# Field Processing & Surface Production Facilities
## Effluent Treatment & Equipment Technology

<table>
<thead>
<tr>
<th>10 days</th>
<th>Overview</th>
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<tbody>
<tr>
<td><strong>LEVEL</strong></td>
<td>Foundation</td>
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<tr>
<td><strong>PURPOSE</strong></td>
<td>This course provides a comprehensive understanding of onshore and offshore Oil &amp; Gas field processing techniques, along with knowledge of technology and operating principles of surface production facilities equipment.</td>
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<td><strong>LEARNING OBJECTIVES</strong></td>
<td>Upon completion of the course, participants will be able to: grasp fundamentals of Oil &amp; Gas production techniques, explain operating principles and conditions of oil, water and gas treatment, detail the technology of main equipment and specificities of offshore production techniques, ascertain fundamentals of process control, draw a typical safety system layout, explain main metering techniques, corrosion issues, its prevention and monitoring.</td>
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<td><strong>WAYS AND MEANS</strong></td>
<td>Very interactive training by industry specialists. Numerous applications and illustrations.</td>
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<td><strong>LEARNING ASSESSMENT</strong></td>
<td>Assessment by test at the end of the course.</td>
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<td><strong>PREREQUISITES</strong></td>
<td>No prerequisites for this course.</td>
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## Agenda

### WELL EFFLUENTS BEHAVIOR
Different types of well effluent. Main characterization parameters. Liquid/vapor equilibrium of pure substances and mixtures. Effluent behavior. Constituents that pose problems for storage, transport or commercialization. Main specifications to conform with and required treatments.  

### FUNDAMENTALS OF RESERVOIR & DRIVE MECHANISM

### FUNDAMENTALS OF DRILLING, COMPLETION & WELL PERFORMANCE
**WELL EFFLUENT TRANSPORTATION, FLOW-ASSURANCE & GAS HYDRATES PREVENTION**

Gathering network design and operation: main flow assurance issues; multiphase flow, flow patterns; hydrates formation prevention strategies, hydrates inhibition.

Case studies: gas condensate field development; deep-offshore production.

**CRUDE OIL PROCESSING**


Crude sweetening (H₂S removal).

Examples of oil treatment and associated gas compression process schemes.

**PRODUCTION & INJECTION WATER TREATMENT**

Quality requirements for production water. Environment related constraints.

Main produced water treatments: API oil-water separators, plate separators, flotators, hydrocyclones…

Reasons for water injection.

Quality requirements and necessary treatments: chlorination, filtration, oxygen removal, sulfate removal.

Examples of process schemes for production and injection water treatment.

**GAS PROCESSING & CONDITIONING**

Gas dehydration: TEG units, solid desiccants (molecular sieves) units. Gas sweetening. Acid components (H₂S and CO₂) removal: amine units, molecular sieves, membranes. Natural Gas Liquids (NGL) extraction: use of cryogenic refrigeration, Joule-Thompson expansion, turbo-expander.

**LIQUEFIED NATURAL GAS**

Fundamentals of Liquefied Natural Gas (LNG) chain.

**CASE OF OFFSHORE DEVELOPMENTS**


**ROTATING MACHINERY**


**THERMAL EQUIPMENT**

Heat exchangers, air coolers, furnaces: types, operation, technology.

**FUNDAMENTALS OF CORROSION**

Different types of corrosion, prevention and monitoring.

**ELECTRICAL SYSTEMS - INSTRUMENTATION & PROCESS CONTROL - SAFETY SYSTEMS**


**METERING & ALLOCATION**