COURSE OVERVIEW DE1045
Chemical Nature of Oilfield Chemicals

Course Title
Chemical Nature of Oilfield Chemicals

Course Date/Venue
Session 1: May 05-09, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 2: August 31-September 04, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Reference
DE1045

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Description

This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.

This course is designed to provide participants with a detailed and up-to-date overview of oilfield chemicals. It covers the production chemistry and the factors that affect the choice of production chemicals; the environmental and ecotoxicological regulations, designing greener chemicals and mercury and arsenic production; the water and gas control, polymer injection, in situ monomer polymerization and gas shut-off; the scale control; and the various types of scale.

During this interactive course, participants will learn the asphaltene control, acid stimulation, matrix acidizing, axial placement of acid treatments and radial placement of acidizing treatments; the sand control, control of naphthenate and other carboxylate fouling and corrosion control during production; the gas hydrate control, gas hydrate plug removal, wax control strategies, chemical wax removal and chemical wax prevention; the methods of demulsifiers including test methods and parameters for demulsifier selection; the foam control, flocculants, cationic polymers, biocides and biostats; and the hydrogen sulfide scavengers, oxygen scavengers and drag-reducing agents.

Course Objectives

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

- Apply and gain an in-depth knowledge on oilfield chemicals
- Discuss oilfield chemicals, production chemistry and the factors that affect the choice of production chemicals
- Explain the environmental and ecotoxicological regulations, designing greener chemicals and mercury and arsenic production
- Carryout water and gas control, covering polymer injection, in situ monomer polymerization and gas shut-off
- Apply scale control and identify the various types of scale
- Employ asphaltene control, acid stimulation, matrix acidizing, axial placement of acid treatments and radial placement of acidizing treatments
- Carryout sand control, control of naphthenate and other carboxylate fouling and corrosion control during production
- Employ gas hydrate control, gas hydrate plug removal, wax control strategies, chemical wax removal and chemical wax prevention
- Apply methods of demulsifiers including test methods and parameters for demulsifier selection
- Implement foam control and recognize flocculants, cationic polymers, biocides and biostats
- Discuss hydrogen sulfide scavengers, oxygen scavengers and drag-reducing agents

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 an overview of all significant aspects and considerations of oil field chemicals for production engineers and production, operations as well as senior technicians and field supervisors with an engineering background.

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.

Accommodation

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

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.

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.

Course Program

The following program is planned for this course. However, the course instructor(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	***Oilfield Chemicals*** *Production Chemistry Overview • Factors that Affect the Choice of Production Chemicals • Environmental & Ecotoxicological Regulations • OSPAR Environmental Regulations for Oilfield Chemicals • European REACH Regulations • U.S. Environmental Regulations • Environmental Regulations Elsewhere • Designing Greener Chemicals •Bioaccumulation • Reducing Toxicity • Increasing Biodegradability • Mercury & Arsenic Production*
0930 – 0945	*Break*
0945 – 1100	***Water & Gas Control*** *Resins & Elastomers •Inorganic Gels • Cross-Linked Organic Polymer Gels for Permanent Shut-Off • Polymer Injection • Metal Ion Cross-Linking of Carboxylate-Containing Acrylamides & Biopolymers • Gels Using Natural Polymers • Organic Cross-Linking •Polyvinyl Alcohol or Polyvinylamine Gels • Problems Associated with Polymer Gel Water Shut-Off Treatments • Other Improvements for Cross-Linked Polymer Gels • In Situ Monomer Polymerization • Viscoelastic Surfactant Gels • Disproportionate Permeability Reducer or Relative Permeability Modifier • Emulsified Gels as DPRs •Hydrophilic Polymers as RPMs • Types of Polymer RPM • Hydrophobically Modified Synthetic Polymers as RPMs • Cross-Linked Polymer RPMs • Water Control Using Microparticles • Gas Shut-Off • Gas Well Foamers for Liquid Unloading*
1100 – 1215	***Scale Control*** *Types of Scale • Calcium Carbonate Scale • Sulfate Scales • Sulfide Scales • Sodium Chloride (Halite) Scale • Mixed Scales •Nonchemical Scale Control • Scale Inhibition of Group II Carbonated & Sulfates • Polyphosphates • Phosphate Esters • Nonpolymeric Phosphonates & Aminophosphonates• Phosphino Polymers & Polyphosphinates • Polycarboxylates •Biodegradable Polycarboxylates • Polysulfonates • Sulfide Scale Inhibition*
1215 – 1230	*Break*

1230 – 1420	***Scale Control (cont'd)*** *Halite Scale Inhibition • Methods of Deploying Scale Inhibitors • Continuous Injection • Scale Inhibitor Squeeze Treatments • Scale Inhibitor Squeeze Treatments Combined with Other Well Treatments • Nonaqueous or Solid Scale Inhibitors for Squeeze Treatments • Oil-Miscible Scale Inhibitors • Totally Water-Free Scale Inhibitors in Organic Solvent Bends • Emulsified Scale Inhibitors • Solid Scale Inhibitors (for Squeezing & Otherwise) • Placement of Scale Inhibitor in a Squeeze Treatment • Performance Testing of Scale Inhibitors • Chemical Scale Removal • Sulfate Scale Removal • Carbonate Scale Removal •Sulfide Scale Removal •Lead Scale Removal*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	***Asphaltene Control*** *Asphaltene Dispersants & Inhibitors • Low Molecular Weight, Nonpolymeric Asphaltene Dispersants • Low-Polarity Nonpolymeric Aromatic Amphiphiles • Sulfonic Acid-Based Nonpolymeric Surfactant ADs • Other Nonpolymeric Surfactant ADs with Acidic Head Groups • Amide & Imide Nonpolymeric Surfactant ADs • Alkylphenols & Related ADs • Ion-Pair Surfactant ADs • Miscellaneous Nonpolymeric ADs • Oligomeric (Resinous) & Polymeric AIs • Alkyphenol-Aldehyde Resin Oligomers • Polyester & Polyamide/Amide AIs •Other Polymeric Asphaltene Inhibitors • Summary of ADs & AIs • Asphaltene Dissolvers*
0930 – 0945	*Break*
0945 – 1100	***Acid Stimulation*** *Fracture Acidizing of Carbonate Formations • Matrix Acidizing • Acids Used in Acidizing • Acids for Carbonate Formations • Acids for Sandstone Formations • Potential Formation Damage from Acidizing • Acidizing Additives • Corrosion Inhibitors for Acidizing • Nitrogen-Based Corrosion Inhibitors • Oxygen-Containing Corrosion Inhibitors Including Those with Unsaturated Linkages • Corrosion Inhibitors Containing Sulfur • Iron Control Agents • Water-Wetting Agents • Other Optional Chemicals in Acidizing Treatments*
1100 – 1215	***Acid Stimulation (cont'd)*** *Axial Placement of Acid Treatments • Solid Particles Diverters • Polymer Gel Diverters •Foam Diverters • Viscoelastic Surfactants • Radial Placement of Acidizing Treatments • Oil-Wetting Surfactants • Weak Organic Acids •Weak Sandstone-Acidizing Fluorinated Agents • Buffered Acids • Gelled or Viscous Acids • Foamed Acids • Temperature-Sensitive Acid-Generating Chemicals & Enzymes • Emulsified Acids*
1215 – 1230	*Break*
1230 – 1420	***Sand Control*** *Chemical Sand Control*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***Control of Naphthenate & Other Carboxylate Fouling*** *Naphtenate Deposition Control Using Acids • Low-Dosage Napthenate Inhibitors*
0930 – 0945	*Break*

0945 – 1100	***Corrosion Control During Production*** *Methods of Corrosion Control • Corrosion Inhibitors • Film-Forming Corrosion Inhibitors • How Film-Forming Corrosion Inhibitors Work • Testing Corrosion Inhibitors • Efforts to Develop More Environment-Friendly Film-Forming Corrosion Inhibitors • Classes of Film-Forming Corrosion Inhibitors • Phosphate Esters • Amine Salts of (Poly)Carboxylic Acids • Quaternary Ammonium & Iminium Salts & Zwitterionics • Amidoamines & Imidazolines • Amides • Polyhydroxy & Ethoxylated Amines/Amides • Other Nitrogen Heterocyclics • Sulfur Compounds • Polyaminoacids & Other Polymeric Water-Soluble Corrosion Inhibitors*
1100 – 1215	***Gas Hydrate Control*** *Chemical Prevention of Hydrate Plugging • Thermodynamic Hydrate Inhibitors • Operational Issues with THIs • Kinetic Hydrate Inhibitors • Introduction to KHIs • Vinyl Lactam KHI Polymers • Hyperbranched Polyesteramide KHIs • Compatibility of KHIs • Pyroglutamate KHI Polymers • Poly (Di)Alkyl(Meth)Acrylamide KHIs • Other Classes of KHIs • Anti-Agglomerants •Emulsion Pipeline AAs • Hydrate-Philic Pipeline AAs • Performance Testing of Pipeline AAs • Natural Surfactants & Nonplugging Oils • Gas-Well AAs • Gas Hydrate Plug Removal • Use of Thermodynamic Hydrate Inhibitors • Heat-Generating Chemicals*
1215 – 1230	*Break*
1230 – 1420	***Wax (Paraffin) Control*** *Wax Deposition • Increased Viscosity & Wax Gelling •Wax Control Strategies • Chemical Wax Removal • Hot-Oiling & Related Techniques • Wax Solvents • Thermochemical Packages • Chemical Wax Prevention •Test Methods • Wax Inhibitors & Pour-Point Depressants • Ethylene Polymers & Copolymers • Comb Polymers • (Meth)Acrylate Ester Polymers •Maleic Copolymers •Miscellaneous Polymers •Wax Dispersants •Polar Crude Fractions as Flow Improvers • Deployment Techniques for Wax Inhibitors & PPDs*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0930	***Demulsifiers*** *Methods of Demulsification • Water-in-Oil Demulsifiers • Theory & Practice • Test Methods & Parameters for Demulsifier Selection • Classes of Water-in-Oil Demulsifier • Polyalkoxylate Block Copolymers & Ester Derivatives • Alkylphenol-Aldehyde Resin Alkoxylates • Polyalkoxylates of Polyols or Glycidyl Ethers • Polyamine Polyalkoxylates & Related Cationic Polymers • Polyurethanes (Carbamates) & Polyalkoxylate Derivatives • Hyperbranched Polymers • Vinyl Polymers • Polysilicones • Demulsifiers with Improved Biodegradability • Dual-Purpose Demulsifiers*
0930 – 0945	*Break*
0945 – 1100	***Foam Control*** *Defoamers & Antifoams •Silicones & Fluorosilicones • Polyglycols*
1100 – 1215	***Flocculants*** *Theory of Flocculation • Flocculants • Performance Testing of Flocculants • Cationic Polymers • Diallydimethylammonium Chloride Polymers • Acrylamide or Acrylate-Based Cationic Polymers • Other Cationic Polymers • Environment-Friendly Cationic Polymeric Flocculants • Dithiocarbamates: Pseudocationic Polymeric Flocculants with Good Environmental Properties • Anionic Polymers*

1215 – 1230	*Break*
1230 – 1420	***Biocides*** *Chemicals for Control of Bacteria • Biocides • Oxidizing Biocides • Nonoxidizing Organic Biocides • Aldehydes • Quaternary Phosphonium Compounds • Quaternary Ammonium Compounds • Cationic Polymers • Organic Bromides • Metronidazole • Isothiazolones (or Isothiazolinones) & Thiones • Organic Thiocyanates • Phenolics • Alkylamines, Diamines, & Tramines • Dithiocarbamates •2-(Decylthio)Ethamine & Its Hydrochloride • Triazine Derivatives • Oxazolidines • Specific Surfactant Classes • Biostats (Control "Biocides" or Metabolic Inhibitors) • Anthraquinone as Control Biocide • Nitrate & Nitrite Treatment • Other Biostats*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0930	***Hydrogen Sulfide Scavengers*** *Nonregenerative H2S Scavengers • Solid Scavengers • Oxidizing Chemicals • Aldehydes • Reaction Products of Aldehydes & Amines, Especially Triazines • Metal Carboxylates & Chelates • Other Amine-Based Products*
0930 – 0945	*Break*
0945 – 1100	***Oxygen Scavengers*** *Classes of Oxygen Scavengers • Dithionite Salts • Hydrazine & Guanidine Salts • Hydroxylamines & Oximes • Activated Aldehydes & Polyhydroxyl Compounds • Catalytic Hydrogenation • Enzymes • Bisulfite, Metabisulfite & Sulfite Salts*
1100 – 1215	***Drag-Reducing Agents*** *Drag-Reducing Agent Mechanisms • Oil-Soluble DRAs • Background • Oil-Soluble Polymeric DRAs • Polyalkene (Polyolefin) DRAs • Poly(meth)Acrylate Ester DRAs • Other Oil-Soluble DRA Polymers • Overcoming Handling, Pumping & Injection Difficulties with UHMW DRA Polymers*
1215 – 1230	*Break*
1230 – 1345	***Drag-Reducing Agents*** *Oil-Soluble Polymeric DRAs in Multiphase Flow • Oil-Soluble Surfactant DRAs • Water-Soluble DRAs • Water-Soluble Polymer DRAs • Polysaccharides & Derivatives • Polyethyleneoxide Drag-Reducing Agents • Acrylamide-Based DRAs • Water-Soluble Surfactant DRAs • Drag Reduction & Corrosion Inhibition*
1345 – 1400	***Course Conclusion***
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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