COURSE OVERVIEW DE0172
PTA/RTA Advanced

Course Title
PTA/RTA Advanced

Course Reference
DE0172

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

Course Date/Venue

Session(s)	Date	Venue
1	April 28-May 02, 2024	Boardroom, Warwick Hotel Doha, Doha, Qatar
2	September 01-05, 2024	
3	November 10-14, 2024	

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 transient analysis/rate transient analysis (PTA/RTA). It covers the advanced wellbore models and well performance models; the advanced well models; the theoretical derivation and response and comparing this to what happens in the real world; the parameters affecting pressure behavior in horizontal wells including low vertical permeability and partial horizontal drainage; and the advanced reservoir models.

Further, the course will also discuss the complex boundary conditions and unconventional limits; the constant pressure boundaries, leaking, conductive and non-continuous faults including finite reservoirs and material balance; the effect of compressibility on reserve estimations and the validity of radius of investigation; the principle and use of the complete production and pressure history in transient analysis; the method for reservoir coupled with limitations and caveats of the method; and developing a consistent workflow combining the G-function plot with derivatives to define the leak-off behavior and the closure pressure including after closure analysis (ACA).

During this interactive course, participants will learn to develop the workflow from the simple analytical case through to the numerical case with increasing complexity; use increasing geological and petrophysical data from 2D to 3D and multiphase; compare the information gained from looking at high resolution, high frequency data (PTA) and low-resolution low frequency data (RTA); identify transient versus boundary dominated diffusion; and determine complex PVT covering the multiphase problem, aquifers and the choice and tuning of the model, Non-Darcy flow, heavy oil analysis, gas condensate and using the non-linear numerical model.

Course Objectives

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

- Apply and gain an advanced knowledge on pressure transient analysis/rate transient analysis (PTA/RTA)
- Illustrate advanced wellbore models and well performance models
- Identify advanced well models covering worked examples of difficult limited entry, multilayer slanted, advanced horizontal, multilateral, numerical wiggly well, multi-frac horizontal and horizontal anisotropy
- Discuss the theoretical derivation and response and compare this to what happens in the real world
- Recognize the parameters affecting pressure behavior in horizontal wells including low vertical permeability and partial horizontal drainage
- Describe the advanced reservoir models comprising of heterogeneous, composite reservoirs, advanced 2Φ, 2κ, multi composite, anisotropy and multilayer models stressing their complexity and the non-uniqueness of the solution
- Identify complex boundary conditions and unconventional limits
- Determine constant pressure boundaries, leaking, conductive and non-continuous faults handled with a common-sense approach including finite reservoirs and material balance
- Discuss the effect of compressibility on reserve estimations and the validity of radius of investigation
- Explain the principle and use of the complete production and pressure history in transient analysis
- Use the method for seeing deeper into the reservoir coupled with limitations and caveats of the method illustrated by worked examples to help define, question and verify the reservoir limits
- Develop a consistent workflow combining the G-function plot with derivatives to define the leak-off behavior & the closure pressure including after closure analysis (ACA)
- Develop the workflow from the simple analytical case through to the numerical case with increasing complexity
- Use increasing geological and petrophysical data from 2D to 3D and multiphase
- Compare the information gained from looking at high resolution, high frequency data (PTA) & low-resolution low frequency data (RTA)
- Discuss transient versus boundary dominated diffusion
- Determine complex PVT covering the multiphase problem, aquifers and the choice and tuning of the model, Non-Darcy flow, heavy oil analysis, gas condensate and using the non-linear numerical model

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 advanced and up-to-date overview of pressure transient analysis/rate transient analysis (PTA/RTA) for production, operations, petroleum and reservoir engineers, geologists, analysts field personnel, senior and field supervisors with an engineering background and analysts involved with the design, supervision and interpretation of well tests who need to obtain a better understanding of the advanced practices used in pressure transient tests and its advanced interpretation models.

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$ 8,500 per Delegate. 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:-

- 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.

- 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.

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 **40 years** of **Offshore & Onshore** extensive experience within the **Oil**, **Gas & Petroleum** industries**.** His area of expertise include **Fractured Reservoir** Classification & Evaluation, Screening of Oil Reservoirs for **Enhanced Oil Recovery**, **Oil Reservoir** Evaluation & Estimation, **Reservoir** Characterization, **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 & Heavy Oil, **Reservoir** Volumetrics, Water Drive **Reservoir**, **Unconventional Resource & Reserves** Evaluation, **Oil & Gas Reserves** Estimation, **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, **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 Supply & Demand**, **Oil Contracts**, **Government Legislation & Oil Contractual Agreements**, **Oil Projects** & Their Feasibility (revenue and profitability), 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

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Advanced Wellbore Models*** *Well Performance Models & Intake with Examples*
0930 – 0945	*Break*
0945 – 1100	***Advanced Well Models*** *Worked Examples of Difficult Limited Entry, Multilayer Slanted, Advanced Horizontal, Multilateral, Numerical Wiggly Well, Multi-Frac Horizontal & Horizontal Anisotropy*
1100 – 1230	***Advanced Well Models (cont'd)*** *The Theoretical Derivation & Response & Comparing this to What Happens in the Real World*
1230 – 1245	*Break*
1245 – 1420	***Advanced Well Models (cont'd)*** *The Parameters Affecting Pressure Behavior in Horizontal Wells including Low Vertical Permeability & Partial Horizontal Drainage ● Real Examples to Illustrate the Various Issues*
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 – 0930	***Advanced Reservoir Models*** *Heterogeneous, Composite Reservoirs (their Bad Reputation & Real-World Use)*
0930 – 0945	*Break*
0945 – 1100	***Advanced Reservoir Models (cont'd)*** *Advanced 2Φ, 2κ, Multi Composite, Anisotropy & Multilayer Models Stressing their Complexity & the Non-Uniqueness of the Solution*
1100 – 1230	***Advanced Boundary Models*** *Complex Boundary Conditions & Unconventional Limits ● Constant Pressure Boundaries, Leaking, Conductive & Non-Continuous Faults Handled with a Common Sense Approach ● Finite Reservoirs & Material Balance*
1230 – 1245	*Break*
1245 – 1420	***Advanced Boundary Models (cont'd)*** *The Effect of Compressibility on Reserve Estimations ● The Validity of Radius of Investigation*
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 – 0930	***Deconvolution*** *The Principle & the Use of the Complete Production & Pressure History in Transient Analysis*
0930 – 0945	*Break*
0945 – 1100	***Deconvolution (cont'd)*** *The Use of the Method for Seeing Deeper into the Reservoir Coupled with Limitations & Caveats of the Method Illustrated by Worked Examples to Help Define, Question & Verify the Reservoir Limits*
1100 – 1230	***Minifrac Analysis*** *Developing a Consistent Workflow Combining the G-Function Plot with Derivatives to Define the Leak-Off Behavior & the Closure Pressure including After Closure Analysis (ACA)*
1230 – 1245	*Break*
1245 – 1420	***Minifrac Analysis (cont'd)*** *Developing a Consistent Workflow Combining the G-Function Plot with Derivatives to Define the Leak-Off Behavior & the Closure Pressure including After Closure Analysis (ACA) (cont'd)*
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 – 0930	***Analytical and/or Numerical?*** *Development of the Workflow from the Simple Analytical Case Through to the Numerical Case with Increasing Complexity*
0930 – 0945	*Break*
0945 – 1100	***Analytical and/or Numerical? (cont'd)*** *From 2D to 3D & Multiphase Using Increasing Geological & Petrophysical Data*
1100 – 1230	***PTA and/or RTA?*** *Comparing the Information Gained from Looking at High Resolution, High Frequency Data (PTA) & Low-Resolution Low Frequency Data (RTA)*
1230 – 1245	*Break*
1245 – 1420	***PTA and/or RTA? (cont'd)*** *Transient versus Boundary Dominated Diffusion*
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*

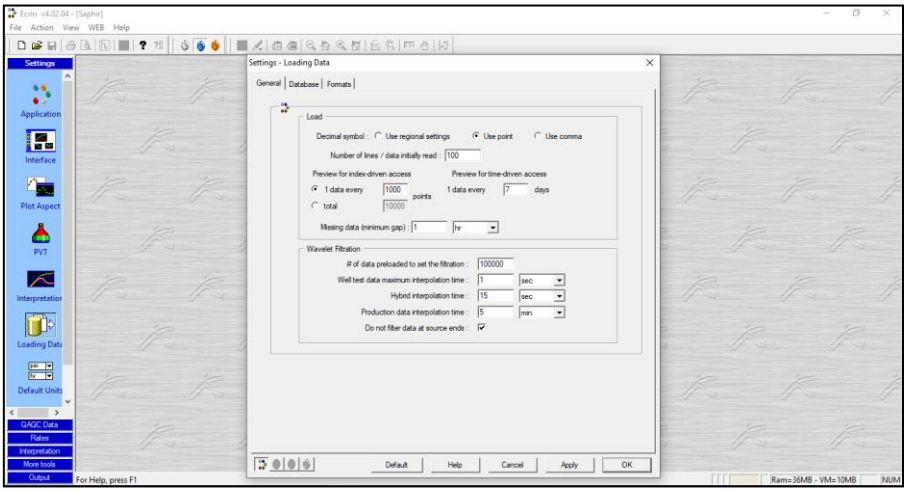
Day 5

0730 – 0930	***Complex PVT*** *The Multiphase Problem ● Aquifers & the Choice & Tuning of the Model*
0930 – 0945	*Break*
0945 - 1100	***Complex PVT (cont'd)*** *Non-Darcy Flow ● Heavy Oil Analysis*
1100 – 1230	***Complex PVT (cont'd)*** *Gas Condensate*

1230 – 1245	*Break*
1245 - 1345	***Complex PVT (cont'd)*** *Using the Non-Linear Numerical Model*
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*

Simulator (Hands-on Practical Sessions)

Practical session 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 simulator "KAPPA" software.



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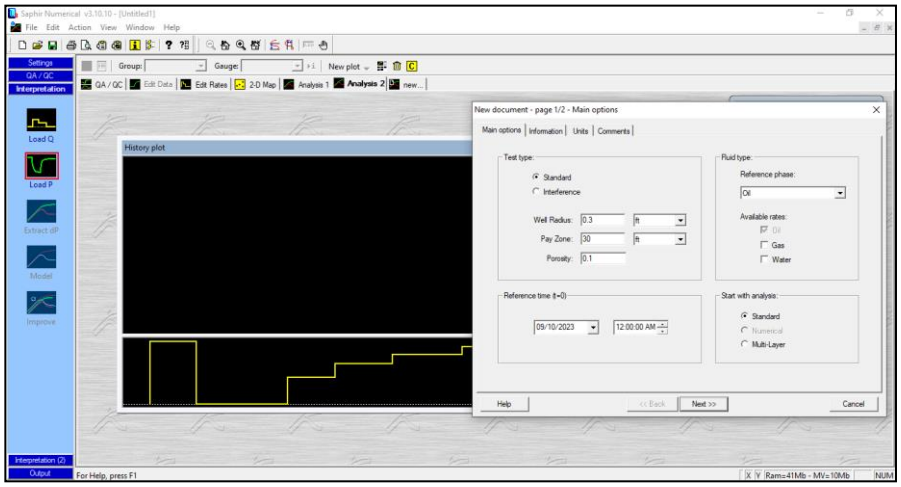

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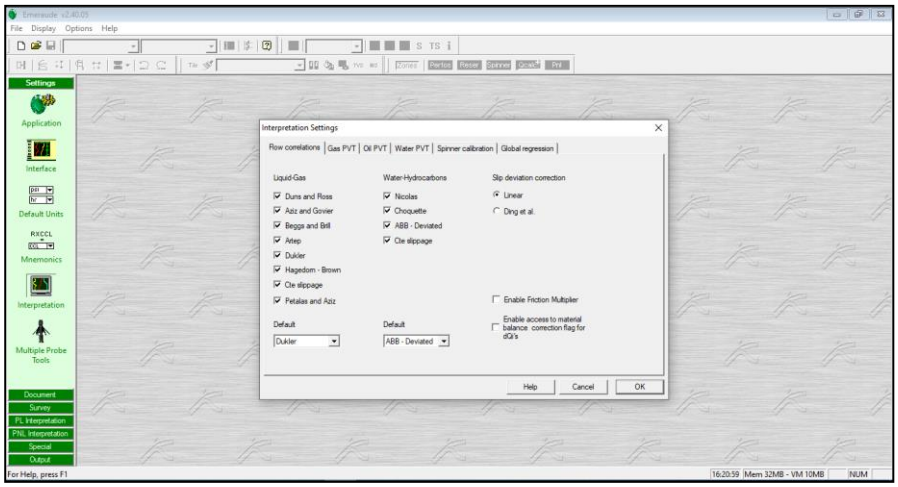

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Course Coordinator

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