Ocean Thermal Energy Conversion (OTEC) Training Course

Professional Development Training Course Outline

Category	Renewable Energy	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Ocean Thermal Energy Conversion (OTEC) is an emerging marine renewable energy technology that converts the natural temperature difference between warm surface seawater and cold deep seawater into useful energy. With growing demand for 24/7 clean power, energy security, decarbonization, blue-economy innovation, and climate-resilient infrastructure, OTEC is attracting renewed attention for tropical and subtropical islands, coastal communities, offshore systems, and specialized subsea applications. Current developments demonstrate progress from laboratory and demonstration systems toward offshore engineering: a 20 kW OTEC system completed successful sea trials in the South China Sea in 2026, while a purpose-built floating OTEC platform was installed in the Canary Islands.

Ocean Thermal Energy Conversion (OTEC) Training Course develops practical and strategic knowledge across thermodynamics, open-cycle and closed-cycle systems, heat exchangers, seawater intake systems, cold-water pipes, power conversion, site assessment, techno-economic analysis, environmental sustainability, offshore engineering, digital monitoring, and project development. The course follows a hands-on, case-study-driven approach consistent with contemporary marine-energy training, combining technical instruction with simulations, mini-projects, demonstrations, and applied problem-solving.

Programme Curriculum

Ocean Thermal Energy Conversion (OTEC) Training Course

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Course Duration

5 days

Course Objectives

By the end of the course, participants will be able to:

1. Understand OTEC fundamentals and the thermodynamic principles governing ocean thermal gradients.
2. Evaluate OTEC resource potential using oceanographic, temperature-profile, and site-characterization data.
3. Differentiate closed-cycle, open-cycle, and hybrid OTEC configurations and identify suitable applications.
4. Assess heat-exchanger technologies for efficient thermal energy transfer and system performance.
5. Analyze seawater intake and cold-water-pipe systems, including offshore engineering considerations.
6. Apply energy and exergy analysis to improve OTEC conversion efficiency and operational performance.
7. Develop preliminary OTEC system models using contemporary simulation and data-analysis approaches.
8. Evaluate techno-economic feasibility, including CAPEX, OPEX, levelized cost of energy, and lifecycle considerations.
9. Assess environmental and marine impacts while integrating ESG and sustainable blue-economy principles.
10. Explore hybrid applications including desalination, aquaculture, district cooling, hydrogen-related systems, and ocean monitoring.
11. Analyze real-world OTEC case studies from demonstration projects and emerging offshore developments.
12. Develop project-development strategies covering financing, stakeholder engagement, permitting, risk management, and commercialization.
13. Design an integrated OTEC concept project incorporating technical, economic, environmental, and operational considerations.

Target Audience

1. Renewable Energy Engineers and Energy Specialists
2. Mechanical, Marine, Ocean, and Offshore Engineers
3. Electrical, Power Systems, and Energy-Systems Professionals
4. Government Energy, Climate, and Infrastructure Officials
5. Utility Companies and Independent Power Producers
6. Researchers, Academics, and Postgraduate Students
7. Blue-Economy, Sustainability, and Environmental Professionals

8. Project Developers, Investors, Consultants, and Technology Entrepreneurs

Course Modules

Module 1: OTEC Fundamentals, Energy Transition & Blue Economy

- OTEC principles.
- Marine energy landscape
- Energy-transition drivers.
- Blue-economy opportunities
- Case study: Hawaii's early OTEC demonstration, including its 50 kW closed-cycle offshore system and deep-water intake.

Module 2: OTEC Cycles, Thermodynamics & System Architecture

- Closed-cycle OTEC.
- Open-cycle OTEC.
- Hybrid OTEC.
- Thermodynamic performance.
- Case study: the 20 kW South China Sea system, where offshore trials demonstrated technical feasibility and recorded a maximum output of 16.4 kW.

Module 3: Ocean Resource Assessment & Site Characterization

- Thermal-resource mapping
- Depth optimization
- Oceanographic datasets.
- Site-screening criteria
- Case study: Malaysia OTEC feasibility research using advanced data analytics and machine learning for thermal-resource and depth assessment.

Module 4: Heat Exchangers, Seawater Systems & Offshore Engineering

- Heat-exchanger design
- Cold-water pipes
- Seawater pumping
- Floating platforms
- Case study: the 2026 Canary Islands floating OTEC platform installation addressing major offshore deployment challenges.

Module 5: OTEC Power Conversion, Digitalization & Performance Optimization

- Power take-off systems
- System modeling.
- Digital OTEC
- Optimization
- Case study: 2026 compact OTEC research using AMESim-Simulink modeling and experimental validation of a hydraulic power-generation module.

Module 6: Integrated Applications & Sustainable Blue-Economy Systems

- OTEC desalination.

- District cooling.
- Aquaculture integration
- Ocean monitoring
- Case study: NOAA's 2026 Hawaii demonstration of an autonomous acoustic profiling float powered by OTEC, supporting extended marine monitoring without conventional battery limitations.

Module 7: Environmental, Economic, Regulatory & Project Development

- Environmental assessment
- Techno-economic analysis
- Regulatory frameworks
- Financing and commercialization
- Case study: emerging OTEC development pathways for island and coastal communities, where continuous renewable power can support energy security and reduce dependence on imported fuels.

Module 8: OTEC Project Design, Feasibility

- Concept development
- Pre-feasibility assessment
- Risk management
- Implementation roadmap
- Case study: teams develop an OTEC concept for a tropical coastal or island application and present its technical design, business case, sustainability strategy, and commercialization roadmap.

Training Methodology

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

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	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

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