COURSE OVERVIEW DE1070-3D

Integrated Geomechanics in Exploration and Production

Course Title
Integrated Geomechanics in Exploration and Production

Course Reference
DE1070-3D

Course Date/Venue
Please refer to page 3

Course Duration/Credits
Three days/1.8 CEUs/18 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 Integrated Geomechanics in Exploration and Production. It covers the geomechanics, rock mechanics principles and the impact of stress and strain in subsurface behavior; the in-situ stress regimes and measurement and rock mechanical properties; the pore pressure prediction and management, failure criteria and fracture mechanics; the geomechanical data acquisition covering core analysis and mechanical testing, wireline and LWD log interpretation and integrating geophysical and petrophysical data; and the wellbore stability and drilling geomechanics including fracture gradient and kick tolerance.

During this interactive course, participants will learn the reservoir compaction and subsidence; the fault reactivation, seal integrity, hydraulic fracturing and stimulation design; the mechanical earth model (MEM) development, coupled reservoir-geomechanical modelling, stress-dependent permeability and porosity; the impact of compaction on production forecasts and the characteristics of shale and tight formations; the natural fracture networks and anisotropy, horizontal wellbore stability and completion design in complex stress fields; and the 4D seismic to monitor geomechanical changes, pressure and saturation effects on rock stiffness and geomechanical evolution.

Course Objectives

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

- Apply and gain an in-depth knowledge on integrated geomechanics in exploration and production
- Discuss geomechanics, rock mechanics principles and the impact of stress and strain in subsurface behavior
- Identify in-situ stress regimes and measurement and rock mechanical properties
- Carryout pore pressure prediction and management and recognize failure criteria and fracture mechanics
- Apply geomechanical data acquisition covering core analysis and mechanical testing, wireline and LWD log interpretation and integrating geophysical and petrophysical data
- Recognize wellbore stability and drilling geomechanics including fracture gradient and kick tolerance reservoir compaction and subsidence
- Describe fault reactivation, seal integrity, hydraulic fracturing and stimulation design
- Discuss mechanical earth model (MEM) development, coupled reservoir-geomechanical modelling, stress-dependent permeability and porosity and the impact of compaction on production forecasts
- Explain the characteristics of shale and tight formations, natural fracture networks and anisotropy, horizontal wellbore stability and completion design in complex stress fields
- Use 4D seismic to monitor geomechanical changes, identify pressure and saturation effects on rock stiffness and visualize geomechanical evolution

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 integrated geomechanics in exploration and production for geologists, geophysicists, reservoir engineers, petrophysicists, drilling engineers, production engineers, completion engineers, geomechanics specialists, technical managers and team leaders and other technical staff.

Course Date/Venue

Session(s)	Date	Venue
1	May 18-20, 2025	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
2	July 13-15, 2025	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
3	September 29-October 01, 2025	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
4	November 23-25, 2025	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE

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$ 5,250 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 **1.8 CEUs** (Continuing Education Units) or **18 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 workshop 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	***Introduction to Geomechanics*** *What is Geomechanics and Why it Matters in E&P • Key Disciplines and Integration Areas (Drilling, Reservoir, Completions) • Overview of Rock Mechanics Principles • Impact of Stress and Strain in Subsurface Behavior*
0930 – 0945	*Break*
0945 – 1030	***In-Situ Stress Regimes & Measurement*** *Types of in-Situ Stresses: Vertical, Minimum/Maximum Horizontal • Stress Regimes: Normal, Strike-Slip, Reverse • Methods to Determine Stress (Logs, Tests, Image Logs) • Regional Tectonics and Local Stress Fields*
1030 – 1130	***Rock Mechanical Properties*** *Elastic Parameters: Young's Modulus, Poisson's Ratio • Strength Parameters: UCS, Tensile Strength, Cohesion, Friction Angle • Stress-Strain Curves and Deformation Behavior • Lab versus Log-Derived Mechanical Properties*
1130 – 1215	***Pore Pressure Prediction & Management*** *Mechanisms of Overpressure Generation • Methods: Eaton's, Bowers' Sonic-Log Techniques • Effects of Pore Pressure on Wellbore Design • Role in Well Planning and Safety*
1215 – 1230	*Break*
1230 – 1330	***Failure Criteria & Fracture Mechanics*** *Mohr-Coulomb and Other Failure Envelopes • Brittle vs Ductile Behavior • Natural vs Induced Fractures • Rock Strength under Different Stress Paths*
1330 – 1420	***Geomechanical Data Acquisition*** *Core Analysis and Mechanical Testing • Wireline and LWD Log Interpretation • Image Log Features: Breakouts, DITFs • Integrating Geophysical and Petrophysical Data*
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	***Wellbore Stability & Drilling Geomechanics*** *Stress Distribution around Wellbores • Borehole Collapse and Fracture Risk • Mud Weight Window and Safe Drilling Envelope • Best Practices in Unstable Formations*
0930 – 0945	*Break*
0945 – 1100	***Fracture Gradient & Kick Tolerance*** *Fracture Gradient Determination • Kick Tolerance and Well Control Implications • Well Design Optimization • Geomechanics Input into Casing and Mud Program*
1100 – 1215	***Reservoir Compaction & Subsidence*** *Reservoir Stress Evolution during Depletion • Poroelastic Compaction and its Effects • Surface Subsidence: Causes and Prediction • Caprock Integrity Implications*

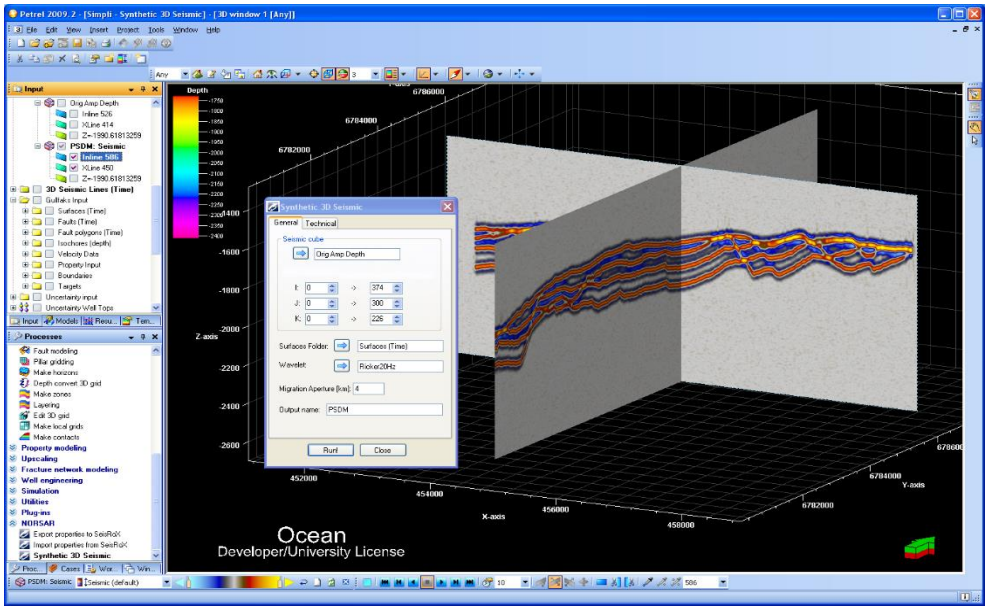
1215 – 1230	*Break*
1230 – 1330	***Fault Reactivation & Seal Integrity*** *Fault Slip Tendency and Fracture Reactivation • Stress Path and Fault Stability • Sealing versus Leaking Fault Behavior • Implications for Containment and Injectivity*
1330 – 1420	***Hydraulic Fracturing & Stimulation Design*** *In-Situ Stress and Fracture Orientation • Minimum Stress Estimation and Frac Design • Fracture Containment and Height Growth • Geomechanical Modeling for Frac Optimization*
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

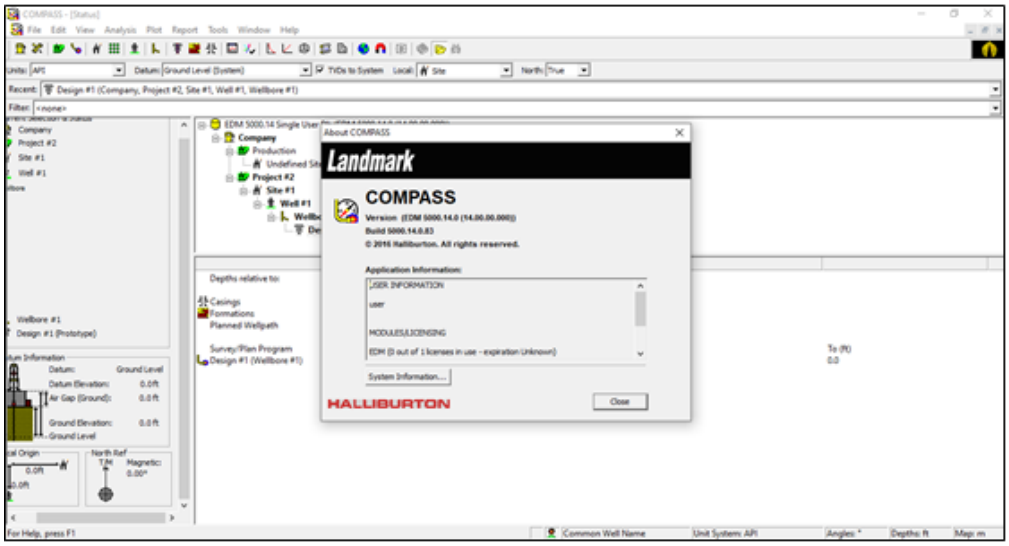
0730 – 0830	***Mechanical Earth Model (MEM) Development*** *Purpose and Components of an MEM • Building a 1D MEM from Logs and Lab Data • Expanding to 3D Geomechanical Models • Model Calibration Using Field Data*
0830 – 0930	***Integration with Reservoir Simulation*** *Coupled Reservoir-Geomechanical Modeling • Stress-Dependent Permeability and Porosity • Impact of Compaction on Production Forecasts • Injection Scenarios and Geomechanical Feedback*
0930 – 0945	*Break*
0945 – 1100	***Unconventional Reservoir Geomechanics*** *Characteristics of Shale and Tight Formations • Natural Fracture Networks and Anisotropy • Horizontal Wellbore Stability • Completion Design in Complex Stress Fields*
1100 – 1215	***Time-Lapse Geomechanics & 4D Seismic*** *Using 4D Seismic to Monitor Geomechanical Changes • Stress and Strain over Time • Pressure and Saturation Effects on Rock Stiffness • Visualization of Geomechanical Evolution*
1215 – 1230	*Break*
1230 – 1300	***Real-Time Applications & Digital Technologies*** *Real-Time Monitoring While Drilling (MWD/LWD) • Integration of DTS and DFIT for Fracture Behavior • Digital Twins for Geomechanics • Machine Learning in Stress Prediction*
1300 – 1345	***Final Workshop & Case Studies*** *Group Analysis of Wellbore Stability in a Complex Field • Designing a Stimulation Strategy Using Geomechanical Inputs • Review of Case Studies (e.g., Fault Activation, Compaction) • Q&A*
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)

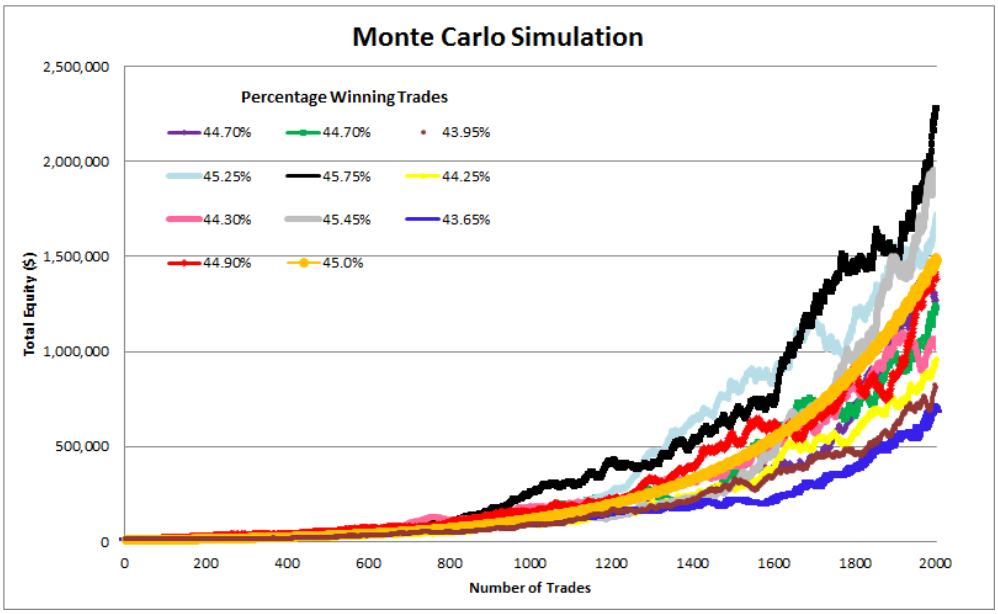
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the "Petrel Software", "COMPASS", "Monte Carlo", "KAPPA", "Interactive Petrophysics (IP)", "ECRIN", "PIPESIM", "Eclipse Software" and "PROSPER" software's.



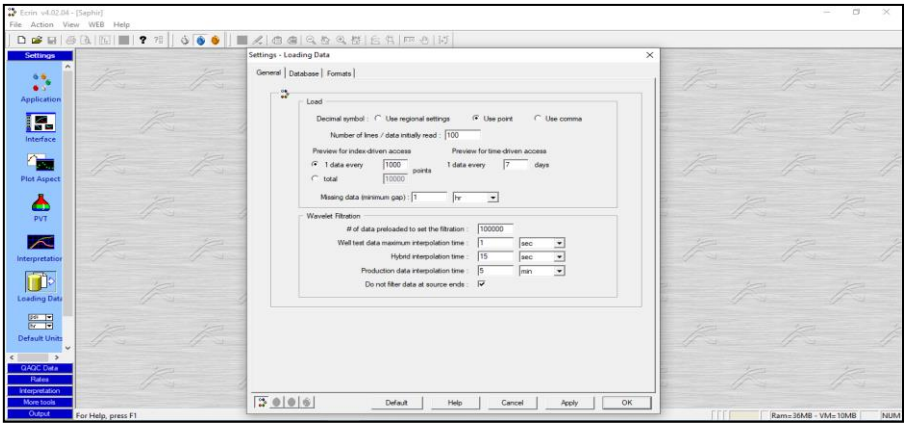
Petrel Software



COMPASS



Monte Carlo Simulation



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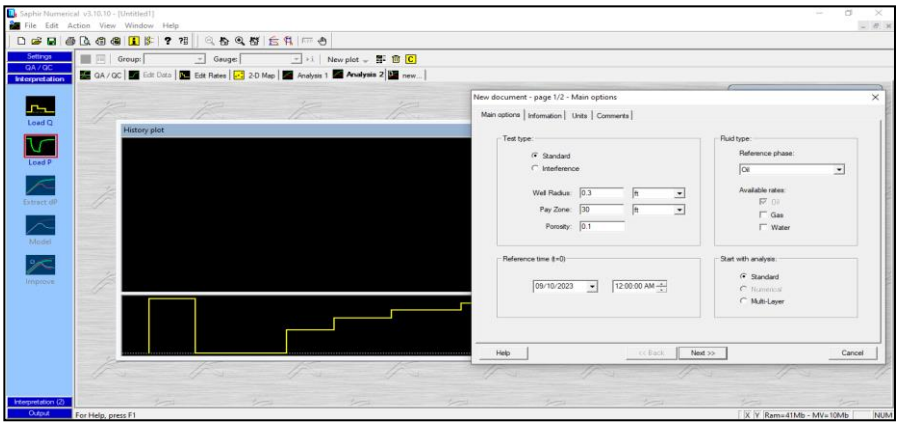

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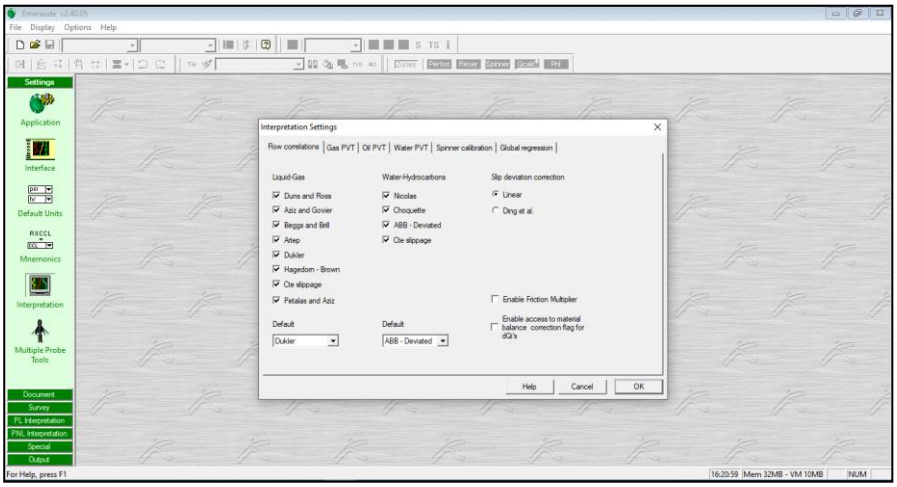

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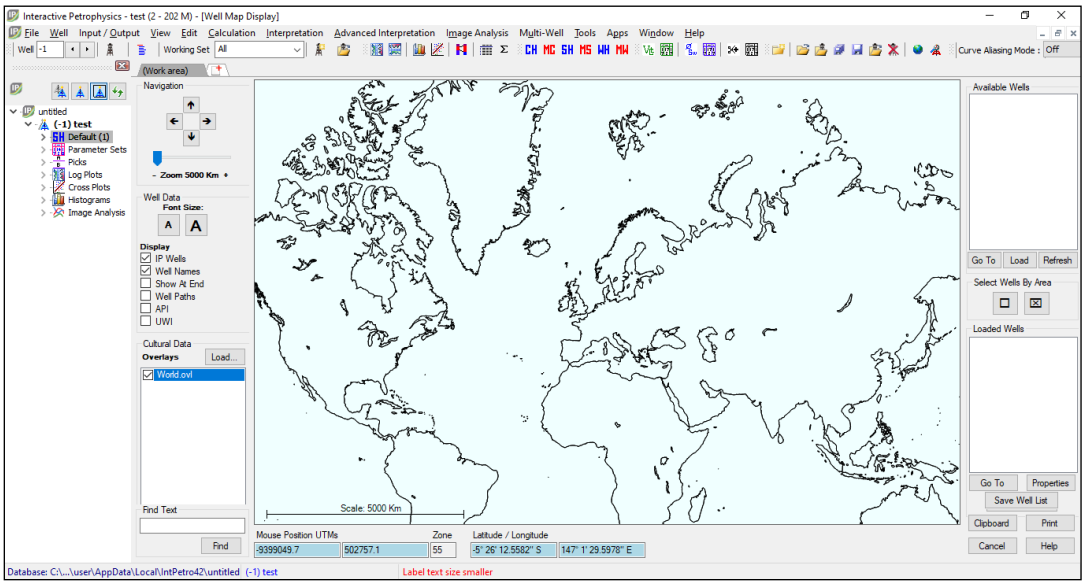
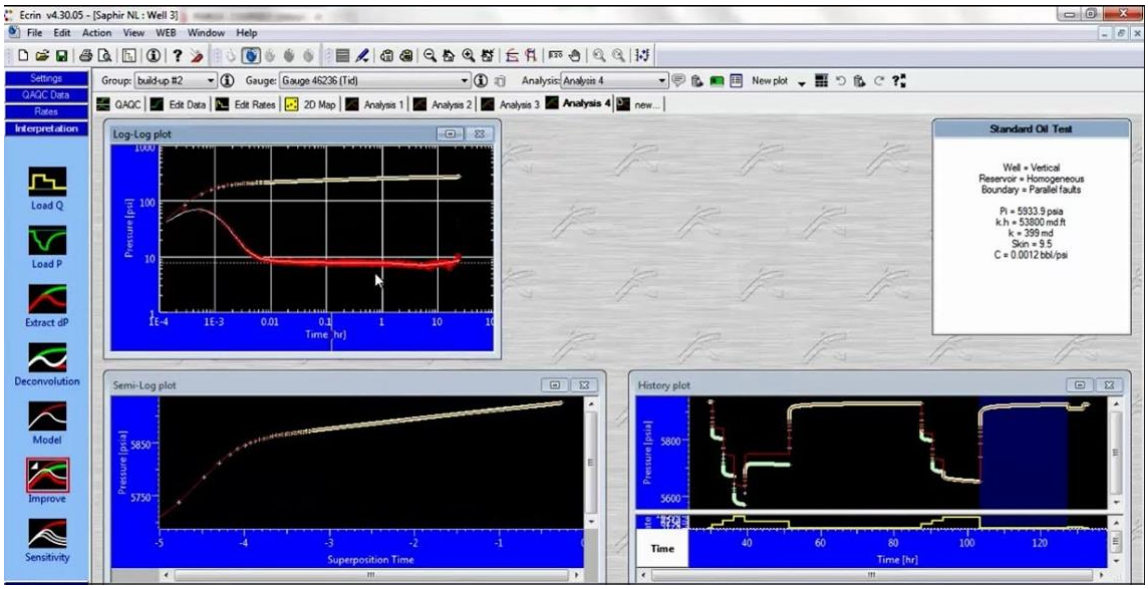
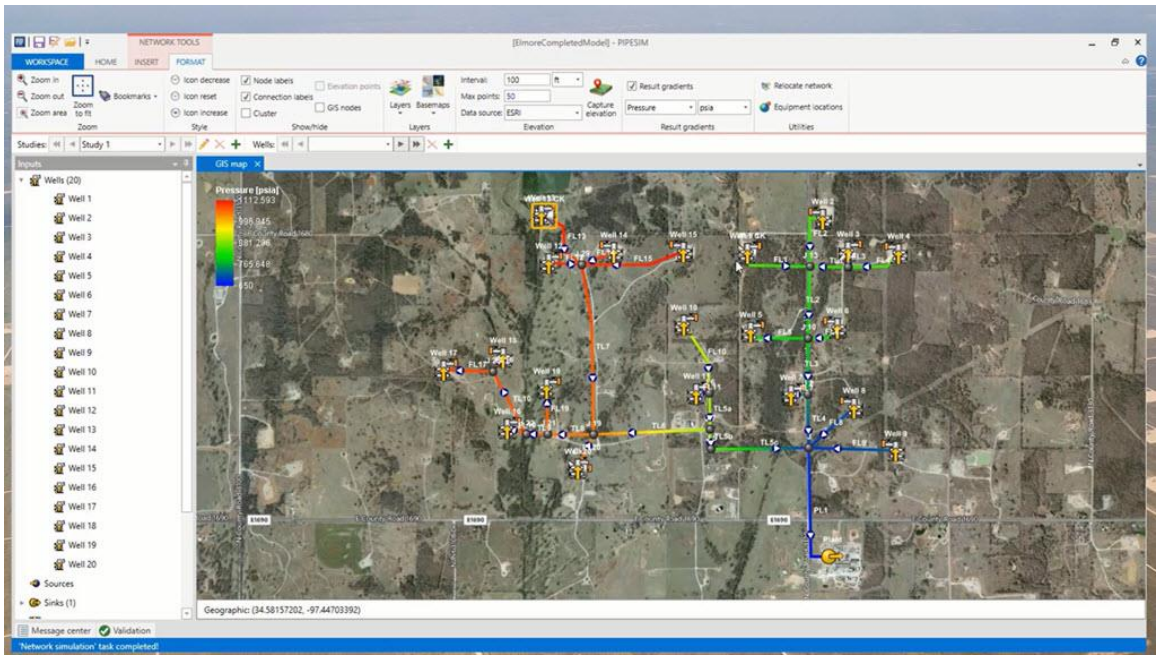


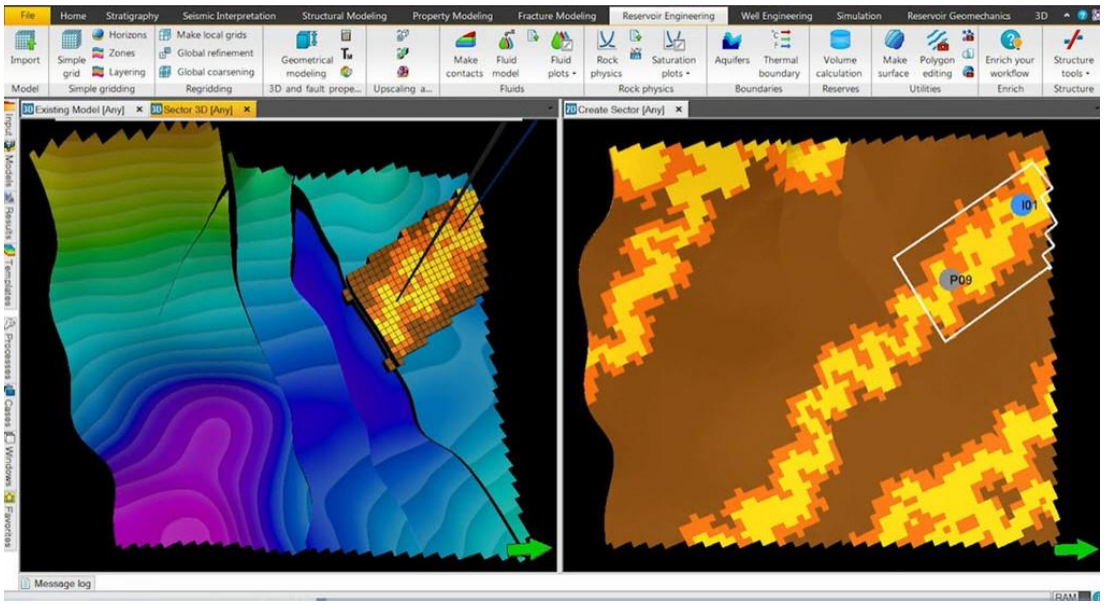
Interactive Petrophysics (IP) Software



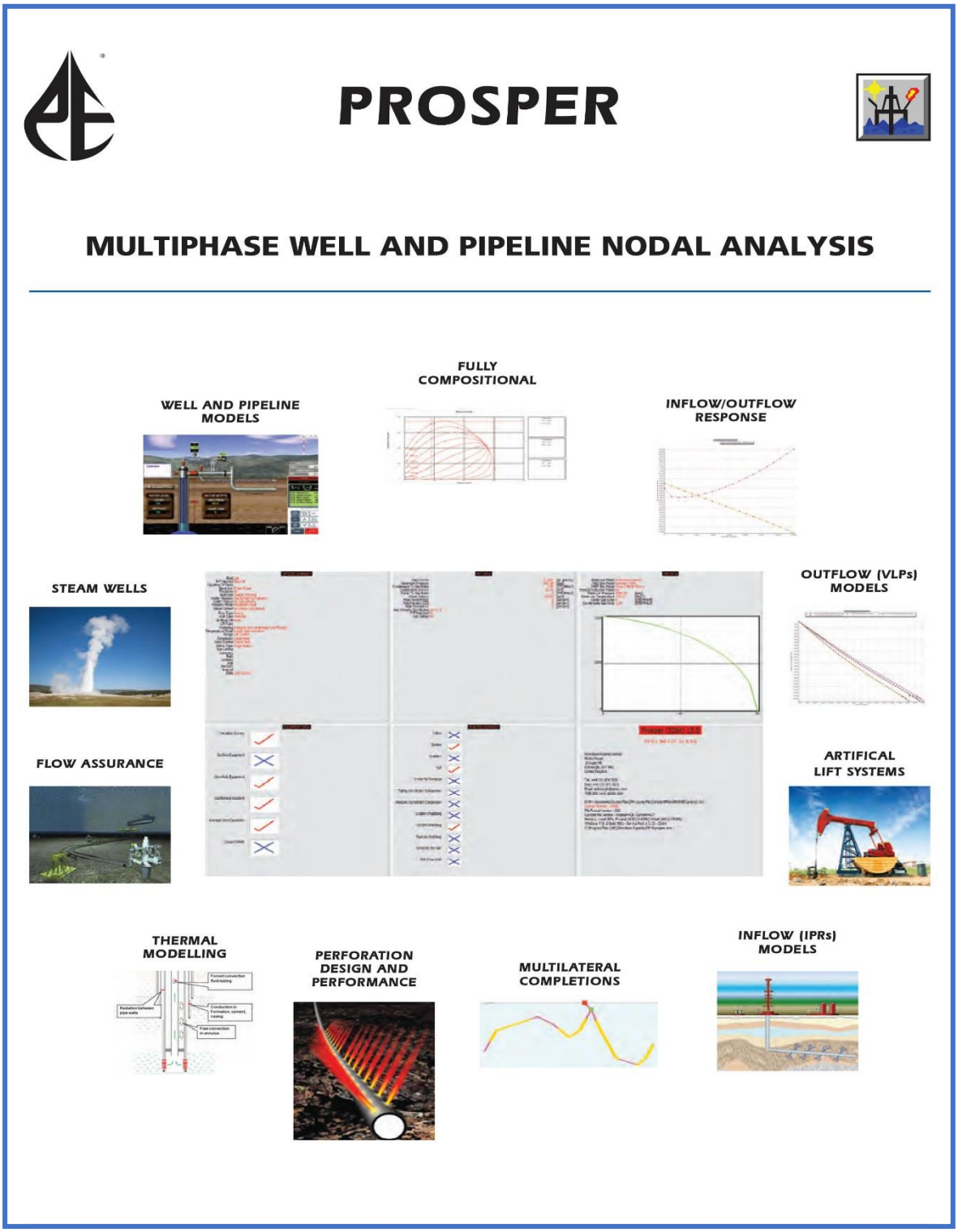
ECRIN Software



PIPESIM



Eclipse Software



Course Coordinator
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