and ECLIPSE simulator software.

PetroMod Petroleum Systems Modeling for Shale Plays

Skill - 5 Days

Shale resource exploitation is a new area of exploration for unconventional reservoirs. In contrast with conventional petroleum systems analysis, shale plays are characterized by a single enclosed system (charge, reservoir and trap in one formation).

The 3-day Petroleum Systems Modeling for Shale Plays course covers all aspects of this unconventional petroleum system. Participants will use PetroMod software to explore tools and workflows directly applicable to solving the challenges faced in shale resource exploitation.

COURSE CONTENT
- Introduction to global shale plays
- Shales - reservoir and charge - characterization, properties and challenges
- Shales - charge, trap and seal - Langmuir adsorption, principles
- Geomechanics - theoretical overview
- Shale play petroleum system assessment
- Individual basin exercises
- Shale play exploration

AUDIENCE
Unconventional exploration geologists, BPSM, geoscientists and geochemists engaged in the petroleum systems modeling of shale plays.

PREREQUISITE
Introduction to PetroMod course required (within last 2 years) or existing PetroMod software user.

ECLIPSE Thermal Reservoir Simulation

Advanced - 5 Days

Thermal recovery methods are typically used in heavy oil reservoirs where the oil viscosity is high at reservoir temperatures but reduces as the temperature increases. Attendees will learn how to use ECLIPSE Thermal E&P software platform to extend the ECLIPSE Blackoil simulator to study problems such as steam injection, hot fluid or gas injection, wellbore heaters, and simple combustion.

COURSE CONTENT
- PVT practices and phase behavior concepts of heavy oils
- Worldwide thermal recovery processes and screening criteria
- Key features of thermal reservoir simulation
- Equations in ECLIPSE Thermal simulator software
- SAGD recovery and the multilateral well model
- Simulation of foamy oil
- Structure requirements and keywords for ECLIPSE Thermal simulator software

AUDIENCE
Reservoir engineers interested in learning simulation of thermal processes using ECLIPSE Thermal simulator.

PREREQUISITE
Experience with the ECLIPSE Blackoil simulator.
NExT has access to well-equipped, global Schlumberger training centers and technical facilities, where participants gain practical, hands-on experiences.
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