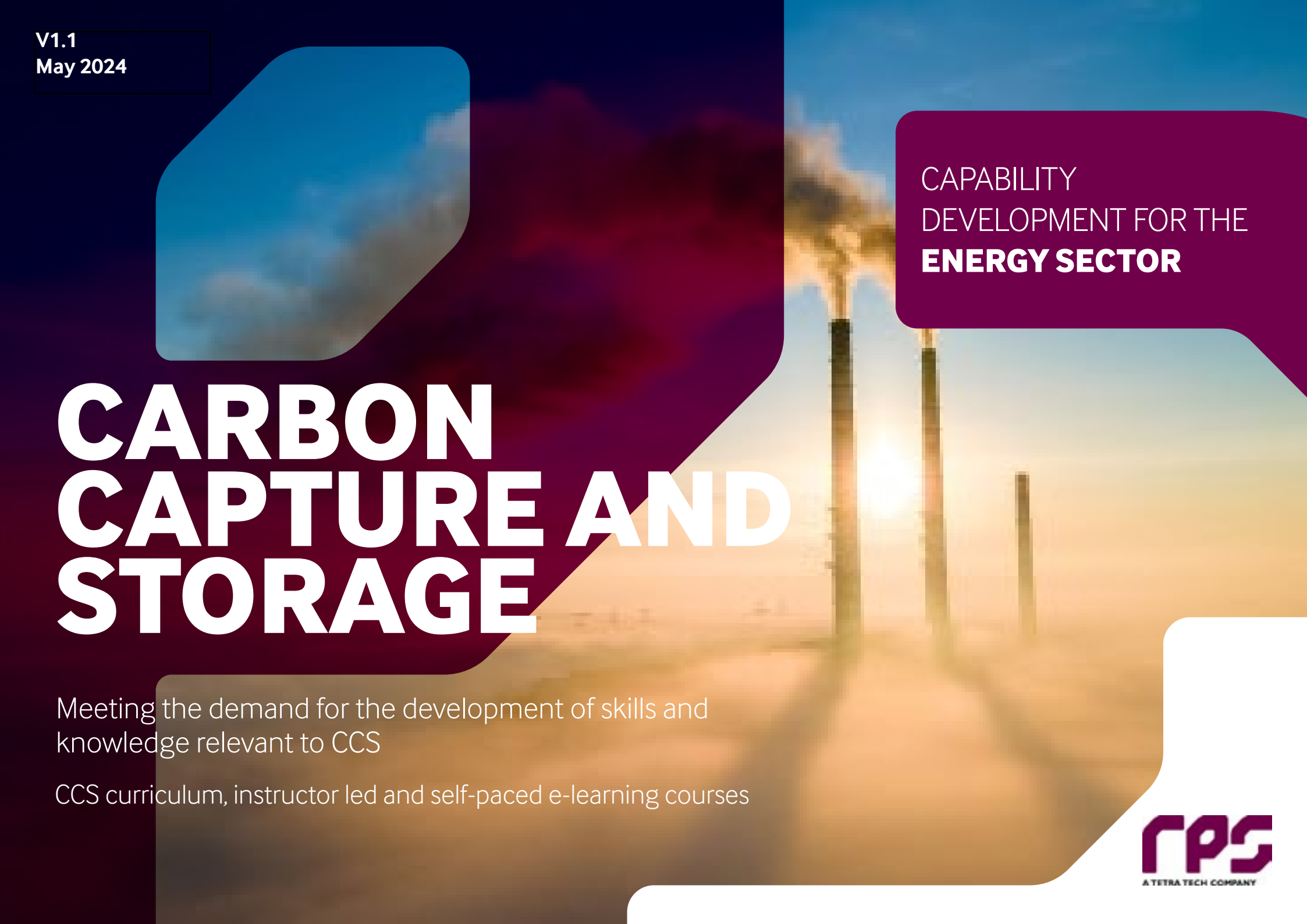
V1.1
May 2024

CAPABILITY DEVELOPMENT FOR THE **ENERGY SECTOR**

CARBON CAPTURE AND STORAGE

Meeting the demand for the development of skills and knowledge relevant to CCS

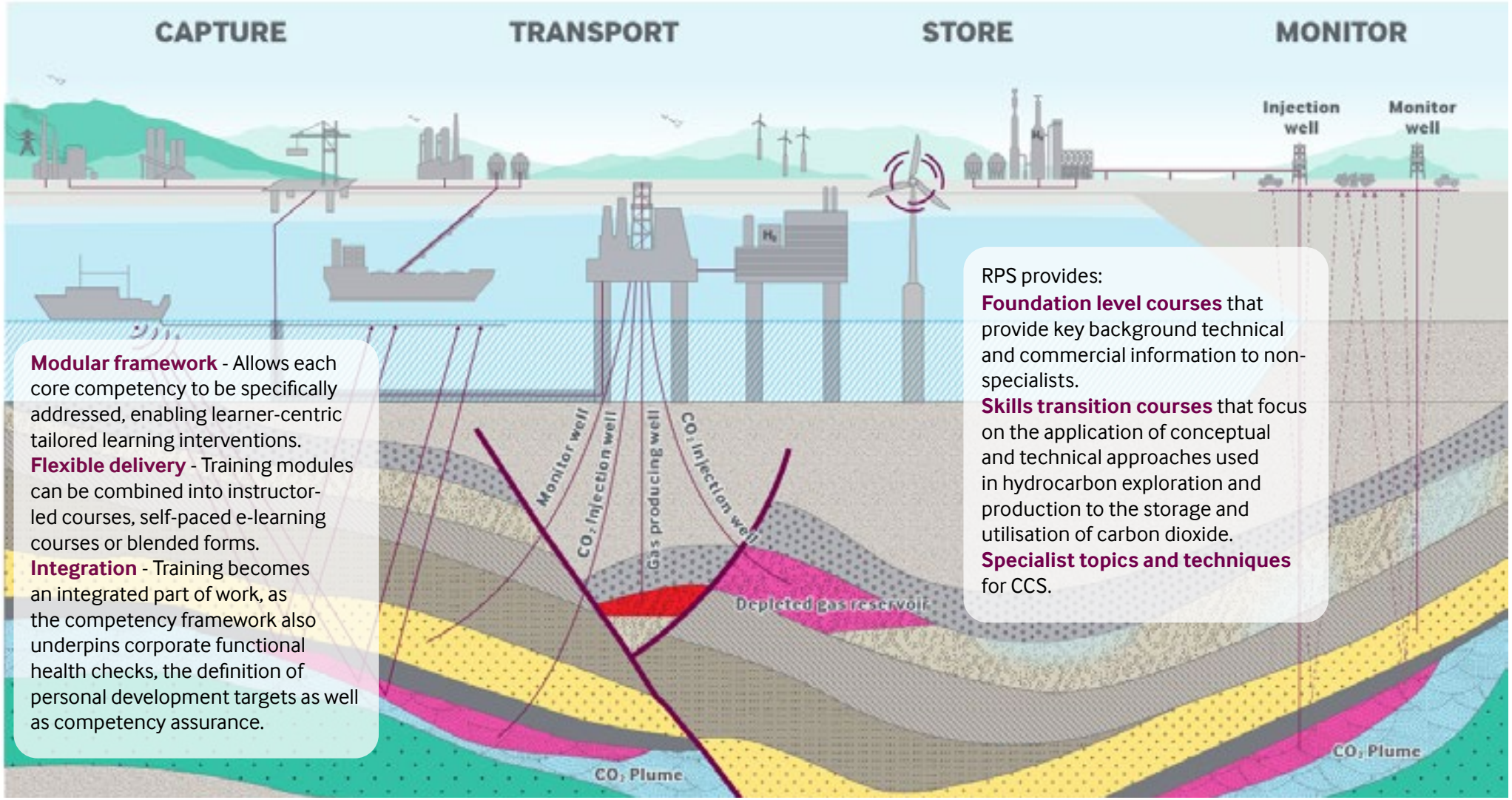
CCS curriculum, instructor led and self-paced e-learning courses



rps
A TETRA TECH COMPANY

CORPORATE CAPABILITY AND INDIVIDUAL SKILLS DEVELOPMENT FOR CARBON CAPTURE AND STORAGE (CCS)

Flexible and adaptable training options to meet the requirements for the energy sector



Modular framework - Allows each core competency to be specifically addressed, enabling learner-centric tailored learning interventions.
Flexible delivery - Training modules can be combined into instructor-led courses, self-paced e-learning courses or blended forms.
Integration - Training becomes an integrated part of work, as the competency framework also underpins corporate functional health checks, the definition of personal development targets as well as competency assurance.

RPS provides:
Foundation level courses that provide key background technical and commercial information to non-specialists.
Skills transition courses that focus on the application of conceptual and technical approaches used in hydrocarbon exploration and production to the storage and utilisation of carbon dioxide.
Specialist topics and techniques for CCS.

CARBON CAPTURE AND STORAGE (CCS) CURRICULUM

GENERAL COURSES - INSTRUCTOR LED

Foundational Understanding for CCS and Hyrogen Underground Storage

The course provides a practical introduction to CCS as a potentially effective technology for the reduction of CO_2 emissions from power generation units or chemical processing plants. The course includes an understanding of how to evaluate the economics of CCS projects and the future outlook of CCS worldwide.

Instructors: Srikanta Mishra

Code: N535 | **Duration:** 4 sessions or 2 days

Skill level: Foundation

MORE INFO

Repurposing Subsurface Petroleum Skills for CCUS

This course empowers attendees to develop and apply their skills to Carbon Capture Utilization and Storage (CCUS). Attendees will be guided through the lifecycle of a CCUS project with an emphasis on key concepts, processes, and workflows with a focus will be on developing the geoscience and engineering skills needed.

Instructors: Alex Bump, Seyyed Hosseini, Katherine Romanak

Code: N538 | **Duration:** 5 sessions or 3 days

Skill level: Skilled

MORE INFO

Subsurface Characterization, Screening and Site Selection for Geologic CO_2 Storage Sites

This course empowers attendees to develop and apply their skills to the growing industry of Carbon Capture Utilization and Storage. Attendees will be guided through the subsurface characterization and risk assessment of a storage site. Focus will be on the geologic needs for site definition, screening and development.

Instructors: Susan Hovorka

Code: N549 | **Duration:** 3 sessions or 2 days

Skill level: Skilled

MORE INFO

Carbon Capture and Storage for Geoscientists and Engineers

This course will provide participants with awareness and understanding of the subsurface needs of CCS projects including subsurface CO_2 storage volumetrics, CO_2 flow away from injector wells, the objective of permanent and safe storage of CO_2, and the key issues of well design and reservoir depth, lithology, quality, and architecture.

Instructors: Richard Worden

Code: N565 | **Duration:** 5 sessions or 3 days

Skill level: Foundation

MORE INFO

Outcrop Analogues for CO_2 Storage (Devon and Dorset, UK)

Using outcrop studies, participants will consider the effects of reservoir geometry, porosity, permeability, and geomechanical properties on CO2 flow patterns, storage, injectivity, reservoir strength, and behaviour at high fluid pressure. Analogues to top-seals for CCS sites will be considered, plus fault reactivation at elevated CO2 pressure, well design, and completions strategies.

Instructors: Howard Johnson, Richard Worden

Code: N577 | **Duration:** 5 Day Field Course

Skill level: Skilled

MORE INFO

The Economics of CCS Projects

This course will look at the factors likely to affect the emergence of a global "market or commodity price" for the transport and storage of CO_2.

Instructors: Andy Kirchin

Code: N668 | **Duration:** 2 sessions or 1 day

Skill level: Foundation

MORE INFO

GENERAL COURSES - SELF-PACED E-LEARNING

Fundamentals of CCS

This course provides participants with awareness and understanding of the subsurface needs of CCS projects. It will establish basics such as how much CCS is needed to make a difference to global warming and explore what types of CO2 injection have already happened including dedicated long-term CCS projects, pilot projects and CO2-enhanced oil recovery projects.

Code: EC003 | **Duration:** 5 hours

Skill level: Foundation

MORE INFO

Geological Storage of CO_2

This course provides participants with understanding of geological subsurface CO_2 storage volumetrics, CO_2 flow in the subsurface away from injector wells, the objective of permanent and safe storage of CO_2. It also covers the key issues of reservoir depth, well design, reservoir lithology, reservoir quality, and reservoir architecture.

Code: EC004 | **Duration:** 5 hours

Skill level: Foundation

MORE INFO

Behaviours of CO_2 in Reservoirs

The course addresses CO_2 as a fluid phase and the key question of CO_2 storage efficiency. The course will address the rate of CO_2 injection and the role reservoir permeability. The all-important issue of the geomechanical effects of CO_2 injection and feedbacks between induced mineral dissolution and rock strength and other rock properties will be addressed.

Code: EC005 | **Duration:** 6 hours

Skill level: Foundation

MORE INFO

Monitoring CO_2 Storage

This course considers the range of potential leakage mechanisms that need to be assessed. It will include a detailed consideration of the monitoring strategies available to assure the safety and integrity of the CO2 storage site.

Code: EC006 | **Duration:** 4 hours

Skill level: Foundation

MORE INFO

The Geoscience of CO_2 Storage

This package of Carbon Capture and Storage (CCS) self-paced e-learning courses will provide geoscientists and engineers with an awareness and understanding of subsurface CO2 storage, CO2 flow in the subsurface, and monitoring of the CO2 storage site. It addresses the key issues of reservoir depth, well design, reservoir lithology, and quality.

Code: EP001 | **Duration:** 20 hours

Skill level: Foundation

MORE INFO

SPECIALIST COURSES - INSTRUCTOR LED

Reservoir Modelling for Storage

This course will summarise the unique issues when modelling for storage. Participants will learn to consider fluid properties, heterogeneity, geomechanics, seismic monitoring, and scale. Modelling the 'storage complex' requires models that encompass not just the target reservoir, but also the surrounding rock volumes where the injected fluid plume is expected to migrate to.

Instructors: Tim Wynn

Code: N548 | **Duration:** 5 sessions or 3 days

Skill level: Foundation

MORE INFO

Monitoring Geologic CO_2 Storage Sites

Monitoring geological CO2 storage sites is a critical element of a CCS project and is generally required over all phases of a project and throughout the entire stratigraphy from reservoir to surface. The choice of tools and approach is highly specific to site conditions, project goals and regulatory requirements.

Instructors: Susan Hovorka, Katherine Romanak

Code: N553 | **Duration:** 3 sessions or 2 days

Skill level: Foundation

MORE INFO

Transforming 60-years of CO_2-EOR Experience into Shale Oil Recovery and CO_2 Sequestration

This course provides clear, concise and practical information for understanding and implementing the CO2 enhanced oil recovery into unconventional reservoirs. The recovery discussions will be complemented with technical discussions on the depleted wells for CO2 sequestration and carbon credit.

Instructors: Yucel Akkutlu

Code: N555 | **Duration:** 3 sessions or 6 days

Skill level: Skilled

MORE INFO

Understanding Faults and Fault Rupture – Applications to Fluid Trapping, Pressure Containment, and Induced Seismicity for Hydrocarbons and CCS (Utah, USA)

This course provides an analysis-level treatment of fault geometry, characterisation of trap effectiveness, and assessment of rupture hazard with application to hydrocarbon exploration, reservoir development and management, fluid pressure containment analysis for CCS, and induced seismicity hazard assessment.

Instructors: Peter Hennings, Robert Krantz

Code: N579 | **Duration:** 5 Day Field Course

Skill level: Skilled

MORE INFO

Storage Exploration – Screening and Selection of CO_2 Sites

This course considers the systematic evaluation of regional structure and stratigraphy to identify potential sites for geological storage of CO2, beginning with a wide range CCS development concepts, potentially encompassing onshore or offshore, new or adaptation of existing infrastructure and open aquifers as well as closed structures.

Instructors: Jim Lorsong, Pete Smith

Code: N584 | **Duration:** 3 sessions or 2 days

Skill level: Skilled

MORE INFO

CO_2 Containment and Storage Monitoring

The course considers physical mechanisms of stabilisation of injected CO2, as well as potential geological migration pathways. It considers design of an integrated, cost-effective monitoring programme to address site-specific subsurface and well CO2 containment risks.

Instructors: Jim Lorsong

Code: N585 | **Duration:** 3 sessions or 2 days

Skill level: Skilled

MORE INFO

SPECIALIST COURSES - INSTRUCTOR LED

Geomechanics for CCS Projects

Starting with some basics of geomechanics and working towards description and examples of sophisticated geomechanical modelling in the context of CCS, this course outlines the importance of geomechanics in CCS projects: caprock integrity, fault reactivation, induced seismicity, fracture influence on reservoir flow, reservoir management, drilling and completion parameters.

Instructors: Kes Heffer, Nick Koutsabeloulis

Code: N590 | **Duration:** 4 sessions or 2 days

Skill level: Skilled

MORE INFO

Geochemistry of CCS: Reservoirs, Seals and the Engineered Environment

The geochemistry of saline aquifers, depleted oil/gas fields and CO2 are considered alongside the reactions of CO2 with different reservoir rock minerals and cements. The course includes geochemical modelling, reactions within well bores and the monitoring of CCS sites.

Instructors: Richard Worden

Code: N591 | **Duration:** 4 sessions or 2 days

Skill level: Skilled

MORE INFO

Well Engineering for CO_2 Storage Applications

This course covers the design specifics of CO2 injection wells. Such wells may be existing or new wells which need to be designed with the challenges of CO2 injection in mind. The design includes the casing, cement, completion and all associated equipment. The challenges covered included potentially highly corrosive (to metals and cements) fluids, large temperature changes associated with potential phase changes.

Instructors: Jonathan Bellarby

Code: N592 | **Duration:** 5 sessions or 3 days

Skill level: Skilled

MORE INFO

Reservoir Characterisation and Simulation for CCS

A course that considers the geological features of storage sites, focussing on the heterogeneity and presence of faults which can lead to complex flow patterns. Flow simulation model objectives cover storage capacity, integrity assessment, development planning and operational monitoring.

Instructors: Andy Woods, Pete Smith

Code: N593 | **Duration:** 3 sessions or 2 days

Skill level: Skilled

MORE INFO

CO_2 Plume Behaviour in a Reservoir

This course explores the controls on the flow of a CO2 plume in a saline aquifer, the fraction of pore space occupied and the rate of dissolution in brine. It covers the controls on the migration of CO2 in the post-injection phase and modelling of how far the CO2 will spread.

Instructors: Andy Woods

Code: N594 | **Duration:** 2 sessions or 1 day

Skill level: Skilled

MORE INFO

SPECIALIST COURSES - SELF-PACED E-LEARNING

Petrophysics for CCS

This course considers the properties of carbon dioxide, contrasts its behaviour with that of methane and the interactions between CO2 and water in an aquifer. There is a review of some of the properties of CO2 that affect how different wireline logs respond to it, in particular the significant effects that the gas has on sonic and neutron log responses.

Code: EC007 | **Duration:** 7 hours

Skill level: Foundation

MORE INFO

Storage Exploration – Screening and Selection of CO_2 Sites

This course considers the systematic evaluation of regional structure and stratigraphy to identify potential sites for geological storage of CO2, beginning with a wide range CCS development concepts, potentially encompassing onshore or offshore, new or adaptation of existing infrastructure and open aquifers as well as closed structures.

Code: EC029

Skill level: Skilled

IN DEVELOPMENT

CO_2 Containment and Storage Monitoring

The course considers physical mechanisms of stabilisation of injected CO2, as well as potential geological migration pathways. It considers design of an integrated, cost-effective monitoring programme to address site-specific subsurface and well CO2 containment risks.

Code: EC030

Skill level: Skilled

IN DEVELOPMENT

Geomechanics for CCS Projects

Starting with some basics of geomechanics and working towards description and examples of sophisticated geomechanical modelling in the context of CCS, this course outlines the importance of geomechanics in CCS projects: caprock integrity, fault reactivation, induced seismicity, fracture influence on reservoir flow, reservoir management, drilling and completion parameters.

Code: EC031 | **Duration:** 6 hours

Skill level: Skilled

MORE INFO

Geochemistry of CCS Projects

The chemistry of saline aquifers, depleted oil/gas fields and CO2 are considered alongside the reactions of CO2 with different reservoir rock minerals and cements. The course includes geochemical modelling, reactions within well bores and the monitoring of CCS sites.

Code: EC032

Skill level: Skilled

IN DEVELOPMENT

Well Engineering for CO_2 Storage Applications

This course covers the design specifics of CO2 injection wells. Such wells may be existing or new wells which need to be designed with the challenges of CO2 injection in mind. The design includes the casing, cement, completion and all associated equipment.

Code: E033

Skill level: Skilled

IN DEVELOPMENT

SPECIALIST COURSES - SELF-PACED E-LEARNING

Reservoir Characterisation and Simulation for CCS

Course considers the geological features of storage sites, focussing on the heterogeneity and presence of faults which can lead to complex flow patterns. Flow simulation model objectives cover storage capacity, integrity assessment, development planning and operational monitoring.

Code: EC034

Skill level: Skilled

IN DEVELOPMENT

CO_2 Plume Behaviour in a Reservoir

This course considers the controls on the flow of a CO2 plume in a saline aquifer, the fraction of pore space occupied and the rate of dissolution in brine. It covers the controls on the migration of CO2 in the post-injection phase and modelling of how far the CO2 will spread.

Code: EC035

Skill level: Skilled

IN DEVELOPMENT

INTERACTIVE DEMOS

Fundamentals of CCS

LAUNCH MODULE

CO_2 in the Atmospere

LAUNCH MODULE

COURSE ACCESS

Scheduled courses

RPS delivers field, classroom and online courses focusing on core skills development and current challenges facing the E&P industry. Courses are delivered by instructors recognised as world class subject matter experts in their field, including industry leaders, professors and distinguished lecturers.

RPS' scheduled courses can be accessed through your corporate Nautilus Training Alliance (NTA) Membership or courses can be booked on-demand as required online by credit card or invoice.

Self-paced e-learning

Offered independently or as part of a blended learning program, RPS' bespoke e-learning solutions immerse learners in a rich variety of content and interactive media to provide a personalised learning experience. By providing access to the RPS e-learning catalogue or producing custom content, RPS can help organisations leverage technology to engage their learners in a dynamic and exciting digital learning environment.

With each new course, you will find an overview of what the course covers and what's associated with the specific course elements in the introductory module page. Specific competencies are addressed through videos, presentation materials, interactive quizzes, 3D models, text and voice-overs. Each module is designed for flexible learning and allows for variable periods of interaction with content to suit individual needs.

Courses can be accessed wither via a corporate license or can be booked on-demand as required online by credit card or invoice.

Inhouse courses

The same best in class virtual, field and classroom courses focusing on core skills development and current challenges but delivered inhouse for groups typically of 10 to 20 participants.

Courses delivered by instructors recognised as world class subject matter experts.

Designed to meet technical requirements – Learning events are tailored to address learning outcomes most relevant to the team in the workplace. Can include variations across all subject areas and specifics to address cross-disciplinary challenges. Established courses can be delivered off-the-shelf or customised to meet specific technical focus and level

Flexible locations – Either in your office, or virtually to provide training for participants in multiple locations

Flexible schedules – Delivered in continuous sessions, or distributed over a longer period of time to suit operational requirements

Efficient - Team focused training is a cost effective means of learning and development for technical staff with shared technical challenges

Book a course or make an Inhouse course enquiry:
training.rpsgroup.com/contact-us/

BLENDED LEARNING

A learning approach of building knowledge through interactive on-line modules with skills development in instructor-led virtual, classroom or field based workshops, exercises and scenario-based activities.

1 WHY

- Self-paced learning of foundation knowledge and skills followed by instructor-led sessions which focus on practical applications provides an efficient and effective blended pathway.

2 WHAT

- Based on the requirements of the organisation and the needs of the individual.
- Designed for cohorts of staff and scheduled as required.
- Self-paced learning modules are available as required.
- Instructor-led sessions may be in-person or virtual.
- Workshops concentrate on integrating knowledge and developing applications of skills through scenario-based exercises.

3 WHO

- Our approach is suitable for cohorts of staff in a wide range of roles in different sizes of organisation.
- Applicable to organisations or discipline sectors of all sizes and is particularly suitable for a distributed workforce.

4 HOW

MODULAR Allows creation of unique training pathways through on-line learning whilst retaining an integrated approach to skills development through classroom and field workshops.

FLEXIBLE Customised content is accompanied by flexibility of scheduling, fitting in with work patterns to be operationally friendly.

ADAPTABLE Methods of delivery are adaptable, with content provided as self-paced learning modules (where available) and/or instructor-led sessions in person or virtually.

COST EFFECTIVE More cost efficient than conventional classroom courses and more effective than on-line training in isolation.

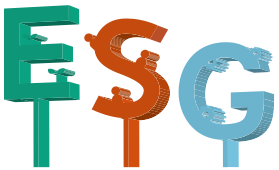
MORE INFO

5 SUBJECT AREAS

Carbon Management and Gas Transition

Oil and Gas

Sustainable Heat - Geothermal



Environmental, Social and Governance (ESG)

RPS | TRAINING

Our goal is to collaborate with our customers to develop the competencies and capability of their workforce through integrated learning that supports their roles and promotes individual development driving organisational excellence.

Our expertise brings flexible and scalable solutions from a diverse energy portfolio in the design, development of technical content and knowledge-based programmes delivered by expert instructors. Our technical and learning expertise help organisations develop the competencies, skills and knowledge they need to fulfill their collective potential.

The stand-out for our clients is that we use our deep expertise to solve problems that matter, making them easy to understand and we're easy to work with – Making complex easy.

www.training.rpsgroup.com

CONTACT

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NAUTILUS

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