COURSE OVERVIEW DE0504

Enhanced Oil Recovery (EOR) & Sustainability with Zero Emission Technology

Course Title
Enhanced Oil Recovery (EOR) & Sustainability with Zero Emission Technology

H-STK© INCLUDED

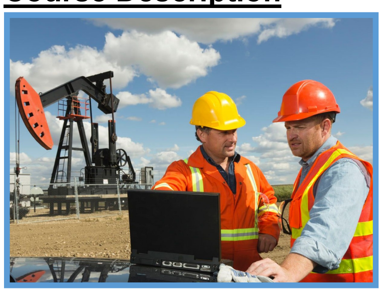
Course Date/Venue
Session 1: April 20-24, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
Session 2: September 22-26, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
DE0504

3.0 CEUs (30 PDHs) AWARD

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

Course Description



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

Crude oil development and production can include up to three distinct phases: primary, secondary, and tertiary (or enhanced) recovery. During primary recovery, the natural pressure of the reservoir or gravity drive oil into the wellbore, combined with artificial lift techniques (such as pumps) which bring the oil to the surface. But only about 10 percent of a reservoir's original oil in place is typically produced during primary recovery. Secondary recovery techniques to the field's productive life generally by injecting water or gas to displace oil and drive it to a production wellbore, resulting in the recovery of 20 to 40 percent of the original oil in place.

The Chemical Enhanced Oil Recovery (EOR) includes polymer flooding, surfactant flooding, alkaline-surfactant-polymer flooding, wettability alteration, mobility control using foam and low salinity water flooding. Major advances in chemical EOR have greatly extended the range of reservoir conditions and types, reduced the cost of recovering the oil and increased the process robustness.

This course is designed to provide an overview of oil recovery process that involve the use of polymer, surfactant, alkali, gel and a combination of them. It reviews reservoir engineering fundamentals and describes the principles for a variety of chemical enhanced oil recovery processes. Examples of laboratory and field performances are presented. Simulation exercises are used for each process.

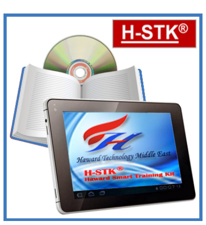
The course provides important case studies related to various chemical EOR pilot and field applications in a variety of oil fields. These case studies focus on practical problems, underlying theoretical and modelling methods, operational parameters (e.g., injected chemical concentration, slug sizes, flooding schemes and well spacing), solutions and sensitivity studies, and performance optimization strategies.

Course Objectives

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

- Apply and gain a fundamental knowledge on chemical enhanced oil recovery
- Evaluate benefits and limitations of different chemical EOR processes
- Select laboratory tests and perform scoping simulations for pilot and field designs
- Screen these techniques for particular fields
- Set expectations on incremental oil recoveries and the economics
- Determine impact of these recovery techniques on production facilities and personnel training
- Discuss chemical EOR including its process, performance evaluation and screening criteria
- Review areal and vertical sweep efficiencies as well as heterogeneity and residual oil saturation
- Illustrate the transportation of chemicals and fractional flow curve analysis
- Employ enhanced oil recovery (EOR) and chemical EOR methods
- Recognize the mobility control requirement in EOR process
- Describe polymer flooding including polymer viscoelastic behavior and its effect on field facilities and operations
- Identify the surfactant flooding, surfactant/polymer flooding, alkaline flooding and alkaline-polymer flooding
- Discuss alkaline-surfactant flooding and alkaline-surfactant-polymer flooding
- Carryout performance control/water shutoff methods

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 chemical enhanced oil recovery for reservoir engineers, production engineers, geoscientists and management personnel who are involved in the screening and planning for chemical enhanced oil recovery applications in the near future. New recruits should also benefit from this course. As well, it may also interest experienced professionals as a refresher 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)

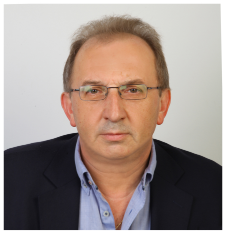
  Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** 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:



Mr. Stan Constantino, MSc, BSc, is a **Senior Petroleum & Reservoir Engineer** with over **35 years** of **Offshore & Onshore** extensive experience within the **Oil**, **Gas & Petroleum** industries**.** His area of expertise include **Reserves & Resources**, **Reserves Estimation & Uncertainty**, **Reservoir** Characterization, **Unconventional Resource & Reserves** Evaluation, **Oil & Gas Reserves** Estimation, Methods for **Aggregation of Reserves & Resources**, **Fractured Reservoir** Classification & Evaluation, **Sequence Stratigraphy**, **Petrophysics & Rock** Properties, **Seismic** Technology, **Geological** Modelling, **Water Saturation**, **Crude Oil & Natural Gas** Demand, **Exploration Agreements & Financial** Modelling, **Seismic Survey** Evaluation, **Exploration Well** Identification, **Field Production** Operation, **Field Development** Evaluation, Crude Oil Marketing, **Core & Log Data** Integration, **Core Logging**, Advanced **Core & Log Integration**, **Well Logs & Core Analysis**, Advanced Petrophysics/Interpretation of **Cased Hole Logs**, **Cased Hole Formation Evaluation**, **Cased Hole Formation** Evaluation, **Cased Hole Evaluation**, **Cased-Hole Logging**, Applied **Production Logging & Cased Hole & Production Log** Evaluation, **Cased Hole Logging & Formation** Evaluation, Open & Cased Hole Logging, Screening of Oil Reservoirs for **Enhanced Oil Recovery**, **Enhanced Oil Recovery**, **Enhanced Oil Recovery** Techniques, **Petroleum Economic** Analysis, **Oil Industry** Orientation, **Oil Production & Refining**, **Crude Oil Market**, **Global Oil Supply & Demand**, **Global Oil Reserves**, **Crude Oil** Types & Specifications, **Oil Processing**, **Oil Transportation-Methods**, **Oil & Gas** Exploration and Methods, **Oil & Gas** Extraction, Technology Usage in Industrial Security; **Upstream**, **Midstream** & **Downstream Operations**; **Oil Reservoir** Evaluation & Estimation, **Oil Supply & Demand**, **Oil Contracts**, **Government Legislation & Oil Contractual Agreements**, **Oil Projects** & Their Feasibility (revenue and profitability), **Water Flooding**, **Reservoir** Souring & Water Breakthrough, **Reservoir Performance** Using Classical Methods, **Fractured Reservoir** Evaluation & Management, **Reservoir Surveillance** & Management, **Reservoir Engineering** & Simulation, **Reservoir Monitoring**, **Pressure Transient** Testing & **Reservoir** Performance Evaluation, **Reservoir** Characterization, **Reservoir** Engineering Applications with ESP and Heavy Oil, **Reservoir** Volumetrics, Water Drive Reservoir, **Reserve** Evaluation, Rock & Fluid Properties, Fluid Flow Mechanics, PVT Analysis, Material Balance, Darcy's Law & Applications, Radial Flow, **Gas Well** Testing, Natural Water Influx, EOR Methods, Directional Drilling, **Drilling** Production & Operations, Field Development & Production of Oil & Gas, **Wireline Logging**, **Mud Logging**, **Cased Hole Logging**, **Production Logging**, **Slick Line**, **Coil Tubing**, Exploration Wells Evaluation, **Horizontal Wells**, **Well Surveillance**, **Well Testing**, **Design & Analysis**, **Well Testing & Oil Well Performance**, **Well Log Interpretation** (**WLI**), **Formation Evaluation**, **Well Workover Supervision**, **Pressure Transient Analysis** and **Petrophysical Log Analysis**. Currently, he is the **CEO** & **Managing Director** of **Geo Resources Technology** wherein he is responsible in managing the services and providing technical supports to underground energy related projects concerning **field development**, **production**, **drilling**, **reservoir engineering** and **simulation**.

Throughout his long career life, Mr. Stan has worked for many international companies such as the **Kavala Oil**, **North Aegean Petroleum Company** and **Texaco Inc.**, as the **Managing Director**, **Operations Manager**, **Technical Trainer**, **Training Consultant**, **Petroleum Engineering & Exploration Department Head**, **Assistant Chief Petroleum Engineer**, **Reservoir Engineer, Resident Petroleum Engineer**, **Senior Petroleum Engineer** and **Petroleum Engineer** wherein he has been managing the evaluation of exploration wells, reservoir simulation, development training, production monitoring, wireline logging and well testing including selection and field application of well completion methods.

Mr. Stan has a **Master**'s degree in **Petroleum Engineering** and a **Bachelor**'s degree in **Geology** from the **New Mexico Institute of Mining & Technology** (**USA**) and from the **Aristotelian University** (**Greece**) respectively. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier**/**Assessor**/**Trainer** by the **Institute of Leadership of Management (ILM**) and a member of the Society of Petroleum Engineers, USA (**SPE**), Society of Well Log Professional Analysts, USA (**SPWLA**) and European Association of Petroleum Geoscientists & Engineers (**EAGE**). Moreover, Mr. Stan published numerous scientific and technical papers and delivered various trainings, courses and workshops worldwide.

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

0800 – 0815	*Registration & Coffee*
0815 – 0830	*Welcome & Introduction*
0830 – 0845	***PRE-TEST***
0845 – 0915	***Introduction to Chemical EOR*** *Enhanced Oil Recovery's Potential • Definitions of EOR & IOR • General Description of Chemical EOR Process • Performance Evaluation of EOR Process • Screening Criteria for Chemical EOR Process*
0915 – 0935	*Break*
0935 – 1140	***Review of Areal & Vertical Sweep Efficiencies***
1140 – 1225	*Break*
1225 – 1300	***Heterogeneity & Vertical Sweep Efficiencies***
1300 - 1330	***Residual Oil Saturation***
1330 – 1400	***Recap***
1400	*Lunch & End of Day One*

Day 2

0800 – 0915	***Transport of Chemicals & Fractional Flow Curve Analysis*** *Introduction • Diffusion • Dispersion • Retardation of Chemicals in Single-Phase Flow • Types of Fronts • Fractional Flow Curve Analysis of Two-Phase Flow*
0915 – 0935	*Break*
1030 – 1140	***Enhanced Oil Recovery (EOR) Methods***
1140 – 1225	*Break*
1225 – 1300	***Chemical EOR Methods***
1300 - 1330	***Mobility Control Requirement in EOR Process*** *Introduction • Background • Setup of Simulation Model • Discussion of the Concept of Mobility Control Requirement • Theoretical Investigation • Numerical Investigation • Experimental Justification • Further Discussion*
1330 – 1400	***Recap***
1400	*Lunch & End of Day Two*

Day 3

0800 – 0915	***Polymer Flooding*** *Introduction • Type s of Polymers & Polymer-Related Systems • Properties of Polymer Solutions • Polymer Flow Behavior in Porous Media • Displacement Mechanisms in Polymer Flooding • Amount of Polymer Injected • Performance Analysis by Hall Plot • Polymer Mixing & Well Operations Related Polymer Injection • Special Cases, Pilot Tests & Field Applications of Polymer Flooding • Polymer Flooding Experience & Learning*
0915 – 0935	*Break*
0935 – 1030	***Polymer Viscoelastic Behavior & Its Effect on Field Facilities & Operations*** *Introduction • Viscoelasticity • Polymer Viscoelastic Behavior • Observations of Viscoelastic Effect • Displacement Mechanisms of Viscoelastic Polymers • Effect of Polymer Solution Viscoelasticity on Injection & Production Facilities*

1030 – 1140	***Surfactant Flooding*** *Introduction • Surfactants • Types of Microemulsions • Phase Behavior Tests • Surfactant Phase Behavior of Microemulsions & IFT • Viscosity of Microemulsion • Capillary Number • Trapping Number • Capillary Desaturation Curve*
1140 – 1225	*Break*
1225 - 1330	***Surfactant Flooding (cont'd)*** *Relative Permeabilities in Surfactant Flooding • Surfactant Retention • Displacement Mechanisms • Amount of Surfactant Needed & Process Optimization • An Experimental Study of Surfactant Flooding*
1330 – 1400	***Recap***
1400	*Lunch & End of Day Three*

Day 4

0800 – 0915	***Surfactant/Polymer Flooding*** *Introduction • Surfactant-Polymer Competetive Adsorption • Surfactant-Polymer Interaction & Compatibility • Optimization of Surfactant-Polymer Injection Schemes • A Field Case of SP Flooding*
0915 – 0935	*Break*
0935 – 1100	***Alkaline Flooding*** *Comparison of Alkalis Used in Alkaline Flooding • Alkaline Reaction with Crude Oil • Measurement of Acid Number • Alkali Interactions with Rock • Recovery Mechanisms*
1100 – 1140	***Alkaline Flooding (cont'd)*** *Simulation of Alkaline Flooding • Alkaline Concentration & Slug Size in Field Projects • Surveillance & Monitoring in Pilot Testing • Application Conditions of Alkaline Flooding*
1140 – 1225	*Break*
1225 - 1330	***Alkaline-Polymer Flooding*** *Interaction between Alkali & Polymer • Synergy Between Alkali & Polymer • Field AP Application Example: Liaohe Field*
1330 – 1400	***Recap***
1400	*Lunch & End of Day Four*

Day 5

0800 – 0830	***Alkaline-Surfactant Flooding*** *Phase Behavior Tests for the Alkaline-Surfactant Process • Quantitative Representation of Phase Behavior of an Alkaline-Surfactant System • Activity Maps • Synergy between Alkali & Surfactant • Synergy between Alkali & Surfactant in Heavy Oil Recovery • pH effect on Surfactant Adsorption • Recovery Mechanisms • Simulation of Phase Behavior of the Alkaline-Surfactant System*
0915 – 0935	*Break*
0935 – 1030	***Alkaline-Surfactant-Polymer Flooding*** *Synergy of Alkali, Surfactant & Polymer • Interactions of ASP Fluids & their Compatibility • Relative Permeabilities in ASP • Emulsions in ASP Flooding • Displacement Mechanisms*
1100 – 1140	***Alkaline-Surfactant-Polymer Flooding (cont'd)*** *Design Optimization of ASP Injection Schemes • Amounts of Chemicals Injected in Field ASP Projects • Vertical Lift Methods in ASP Flooding • Problems Associated with ASP • ASP Examples of Field Pilots & Applications*

1140 – 1225	*Break*
1225 – 1315	***Performance Control/Water Shutoff Methods*** *Overview of Conformance Control Options (i.e. Bulk Gel, CDG, PPG, Bright Water) • Gel Properties • Laboratory Screening • Field Examples & Designs • Reservoir Simulators for Conformance Control Methods*
1315 - 1330	***Course Conclusion***
1330 – 1345	***POST-TEST***
1345 – 1400	*Presentation of Course Certificates*
1400	*Lunch & End of Course*

Practical Sessions

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

Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org