Society of Petroleum Engineers
ASIA PACIFIC TRAINING COURSES

SPE International
Society of Petroleum Engineers

Integrated Core Analysis, Modelling and Reservoir Characterisation Training Series

Kuala Lumpur, Malaysia

Register by **12 June 2017** for Early Bird Savings

Module I:	**Conventional Core Analysis and Reservoir Zonation**	**10 – 11 July 2017**
Module II:	**Capillary Pressure and Saturation**	**11 – 12 July 2017**
Module III:	**Relative Permeability Prediction**	**13 – 14 July 2017**

Series Description

Each module has a duration of two days with emphasis on different aspects of reservoir characterisation, the ultimate goal being the preparation of optimal formation and rock property data from core analysis and other data sources for the purpose of static geological modelling and dynamic reservoir simulation. Seminar style lectures are typically given each morning and participants put their learning into practice in the afternoons, utilising real field data (including their own if desired). For this purpose, specialised spreadsheets are utilised.

"Intelligent" spreadsheets will be made available to course participants for their use in practical exercises – putting theory into practice. Course participants may also bring their own data, which they may use with the spreadsheets. Spreadsheets may be operated in rapid fashion to obtain optimal solutions. Sample of spreadsheets are:

- Core Overburden Correction
- HFZ Calculations
- Capillary Pressure Prediction
- Relative Permeability Predictor

Instructor

Peter Behrenbruch is a consultant and Adj. Prof at the Australian School of Petroleum, the University of Adelaide (UoA), specialising in reservoir engineering and field development, lecturing also at three other universities. Active for over 40 years in the petroleum industry, his most recent position was Chief Operating Officer and Project Director for AED Oil and East Puffin, responsible for implementing the Puffin offshore development, Timor Sea.

Prior to his academic year, he worked for 16 years with BHP Billiton as the Global Chief Reservoir Engineer. He also held other management positions over the years in BHP Billiton such as the Project Manager for two Australian FPSO Projects and the Technical Manaer for the Dai Hung Project.

Previously, he worked for Shell International, including secondment to Woodside Energy, where he had a leading role in Australia's largest capital project. His primary research interests are in reservoir characterisation and special core analysis. He was SPE Asia Pacific director and a member of the SPE Board.

About SPE

The **Society of Petroleum Engineers (SPE)** is a not-for-profit organisation. Income from this event will be invested back into SPE to support many other Society programmes. When you attend an SPE event, you help provide even more opportunities for industry professionals to enhance their technical and professional competence. Scholarships, certification, the Distinguished Lecturer programme, and SPE's energy education programme Energy4me are just a few examples of programmes that are supported by SPE.

Continuing Education Units (CEUs)

Attendees of SPE training courses earn 0.8 CEUs for each day of training. We provide each attendee a certificate upon completion of the training course.

Why Choose SPE

- Strong technical content developed by industry experts
- Relevant to region and current industry needs
- Multi-disciplinary technical courses and case studies
- Industry and peer-to-peer networking opportunities

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Module 1: Conventional Core Analysis and Reservoir Zonation

10 – 11 July 2017

Course Description

Part 1 of the overall course covers all aspects related to using Routine Core Analysis (RCA) laboratory results to optimally zone a cored reservoir interval. Commencing with core management, topics discussed are plug selection and cleaning, followed by laboratory measurement techniques. The importance of integration with other information is demonstrated: core photographs and detailed core description, GR logs and core gamma, petrographics etc., stressing the correct use of laboratory data. It is also shown how to apply necessary corrections to lab measurements before zonation. The end objective is optimal reservoir zonation for petrophysical application and dynamic reservoir simulation. Here are the main topics which will be covered in this course module:

- Laboratory methods for Routine Core Analysis (RCA) measurements
- Overburden and Klinkenberg corrections
- Reservoir characterization techniques and Global Characteristics Envelopes (GCEs)
- Hydraulic Flow Zone Unit (HFZU) analysis – full range of models
- Optimal zonation of cored reservoir intervals
- Core related data integration with other subsurface data

Objectives

Attendance of the course will allow participants to:

- Appreciate the multidisciplinary nature of reservoir characterization using core data
- Understand various laboratory methods used in conventional core analysis
- Be able to synthesise conventional core analysis data for various uses
- Be able to optimally zonate reservoir intervals and integrate with other subsurface data

Target Audience

The course is intended for geologists, petrophysicists, reservoir engineers and technical personnel involved in reservoir characterization and field development studies.

Pre-Requisite

General knowledge related to reservoirs. Coring techniques and core preservation options are covered in pre-reading material, made available to course participants prior to the course. Participants are to bring their laptop to be able to run computer programs.

Day One (Full Day)

Monday, 10 July 2017

- Conventional core analysis and laboratory methods
- Review of laboratory reports and data
- Synthesising conventional core analysis data
- Morning Break
- Overburden and Klinkenberg correction
- Overview of reservoir characterisation and core data
- Review of data used for reservoir characterisation
- Alternative reservoir characterisation approaches
- Geological zonation using core data
- Introduction to computer programs: GCE and CORC
- Introduction to the HFZU computer program - ORZ
- Zonation exercises – manual mode

Day Two (Half Day - AM)

Tuesday, 11 July 2017

- Case History I: Reservoir Characterisation for the Bayu-Undan Gas Field
- Zonation exercise – auto-mode
- Morning Break
- Zonation and integration

Module 2: Capillary Pressure and Saturation

11 – 12 July 2017

Course Description

Part 2 of the overall course covers all aspects related to Capillary Pressure (CP) and modelling, stressing drainage relationships. Firstly, the three main lab techniques used in deriving CP profiles are covered. The modelling part involves two aspects: quality checking and validation, and prediction of CP relationships from basic data. Various formulations are reviewed and both, matching and prediction workflows are covered. Using an advanced and universal formulation, it is shown how both, forward and reverse modelling is possible for matching and deriving CP relationships. The end objective is to derive appropriate CP relationships for every HFZU identified for reservoir simulation and for saturation-height modelling. Here are the main topics which will be covered in the course:

- Laboratory techniques: porous plate, centrifuge and mercury injection
- Capillary pressure models: Leverett J-function to recent
- Laboratory data: quality checking and validation
- Capillary pressure endpoint correlations
- Prediction of capillary pressure relationships from basic data
- Capillary pressure profiles and saturation-height modelling

Objectives

Attendance of the course will allow participants to:

- Appreciate the multidisciplinary nature of reservoir characterization using core data
- Understand various laboratory methods used for measuring capillary pressure
- Be able to synthesise CP relationships for various uses
- To be able to derive optimal CP relationships for every geological unit (HFZU)

Target Audience

The course is intended for geologists, petrophysicists, reservoir engineers and technical personnel involved in reservoir characterization and field development studies.

Pre-Requisite

General knowledge related to reservoirs. Basic capillary pressure material will be made available to course participants prior to the course (pre-reading). Participants are to bring their laptop to be able to run computer programs.

Day Two (Half Day - PM)

Tuesday, 11 July 2017

- Laboratory methods: porous plate, centrifuge and mercury injection
- Review of laboratory reports and data
- Capillary pressure and saturation models
- Use of traditional models to match laboratory CP data
- Introduction of the Modified Carman-Kozeny Purcell (MCKP) model
- Discussion and lessons learned

Day Three (Full Day)

Wednesday, 12 July 2017

- Case History II: Capillary Pressure Modelling for the Bayu-Undan Gas Field
- Introduction to computer program CP2 (manual mode), CP matching
- CP matching of lab data, manual mode
- Endpoint Correlations
- Introduction to computer program GCE, endpoint data validation
- Introduction to computer program PROPS, endpoint data correlation
- Overview of Saturation Modelling
- Computer program CP2 (auto mode), CP matching and prediction
- CP matching and prediction – auto mode

Module 3: Relative Permeability Prediction

13 – 14 July 2017

Course Description

Part 3 of the overall course covers all aspects related to Relative Permeability (RP) and modelling, for different fluid pairs and both, steady state and unsteady state. Firstly, various types of lab techniques used in deriving RP profiles are covered, core flooding and centrifuge. The modelling part involves two aspects: quality checking and validation, and prediction of RP relationships from basic data. Various formulations are reviewed and both, matching and prediction workflows are covered. Using an advanced and universal formulation, it is shown how both, forward and reverse modelling is possible for matching and deriving RP relationships. The end objective is to derive appropriate RP relationships for every HFZU identified for reservoir simulation. It is also shown how to integrate flooding and centrifuge data. Here are the main topics which will be covered in the course:

- Laboratory techniques: flooding (steady and unsteady state) and centrifuge
- Capillary pressure models: Modified Brooks-Corey to recent
- Laboratory data: quality checking and validation
- Relative permeability endpoint correlations
- Prediction of relative permeability relationships from basic data
- Relative permeability and integration of various types of tests

Objectives

Attendance of the course will allow participants to:

- Appreciate the multidisciplinary nature of reservoir characterization using core data
- Understand various laboratory methods used for measuring relative permeability
- Be able to synthesise RP relationships for various uses
- To be able to derive optimal RP relationships for every geological unit (HFZU)

Target Audience

The course is intended for petrophysicists and reservoir engineers, and technical personnel involved in reservoir characterization and field development studies.

Pre-Requisite

General knowledge related to reservoirs. Basic relative permeability material will be made available to course participants prior to the course (pre-reading). Participants are to bring their laptop to be able to run computer programs.

Day Four (Full Day)

Thursday, 13 July 2017

- Overview of relative permeability
- Laboratory methods: steady and unsteady state, centrifuge
- Laboratory reports and data
- Examples of various types of laboratory results
- Use of traditional models to match laboratory RP data
- Introduction of the 2-phase Modified Carman-Kozeny (2pMCK) model
- Lessons learned
- Case History III: Laminaria-Corallina Oil Field Development (lecture, 60 min)
- Introduction to computer program RP2 (manual mode), RP matching
- RP matching of lab data, manual mode
- Endpoint Correlations

Day Five (Half Day - AM)

Friday, 14 July 2017

- Introduction to computer program GCE, endpoint data validation
- Introduction to computer program PROPS, endpoint data correlation
- Integration of data from different experiments
- Computer program RP2 (auto mode), RP matching and prediction
- RP matching and prediction – auto mode

Exclusive Open Session with the Instructor!

Friday, 14 July 2017 | 1330 – 1730

Come and experience ICDMS, a state-of-the-art Integrated Core Data Modelling System, utilising models with real predictive powers (not just fitting data) – never achieved before! Group sessions may also be arranged

Requirement to join the session:

- **Signing up to at least one (1) course module entitles you to a trial of ICDMS using your own data sets, with help of the course instructor.**
- **Participants must bring their laptop and charger (or share with 1 person) with Microsoft Excel 2013 minimum for the open session.**

Registration Form

Integrated Core Analysis, Modelling and Reservoir Characterisation Training Series

Kuala Lumpur, Malaysia

SPE International
Society of Petroleum Engineers

Registration Details

Date : _____ Member No : _____

First Name : _____ Last Name : _____

Company : _____ Job Title : _____

Address : _____

Town/City : _____ Country : _____ Postal Code: _____

Telephone No : _____ Email : _____

Registration Fees *Please tick appropriate box*		Early Bird Registration On/Before 12 June 2017	Registration After 12 June 2017
Any 1 Module	SPE Member	☐ USD 1,400	☐ USD 1,500
	Non-SPE Member	☐ USD 1,600	☐ USD 1,700
Any 2 Modules	SPE Member	☐ USD 2,200	☐ USD 2,400
	Non-SPE Member	☐ USD 2,500	☐ USD 2,700
Complete Series	SPE Member	☐ USD 2,800	☐ USD 3,000
	Non-SPE Member	☐ USD 3,100	☐ USD 3,300

Select Your Course(s):		
☐	Module 1: Conventional Core Analysis and Reservoir Zonation	10 – 11 July 2017
☐	Module 2: Capillary Pressure and Saturation	11 – 12 July 2017
☐	Module 3: Relative Permeability Prediction	13 – 14 July 2017

- Prices inclusive of 6% Malaysian GST
- Registration Deadline: **26 June 2017**
- Fee includes course registration, training materials, certificate of attendance, daily luncheons and coffee breaks
- If attendance is not sufficient for the course by **26 June 2017** SPE reserves the right to cancel the course

Payment By Credit Card

Credit card payment will be processed in US Dollars only

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Note: Forms will not be processed and space cannot be guaranteed unless accompanied by payment for total amount

This form may be used as a company invoice.

Cancellation Policy

a) A processing fee of **USD 150** will be charged for cancellation received before the Registration Deadline **26 June 2017** .
b) Cancellation received after **26 June 2017**, a 25% refund will be made to the registrant.
c) No refund on cancellation received after **3 July 2017**.
d) No refund will be issued if a registrant fails to show up for the training course .

Mail completed registration form with remittance and any supporting material to:

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Mid Valley City, Lingkaran Syed Putra,
59200 Kuala Lumpur, Malaysia
Tel: 60.3.2182.3000 | Fax: 60.3.2182.3030
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