

Masterclass on Carbon Capture and Storage

A masterclass for the development of skills, technology and knowledge of CCS

10th - 12th June 2026 at Kuala Lumpur, Malaysia | 15th - 17th June at Bangkok, Thailand
18th - 20th November 2026 at Kuala Lumpur, Malaysia | 23rd - 25th November 2026 at Bali, Indonesia



Petrosync Distinguished Instructor

Richard Worden

Professor of Geology at the University of Liverpool, UK

Managing Director of Geochem Research Ltd

Director of UK start-ups: Geo-engines Ltd and Hydrogen Resources Ltd

A lot of
Practical Things,
Case Studies
and Exercises!

- Over 25 years' experience of geological carbon storage
- High ranking professor at the University of Liverpool, UK
- Led courses on CCS more than 44 times, to more than 760 people, from more than 42 organisations
- Expert in subsurface aspects of geological carbon storage (CCS) including characterisation (storage volume and injection rate) and effects (geochemical, geomechanical and petrophysical) of CO₂ on reservoirs and seals
- Led courses and expert in the "Geochemical effects of CO₂ on reservoirs, seals and engineered environments during CCS"

PROGRAM SCHEDULE

08:00	Registration (Day1)
08:00 - 10:00	Session I
10:00 - 10:15	Refreshment & Networking Session I
10:15 - 12:30	Session II
12:30 - 13:30	Lunch
13:30 - 15:00	Session III
15:00 - 15:15	Refreshment & Networking Session II
15:15 - 16:00	Session IV
16:00	End of Day

*Schedule may vary for each training

HYBRID TRAINING SOLUTIONS

FOCUS TRAINING • REDUCE COST • ENHANCED RESULTS

Over the years, there has been a growing demand for hybrid training programs. It is an excellent option to maximize your training dollar for your specific training needs. We make it possible to run a training program that is customized totally to your training needs at a fraction of an in-house budget!

If you like to know more about this excellent program, please contact us on +65 3159 0800 or email general@petrosync.com

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Course Overview

Designed for technical staff, geoscientists, and engineers, this course offers a comprehensive dive into CCS (Carbon Capture and Storage). It begins with the fundamentals of CCS need and CO₂ behaviour in the subsurface, supported by real-world data from current and past projects. You will explore CO₂ storage capacities in saline aquifers and depleted gas fields, along with insights on injection rates, reservoir permeability, and pressure management. Key topics include reservoir and top-seal properties, geomechanics to prevent fractures, and the geochemistry of CO₂ trapping. The course also covers CO₂ leakage risks, monitoring, and risk assessment, providing a practical, science-driven approach to CCS challenges.

Course Objectives

During this course, you will:

- Explore the role of geoscience in CCS and its impact on CO₂ emissions reduction.
- Examine past CO₂ injection projects and their differences from industrial-scale CCS.
- Understand CO₂ behaviour in the subsurface, including injection pressures and stress regimes.
- Learn about CO₂ storage capacities, from pore-scale to aquifer volumes.
- Analyze factors influencing CO₂ flow, including permeability and aquifer architecture.
- Investigate the effects of CO₂ on host aquifers, from geomechanical to geochemical impacts.
- Assess seal integrity and risks, from fracking to induced seismicity and leakage.
- Explore strategies for monitoring and ensuring safe, long-term CO₂ storage.
- Compare CCS in saline aquifers versus depleted gas fields.

Specially Designed For

This course is designed for technical staff, geoscientists, petrophysicists and engineers, most of whom will have had experience in oil and gas exploration and production projects; the course will allow you to adapt your existing petroleum skills for the new world of CCS. The course is also suitable for those from a technical background embarking on a career in the energy transition.

WHY YOU SHOULD ATTEND PETROSYNC'S EVENTS

- To ensure that all objectives of the course matches yours, all PetroSync programs are developed after intensive and extensive research within the industry
- PetroSync programs focus on your immediate working issues to ensure that you are able to apply and deliver immediate results in real work situations
- Application and implementation of industry knowledge and experience are the drivers for our course design, not theoretical academic lectures
- PetroSync training focuses on practical interactive learning tools and techniques including case studies, group discussions, scenarios, simulations, practical exercises and knowledge assessments during the course. Invest a small amount of your time to prepare before attending the course to ensure maximum learning
- PetroSync follows a rigorous selection process to ensure that all expert trainers have first-hand, up-to-date and practical knowledge and are leaders of their respective industrial discipline

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Training Agenda

Day 1: Overview

- Introductions and Context**
 Background on CCS and its role in reducing greenhouse gas emissions, with an exercise on changing greenhouse gas sources in developed nations.
- Geological Storage Options**
 Overview of CCS history, types of projects, and extend of need to scale up CCS, with a related exercise.
- Evidence and Projects**
 Insights into CO₂-EOR, saline aquifer CCS, hub and cluster plans, and typical injection rates.
- CO₂ Properties and Storage**
 Phase behaviour, trapping mechanisms, and storage quantification in saline aquifers vs. depleted gas fields, with an exercise on phase and depth effects
- Porosity in Storage Reservoirs**
 Typical values, porosity distribution in sandstones and carbonates
Case study and exercise: Porosity controls in CCS reservoirs.

Day 2

- Storage Efficiency**
 Factors influencing CO₂ trapping, including viscosity, buoyancy, and plume radius, with a comparison of efficiency in gas fields vs. saline aquifers. Exercise on storage efficiency influenced by (i) fluid viscosity and (ii) gravity effects.
- CO₂ Injectivity**
 Key role of permeability in injection rates, controls on permeability, and an exercise predicting injection rates
- Relative Permeability**
 Impact on CO₂ flow, formation damage, and intraformational baffles, with an exercise on predicting effect of formation damage on injection rates.
- Geomechanical Aspects**
 Effects of high-pressure CO₂ on stresses, fault failure, and intact rock behaviour in saline aquifers and gas fields. Exercise on safe maximum CO₂ injection pressure and thus injection rates.
- Mineral Dissolution Processes**
 Mechanisms, extent, and evidence of dissolution, and its effects on storage and injection rates.
Case study and exercise: The range effects of dissolution on CO₂ storage and injection rate.

Day 3

- Mineral Precipitation Processes**
 Causes, controls, and likely extent of mineral precipitation during CO₂ injection, including halite in saline aquifers and rapid mineral sequestration in basalts.
- Top-Seal Attributes**
 Mudstone porosity, geochemistry, and effects of CO₂, with an exercise on calculating maximum safe CO₂ column height.
- Leakage Risks**
 CO₂ diffusion and advection through top-seals, leakage via wells, and interaction with well materials. Exercise on predicting potential leakage rates from saline aquifers.
- Geomechanical Issues**
 Fault behavior under CO₂ pressure, fault reactivation risks, and fracturing evidence. Exercise on predicting uplift from CO₂ injection.
- Monitoring CO₂ Injection**
 Purposes, methods, costs, and regulatory requirements, with a focus on risk assessment using immediacy versus severity matrices.
Case study and synthesis comparing the successful Sleipner (Norway) and the terminated In Salah (Algeria) CCS projects in terms of perception of leakage risk

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Richard H. Worden is a Professor of Geology in the Department of Earth, Ocean, and Ecological Sciences at the University of Liverpool, UK. He earned a BSc in Geology and Geochemistry (1981–1984) and a PhD in Geology from the University of Manchester (1984–1988). After research at the University of Edinburgh, he worked as a sedimentary geochemist at BP Sunbury, contributing to reservoir and geochemistry projects. He later became a lecturer at Queen’s University Belfast before joining the University of Liverpool in 2000.

Prof. Worden collaborates with industry on advice, training, and joint research projects. His research focuses on geoscience applications in the energy transition (CO₂ and hydrogen storage, nuclear waste disposal) and subsurface reservoir and top-seal studies using geochemistry, geochemical modelling, sedimentology, petrophysics, geomechanics, and machine learning.

Major Project List

- Reservoir and top-seal CO₂ geochemical interaction, Viking CCS site, UK (2023)
- Reservoir and top-seal CO₂ geochemical interaction, Aegean Basin, Greece (2023)
- Review of CCS prospects, UK: geochemical perspective (2015-2016)
- Reservoir and top-seal geomechanical, petrophysical and petrographic properties in Acorn and East Mey, UK (2018-present)
- Geochemical modelling (Phreeqc) the effects of CO₂ on reservoirs, seals and engineered environments during geological carbon storage (2023-present)
- Top-seal geomechanical, petrophysical and petrographic properties in East Irish Sea and Southern North Sea, UK, (2013-present)
- Top-seal geomechanical, petrophysical and petrographic properties in Salah, Algeria (2004-2012)
- Application of natural CO₂-rich analogues to understand the behavior of injected CO₂ (1999)

Partial Client List

- | | |
|----------------------------------|-------------------------|
| ◦ BP | ◦ Energean |
| ◦ TotalEnergies | ◦ Harbour Energy |
| ◦ Pale Blue Dot (Storegga) | ◦ Eni |
| ◦ Saudi Aramco | ◦ Petrobras |
| ◦ Dong Energy | ◦ Equinor |
| ◦ CNOOC | ◦ Sonatrach |
| ◦ North Sea Transition Authority | ◦ Halliburton |
| ◦ Shell | ◦ CEPSA |
| ◦ Perenco | ◦ iSquared VC and more. |

IN-HOUSE SOLUTIONS

SAVE COST • IMPROVE PERFORMANCE • REDUCE RISK

PetroSync understands that in current economic climate, getting an excellent return on your training investment is critical for all our clients. This excellent training can be conducted exclusively for your organization. The training can be tailored to meet your specific needs at your preferred location and time. We will meet you anywhere around the globe.

If you like to know more about this excellent program, please contact us on +65 3159 0800 or email general@petrosync.com

INVESTMENT PACKAGES

Please checklist the package that you are attending!

	Masterclass on Carbon Capture and Storage SCHEDULES	LOCATION	PRICE
<input type="checkbox"/>	10 th - 12 th June 2026	Kuala Lumpur, Malaysia	USD 5,050
<input type="checkbox"/>	15 th - 17 th June 2026	Bangkok, Thailand	USD 5,050
<input type="checkbox"/>	18 th - 20 th November 2026	Kuala Lumpur, Malaysia	USD 5,050
<input type="checkbox"/>	23 rd - 25 th November 2026	Bali, Indonesia	USD 5,250

* All prices are subject to change without notice and are not guaranteed, except that prices for an order that have been accepted by PetroSync is not subject to change after acceptance.

* Price is nett excluding Withholding Tax if any and will be quoted separately. Please send us the withholding tax payment receipt.

DELEGATE DETAILS

1st Delegate Name _____ Mr Mrs Ms Dr Others

Direct Line Number: _____ Email: _____

Mobile Number: _____ Job Title: _____

Department: _____ Head of Department: _____

2nd Delegate Name _____ Mr Mrs Ms Dr Others

Direct Line Number: _____ Email: _____

Mobile Number: _____ Job Title: _____

Department: _____ Head of Department: _____

3rd Delegate Name _____ Mr Mrs Ms Dr Others

Direct Line Number: _____ Email: _____

Mobile Number: _____ Job Title: _____

Department: _____ Head of Department: _____

*Please fill all the details including mobile number. This help us to contact participant if they are late in class or if there is any urgent update (through whatsapp/call)

INVOICE DETAILS

Attention Invoice to: _____

Direct Line Number: _____ Fax: _____

Company: _____ Industry: _____

Address: _____ Postcode: _____

Country: _____ Email: _____

Please note:

- Indicate if you have already registered by Phone Fax Email Web

- If you have not received an acknowledgement before the training, please call us to confirm your booking.

PAYMENT METHODS

By Credit Card

By Direct Transfer : Please quote invoice number(s) on remittance advice

PetroSync Global Pte Ltd Bank details:

Account Name : PetroSync Global Pte Ltd

Bank Name : DBS Bank Ltd

Bank Code : 7171 • Bank Swift Code : DBSSSGSGXXX • Branch code : 288

Account No : 0288-002682-01-6-022 (USD)

Bank Address : 12 Marina Boulevard, Level 3. Marina Bay Financial Centre Tower 3. Singapore 018982

All bank charges to be borne by payer. Please ensure that PetroSync Global Pte Ltd receives the full invoiced amount.

Confirmation

I agree to PetroSync's payment terms and cancellation policy.

Signature : _____

Date : _____

PAYMENT TERMS : Payment is due in full at the time of registration. Full payment is mandatory for event attendance.

PROGRAMME CONSULTANT

Contact : Cay Aagen

Email : registration@petrosync.com

Phone : +65 3159 0800

TERMS AND CONDITIONS

DISCLAIMER

Please note that trainers and topics were confirmed at the time of publishing; however, PetroSync may necessitate substitutions, alterations or cancellations of the trainers or topics or location (classroom / Virtual). As such, PetroSync reserves the right to change or cancel any part of its published programme due to unforeseen circumstances. Any substitutions or alterations will be updated on our web page as soon as possible

DATA PROTECTION

The information you provide will be safeguarded by PetroSync that may be used to keep you informed of relevant products and services. As an international group we may transfer your data on a global basis for the purpose indicated above. If you do not want us to share your information with other reputable companies, please tick this box

CANCELLATION POLICY

Delegates who cancel after the training is officially confirmed run by email, are liable to pay the full course fee and no refunds will be granted. You may substitute delegates at any time as long as reasonable advance notice is given to PetroSync.

In the event that PetroSync cancels or postpones or change the trainer or change the training location (classroom / virtual) of an event for any reason and that the delegate is unable or unwilling to attend in on the rescheduled date, you will receive a credit voucher for 100% of the contract fee paid. You may use this credit voucher for another PetroSync to be mutually agreed with PetroSync, which must occur within a year from the date of postponement.

PetroSync is not responsible for any loss or damage as a result of the cancellation policy. PetroSync will assume no liability whatsoever in the event this event is cancelled, rescheduled or postponed due to any Act of God, fire, act of government or state, war, civil commotion, insurrection, embargo, industrial action, or any other reason beyond management control.

DETAILS

Please accept our apologies for mail or email that is incorrectly addressed.

Please email us at registration@petrosync.com and inform us of any incorrect details. We will amend them accordingly.

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CHARGES & FEE(S)

- For Payment by Direct TelegraphicTransfer, client has to bear both local and oversea bank charges.

- For credit card payment, there is additional 4% credit card processing fee.