

COURSE OVERVIEW DE0255

Production Chemistry & Chemical Treatment in the Oil and Gas

Course Title

Production Chemistry & Chemical Treatment in the Oil and Gas

Course Date/Venue

Session 1: May 19-23, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Session 2: November 09-13, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE



Course Reference

DE0255



Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

Course Description



This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.

Production chemistry issues occur as a result of chemical and physical changes to the well stream fluids, as it is transported from the reservoir through the processing system. The well stream fluids may consist of a mixture of liquid hydrocarbon (oil or condensate), gaseous hydrocarbon (raw natural gas), and associated water.



This mixture passes from the reservoir, through the tubular string and wellhead, and then along flowlines to the processing plant where the various phases are separated. As the fluids will experience a significant drop in pressure, a change in temperature, and considerable agitation, there will be predictable and sometimes unpredictable changes in state that influence the efficiency of the overall operation. In general, production chemistry problems are one of four types:-



- Problems caused by fouling. This is defined as the deposition of any unwanted matter in a system and includes scales, corrosion products, wax (paraffin), asphaltenes, biofouling, and gas hydrates.
- Problems caused by the physical properties of the fluid. Foams, emulsions, and viscous flow are examples.
- Problems that affect the structural integrity of the facilities and the safety of the workforce. These are mainly corrosion-related issues.

- Problems that are environmental or economic. Oily water discharge can damage the environment and the presence of sulfur compounds such as hydrogen sulfide (H₂S) has environmental and economic consequences.

The resolution of these problems can be made by the application of nonchemical techniques and through the use of properly selected chemical additives. A good facilities design and correct choice of materials can significantly reduce production chemistry issues later in field life. Unfortunately, crude oil production is characterized by variable production rates and unpredictable changes to the nature of the produced fluids. It is therefore essential that the production chemist can have a range of production chemical additives available that may be used to rectify issues that would not otherwise be fully resolved.

Modern production methods, the need to upgrade crude oils of variable quality, and environmental constraints demand chemical solutions. Oilfield production chemicals are therefore required to overcome or minimize the effects of the production chemistry problems.

This course is designed to cover the selection and use of chemicals in oil and gas production. Chemicals used for controlling corrosion, emulsions, foaming, mineral scales, paraffins (waxes), asphaltenes, gas hydrates, hydrogen sulfide scavengers and water clarifiers are covered. The course includes methods to determine the need for chemical treating, how to select the proper chemicals, and how to perform testing for chemical compatibility with the formation and other materials.

The course bridges the gap between process technology and production chemistry. It includes aspects common to operational issues such as organic precipitates (asphaltenes and waxes), water treatment and quality for re-injection, causes of non-effective treatment plants, interpretation of water analyses, scale formation, stimulation concepts, chemicals in gas production, occurrence of Halite scale in gas production and storage. The course focuses on practical onsite experience. Case histories and practical examples will be discussed.

Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain an in-depth knowledge on production chemistry and chemical treatment
- Recognize corrosive conditions and monitor corrosion rates
- Select and apply corrosion inhibitors
- Predict and treat emulsions
- Explain causes and control of foaming
- Predict scale forming conditions
- Select and apply scale inhibitors
- Control gas hydrate formation
- Predict and control paraffin (wax) deposition
- Evaluate methods for asphaltene control
- Scavenge low concentrations of H₂S
- Select and apply water clarifiers
- Select chemicals use in onshore and offshore fields
- Select environmentally friendly chemicals

Exclusive Smart Training Kit - H-STK®



Participants of this course will receive the exclusive “Haward Smart Training Kit” (H-STK®). The H-STK® consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.

Who Should Attend

This course provides a complete and up-to-date overview of the production chemistry and chemical treatment in the oil and gas fields. Production engineers, facility engineers and other technical staff dealing with well and near well operations, who are responsible for recognizing and treating problems which require chemicals will definitely benefit from this course.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures
- 20% Practical Workshops & Work Presentations
- 30% Hands-on Practical Exercises & Case Studies
- 20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Fee

US\$ 8,000 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.


Certificate Accreditations

Certificates are accredited by the following international accreditation organizations: -



British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

-  **The International Accreditors for Continuing Education and Training (IACET - USA)**

Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

Haward Technology’s courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units (CEUs)** in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant’s involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant’s CEU and PDH Transcript of Records upon request.



Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:



Dr. Hesham Abdou, PhD, MSc, BSc, is a **Senior Drilling & Petroleum Engineer** with over **35 years** of integrated industrial and academic experience as a **University Professor**. His specialization widely covers in the areas of **Drilling & Completion Technology, Directional Drilling, Horizontal & Sidetracking, Drilling Operation Management, Drilling & Production Equipment, ERD Drilling & Stuck Pipe Prevention, Natural & Artificial Flow Well Completion, Well Testing Procedures & Evaluation, Well Performance, Coiled Tubing Technology, Oil Recovery Methods Enhancement, Well Integrity Management, Well Casing & Cementing, Acid Gas Removal, Heavy Oil Production & Treatment Techniques, Crude Oil Testing & Water Analysis, Crude Oil & Water Sampling Procedures, Equipment Handling Procedures, Crude & Vacuum Process Technology, Gas Conditioning & Processing, Cooling Towers Operation & Troubleshooting, Sucker Rod Pumping, ESP & Gas Lift, PCP & Jet Pump, Pigging Operations, Electric Submersible Pumps (ESP), Progressive Cavity Pumps (PCP), Water Flooding, Water Lift Pumps Troubleshooting, Water System Design & Installation, Water Networks Design Procedures, Water Pumping Process, Pipelines, Pumps, Turbines, Heat Exchangers, Separators, Heaters, Compressors, Storage Tanks, Valves Selection, Compressors, Tank & Tank Farms Operations & Performance, Oil & Gas Transportation, Oil & Gas Production Strategies, Artificial Lift Methods, Piping & Pumping Operations, Oil & Water Source Wells Restoration, Pump Performance Monitoring, Rotor Bearing Modelling, Hydraulic Repairs & Cylinders, Root Cause Analysis, Vibration & Condition Monitoring, Piping Stress Analysis, Amine Gas Sweetening & Sulfur Recovery, Heat & Mass Transfer and Fluid Mechanics.**

During his career life, Dr. Hesham held significant positions and dedication as the **General Manager, Petroleum Engineering Assistant General Manager, Workover Assistant General Manager, Workover Department Manager, Artificial Section Head, Oil & Gas Production Engineer** and **Senior Instructor/Lecturer** from various companies and universities such as the Cairo University, Helwan University, British University in Egypt, Banha University and Agiba Petroleum Company.

Dr. Hesham has a **PhD** and **Master** degree in **Mechanical Power Engineering** and a **Bachelor** degree in **Petroleum Engineering**. Further, he is a **Certified Instructor/Trainer** and a **Peer Reviewer**. Dr. Hesham is a member of Egyptian Engineering Syndicate and the Society of Petroleum Engineering. Moreover, he has published technical papers and journals and has delivered numerous trainings, workshops, courses, seminars and conferences internationally.



Course Program

The following program is planned for this course. However, the course director(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0930	Production Chemistry & Environmental Issues Production Chemistry Overview • Factors that Affect the Choice of Production Chemicals • Environmental & Ecotoxicological Regulations • Designing Greener Chemicals • Mercury & Arsenic Production
0930 – 0945	Break
0945 – 1100	Water & Gas Control Introduction • Resins & Elastomers • Inorganic Gels • Cross-Linked Organic Polymer Gels for Permanent Shut-Off • Viscoelastic Surfactant Gels • Disproportionate Permeability Reducer or Relative Permeability Modifier • Water Control Using Microparticles • Gas Shut-Off
1100 – 1230	Scale Control Introduction • Types of Scale • Nonchemical Scale Control • Scale Inhibition of Group II Carbonates & Sulfates • Sulfide Scale Inhibition • Halite Scale Inhibition • Methods of Deploying Scale Inhibitors • Performance Testing of Scale Inhibitors • Chemical Scale Removal
1230 – 1245	Break
1245 – 1420	Asphaltene Control Introduction • Asphaltene Dispersants & Inhibitors • Low Molecular Weight, Nonpolymeric Asphaltene • Oligomeric (Resinous) & Polymeric AIs • Summary of ADs & AIs • Asphaltene Dissolvers
1420 - 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day One

Day 2

0730 – 0900	Acid Stimulation Introduction • Fracture Acidizing of Carbonate Formations • Matrix Acidizing • Acids Used in Acidizing • Potential Formation Damage from Acidizing
0900 – 0915	Break
0915 – 1100	Acid Stimulation (cont'd) Acidizing Additives • Axial Placement of Acid Treatments • Radial Placement of Acidizing Treatments
1100 – 1230	Sand Control Introduction • Chemical Sand Control
1230 – 1245	Break



1245 – 1420	Control of Naphthenate & Other Carboxylate Fouling Introduction • Naphthenate Deposition Control Using Acids • Low-Dosage Naphthenate Inhibitors
1420 - 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day Two

Day 3

0730 – 0900	Corrosion Control During Production Introduction • Methods of Corrosion Control
0900 – 0915	Break
0915 – 1100	Corrosion Control During Production (cont'd) Corrosion Inhibitors • Film-Forming Corrosion Inhibitors
1100 – 1230	Gas Hydrate Control Introduction • Chemical Prevention of Hydrate Plugging • Gas Hydrate Plug Removal
1230 – 1245	Break
1245 – 1420	Wax (Paraffin) Control Introduction • Wax Control Strategies • Chemical Wax Removal • Chemical Wax Prevention
1420 - 1430	Recap
1430	Lunch & End of Day Three

Day 4

0730 – 0900	Demulsifiers Introduction • Methods of Demulsifiers • Water-in-Oil Demulsifiers
0900 – 0915	Break
0915 – 1100	Foam Control Introduction • Defoamers & Antiforms
1100 – 1230	Flocullants Introduction • Theory of Floculation • Flocullants
1230 – 1245	Break
1245 – 1420	Biocides Introduction • Chemicals for Control of Bacteria • Biocides • Bioslats (Control "Biocides" or Metabolic Inhibitors) • Summary
1420 - 1430	Recap
1430	Lunch & End of Day Four

Day 5

0730 – 0930	Hydrogen Sulfide Scavengers Introduction • Nonregenerative H ₂ S Scavengers • Summary
0930 – 0945	Break
0945 – 1100	Oxygen Scavengers Introduction • Classes of Oxygen Scavengers
1100 – 1215	Drag-Reducing Agents Introduction • Drag-Reducing Agents Mechanisms
1215 – 1230	Break



1230 - 1345	Drag-Reducing Agents (cont'd) Oil-Soluble DRAs • Water- Soluble DRAs
1345 - 1400	Course Conclusion Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course
1400 - 1415	POST-TEST
1415 - 1430	Presentation of Course Certificates
1430	Lunch & End of Course

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-



Course Coordinator

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