MERCURY

Chemical Production Chemistry Course

17 – 21 May 2027
Rome (Italy)



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Chemical Production Chemistry Course

Ref: 16382_1018363 **Date:** 17 – 21 May 2027 **Location:** Rome (Italy) **Fees:** 7200 Euro

Introduction:

The Chemical Production Chemistry course equips participants with a deep theoretical understanding of chemicals used in upstream oil & gas production systems. In production chemistry, proper chemical use is crucial for ensuring safe, reliable, and optimized operations. This course addresses major operational challenges—corrosion, emulsions, foaming, scale, wax, asphaltenes, hydrates, H_2S, and water treatment—and links theory to field-scale application.

Attendees will learn about selection criteria, dosages, monitoring methods, and the design of remedial strategies. The Chemical Production Chemistry program emphasizes real-world case studies, software exercises, and the application of industry standards. Upon finishing, participants will be competent in designing chemical management programs across production, transport, and injection systems.

Targeted Groups:

This Chemical Production Chemistry training targets professionals seeking specialized knowledge and skills:

- Production engineers in upstream oil & gas.
- Flow assurance and corrosion control specialists.
- Surface facilities and process engineers.
- Field chemists and chemical treatment supervisors.
- Asset integrity and maintenance engineers.

Course Objectives:

Participants will achieve the following objectives by completing the Chemical Production Chemistry course:

- Understand and classify corrosion mechanisms and predict corrosion rates under oilfield conditions.
- Evaluate and select corrosion inhibitors and design appropriate application methods.
- Diagnose emulsion and foaming issues and choose effective breakers or antifoam chemistries.
- Predict scale tendency, select scale inhibitors, and design field-scale inhibition strategies to mitigate scale formation.
- Analyze risks associated with hydrate and paraffin deposition; apply chemical and operational controls.
- Assess asphaltene behavior and propose chemical/thermal/mechanical mitigation.
- Design schemes for H_2S scavenging, water clarification, and biocide/oxygen scavenger use.
- Specify and operate chemical injection systems including pumps, controls, and associated hardware safely.
- Incorporate environmental and regulatory constraints when selecting production chemicals.

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Targeted Competencies:

Participants will gain the following competencies during the Chemical Production Chemistry program:

- Ability to interpret process and fluid data and correlate with chemical challenges.
- Capability to map operational risks corrosion, scale, hydrates, wax, asphaltenes to chemical solutions.
- Skill to design monitoring regimes corrosion coupons, inhibitors residuals, scale detection.
- Competence to select appropriate chemical formulations tailored to system conditions.
- Confidence in drafting field-scale management plans that optimize cost, performance, and safety.
- Aptitude to size, specify, and troubleshoot chemical injection hardware and procedures.
- Sensitivity to environmental impact and the ability to integrate green chemical options.
- Analytical mindset for root-cause troubleshooting of complex, coupled production chemistry issues.

Studying Scenarios:

In this Chemical Production Chemistry training, participants will develop their skills through the analysis of the following scenarios:

- High-water-cut well exhibiting accelerated corrosion and internal erosion: participants propose a corrosion inhibitor program, a monitoring plan, and a mitigation path.
- Production train experiencing persistent emulsions and foaming: learners evaluate fluid properties, select demulsifier and antifoam chemistries, and determine injection points.
- Multiphase pipeline where scale deposition and wax deposition co-occur: participants forecast scaling risk, wax onset, and propose a combined chemical treatment schedule.
- Gas export line with hydrate risk under changing pressure/temperature: participants run hydrate prediction software, design injection protocols, and plan contingency controls.
- Oilfield personnel encounter asphaltene deposition along flowlines: learners assess solvent/chemical options, thermal versus mechanical mitigation, and integrate these into an operational plan.

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Course Content:

Unit 1: Mastering Corrosion Control in Production Systems:

- Fundamentals of Corrosion:
  - Classification of corrosion types.
  - Detailed corrosion mechanisms in oil and gas environments.
  - Methods for determining and predicting corrosion rates.
- Corrosion Control Strategies:
  - Common methods for corrosion control.
  - In-depth study of corrosion inhibitors: fundamentals, guidelines, and selection criteria.
  - Application methods for corrosion inhibitors.
- Corrosion Monitoring and Testing:
  - Advanced corrosion monitoring techniques.
  - Overview of relevant corrosion tests and standards:
    - NACE TM0274: Dynamic corrosion testing of metals in high-temperature water.
    - NACE TM0169: Laboratory corrosion testing of metals for process industries.
    - ASTM G4: Method for conducting corrosion coupon tests for plant equipment.
    - ASTM G16: Guide for applying statistics to analysis of corrosion.
    - ASTM G71: Practice for conducting and evaluating galvanic corrosion tests in electrolytes.
- Case Study and Practical Application:
  - Comprehensive case study on corrosion management in a real-world scenario.

Unit 2: Managing Emulsion, Foam, and Scale Challenges:

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- Emulsion and Foam Management:
  - Understanding crude oil natural surfactants: composition and structure.
  - Emulsion Theory and Factors Affecting Emulsion Stability.
  - Effective emulsion control and destabilization techniques.
  - Chemical selection and optimal injection points for emulsion breakers.
  - Foam formation, stability, and use of foam breakers.
  - Chemical selection for foam control.
- Oilfield Scale Control:
  - Introduction to oilfield scale: types and characteristics.
  - Principles and Fundamentals of Scale Deposition Mechanisms.
  - Causes of scale formation and prediction of scaling tendency.
  - Control and remediation strategies for scale.
  - Selection of appropriate scale inhibitors.
  - Designing effective field-scale management programs.
- Case Study:
  - Practical case study on managing emulsion, foam, and scale issues.

Unit 3: Hydrate and Paraffin Management:

- Gas Hydrate Control:
  - Understanding gas hydrates and their deposition sites.
  - Impact of hydrate formation on production systems.
  - Hydrate composition and structure.
  - Conditions for hydrate formation and detection methods.
  - Control and Remediation Strategies for Gas Hydrates.
  - Detailed discussion on hydrate mechanisms.
  - Exercises using specialized software for hydrate prediction and control.
- Paraffin Wax Deposition Control:
  - Characteristics of paraffins: composition, structure, and properties.
  - Mechanisms of paraffin deposition.
  - Testing methods for paraffin content.
  - Factors affecting paraffin deposition and associated operational problems.
  - Control, remediation, and monitoring techniques for paraffin deposition.
  - Exercises using specialized software for paraffin management.
- Case Study:
  - Comprehensive case study on managing hydrate and paraffin challenges.

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Unit 4: Asphaltene Management and Water Treatment Chemicals:

- Asphaltene Control:
  - Key properties of asphaltenes.
  - Deposition mechanisms and models.
  - Effect of variables on asphaltene deposition.
  - Identification of deposition sites and their impact on operations.
  - Causes of asphaltene deposition and related operational problems.
  - Prevention and remediation strategies:
    - Mechanical methods.
    - Thermal methods.
    - Chemical treatments.
- Chemicals in Water Treatment:
  - Introduction to polyelectrolytes in water treatment.
  - Coagulants and clarifiers for water purification.
  - Antifoam agents in water systems.
  - Oxygen scavengers for corrosion prevention.
  - Biocides for microbial control.

Unit 5: Chemical Applications in Transport, Processing, and Injection Systems:

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- Chemicals in Oil Transport, Processing, and Treatment:
  - Advanced emulsion breakers.
  - Drag reducers for pipeline efficiency.
  - Viscosity reducers for heavy oil transport.
  - H_2S scavengers for gas sweetening.
- Recent Developments and Environmental Considerations:
  - Overview of recent developments in environmentally friendly chemicals.
- Chemical Injection Systems:
  - Documentation requirements for chemical injection systems.
  - Types of pumps used in chemical injection.
  - Associated hardware and components.
  - Operational procedures for chemical injection systems.
  - Criteria for selecting proper chemical injection methods.
  - Characteristics of various chemical treatments.
- Chemical Safety and Best Practices:
  - Comprehensive review of chemical safety protocols and best practices in the oil and gas industry.

Final Insights & Key Takeaways:

A proper chemical strategy underpins reliability and efficiency in upstream operations, minimizing downtime. A robust chemical program—grounded in theory, guided by field data, and constrained by environmental best practice—becomes a strategic asset.