COURSE OVERVIEW DE0430
Pressure-Volume-Temperature (PVT) & Equation of State (EOS) Characterization

Course Title
Pressure-Volume-Temperature (PVT) & Equation of State (EOS) Characterization



Course Date/Venue
November 16-20, 2026/Executive Lounge Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

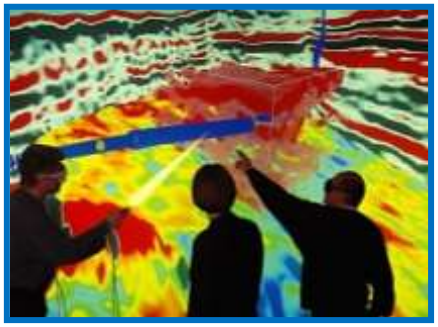
2.75 CEUs (27.5 PDHs) AWARD

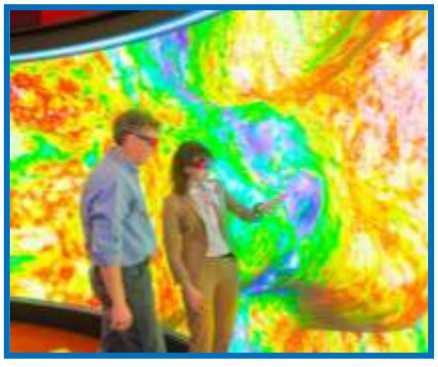
Course Reference
DE0430

Course Duration/Credits
Five days/2.75 CEUs/27.5 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 Advanced Pressure-Volume-Temperature (PVT) and Equation of State (EOS) Characterization. It covers the PVT analysis and its importance in reservoir engineering and applications in the oil and gas industry; the phase behavior of hydrocarbon systems; the techniques for hydrocarbon sample collection and experimental methods used in PVT analysis; the fluid properties in reservoir conditions, equations of state (EOS) basics concepts and the common EOS models; parameterizing EOS models to match experimental PVT data; and the advanced methods for tuning EOS parameters to improve model accuracy using regression techniques.

Further, the course will also discuss the mixing rules in EOS models and their application to multi-component hydrocarbon systems; the volume translation and density calculations; using EOS models to visualize phase behavior; constructing phase diagrams for reservoir fluids; and analyzing compositional gradients and reservoir fluid grading using PVT data.

During this interactive course, participants will learn the asphaltene precipitation and wax formation including PVT modeling of complex fluids and thermodynamic models for hydrate formation; the EOS for unconventional reservoirs, software tools for PVT and EOS analysis; the challenges and future research directions in PVT analysis and EOS characterization; the PVT and EOS data in field development planning and decision-making processes; integrating PVT data with reservoir management strategies; the impact of PVT analysis on production forecasting; and utilizing PVT analysis in the evaluation and acquisition of oil and gas assets.

Course Objectives/Outcomes & Benefits for the Participants

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

- Apply and gain an advanced knowledge on pressure-volume-temperature (PVT) and equation of state (EOS) characterization
- Discuss PVT analysis and its importance in reservoir engineering and applications in the oil and gas industry
- Recognize the phase behavior of hydrocarbon systems and apply techniques for hydrocarbon sample collection and experimental methods used in PVT analysis
- Identify the fluid properties in reservoir conditions, equations of state (EOS) concepts and the common EOS models
- Parameterize EOS models to match experimental PVT data and apply advanced methods for tuning EOS parameters to improve model accuracy using regression techniques
- Mix rules in EOS models and their application to multi-component hydrocarbon systems
- Carryout volume translation and density calculations as well as use EOS models to visualize phase behavior and construct phase diagrams for reservoir fluids
- Apply PVT analysis in reservoir simulation and discuss the role of PVT in well test analysis
- Examine the role of PVT analysis in designing and optimizing EOR projects
- Use PVT analysis to evaluate gas injection strategies and miscibility conditions for EOR
- Analyze compositional gradients and reservoir fluid grading using PVT data
- Discuss asphaltene precipitation and wax formation including PVT modeling of complex fluids and thermodynamic models for hydrate formation
- Recognize the EOS for unconventional reservoirs, software tools for PVT and EOS analysis and current challenges and future research directions in PVT analysis and EOS characterization
- Apply PVT and EOS data in field development planning and decision-making processes
- Integrate PVT data with reservoir management strategies and discuss the impact of PVT analysis on production forecasting
- Utilize PVT analysis in the evaluation and acquisition of oil and gas assets

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 advanced pressure-volume-temperature (PVT) and equation of state (EOS) characterization for reservoir engineers and petroleum engineers who have a medium background of PVT.

Training Methodology

Our courses employ an interactive, learner-centred methodology that integrates theoretical knowledge with practical application. The training is delivered through a suitable combination of some or all of the following methods, selected according to the course content and learning objectives:

- Instructor-led presentations and facilitated discussions
- Practical workshops and participant presentations
- Hands-on exercises and real-world case studies
- Equipment demonstrations and technical drawings
- Hardware- and software-based simulations
- Gamification & Role Play in soft-skills courses only
- Virtual Reality (VR) and Augmented Reality (AR)
- Instructional videos and other relevant training resources

This blended approach encourages active participation, strengthens practical skills and supports the effective application of acquired knowledge in the workplace.

Learning Design & Customization

This course can be customized to the exact requirements of clients. Haward Technology is so proud of our huge capabilities in tailoring our courses to the training needs of our valued clients.

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

Haward's 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**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). 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 **2.75 CEUs** (Continuing Education Units) or **27.5 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 **30 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 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: ***Monday, 16th of November 2026***

0800 – 0830	*Registration & Coffee*
0830 – 0845	*Welcome & Introduction*
0845 – 0900	***PRE-TEST***
0900 – 0930	***Introduction to PVT Analysis:*** *Overview of PVT Analysis, its Importance in Reservoir Engineering & Applications in the Oil & Gas Industry*
0930 – 0945	*Break*
0945 - 1115	***Phase Behavior of Hydrocarbon Systems:*** *Detailed Examination of Hydrocarbon Phase Behavior, including Phase Envelopes & Critical Points*
1115 – 1145	***Sampling & Experimental PVT Studies:*** *Techniques for Hydrocarbon Sample Collection & Experimental Methods Used in PVT Analysis*
1145 – 1200	***Fluid Properties in Reservoir Conditions:*** *The Key Fluid Properties Under Reservoir Conditions, such as Bubble Point, Dew Point & Viscosity*
1200 - 1215	*Break*
1215 - 1300	***Equations of State (EOS) Basics:*** *EOS Concepts & their Role in Characterizing PVT Properties of Reservoir Fluids*
1300 - 1350	***Common EOS Models:*** *Overview of Commonly Used EOS Models, including Peng-Robinson & Soave-Redlich-Kwong Models*
1350 – 1400	***Recap***
1400	*Lunch & End of Day One*

Day 2: ***Tuesday, 17th of November 2026***

0800 - 0845	***Parameterization of EOS Models:*** *Techniques for Parameterizing EOS Models to Match Experimental PVT Data*
0845 - 0930	***EOS Tuning & Regression Techniques:*** *Advanced Methods for Tuning EOS Parameters to Improve Model Accuracy Using Regression Techniques*
0930 - 0945	*Break*
0945 – 1100	***Mixing Rules & Fluid Characterization:*** *Mixing Rules in EOS Models & their Application to Multi-Component Hydrocarbon Systems*
1100 – 1200	***Volume Translation & Density Calculations:*** *Techniques for Volume Translation & Accurate Density Calculations Using EOS Models*
1200 - 1215	*Break*
1215 - 1300	***Visualizing Phase Behavior with EOS:*** *Using EOS Models to Visualize Phase Behavior & Construct Phase Diagrams for Reservoir Fluids*
1300 - 1350	***Case Studies on EOS Model Applications:*** *Discussion of Case Studies Illustrating the Application of EOS Models in Reservoir Simulation & EOR Projects*
1350 – 1400	***Recap***
1400	*Lunch & End of Day Two*

Day 3: ***Wednesday, 18th of November 2026***

0800 - 0845	***PVT Analysis in Reservoir Simulation:*** *Importance of Accurate PVT Data in Reservoir Simulation Models & Impact on Simulation Outcomes*
0845 - 0930	***Role of PVT in Well Test Analysis:*** *Application of PVT Data in Interpreting Well Test Results & Reservoir Properties*

0930 - 0945	Break
0945 – 1100	***PVT Considerations in Enhanced Oil Recovery (EOR):*** *Examining the Role of PVT Analysis in Designing & Optimizing EOR Projects*
1100 – 1200	***Gas Injection & Miscibility Studies:*** *Using PVT Analysis to Evaluate Gas Injection Strategies & Miscibility Conditions for EOR*
1200 - 1215	Break
1215 - 1300	***Reservoir Fluid Grading & Compositional Gradients:*** *Analysis of Compositional Gradients & Reservoir Fluid Grading Using PVT Data*
1300 - 1350	***Workshop on PVT Data Interpretation:*** *Workshop Focused on Interpreting PVT Data for Reservoir & Production Engineering Applications*
1350 – 1400	***Recap***
1400	Lunch & End of Day Three

Day 4: Thursday, 19th of November 2026

0800 - 0845	***Asphaltene Precipitation & Wax Formation:*** *Study of Asphaltene & Wax Precipitation Phenomena & their Impact on Reservoir & Production Operations*
0845 - 0930	***PVT Modeling of Complex Fluids:*** *Advanced Techniques for Modeling Complex Fluids, including Heavy Oils & Gas Condensates*
0930 - 0945	Break
0945 – 1100	***Thermodynamic Models for Hydrate Formation:*** *The Thermodynamics of Hydrate Formation & its Significance in Flow Assurance*
1100 – 1200	***EOS for Unconventional Reservoirs:*** *Adapting EOS Models for Unconventional Reservoirs, including Shale Gas & Tight Oil Formations*
1200 - 1215	Break
1215 - 1300	***Software Tools for PVT & EOS Analysis:*** *Overview of Software Tools & Packages Used for PVT Analysis & EOS Modeling in the Industry*
1300 - 1350	***Challenges & Future Directions in PVT & EOS:*** *Discussion on Current Challenges & Future Research Directions in PVT Analysis & EOS Characterization*
1350 – 1400	***Recap***
1400	Lunch & End of Day Four

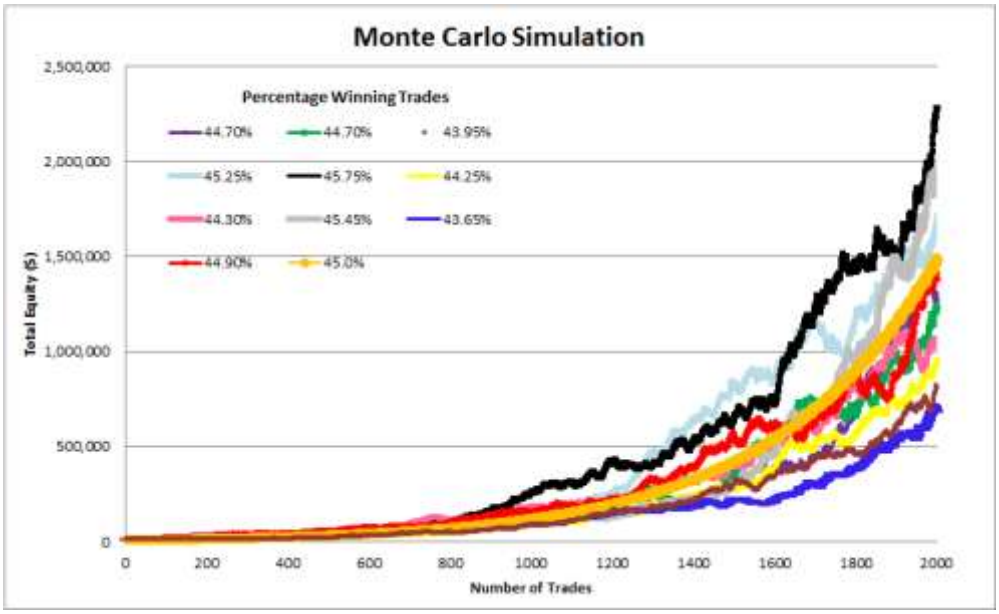
Day 5: Friday, 20th of November 2026

0800 - 0845	***PVT & EOS in Field Development Planning:*** *Application of PVT & EOS Data in Field Development Planning & Decision-Making Processes*
0845 - 0930	***Integrating PVT Data with Reservoir Management Strategies:*** *Strategies for Integrating PVT Data into Comprehensive Reservoir Management Plans*
0930 - 0945	Break
0945 – 1100	***Impact of PVT Analysis on Production Forecasting:*** *Exploring the Impact of PVT Properties on Production Forecasting & Reserve Estimation*
1100 – 1200	***PVT Analysis for Asset Evaluation & Acquisition:*** *Utilizing PVT Analysis in the Evaluation & Acquisition of Oil & Gas Assets*

1200 - 1215	*Break*
1215 – 1315	***Case Studies on Advanced PVT & EOS Applications:*** *Review of Detailed Case Studies Showcasing Advanced Applications of PVT & EOS in Reservoir Engineering*
1315 – 1330	***Course Conclusion***
1330 – 1345	***POST-TEST***
1345 – 1400	*Presentation of Course Certificates*
1400	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the "Monte Carlo Simulation".



Monte Carlo Simulation

Course Coordinator

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