



**COURSE OVERVIEW DE0172-4D**  
**PTA/RTA Advanced**

**Course Title**

PTA/RTA Advanced

**Course Date/Venue**

December 16-19, 2024/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

**Course Reference**

DE0172-4D

**Course Duration/Credits**

Four days/2.4 CEUs/24 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 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  $2\Phi$ ,  $2\kappa$ , 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\$ 6,750** 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:-

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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 **2.4 CEUs** (Continuing Education Units) or **24 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.

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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: Monday, 16<sup>th</sup> of December 2024**

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	<b>PRE-TEST</b>
0830 – 0930	<b>Advanced Wellbore Models</b> Well Performance Models & Intake with Examples
0930 – 0945	Break
0945 – 1100	<b>Advanced Well Models</b> Worked Examples of Difficult Limited Entry, Multilayer Slanted, Advanced Horizontal, Multilateral, Numerical Wiggly Well, Multi-Frac Horizontal & Horizontal Anisotropy • The Theoretical Derivation & Response & Comparing this to What Happens in the Real World
1100 – 1230	<b>Advanced Well Models (cont'd)</b> The Parameters Affecting Pressure Behavior in Horizontal Wells including Low Vertical Permeability & Partial Horizontal Drainage • Real Examples to Illustrate the Various Issues
1230 – 1245	Break
1245 – 1420	<b>Advanced Reservoir Models</b> Heterogeneous, Composite Reservoirs (their Bad Reputation & Real-World Use) • Advanced $2\Phi$ , $2\kappa$ , Multi Composite, Anisotropy & Multilayer Models Stressing their Complexity & the Non-Uniqueness of the Solution
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day One

**Day 2: Monday, 17<sup>th</sup> of December 2024**

0730 – 0930	<b>Advanced Boundary Models</b> Complex Boundary Conditions & Unconventional Limits • Constant Pressure Boundaries, Leaking, Conductive & Non-Continuous Faults Handled with a Common Sense Approach
0930 – 0945	Break
0945 – 1100	<b>Advanced Boundary Models (cont'd)</b> Finite Reservoirs & Material Balance • The Effect of Compressibility on Reserve Estimations • The Validity of Radius of Investigation
1100 – 1230	<b>Deconvolution</b> The Principle & the Use of the Complete Production & Pressure History in Transient Analysis
1230 – 1245	Break
1245 – 1420	<b>Deconvolution (cont'd)</b> 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
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day Two





**Day 3: Tuesday, 18<sup>th</sup> of December 2024**

0730 – 0930	<b>Minifrac Analysis</b> <i>Developing a Consistent Workflow Combining the G-Function Plot with Derivatives to Define the Leak-Off Behavior &amp; the Closure Pressure including After Closure Analysis (ACA)</i>
0930 – 0945	Break
0945 – 1100	<b>Minifrac Analysis (cont'd)</b> <i>Developing a Consistent Workflow Combining the G-Function Plot with Derivatives to Define the Leak-Off Behavior &amp; the Closure Pressure including After Closure Analysis (ACA) (cont'd)</i>
1100 – 1230	<b>Analytical and/or Numerical?</b> <i>Development of the Workflow from the Simple Analytical Case Through to the Numerical Case with Increasing Complexity</i>
1230 – 1245	Break
1245 – 1420	<b>Analytical and/or Numerical? (cont'd)</b> <i>From 2D to 3D &amp; Multiphase Using Increasing Geological &amp; Petrophysical Data</i>
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day Three

**Day 4: Wednesday, 19<sup>th</sup> of December 2024**

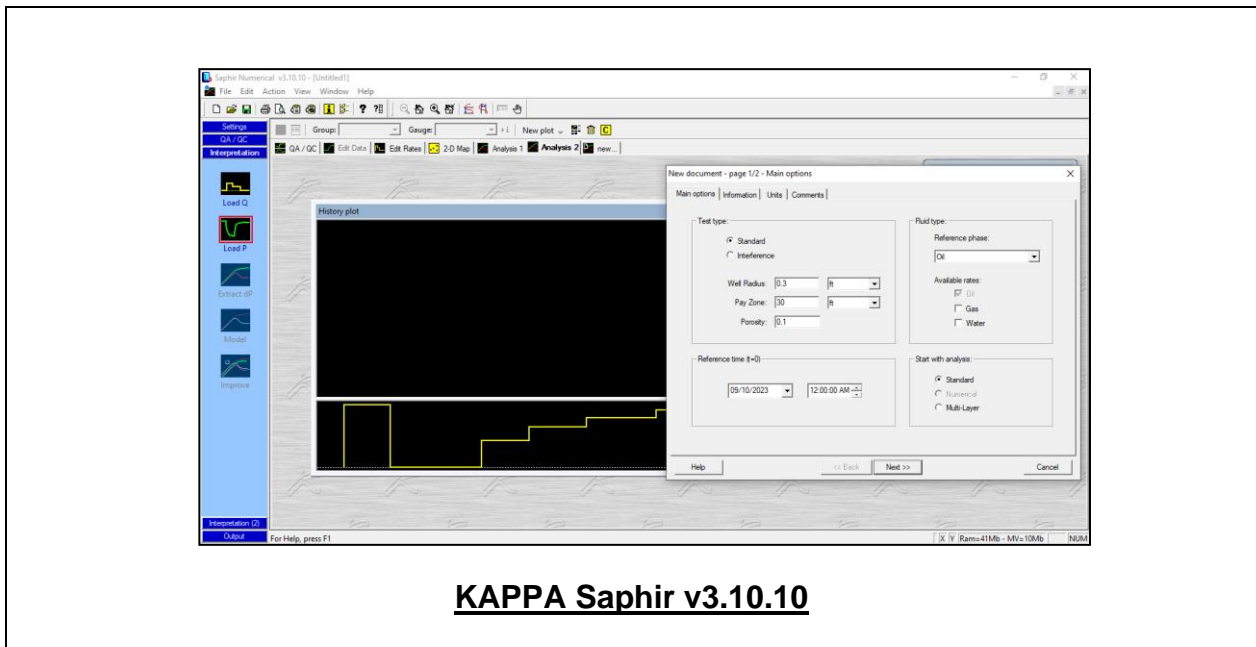
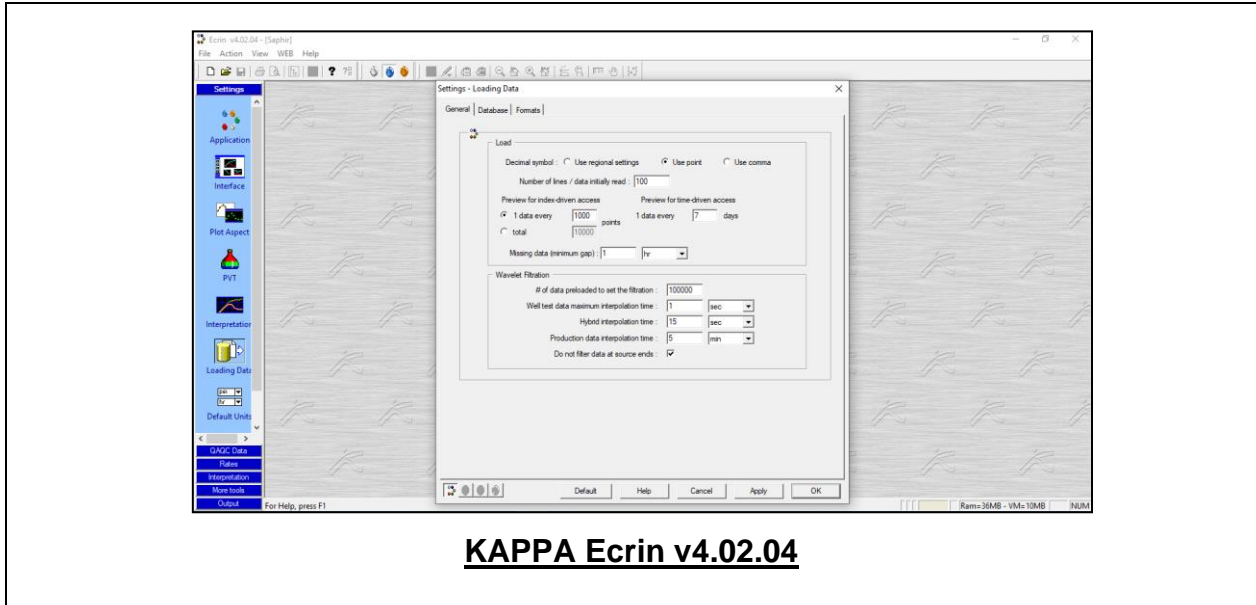
0730 – 0930	<b>PTA and/or RTA?</b> <i>Comparing the Information Gained from Looking at High Resolution, High Frequency Data (PTA) &amp; Low-Resolution Low Frequency Data (RTA)</i>
0930 – 0945	Break
0945 – 1100	<b>PTA and/or RTA? (cont'd)</b> <i>Transient versus Boundary Dominated Diffusion</i>
1100 – 1230	<b>Complex PVT</b> <i>The Multiphase Problem • Aquifers &amp; the Choice &amp; Tuning of the Model • Non-Darcy Flow</i>
1230 – 1245	Break
1245 – 1345	<b>Complex PVT (cont'd)</b> <i>Heavy Oil Analysis • Gas Condensate • Using the Non-Linear Numerical Model</i>
1345 – 1400	<b>Course Conclusion</b>
1400 – 1415	<b>POST-TEST</b>
1415 – 1430	<i>Presentation of Course Certificates</i>
1430	Lunch & End of Course



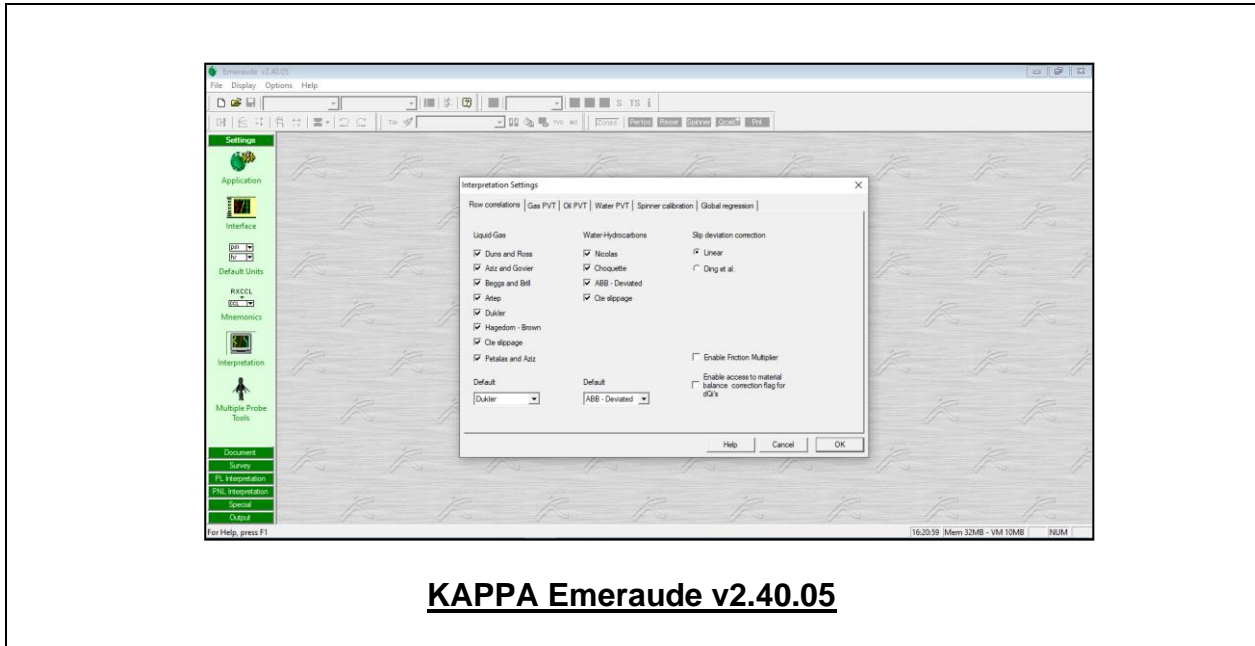


**Simulator (Hands-on Practical Sessions)**

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.







**KAPPA Emerald v2.40.05**

**Course Coordinator**

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