

# **PetroTech Program**

## **Module Overview and Course Descriptions**

**Revised November 16, 2009**

# Module 1 - Introduction to the Oil & Gas Industry

## Topics Covered Include:

- What are crude oil and natural gas?
- Where do we find crude oil and natural gas?
- Generation, migration, and accumulation of petroleum
- Geographic Distribution (current consumption, production, and reserves)
- Geologic Time
- Rock Cycle – Rock Types
- Petroleum Reservoir Rocks
- Petroleum traps and how they are formed
- Earth's crust (Plate Tectonics)
- Geologic Structures
- Depositional Environments
- Petroleum exploration methods
- Basic types of maps used in industry
- Land Survey System
- Land and Mineral Ownership
- Engineering, Economics and Risk
- Drilling a well
- Evaluating a well
- Completing a well
- Oil & Gas Production
- Enhanced Recovery
- Unconventional Reservoirs

## Prerequisites:

NONE

## Length:

12 hours

## Description:

After taking this course students should have a good general understanding of the basic geologic and engineering concepts utilized in the exploration and production of oil and gas. They should understand the uses of crude oil and natural gas, their importance and geographic distribution. Students will have a basic understanding of exploration, drilling, completion and reserve estimation techniques and methods currently used in the oil and gas industry.

## **Module 2A - Petroleum Business Applications: EXCEL Level 1**

### **Topics Covered Include:**

- Exploring Excel
- Using Basic Workbook Skills
- Working with Ranges
- Creating Simple Formulas
- Copying and Moving Data
- Printing
- Using Page Setup
- Formatting Numbers
- Formatting Text
- Working with Columns and Rows
- Formatting Cells
- Using Other Functions
- Creating Charts
- Formatting Charts
- Using Automatic Formatting
- Using Office Assistant
- Using Online Help

### **Prerequisites:**

Microsoft Windows Knowledge

### **Length:**

15 hours

### **Description:**

Microsoft Excel 2003 is a spreadsheet program that provides you with tools to manage critical business data. This course is designed to teach students the basics of Excel 2003. Students will learn to work with worksheet data; edit, copy, move and delete data; format and print worksheets; create formulas; and use numeric formats. Where possible, examples from the Oil and Gas industry will be used to help illustrate concepts.

## **Module 2B - Petroleum Business Applications: EXCEL Level 2**

### **Topics Covered Include:**

- Using Large Worksheets
- Working with Multiple Worksheets
- Managing Worksheets
- Using Range Names
- Managing Data
- Using AutoFilter
- Managing Files
- Working with Comments
- Working with Labels in Formulas
- Working with Outlines
- Working with Databases
- Working with the Data Form
- Working with Advanced Filters
- Exporting and Importing Data
- Using Multiple Workbooks
- Using Conditional and Custom Formats
- Using Templates
- Using Paste Special
- Customizing Excel Templates
- Using Worksheet Protection
- Using HTML Files

### **Prerequisites:**

Module 2A

### **Length:**

15 hours

### **Description:**

This class will cover more features of Excel 2003. Students will learn how to work with multiple worksheets and files; use range names and comments; use other functions including financial, logical, date, lookup, and round; work with data series; outline worksheets; create and format charts; manage files; and customize Excel preferences. Where possible, examples from the Oil and Gas industry will be used to help illustrate concepts.

## **Module 2C. - Petroleum Business Applications: EXCEL Level 3**

### **Topics Covered Include:**

- Managing Data
- Using AutoFilter
- Working with Advance Filters
- Working with Databases
- Working with the Data Form
- Using Data Tables
- Using Conditional and Custom Formats
- Using Paste Special
- Consolidating Worksheets
- Creating/Revising Pivot Tables
- Using Worksheet Protection
- Using Templates
- Sharing Workbooks
- Using HTML Files
- Exporting and Importing Data
- Using Macros
- Recording Macros
- Editing Macros

### **Prerequisites:**

Modules 2A and 2B

### **Length:**

15 hours

### **Description:**

This course will cover advanced features of Excel 2003. Students will learn how to work with worksheet data as a database - including sort and filter data, use the subtotal and data table features, and database functions. Students will also create conditional and custom formats, use paste special, consolidate worksheets, create and revise pivot tables, use worksheet protection and templates, use HTML files, export and import data, and record and edit macros. Where possible, examples from the Oil and Gas industry will be used to help illustrate concepts.

## **Module 3A - Petroleum Business Applications: ACCESS Level 1**

### **Topics Covered Include:**

- Exploring Access
- Working with Office Assistant
- Creating Tables
- Working with Tables
- Editing Tables
- Finding and Filtering
- Printing Data
- Creating Relationships
- Using Simple Queries
- Modifying Query Results
- Analyzing Tables
- Creating Basic Forms
- Creating Basic Reports
- Using Editing Tools
- Using Online Help

### **Prerequisites:**

Modules 2A and 2B

### **Length:**

12 hours

### **Description:**

This course presents the learner with the fundamentals of Microsoft Access 2003. Students will learn to create, work with and edit tables; set field properties; use find and filter; print data; create relationships using simple queries; modify query results; and analyze tables. Students will also learn to create basic forms and reports. Where possible, examples from the Oil and Gas industry will be used to help illustrate concepts.

## **Module 3B - Petroleum Business Applications: ACCESS Level 2**

### **Topics Covered Include:**

- Modifying Tables
- Setting Field Properties
- Using Operators in Queries
- Designing Advanced Queries
- Creating Action Queries
- Using Advanced Query Wizards
- Using Advanced Database Features
- Manipulating Controls
- Using Design View
- Using Advanced Form Design
- Using Advance Report Design
- Using Editing Tools

### **Prerequisites:**

Modules 2A, 2B, and 3A

### **Length:**

12 hours

### **Description:**

This course is intended for users who need the intermediate skills of Microsoft Access 2003. Students will learn to modify tables, use operators in queries, design advanced queries, create action queries, use advanced query and query wizards, use database utilities, manipulate controls, and use design view and editing tools. Where possible, examples from the Oil and Gas industry will be used to help illustrate concepts.

## **Module 3C - Petroleum Business Applications: ACCESS Level 3**

### **Topics Covered Include:**

- Using Charts
- Using Subforms/Subreports
- Using Other Form Techniques
- Using ActiveX Controls
- Working with Indexes
- Replicating Databases
- Using Access and the Internet
- Using Access Database Security
- Creating Macros
- Using Macros
- Using Switchboards
- Creating Custom Toolbars
- Exporting Data to Excel and Word

### **Prerequisites:**

Modules 2A, 2B, 2C, 3A, and 3B

### **Length:**

12 hours

### **Description:**

This course teaches the more complex aspects of data handling using Microsoft Access 2003. Students will learn to use charts and subforms, work with indexes, replicate databases, create and use basic macros, use switchboards, and create custom toolbars. Where possible, examples from the Oil and Gas industry will be used to help illustrate concepts.

## **Module 4. Well & Production Data Management**

### **Topics Covered Include:**

- Common Oil Field terminology and abbreviations.
  - A Dictionary for the Petroleum Industry 3<sup>rd</sup> Edition
  - A Primer of Oilwell Drilling 6<sup>th</sup> Edition
  - The Production Story
- Drilling Reports
- Completion Reports
- Wellbore Schematics
- Overview of common datasets generally utilized in the oil and gas business.
- General uses and applications for each.
- Basic queries, reports and digital exports.
- Specific Datasets and applications reviewed
  - IHS Well Data
  - IHS Production Data
  - DrillingInfo
  - Pangaea
  - OCC web based data access and downloads.

### **Pre-Requisites:**

Modules 1, 2A, 2B

### **Length:**

12 hours

### **Description:**

After taking this course students should have a good general understanding of the terminology and abbreviations commonly utilized in the oil and gas industry. They will also utilize common industry databases (i.e. scout ticket, production, activity, ect.) to build and run queries, as well as generate reports, graphs and basic wellbore schematics.

## Module 5A. Mud Logging

### Topics Covered Include:

- General background and history of Mud Logging
  - Process overview
  - Equipment
  - Techniques
  - Utilization
  
  - Data Collection
    - Samples
      - Description
        - Lithology
        - Hydrocarbon Shows
        - Porosity
        - Etc.
      - Total Gas (“Hot Wire”)
      - Gas Chromatograph
      - Pore Pressure
      - Directional Data
    - Uses of Mud Logs
      - ID of potential “Pay” zones
      - Correlation
        - Tops & Markers
          - Structural
          - Stratigraphic
      - Over Pressure/Under Pressure indicators/measurments
      -
    - Common Digital output formats
    - Common Raster output formats
    - Functionality of commonly utilized software utilities.
      - Wellsite Systems, Etc.

### Pre-Requisites:

Modules 1 & 4

### Length:

3 hours

### Description:

After taking this course students will have a good general understanding of the history and current utilization of mud logs. The course will provide an overview of the drilling operation and more specifically the drilling mud system. Students will be introduced to the various methods and techniques by which mud logging data are collected, interpreted and incorporated into the final mud log. In addition they will be introduced to the most common software programs and data output formats utilized in the industry.

## Module 5B. Electric Logging

### Topics Covered Include:

- General background and history of Mud Logging
  - Process overview
  - Equipment
  - Techniques
  - Utilization
  - Common digital output formats
    - Overview of several commonly utilized software utilities.
  
- General background and history of Electric Logging
  - Process overview
  - Log Types
    - Caliper
    - Spontaneous Potential
    - Gamma Ray
    - Neutron
    - Formation Density
    - Compensated Neutron-Density
    - Sonic
    - Induction Electric
    - Electric
    - Dipmeter
    - Image Logs
    - Specialty Logs
  - Common Log Names and Abbreviations by Service Company
  - How They Work
    - Electrical
    - Radioactive
    - Acoustic
    - Etc.
  - How they are used
    - Correlation
      - Tops & Markers
        - Structural
        - Stratigraphic
    - Porosity
    - Water Saturation
    - Permeability
  - Common Digital output formats
    - LAS
    - LIS
    - Etc.
  - Common Raster output formats
    - TIFF
    - CGM
    - Etc
  - Functionality of commonly utilized software utilities.
    - Blue View, PDS View, Reeves Data View, Halliburton Log Viewer, Baker Atlas MetaWin, Etc.

**Pre-Requisites:**

Modules 1 & 4

**Length:**

9 hours

**Description:**

After taking this course students will have a good general understanding of the history and current utilization of open hole logs. The course will provide a broad overview of the various log types, how they work and how the data from each is utilized in the oil and gas industry. Additionally, students will utilize specific software utilities to generate common displays for use by oil and gas professionals.

## **Module 6. Introduction to Oil & Gas Economics**

### **Topics Covered Include:**

- Provide the student an overview of economic practices use in the Oil & Gas Industry.
- Uses for Economic Analysis
- Information Provided by Economic Analysis
- Data Needed to Conduct an Economic Evaluation
- Forecast Work Needed to Complete an Economic Analysis from Production Plots
- Output Contained in an Economic Reports & Types of Reports
- Reserve Reporting
- Prepare students for classes related to the use of economic software.
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### **Pre-Requisites:**

Module 1

### **Length:**

3 hours

### **Description:**

After taking this course, students should have a general understanding of basic engineering And economic concepts utilized in the exploration and production of oil and gas. Students should understand the uses of economics to value oil and gas assets, the importance of economic estimates in the exploration, drilling, and re-completion of wells as well as reserve reporting practices currently used in the oil and gas industry.

## Module 6A. Oil & Gas Economics - PHDWin

### Topics Covered Include:

- Creating an Economic Project
  - Overview of Data Input Tabs in Program
    - IHS data Input
    - Other Data Input Methods
    - Data Editors
    - Importing Data
  - Production Analysis Using Decline Curves
    - Decline Curve Analysis
    - Pressure/Time Analysis
    - Batch Print of Graphs
    - Summary Graphs
    - Normalized Production Graphs
  - Economic Parameters
    - Operating Costs and Economic Limit
    - Ownership, Payouts, Reversions
    - Price Decks, Models, and Differentials
    - Investments
    - Escalation of Prices, Costs, and Investments
    - Taxes – State Severance, Local & County, Federal
  - Running Economics
    - How to Run Economics
    - Basic Reports
    - Output Options such as pdf's, Excel, Word, & Access
  - Other Data Management
    - Global Edits
    - Edit in Excel
    - Exporting Files/Merging Files
    - Exports to Access

### Pre-Requisites:

Modules 1, 2A, 2B, 4 and 6

### Length:

9 hours

### Description:

Students will learn the basics of oil and gas economics and reserves estimation. Specifically they will utilize OGRE\ARIES tools to integrate production decline curve, pressure, and volumetric data to generate reserves and economic reports. Additionally they will learn to generate data for maps in Petra or Geographix.

## **Module 6B. Oil & Gas Economics – PowerTools**

### **Topics Covered Include:**

- General overview of Oil & Gas economics
  - Process Overview
  - Data required
  - Basic economic parameters, yardsticks and their utilization.
    - PV
    - ROI
    - IRR
    - Etc.
- Software Overview
  - Project Creation
    - Structural Overview
    - Cases\Scenarios
    - Input Parameters
    - Decline Curve Analysis
    - Economics Calculations and Economic Life of a Lease
    - Reversions and Escalations
    - Pressure Analysis
    - Volumetric Analysis
    - Pressure/Time Analysis
    - Custom Graphs
    - Map
    - Etc.

### **Pre-Requisites:**

Modules 1, 2A, 2B, 4 and 6

### **Length:**

15 hours

### **Description:**

Students will learn the basics of oil and gas economics and reserves estimation. Specifically they will utilize PowerTools to integrate production decline curve, pressure, and volumetric data to generate reserves and economic reports. Additionally they will learn to generate maps incorporating labels, bubbles, contours, and time bubbles to illustrate the information collected and created.

## Module 6C. Oil & Gas Economics - OGRE\ARIES

### Topics Covered Include:

- General overview of Oil & Gas economics
  - Process Overview
  - Data required
  - Basic economic parameters, yardsticks and their utilization.
  - Uses for economics
    - SEC Reserves – Corporate Asset Value
    - Acquisitions & Divestitures
    - Project Evaluation & Comparison
    - Budgeting & Revenue Forecasting
- Software Overview
  - Project Creation
    - Structural Overview
    - Dwight's Data Input
    - Other Input Methods
    - Data and Property Tables
    - Data Editors
    - Cases\Scenarios\Pick Lists\Study Files
  - Production Analysis
    - Decline Curve Analysis
    - Pressure/Time Analysis
    - Batch Print of Graphs
    - Summary Graphs
    - Custom Graphs
  - Economic Parameters
    - Operating Costs and Economic Life of a Lease
    - Ownership, Payouts, Reversions
    - Price Decks
    - Escalation of Prices and Costs
    - Taxes – State Severance, Local and County Taxes, Federal
  - Running the Economics
    - How to Run the Economics
    - Basic Reports
    - Report Generation With MS Access, Excel and Word
  - Other Data Management and Economics Cases
    - Import/Export of Cases
    - Global Edits (or cover in Project Creation section?)
    - Update Queries with MS Access
    - Exports To and Inputs From Mapping Software
    - Other Non-Producing Reserves Cases
    - Net Plots

### Pre-Requisites:

Modules 1, 2A, 2B, 4 and 6

### Length:

15 hours

### Description:

Students will learn the basics of oil and gas economics and reserves estimation. Specifically they will utilize OGRE\ARIES tools to integrate production decline curve, pressure, and volumetric data to generate reserves and economic reports. Additionally they will learn to generate data for maps in Petra or Geographix.

## Module 7. Land and Lease Records

### Topics Covered Include:

- Land Title issues
  - How title to lands are determined
  - Surface owner rights vs. Mineral Owner rights
  - Land conveyance documents (Warranty Deeds, Quitclaim Deeds, Mortgages, Oil & Gas Leases, Assignments, Affidavits)
  - Checking County Records for land title.
  - Checking spacing to begin lease acquisition
- Lease Acquisition process
- Where to buy leases and on what terms
- The lease form language
  - Term
  - Royalty
  - Shut-in royalty payment
  - Free gas language
  - Depth clauses
  - Land description
  - Net acres vs gross acres
- Review of Drilling Title Opinion
  - Necessity of opinion
  - What opinion covers
  - What it does not cover
  - How to understand the opinion
  - Title requirements
- Acreage Acquisition via Third Party Agreements
  - Farmout Agreements and their terms
  - Acreage contribution Agreements
  - Dryhole contribution agreements
- Sale of Prospect to Partners
- Necessity for sales agreement
- Terms of sales agreements
  - Well costs
  - Acreage purchased
  - Purchase price
  - Promotion on well costs
  - Retained ORRIs
  - Area of Mutual interest
  - Subsequent Operations
- Proposing the well
- Determining well location from geological and land perspective
- Staking well location
- Determining if a location exception will be needed
- Determining if an Increased Density exception is needed
- Who to propose a well to
- What items to put into a well proposal
- Alternatives to well participation

- Force Pooling under Oklahoma Statutes
- Who is to be pooled
- Notice and timing of pooling
- Hearing on pooling
- Testimony at pooling hearing
  - Fair market value
  - Commencement date of well
  - Requirements to participate
  - AFE
  - Alternatives to participating
  - Subsequent well testimony
- What happens if you are protested
  - Timing on Protested hearings
  - Signing side letter agreements
- Other Oklahoma Corporation Commission Issues
  - Spacing applications
  - Location Exception applications
  - Increased Density applications
  - Separate allowable applications
- Well participation agreements
- Side letters with pooled participating parties
- Joint Operating Agreement terms
  - Commencement
  - Location
  - Casingpoint election
  - Payment obligations
- Surface Agreements
  - Surface Damage Agreement
  - Water Use Agreement
  - What happens if can't agree on surface damages
  - Timing and requirements under surface damage act
- Pipeline Right of Way Issues
  - When are you required to settle pipeline right of way damages
  - When do you need a pipeline easement
  - How are damages calculated
  - Rights to condemn land for right of way
- Division Order Title Opinions
  - Preparing a Division Order Title Opinion
  - Why an opinion must be prepared
  - Verifying interests under Division Order Title Opinion
  - Verifying ownership under the Division order Title Opinion
  - Curing title requirements
- Division orders and revenue disbursement
  - What is a Division order
  - Legal rights under a Division order
  - When must revenue be disbursed
  - Who must disburse revenues on oil and gas
  - Who must receive revenues

**Pre-Requisites:**

Module 1

**Length:**

15 hours

**Description:**

After taking this course students should have a general understanding of the landman's role in the oil and gas industry, beginning with the acquisition of an oil and gas lease and continuing through to the disbursement of well revenues resulting from the drilling of the well on the oil and gas lease.

## Module 8A - Geological Mapping – Geographix

### Topics Covered Include:

- Process Overview
- Application Overview
  - Module Description and Utilization
    - Project Explorer
    - Wellbase
    - Landnet
    - GeoAtlas
    - Zone Manager
    - Cross Section
- Build a Project
  - Import Data
    - Grid
    - Wells
    - Culture
    - Production
    - Tops
    - Logs
      - Raster
      - LAS
  - Build
    - Base Map
    - Structure Map
      - Manual
        - Mouse Input
        - Digitize Hard Copy
      - Computer generated
    - Isopach Map
      - Manual
        - Mouse Input
        - Digitize Hard Copy
      - Computer generated
    - Cross Section
      - Raster
      - LAS
    - Production Map

### Pre-Requisites:

Modules 1, 2A, 2B, 2C, 3A, 3B, 3C, 4, and 7

### Length:

18 hours

### Description:

After completion of the course students will be able to create a project, import grid, culture, well and production data as well as raster and digital log data. They will be familiar with the creation of basemaps, structure maps, isopach maps, production maps and geologic cross-sections.

## Module 8B - Geological Mapping – PETRA

### Topics Covered Include:

- Process Overview
- Application Overview
  - Module Description and Utilization
- Build a Project
  - Import Data
    - Grid
    - Wells
    - Culture
    - Production
    - Tops
    - Logs
      - Raster
        - Digitize Raster Logs
      - LAS
  - Build
    - Base Map
    - Structure Map
      - Manual
        - Mouse Input
        - Digitize Hard Copy
      - Computer generated
    - Isopach Map
      - Manual
        - Mouse Input
        - Digitize Hard Copy
      - Computer generated
    - Cross Section
      - Raster
      - LAS
    - Production Map

### Pre-Requisites:

Modules 1, 2A, 2B, 2C, 3A, 3B, 3C, 4, and 7

### Length:

18 hours

### Description:

After completion of the course students will be able to create a project, import grid, culture, well and production data as well as raster and digital log data. They will be familiar with the creation of basemaps, structure maps, isopach maps, production maps and geologic cross-sections.

## Module 8C - Geological Mapping – ArcView

### Topics Covered Include:

- Process Overview
- Application Overview
  - Module Description and Utilization
- Build a Project
  - Import Data
    - Grid
    - Wells
    - Culture
    - Production
    - Tops
    - Logs
      - Raster
        - Digitize Raster Logs
      - LAS
  - Build
    - Base Map
    - Structure Map
      - Manual
        - Mouse Input
        - Digitize Hard Copy
      - Computer generated
    - Isopach Map
      - Manual
        - Mouse Input
        - Digitize Hard Copy
      - Computer generated
    - Cross Section
      - Raster
      - LAS
    - Production Map

### Pre-Requisites:

Modules 1, 2A, 2B, 2C, 3A, 3B, 3C, 4, and 7

### Length:

21 hours

### Description:

After completion of the course students will be able to create a project, import grid, culture, well and production data as well as raster and digital log data. They will be familiar with the creation of basemaps, structure maps, isopach maps, production maps and geologic cross-sections.

## **Module 9 – Resume/Interviewing**

### **Topics Covered Include:**

- Resume preparation.
- Cover Letter preparation.
- Interviewing tips/suggestions.

### **Pre-Requisites:**

Satisfactory completion of 100 or more hours of OERB PetroTech courses.

### **Length:**

6 Hours

### **Description:**

This course offers students real-world preparation for finding a job in the oil and gas industry. Students will bring electronic copies of their resumes to the first class session and revise them in class. Further work on resumes is assigned by the instructor in the first class session. The second class session focuses on final editing of resumes and interviewing. Interview attire is required for the second session. Students will be expected to complete work on resumes outside of class time.