COURSE OVERVIEW DE0564
AI in Sub-Surface Oil and Gas

Course Title
AI in Sub-Surface Oil and Gas

Course Date/Venue
Session 1: August 25-29 2025/Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 2: December 14-18, 2025/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai UAE

Course Reference
DE0564

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.

This course is designed to provide participants with a detailed and up-to-date overview of Artificial Intelligence in Sub-Surface Oil & Gas. It covers the fundamentals of AI and machine learning in oil and gas and the key AI tools and platforms used in subsurface exploration; the AI for geological data analysis, subsurface mapping, seismic data interpretation, well log interpretation and formation evaluation; the AI in reservoir characterization and modeling covering AI-based reservoir property estimation, predicting subsurface heterogeneity using AI, AI-driven geostatistical modeling and AI-powered reservoir simulation integration; and using machine learning for rapid history matching, AI-driven optimization of simulation parameters and AI-based uncertainty quantification in history matching.

Further, the course will also discuss the machine learning for reservoir performance prediction and AI for fluid flow modeling and pressure transient analysis; the AI for fracture characterization and well stimulation and the production logging and well performance analysis; the AI-driven wellbore stability and geomechanics analysis, real-time drilling optimization, well placement and trajectory optimization; the AI-powered formation damage detection and mitigation and downhole sensor data interpretation; and the AI for secondary and tertiary recovery optimization, reservoir surveillance, production optimization and CO_2 sequestration and carbon storage.

During this interactive course, participants will learn the digital twins in oil and gas and pipeline and well integrity monitoring, subsurface corrosion prediction, subsurface geohazards identification and predictive maintenance for wells; the AI trends and innovations in subsurface engineering and the AI for autonomous subsurface decision-making; and the AI and IoT integration for smart subsurface operations, reducing operational costs and increasing efficiency.

Course Objectives

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

- Apply and gain an in-depth knowledge on artificial intelligence in sub-surface oil & gas
- Discuss the fundamentals of AI and machine learning in oil and gas and the key AI tools and platforms used in subsurface exploration
- Carryout AI for geological data analysis, subsurface mapping, seismic data interpretation, well log interpretation and formation evaluation
- Employ AI in reservoir characterization and modeling covering AI-based reservoir property estimation, predicting subsurface heterogeneity using AI, AI-driven geostatistical modeling and AI-powered reservoir simulation integration
- Use machine learning for rapid history matching, AI-driven optimization of simulation parameters and AI-based uncertainty quantification in history matching
- Carryout machine learning for reservoir performance prediction and AI for fluid flow modeling and pressure transient analysis
- Illustrate AI for fracture characterization and well stimulation as well as production logging and well performance analysis
- Apply AI-driven wellbore stability and geomechanics analysis, real-time drilling optimization, well placement and trajectory optimization
- Employ AI-powered formation damage detection and mitigation and downhole sensor data interpretation
- Carryout AI for secondary and tertiary recovery optimization, reservoir surveillance, production optimization and CO_2 sequestration and carbon storage
- Discuss digital twins in oil and gas and apply pipeline and well integrity monitoring, subsurface corrosion prediction, subsurface geohazards identification and predictive maintenance for wells
- Recognize AI trends and innovations in subsurface engineering and apply AI for autonomous subsurface decision-making
- Carryout AI and IoT integration for smart subsurface operations including reducing operational costs and increasing efficiency

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 covers systematic techniques on Artificial Intelligence in Sub-Surface Oil & Gas for project managers & decision-makers, data scientists & data engineers, reservoir engineers, geophysicists & geologists, operations engineers, drilling engineers, AI and machine learning specialists, petroleum engineers, IT and technology professionals in oil & gas, consultants and industry experts, regulatory and compliance officers, business analysts in oil & gas, energy analysts.

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, **Unconventiona**l **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.

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 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 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	***Fundamentals of AI & Machine Learning in Oil & Gas*** *Overview of AI, ML, and Deep Learning in Oil & Gas • AI versus Traditional Subsurface Techniques • AI-Driven Decision-Making in Subsurface Operations • Key AI Tools and Platforms Used in Subsurface Exploration*
0930 – 0945	*Break*
0945 – 1045	***AI for Geological Data Analysis & Subsurface Mapping*** *AI-Driven Geological Data Processing • AI for Lithology and Facies Classification • Machine Learning for Structural and Stratigraphic Mapping • AI-Assisted Geospatial Analysis in Reservoir Studies*
1045 – 1130	***AI in Seismic Data Interpretation*** *AI-Powered Seismic Data Denoising and Enhancement • Machine Learning for Seismic Facies Classification • AI-Driven Automated Fault and Fracture Detection • AI for Horizon Picking and Reservoir Delineation*
1130 – 1230	***AI for Well Log Interpretation & Formation Evaluation*** *AI-Based Automatic Lithology Classification • Machine Learning for Petrophysical Property Prediction • AI-Assisted Porosity, Permeability, and Saturation Estimation • AI for Optimizing Well Log Correlation*
1230 – 1245	*Break*
1245 – 1330	***AI in Reservoir Characterization & Modeling*** *AI-Based Reservoir Property Estimation • Predicting Subsurface Heterogeneity Using AI • AI-Driven Geostatistical Modeling • AI-Powered Reservoir Simulation Integration*

1330 – 1420	***Hands-On: AI-Based Seismic Data Analysis*** *Implementing AI for Automated Seismic Fault Detection • AI-Driven Lithology Classification from Well Logs • Machine Learning for Subsurface Geological Model Refinement • AI-Based Porosity and Permeability Estimation*
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 – 0830	***AI for Reservoir Simulation & History Matching*** *AI-Assisted Reservoir Simulation Workflow • Using Machine Learning for Rapid History Matching • AI-Driven Optimization of Simulation Parameters • AI-Based Uncertainty Quantification in History Matching*
0830 – 0930	***Machine Learning for Reservoir Performance Prediction*** *AI-Driven Production Forecasting Models • Machine Learning for Reservoir Decline Curve Analysis • AI-Based Pressure and Fluid Behavior Predictions • AI-Assisted Reservoir Connectivity Analysis*
0930 – 0945	*Break*
0945 – 1030	***AI for Fluid Flow Modeling & Pressure Transient Analysis*** *Machine Learning for Permeability and Fluid Mobility Prediction • AI-Driven Flow Rate Forecasting in Reservoirs • AI-Assisted Pressure Transient Analysis for Reservoir Diagnostics • AI-Based Reservoir Pressure Mapping*
1030 – 1100	***AI for Fracture Characterization & Well Stimulation*** *AI-Assisted Hydraulic Fracture Modeling • Machine Learning for Stress Field Analysis • AI for Optimizing Fracturing Fluid Selection• AI-Driven Well Stimulation Performance Prediction*
1230 – 1245	*Break*
1245 – 1330	***AI in Production Logging & Well Performance Analysis*** *AI-Driven Multiphase Flow Analysis • Machine Learning for Production Logging Interpretation • AI for Wellbore Damage and Skin Factor Prediction • AI-Driven Production Anomaly Detection*
1330 – 1420	***Hands-On: AI-Powered Reservoir Performance Forecasting*** *Implementing AI for Rapid History Matching • AI-Based Decline Curve Analysis in Production Forecasting • Machine Learning for Fluid Flow Prediction • AI-Driven Optimization of Hydraulic Fracture Design*
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 – 0830	***AI-Driven Wellbore Stability & Geomechanics Analysis*** *AI for Predicting Borehole Collapse & Stability Issues • AI-Powered Wellbore Stress & Pore Pressure Estimation • AI-Driven Mud Weight & Casing Design Optimization • AI for Rock Failure and Fracture Prediction*
0830 – 0930	***AI in Real-Time Drilling Optimization*** *Machine Learning for Optimizing Rate of Penetration (ROP) • AI-Driven Real-Time Drilling Parameter Adjustments • AI for Detecting and Mitigating Drilling Hazards • AI-Powered Early Kick and Loss Detection*
0930 – 0945	*Break*

0945 – 1045	***AI for Well Placement & Trajectory Optimization*** *AI-Assisted Geosteering for Optimal Well Placement • Machine Learning for Well Trajectory Prediction • AI-Driven Horizontal and Deviated Well Planning • AI for Optimizing Multi-Well Pad Placement*
1045 – 1230	***AI-Powered Formation Damage Detection & Mitigation*** *AI-Driven Early Detection of Formation Damage • AI-Based Modeling of Permeability Impairment • Machine Learning for Predicting Fines Migration • AI-Assisted Acidizing and Damage Mitigation Strategies*
1230 – 1245	*Break*
1245 – 1330	***AI for Downhole Sensor Data Interpretation*** *AI-Driven Interpretation of MWD/LWD Data • AI for Subsurface Temperature and Pressure Predictions • Machine Learning for Drill String and Downhole Tool Performance Analysis • AI-Powered Anomaly Detection in Real-Time Drilling Data*
1330 - 1420	***Hands-On: AI for Subsurface Drilling Optimization*** *AI-Based Prediction of Wellbore Instability • Machine Learning Models for ROP Optimization • AI-Driven Real-Time Trajectory Corrections • AI-Powered Early Kick Detection System*
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 Three*

Day 4

0730 – 0830	***AI for Secondary & Tertiary Recovery Optimization*** *AI-Driven Waterflooding Efficiency Prediction • Machine Learning for Polymer and CO_2 Injection Strategies • AI for Optimizing Steam Injection in Thermal EOR • AI-Driven Predictive Modeling of EOR Success Rates*
0830 – 0930	***AI for Reservoir Surveillance & Production Optimization*** *AI-Powered Real-Time Reservoir Monitoring • Machine Learning for Production Allocation Optimization • AI-Assisted Intelligent Well Control Systems • AI for Optimizing Artificial Lift Methods*
0930 – 0945	*Break*
0945 – 1045	***AI for CO_2 Sequestration & Carbon Storage*** *AI-Powered Monitoring of CO_2 Injection and Storage • AI-Driven Prediction of CO_2 Migration and Leakage Risks • Machine Learning for Optimal Site Selection for CO_2 Storage • AI-Based Analysis of Subsurface Carbon Sequestration Efficiency*
1045 – 1230	***AI-Enhanced Digital Twins for Subsurface Asset Management*** *What are Digital Twins in Oil & Gas? • AI-Driven Real-Time Digital Twin Modeling • AI for Predictive Analytics in Digital Twin Applications • AI-Assisted Risk Assessment Using Digital Twin Simulations*
1230 – 1245	*Break*
1245 – 1330	***AI for Asset Integrity & Subsurface Risk Assessment*** *AI for Pipeline and Well Integrity Monitoring • AI-Driven Subsurface Corrosion Prediction • Machine Learning for Identifying Subsurface Geohazards • AI-Powered Predictive Maintenance for Wells*

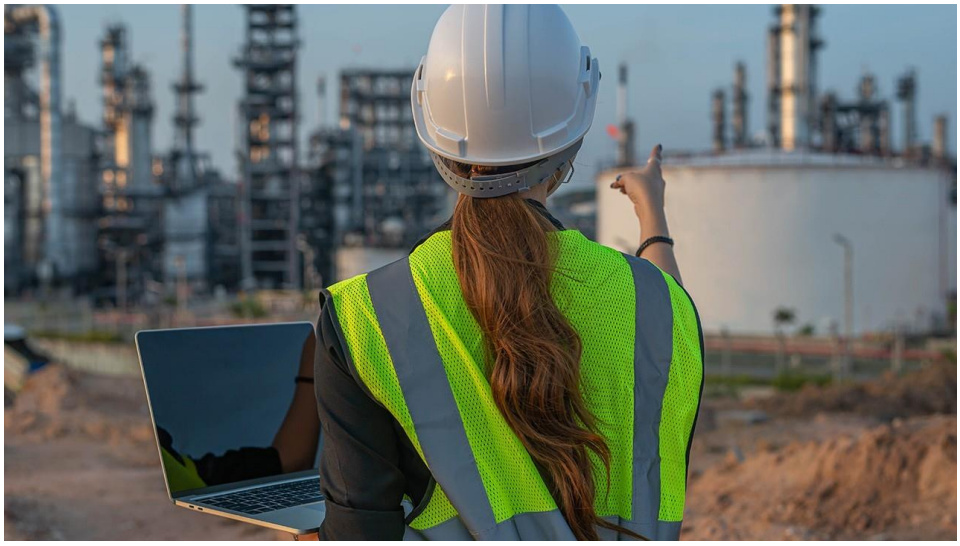
1330 – 1420	***Hands-On: AI for EOR & Subsurface Asset Management*** *AI-Based Predictive Modeling for Waterflooding Efficiency • AI-Driven Real-Time Reservoir Performance Monitoring • Machine Learning Models for CO_2 Sequestration Analysis • AI-Assisted Optimization of Artificial Lift Strategies*
1420 – 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 Four*

Day 5

0730 – 0830	***AI Trends & Innovations in Subsurface Engineering*** *AI-Powered Automated Reservoir Simulation • AI-Driven Self-Learning Geological Models • AI for Unconventional and Deepwater Reservoir Management • Future of AI in Sustainable Oil and Gas Operations*
0830 - 0930	***AI for Autonomous Subsurface Decision-Making*** *AI-Powered Real-Time Production Optimization Systems • AI-Driven Well Intervention Decision Support • AI-Enhanced Drilling Automation Strategies • AI for Intelligent Field Management*
0930 – 0945	*Break*
0945 – 1100	***AI & IoT Integration for Smart Subsurface Operations*** *AI-Driven IoT Sensors for Downhole Monitoring • Machine Learning for Real-Time Reservoir Pressure Analysis • AI-Powered Predictive Analytics for Smart Wells • AI-Assisted Automated Data Acquisition Systems*
1100 - 1230	***AI for Reducing Operational Costs & Increasing Efficiency*** *AI-Driven Cost Reduction in Field Development • AI-Powered Energy Efficiency Optimization • AI-Based Drilling and Production Economic Forecasting • AI-Driven Workflow Automation for Subsurface Operations*
1230 - 1245	*Break*
1245 – 1345	***Hands-On: AI-Powered Subsurface Engineering Solutions*** *AI-Based Reservoir Management Simulation • AI-Driven Predictive Well Performance Modelling • AI-Powered Risk Assessment for Subsurface Geohazards • AI-Enhanced Optimization of Waterflooding Operations*
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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