



OFFICE OF CONSULTATION & TRAINING  
College of Engineering and Petroleum





# Kuwait University- College of Engineering & Petroleum - Petrol Engineering – OCT

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## PE001- Oral Communication and Presentation Skills



### Contact

-  98765392
-  24983523
-  24983474
-  [tpd.occd@eng.ku.edu.kw](mailto:tpd.occd@eng.ku.edu.kw)

### Training course duration:

**Three Days**

### Timing:

**8 a.m. - 2 p.m. Daily**

### Fees:

**250 KD**

### Course objectives:

- Trainee will learn the skills of presentation, guideline to prepare impressive presentation, and how to ensure the engagements of the audience.

### Course outline:

#### Day one topics:

- Introduction and preparation

#### Day two topics:

- Heat Exchanger Design (Evaporators and Condensers)

#### Day three topics:

- Evaluation

### Instructor:

Dr. Salah AL-Mudhhi  
Petroleum Engineering  
College of Engineering & petroleum  
Kuwait University



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## PE002- Enhanced oil Recovery



### Contact

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**Training course  
duration:**

**Five Days**

**Timing:**

**8 a.m. - 2 p.m. Daily**

### Course objectives:

- Basics of EOR, Design, Implementations, and Case histories

### Course outline:

#### Day one topics:

- Oil Recovery Methods  
Primary, Secondary and Improved Recovery Methods

#### Day two topics:

- Polymer Flooding  
Principle and Method Description & Polymer Types  
Guidelines for Polymer Applications & Design  
consideration

#### Day three topics:

- Surfactant/Alkaline Flooding  
Displacement Mechanisms and Method Description  
Screening Criteria & Design Description

#### Day Four topics:

- Miscible Fluid Displacement  
. Phase Behavior, Residual Oil Saturation and IFT  
First-contact and Multiple-contact miscible  
displacements  
Screening Criteria  
. CO<sub>2</sub> flooding, N<sub>2</sub> and flue gas flooding



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### PE002- Enhanced oil Recovery



#### **Fees:**

**250 KD**

#### **Day Five topics:**

- Thermal oil recovery  
Steam flooding  
In-situ combustion

#### **Instructor:**

Prof. Adel Elsharkawy  
Petroleum Engineering  
College of Engineering & petroleum  
Kuwait University







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# Kuwait University- College of Engineering & Petroleum - Petrol Engineering – OCT PE003- Petroleum Economics Evaluation



## Contact

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## Training course duration:

***Five Days***

## Timing:

***8 a.m. - 2 p.m. Daily***

## Course objectives:

- This course will offer the participants the opportunity to learn about the different types of energies used worldwide for electricity generation and transportation fuel needs. In addition, this course will focus on discussing the fundamentals and engineering of fossil fuels (oil, gas & coal) since they make up nearly 90% of energy usage worldwide. Reserve distribution, production and consumption of fossil fuels will be thoroughly addressed using latest data and statistics. More importantly, the participants will learn about discounted cash flow methods for evaluating petroleum projects. Furthermore, feasibility and risk analysis will be discussed to help participants make sound and educated evaluations of petroleum projects.

## Course outline:

### Day one topics:

- -Overview of the energy industry
- Energy relationship to agriculture and society
- Re-newable vs non re-newable energy sources
- Fossil fuels : coal, oil and natural gas
- Hazardous problems related to fossil fuels
- State sovereignty and the oil industry
- Ownership of oil resources
- The participant in the oil industry
- International petroleum practise
- Licensing concession system
- Exploration & production contractual system
- Awarding rights for oil exploration & production



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## PE003- Petroleum Economics Evaluation



### **Fees:**

**250 KD**

#### **Day two topics:**

- -Type of oil & gas agreements (contracts)
  - Concessions
  - Production sharing agreements (PSA)
  - Service agreements (SA)
  - Participation agreements (PA)
  - Joint operation agreements (JOA)
  - Joint study & bid agreements (JSBA)
- Upstream agreements during the contract implementation
  - Farm-out agreements (FO)
  - Unitization agreements (UA)
- Stabilization clauses
  - Recent features of stabilization clauses in oil contracts
  - Stabilization clauses and environmental standards

#### **Day three topics:**

- -Financial models & economic evaluation
  - Discounted cash flow theory (DCF)
  - Net present value (NPV)
  - Internal rate of return (IRR)
  - Growth rate of return (GROR)
  - Present value ratio (PVR)
  - Payback period

#### **Day Four topics:**

- -Treatment of inflation in financial models & economic evaluation
  - Tax allowances (book transactions)
  - Depreciation
  - Depletion
  - amortization
- Feasibility study
  - Sensitivity of discount rate choice
  - NPV profile
  - Spider diagram



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## PE003- Petroleum Economics Evaluation



### Day Five topics:

- -Risk analysis (analytical)
  - Risk adjusted discount rate method
  - Risk adjusted input parameters method
  - Risk adjusted payback period method
  - Probabilistic risk method
- Case study

### Instructor:

Dr. Talal AL-Bazali  
Petroleum Engineering  
College of Engineering & petroleum  
Kuwait University







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# Kuwait University- College of Engineering & Petroleum – Petrol Engineering – OCT PE004- Introduction to Cased Hole Logging



## Contact

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## Training course duration:

**Five Days**

## Timing:

**8 a.m. - 2 p.m. Daily**

## Course objectives:

- 1. Monitor reservoir performance by mapping fluid movement downhole using cased hole
- Logs.
- 2. Introduce the well integrity evaluation using cement bond and casing inspection logs.
- 3. Evaluate reservoir formations for the presence of hydrocarbons using cased hole logs.

## Course outline:

### Day one topics:

- 1. Role of cased hole logging & job planning
- 2. Casing collar locator & depth control
- 3. Temperature surveys

### Day two topics:

- 4. Casing inspection logs
- 5. Spinner flow meter

### Day three topics:

- 6. Noise logging
- 7. Cement bond log

### Day Four topics:

- 8. Radioactive tracer logging



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## Kuwait University- College of Engineering & Petroleum – Petrol Engineering – OCT PE004- Introduction to Cased Hole Logging



### **Fees:**

**250 KD**

### **Day Five topics:**

9. Pulsed neutron capture logs
10. Resistivity behind the casing

### **Instructor:**

Dr. Khadhr Altarabulsi  
Petroleum Engineering  
College of Engineering & petroleum  
Kuwait University





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## PE005- Gas Well Deliquification



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### Training course duration:

**Four Days**

### Timing:

**8 a.m. - 2 p.m. Daily**

### Course objectives:

- In this course engineers will learn the following
  1. How to Recognize liquid loading when it occurs.
  2. How to design your well to minimize liquid loading effects.
  3. What tools are available to help you design and analyze gas wells for liquid loading issues.
  4. The best methods of minimizing the effects of liquids in lowers velocity gas wells and the advantage and disadvantages of these methods.
  5. What should be considered when selecting a lift method for liquid removal.

### Course outline:

#### Day one topics:

- Introduction to Liquid Loading:
  1. Multiphase flow in a gas well
  2. What is liquid loading
  3. Problem cause by liquid loading
  4. Deliquefying techniques
  5. Source of liquids

#### Day two topics:

- Recognizing symptoms of Liquid Loading in gas wells  
Critical velocity concept  
System nodal analysis



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### PE005- Gas Well Deliquification



#### **Fees:**

**250 KD**

#### **Day three topics:**

- Gas well Deliquification methods:
  1. Sizing Tubing
  2. Compression
  3. plunger Lift
  4. Foam lift
  5. Hydraulic pumps

#### **Day Four topics:**

- Gas well Deliquification methods:
  6. Beam pumps
  7. Gas lift
  8. ESP
  9. Progressive cavity pump
  10. Tubing inserts

#### **Instructor:**

Dr. Maziad Alsanea  
Petroleum Engineering  
College of Engineering & petroleum  
Kuwait University



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# Kuwait University- College of Engineering & Petroleum - Petrol Engineering – OCT

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## PE006 - Directional, Horizontal, And Multi- Lateral Drilling Workshop



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-  [tpd.occd@eng.ku.edu.kw](mailto:tpd.occd@eng.ku.edu.kw)

### Training course duration:

***Five Days***

### Timing:

***8 a.m. - 2 p.m. Daily***

### Course objectives

The objective of this workshop is to familiarize the participants with the basis of directional, horizontal, and multi-lateral drilling. The following topics will be thoroughly presented and explained:

- Planning of two-dimensional and three-dimensional well trajectories for various types of directional, horizontal, and multi-lateral.
- Factors affecting the selection of the optimum well trajectories for the various types of directional, horizontal, and multi-lateral.
- Surveying tools, techniques, and different surveying calculation methods.
- Bottom hole assembly (BHA) design for deviated wells
- Deflecting “directional deviating” tools and various deflecting methods.
- Geosteering and optimal well placement for conventional and unconventional oil exploitation.
- Problems encountered while drilling directional, horizontal, and multi-lateral wells
- Torque and drag calculations.
- Drill string buckling
- Wellbore instability for horizontal and multi-lateral wells
- Well completion for horizontal and multi-lateral wells

### Course outline :

#### Day one topics:

1. Definition and benefits of Directional, Horizontal, and Multi-lateral (DHM) drilling
2. Directional drilling types and their applications
  - a. Slant (L) Type
  - b. S-Type
  - c. Double Build Type
3. Horizontal drilling types and their applications
  - a. Long radius



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## PE006 - Directional, Horizontal, And Multi- Lateral Drilling Workshop



- b. Medium radius
- c. Short radius
- d. Ultra short radius
- e. Extended reach
- 4. Multi-lateral well types and their applications
  - a. Stacked laterals
  - b. Planner laterals
  - c. Multi-branch
  - d. Other types
- 5. Two-dimensional trajectory planning for various types of (DHM) wells
  - a. Defining the main parameters required for the two-dimensional planning
  - b. Visualizing the planned path "trajectory"
    - i. Vertical section view
    - ii. Plan view

### **Day two topics:**

- c. Determination of the inclination angle for
  - i. L-Type
  - ii. S-Type
  - iii. Double build
  - iv. Horizontal
  - v. Extended reach
- d. Determination of the True vertical depth (TVD) and departure for the main points (such as end of build) for the above well types
- e. Determination of the (TVD) and departure for all the points along the trajectory
- f. Transposing true vertical depth (TVD) to measured depth (MD) and its importance
- g. Transposing measured depth (MD) to true vertical depth (TVD) and its importance
- 6. Exercises
  - a. Calculate the inclination angle for L-type and S-type using calculator
  - b. Plan a two-dimensional trajectory for the above deviated well types using an excel sheet
    - i. Perform sensitivity analyses by changing design parameters to understand the effect of each parameter on the trajectory planning



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## PE006 - Directional, Horizontal, And Multi- Lateral Drilling Workshop



- c. Transpose a given TVD to MD
- d. Transpose a given MD to TVD

### Day three topics:

- 7. Three-dimensional trajectory planning for various types of (DHM) wells
  - a. Defining the main parameters required for the three-dimensional planning
  - b. Determination of the minimum dog-leg severity (DLS) required to reach the target
  - c. Determination of the inclination and azimuth angles required to reach the target
  - d. Determine all the points along the three-dimensional path
- 8. Visualize the three-dimensional trajectory by using 3-d visualizing software
- 9. Exercises
  - a. Plan a two-dimensional trajectory for the above deviated well types using an excel sheet
    - i. Perform sensitivity analyses by changing design parameters to understand the effect of each parameter on the trajectory planning
    - b. Calculate the minimum dog-leg severity required to reach the target
    - c. Plot the three-dimensional trajectory to obtain a 3-D view of the well's trajectory
- 10. Surveying
  - a. Explaining surveying concept and its importance
  - b. Defining the main parameters of surveying
  - c. Different surveying tools
    - i. Magnetic single and multi-shots
    - ii. Measurement while drilling

### Day four topics:

- 11. Survey Calculations Methods
  - a. Tangential method
  - b. Average tangential method
  - c. Balanced tangential method
  - d. Radius of curvature method
  - e. Minimum curvature methods



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## PE006 - Directional, Horizontal, And Multi- Lateral Drilling Workshop



12. Dog-leg severity calculations
13. Extended survey calculations
14. Survey tools' errors
  - a. Ellipse of uncertainty
15. Exercises
  - a. Calculate the surveying parameters at different stations using tangential, average tangential, and radius of curvature methods
    - i. Compare the results between the three methods
    - ii. Calculate the extended survey parameters for the radius of curvature method
16. Design of the bottom hole assembly (BHA)
  - a. Rotary (BHA)
  - b. Slick (BHA)
  - c. Stabilizer (BHA)
    - i. Single, two, multi-stabilizers
  - d. (BHA) design for building the inclination angle
  - e. (BHA) design for maintaining the inclination angle
  - f. (BHA) design for dropping the inclination angle
  - g. Jetting (BHA) design

### Day five topics:

17. Deflection Methods
  - a. Whipstocks
  - b. Jetting
  - c. Motors
    - i. Positive displacement motors (PDM) with bent sub
    - ii. Steerable positive displacement motors
18. Geosteering and optimal well placement
  - a. Conventional and unconventional reservoirs
19. Problems encountered during (DHM) wells
  - a. Wellbore stability
  - b. Torque and Drag
    - i. Factors affecting torque and drag
    - ii. Torque and drag calculations
      1. Maximum available weight on bit
      2. Maximum torque
  - c. Drill string Buckling
20. Well completion for horizontal and multi-lateral wells
21. Multi-lateral well configuration



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- a. TAML levels
- 22. Exercises
  - a. Determination of the drag forces along the different section of the trajectory
  - b. Determination of the maximum available weight on bit for a given horizontal well
  - c. Determination of the total torque
  - d. Determination of the Buckling load

### **Fees:**

**250 KD**

### **Instructor:**

Dr. Abdullah S. Ebrahim  
petroleum Engineering  
College of Engineering & petroleum  
Kuwait University



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## PE007 Casing Design and Cementing Workshop



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-  [tpd.occd@eng.ku.edu.kw](mailto:tpd.occd@eng.ku.edu.kw)

### Course objectives

The objective of this workshop is to familiarize the participants with the fundamentals and basis of casing design and cementing. The participant will be able to perform casing design for the entire well. Moreover, the participants will be familiar with different cementing operations and procedures, as well as calculating their design parameters

### Training course duration:

***Five Days***

### Timing:

**8 a.m. - 2 p.m. Daily**

### Course outline :

#### Day one topics:

1. Casing functions
2. Casing types
  - a. Different casing types
  - b. Liner types
    - i. Advantages of liners
3. Casing steel properties
  - a. Manufacturing process
  - b. Joint length
  - c. Grade of steel





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## PE007 Casing Design and Cementing Workshop



- d. Special casing grades for H<sub>2</sub>S
- 4. Casing strength properties
  - a. Yield strength for plain body and coupling
  - b. Collapse strength
    - i. Elastic, transition, plastic, ultimate yield
    - ii. Biaxial loading
  - c. Burst strength for plain body and coupling
- 5. Casing specification
  - a. Outside diameter, inside diameter, and wall thickness
  - b. Weight per unit length
- 6. Casing threads "connections"
  - a. Types of couplings and elements of threads
  - b. Premium threads
- 7. Exercise
  - a. Biaxial loading
    - i. Determination the effect of tensile loads on collapse resistance of a casing

### Day two topics:

- 8. Factors influencing casing design
- 9. Casing design criteria
- 10. Collapse criterion
  - a. Calculations of collapse load
  - b. Collapse resistance
- 11. Burst criterion
  - a. Calculations of burst load
  - b. Burst resistance
- 12. Graphical method for the selection of combination casing string
  - a. Casing grade selection based on collapse load
  - b. Casing grade selection based on burst load
  - c. Casing grade selection based on collapse and burst load
- 13. Tension Criteria
  - a. Boyed weight
  - b. Bending force
  - c. Shock load
  - d. Pressure testing
- 14. Exercise (Using Calculators)
  - a. Calculation of the collapse load and burst load
  - b. Calculation of the total tensile load
  - c. Calculation of the biaxial effect



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## PE007 Casing Design and Cementing Workshop

### Day three topics:

15. Service loads during drilling and production operation
  - a. Ballooning Force
  - b. Temperature Force
16. Biaxial effect
  - a. Check if the casing will collapse when subjected to the total tensile loads
17. Triaxial effect
  - a. Triaxial effect Concept
    - i. Radial stress
    - ii. Tangential stress
    - iii. Axial stress
18. Casing design project using Excel sheet

### Day four topics:

19. Cement Functions
20. Cement and cementing additives
  - a. Accelerators, retarders, etc.
21. Cementing operation procedure
22. Primary cementing
23. Cementing calculations
  - a. Lead cement volume
  - b. Tail cement volume
  - c. Hydrostatic pressure for various cement positions
  - d. Differential pressure at the end of cement displacement
  - e. Collapse pressure at the casing shoe at the end of displacement
24. Exercise
  - a. Perform the above cementing calculations for a given primary casing cementing

### Day five topics:



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## PE007 Casing Design and Cementing Workshop



- 25. Cement Plug
  - a. Balance plug technique concept and calculations
  - b. Dump bailer method and calculations
- 26. Squeeze cementing
  - a. Squeeze cementing techniques
    - i. Hesitation squeeze
    - ii. Low pressure squeeze
    - iii. High pressure squeeze
  - b. Placement Techniques
- 27. Guidelines for cementing horizontal and high angle wells
- 28. Exercise
  - a. Balance plug technique calculations
  - b. Dump bailer method calculations

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### **Fees:**

**250 KD**

### **Instructor:**

Dr. Abdullah S. Ebrahim  
petroleum Engineering  
College of Engineering & petroleum  
Kuwait University

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## PE008 Introduction to Well Logging



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### Course objectives

1. Explain the principles of basic well-logging interpretations.
2. Identify the different logging tools and their working principles.
3. Apply the principles of basic well-logging interpretations for determining hydrocarbon-bearing permeable zones and their properties.

### Training course duration:

***Five Days***

### Timing:

**8 a.m. - 2 p.m. Daily**

### Course outline :

#### Day one topics:

Electrical resistivity of rocks and fluids  
Temperature gradients  
Water salinity determination

#### Day two topics:

Caliper Log  
Resistivity logs  
Acoustic logs

#### Day three topics:

Neutron logs  
Gamma-ray logs  
Formation density logs



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## PE008 Introduction to Well Logging



### Day four topics:

Lithodensity Log  
Various cross-plotting techniques

### Day five topics:

Quick-look techniques  
Shaly sand interpretation

### Fees:

**250 KD**

### Instructor:

Dr. Khudr Altarabulsi  
petroleum Engineering  
College of Engineering & petroleum  
Kuwait University



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## PE009- Introduction to Petroleum Engineering



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### Course objectives

1. Define the origin, migration, and accumulation of petroleum fluids.
2. Describe the different types of reservoir exploration methods.
3. Recognize the properties of reservoir rocks and fluids.
4. Describe the drilling operations and production mechanisms.

### Training course duration:

***Three Days***

### Timing:

**8 a.m. - 2 p.m. Daily**

### Course outline :

#### Day one topics:

- a. Origin, migration, and accumulation of petroleum fluids
- b. Methods of explorations

#### Day two topics:

- c. Rock and fluid properties
- d. Drilling for oil and gas

#### Day three topics:

- e. Principles of formation evaluation
- f. Production mechanisms and equipment



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Kuwait University- College of Engineering  
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PE009- Introduction to Petroleum  
Engineering



**Fees:**

**250 KD**

**Instructor:**

Dr. Khudr Altarabulsi  
petroleum Engineering  
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Kuwait University