# Training Course on Carbon Capture, Utilization and Storage (CCUS) Technologies

Professional Development Training Course Outline

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|---|---|---|---|
| **Category** | Oil and Gas | **Duration** | 10 Days |
| **Base Fee** | $3,000 USD | **Delivery Mode** | Online / On-site Hybrid |

## Course Introduction

As the global community intensifies its efforts to combat climate change and achieve net-zero emissions, Carbon Capture, Utilization, and Storage (CCUS) technologies have emerged as critical tools in the decarbonization strategy. CCUS not only reduces emissions from industrial processes and power generation but also offers solutions for the circular carbon economy, enabling the transformation of CO? into valuable products. This course provides a comprehensive and up-to-date learning experience focused on cutting-edge carbon management, energy transition, and climate mitigation solutions.

Training Course on Carbon Capture, Utilization & Storage (CCUS) Technologies is designed for professionals, researchers, and policymakers eager to deepen their understanding of low-carbon technologies, regulatory frameworks, and the latest CCUS innovations. Through 15 structured modules featuring real-world case studies, participants will learn about CO? capture methods, geological and non-geological storage options, economic feasibility, and safety protocols. The course is structured with interactive sessions, group work, and practical tools to ensure knowledge retention and real-world applicability.

## Programme Curriculum

**Training Course on Carbon Capture, Utilization & Storage (CCUS) Technologies**

**Introduction**

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**Course Objectives**

1. Understand the fundamentals of CCUS technology and its role in achieving net-zero emissions.
2. Identify different CO? capture techniques such as post-combustion, pre-combustion, and oxy-fuel combustion.
3. Analyze carbon utilization pathways including mineralization, fuels, and chemicals.
4. Evaluate geological storage methods including saline aquifers and depleted oil fields.
5. Examine the life cycle assessment of CCUS projects.
6. Understand the economic and financial models supporting CCUS deployment.
7. Navigate through policy, regulation, and legal frameworks governing CCUS.
8. Investigate the potential of Direct Air Capture (DAC) and Bioenergy with CCS (BECCS).
9. Explore public perception and stakeholder engagement in CCUS deployment.
10. Implement risk assessment and monitoring protocols for CO? leakage.
11. Utilize digital technologies such as AI and IoT in CCUS systems.
12. Study international case studies and success stories in CCUS adoption.
13. Develop a strategic plan for scaling up CCUS in industrial sectors.

**Target Audience**

1. Environmental Engineers
2. Climate Policy Makers
3. Oil & Gas Professionals
4. Energy Sector Planners
5. Academics and Researchers
6. Sustainability Consultants
7. Regulatory Authorities
8. Industrial Emission Managers

**Course Duration:** 10 days

**Course Modules**

**Module 1: Introduction to CCUS**

- Overview of climate change and carbon emissions
- History and evolution of CCUS technologies
- Types of CCUS: Capture, Utilization, Storage
- Importance in climate mitigation pathways
- Role in net-zero targets and ESG metrics
- **Case Study:** Norway's Sleipner CO? Storage Project

**Module 2: CO? Capture Technologies**

- Post-combustion capture
- Pre-combustion capture
- Oxy-fuel combustion
- Capture material types (amines, membranes)
- Capture efficiency vs. cost trade-offs
- **Case Study:** Petra Nova Project, Texas

**Module 3: Carbon Utilization Methods**

- Mineralization and construction materials
- CO? to fuels (methanol, syngas)
- CO? to chemicals and polymers
- Algae-based CO? utilization
- Techno-economic analysis of utilization
- **Case Study:** Carbon Clean Solutions, India

**Module 4: Geological Storage Solutions**

- Saline aquifers
- Depleted oil and gas fields
- Enhanced Oil Recovery (EOR)
- Site selection criteria
- Injection well design and management
- **Case Study:** Illinois Basin – Decatur Project

**Module 5: Non-Geological Storage Innovations**

- Mineral carbonation
- Ocean storage (ethical concerns)
- Solid carbon products
- Innovative capture-to-product cycles
- Long-term durability and monitoring
- **Case Study:** Carbfix Project, Iceland

**Module 6: Monitoring and Risk Management**

- CO? plume monitoring techniques
- Seismic and geophysical tracking
- Pressure monitoring and leak detection
- Risk assessment protocols
- Emergency response planning
- **Case Study:** Otway Project, Australia

**Module 7: Regulatory & Legal Frameworks**

- International CCUS policies (IPCC, EU)
- National regulations and compliance
- Liability frameworks and CO? ownership
- Cross-border storage agreements
- Permitting and environmental impact assessments
- **Case Study:** Canadian CCS Regulatory Framework

**Module 8: Economics and Financing**

- CAPEX and OPEX breakdown
- Revenue models (credits, taxes, products)
- Carbon markets and trading
- Public-private financing strategies
- Cost-benefit analysis tools
- **Case Study:** Boundary Dam CCS Project, Canada

**Module 9: Direct Air Capture (DAC)**

- DAC technology overview
- Sorbent materials and equipment
- Energy intensity and efficiency
- Integration with renewable energy
- Market potential for DAC services
- **Case Study:** Climeworks, Switzerland

**Module 10: Bioenergy with Carbon Capture (BECCS)**

- BECCS technology framework
- Feedstock and process integration
- Carbon negative potential analysis
- Land use and biomass sustainability
- Socioeconomic implications
- **Case Study:** Drax Power Station, UK

**Module 11: Digital Technologies in CCUS**

- AI for storage site monitoring
- Digital twin modeling

- IoT in pipeline and facility tracking
- Blockchain for carbon credit validation
- Predictive maintenance of CCUS equipment
- **Case Study:** Shell’s Digital CCUS Initiative

**Module 12: CCUS Infrastructure & Supply Chain**

- Pipeline transport systems
- Compression and dehydration units
- Storage site infrastructure
- Multi-user hubs and clustering
- CO? shipping and logistics
- **Case Study:** Northern Lights Project, Norway

**Module 13: Public Perception and Stakeholder Engagement**

- Communication strategies
- Education and community awareness
- Handling misinformation
- Transparency and social license to operate
- Inclusive policy-making
- **Case Study:** Quest Project Community Engagement

**Module 14: International Case Studies**

- Comparative analysis of global CCUS projects
- Government and private sector collaboration
- Lessons learned from failures and successes
- Key performance indicators and benchmarks
- Innovations across continents
- **Case Study:** Global CCS Institute Reports

**Module 15: Scaling Up & Future of CCUS**

- Roadmap to 2030 and 2050 goals
- Integrating CCUS with hydrogen and renewables
- Role of startups and entrepreneurs
- National deployment strategies
- Climate equity and developing nations
- **Case Study:** U.S. DOE CarbonSAFE Initiative

**Training Methodology**

- Instructor-led sessions with technical deep dives
- Interactive group discussions and workshops
- Hands-on case study analysis and problem-solving
- Visual simulations and modeling tools

- Access to a digital resource library and toolkits
- Real-world project assignments and presentations

**Register as a group from 3 participants for a Discount**

**Send us an email: info@fineskilltrainingcenter.org or call** *+254769199797*

***Certification***

*Upon successful completion of this training, participants will be issued with a globally- recognized certificate.*

***Tailor-Made Course***

*We also offer tailor-made courses based on your needs.*

**Key Notes**

**a.** The participant must be conversant with English.

**b.** Upon completion of training the participant will be issued with an Authorized Training Certificate

**c.** Course duration is flexible and the contents can be modified to fit any number of days.

**d.** The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

**e.** One-year post-training support Consultation and Coaching provided after the course.

**f.** Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

## Upcoming Scheduled Sessions

| Start Date | End Date | Location | Price |
|---|---|---|---|
| **23 Nov 2026** | 04 Dec 2026 | Online | $2,000 |
| **23 Nov 2026** | 04 Dec 2026 | Physical | $3,000 |
| **23 Nov 2026** | 04 Dec 2026 | Physical | $6,000 |
| **23 Nov 2026** | 04 Dec 2026 | Physical | $6,000 |
| **23 Nov 2026** | 04 Dec 2026 | Physical | $12,000 |

| Start Date | End Date | Location | Price |
|---|---|---|---|
| **23 Nov 2026** | 04 Dec 2026 | Physical | $9,000 |
| **23 Nov 2026** | 04 Dec 2026 | Physical | $12,000 |
| **23 Nov 2026** | 04 Dec 2026 | Physical | $12,000 |

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