Sustainable Cooling Technologies 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

Sustainable Cooling Technologies Training Course provides a practical, future-focused learning pathway for professionals, technicians, engineers, policymakers, educators, and organizations seeking to accelerate the transition toward energy-efficient, climate-friendly, low-GWP, and resilient cooling systems. Cooling demand is projected to rise sharply toward 2050, making sustainable cooling a critical component of climate action, energy transition, urban resilience, food security, and sustainable development. The course explores how passive cooling, high-efficiency equipment, low-GWP refrigerants, natural refrigerants, heat pumps, thermal energy storage, renewable-powered cooling, smart controls, and advanced building design can reduce energy consumption and greenhouse-gas emissions. The curriculum is aligned with emerging priorities under the Kigali Amendment, National Cooling Action Plans, the Paris Agreement, and the Global Cooling Pledge.

The programme emphasizes the whole-system approach to sustainable cooling: reducing cooling demand first, improving equipment efficiency, managing refrigerants throughout their lifecycle, and strengthening resilience and affordability. Participants examine real-world case studies covering efficient air conditioning, sustainable cold chains, passive buildings, alternative cooling technologies, and refrigerant-management programmes. Current international practice increasingly combines passive cooling, low-energy and hybrid cooling, efficient equipment, and HFC phase-down, while emerging technologies such as radiative cooling, advanced insulation, hybrid fan-AC systems, and solar-powered cooling are receiving growing attention.

Programme Curriculum

Sustainable Cooling Technologies Training Course

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Course Objectives

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

1. Understand the principles of Sustainable Cooling and its role in climate mitigation and adaptation.
2. Explain the Kigali Amendment and HFC phase-down requirements.
3. Evaluate energy-efficient HVAC&R technologies using performance indicators.
4. Identify appropriate low-GWP and natural refrigerant options.
5. Apply passive cooling and climate-responsive building-design strategies.
6. Assess heat pump technologies and electrification opportunities.
7. Design concepts for solar-powered and renewable-energy cooling.
8. Apply thermal energy storage and peak-load management approaches.
9. Improve refrigerant leak prevention, recovery, recycling, and reclamation practices.
10. Assess sustainable solutions for cold chains, food security, and healthcare refrigeration.
11. Explore smart cooling, IoT monitoring, automation, and digital energy management.
12. Develop National Cooling Action Plan and organizational cooling strategies.
13. Evaluate climate finance, green investment, lifecycle cost, and scalable cooling solutions.

Target Audience

1. HVAC&R engineers and technicians
2. Energy and sustainability professionals
3. Building designers, architects, and facility managers
4. Government officials and policymakers
5. Environmental and climate-change practitioners
6. Refrigeration and cold-chain professionals
7. Renewable-energy and energy-efficiency specialists
8. Researchers, trainers, consultants, and development-sector professionals

Course Modules

Module 1: Sustainable Cooling Fundamentals

- Cooling demand, climate change, energy use, and emissions
- **Direct and indirect emissions** from cooling systems
- Sustainable Cooling Pathway and **systems thinking**
- Climate resilience, thermal comfort, and cooling access
- **Case Study:** UNEP Sustainable Cooling Pathway and integrated cooling strategies

Module 2: Energy-Efficient Cooling Technologies

- **Energy efficiency**, COP, EER, SEER, and system performance
- High-efficiency air conditioners and refrigeration systems
- Minimum Energy Performance Standards (**MEPS**) and energy labels
- Variable-speed compressors, efficient fans, and smart controls
- **Case Study:** Kigali-linked efficiency programmes combining refrigerant transition with energy-efficiency improvements

Module 3: Low-GWP Refrigerants and the Kigali Transition

- **HFC phase-down** and refrigerant transition pathways
- Low-GWP and **natural refrigerants**
- Ammonia, CO?, hydrocarbons, and emerging alternatives
- Refrigerant selection, environmental performance, and lifecycle considerations
- **Case Study:** Commercial refrigeration transition toward **HC-290, R-744, and low-GWP alternatives**

Module 4: Passive, Hybrid, and Alternative Cooling

- Passive cooling and **demand reduction**
- Natural ventilation, shading, insulation, and reflective surfaces
- Green roofs, urban greening, and nature-based cooling
- **Radiative cooling, solid-state cooling, and hybrid cooling**
- **Case Study:** Emerging Alternative Cooling Technologies supporting Kigali implementation

Module 5: Heat Pumps, Renewable Energy, and Thermal Storage

- **Heat pump technology** and efficient electrification
- Solar-assisted and **solar-powered cooling**
- Thermal energy storage and peak-demand reduction
- Smart controls and renewable-energy integration
- **Case Study:** Renewable-powered cooling concepts for buildings and off-grid applications

Module 6: Sustainable Cold Chains and Refrigeration

- Sustainable refrigeration for **food, agriculture, healthcare, and logistics**
- Cold-chain energy efficiency and temperature management
- Refrigerant optimization and equipment selection
- Reducing **food loss, waste, and supply-chain emissions**
- **Case Study:** Low-GWP refrigeration pathways for food retail and food-service applications

Module 7: Refrigerant Lifecycle Management and Smart Servicing

- Refrigerant **leak detection and prevention**

- Recovery, recycling, reclamation, and responsible disposal
- Technician skills and **good servicing practices**
- Digital monitoring, maintenance analytics, and asset management
- **Case Study:** UNEP OzonAction's lifecycle refrigerant-management approach for circular cooling

Module 8: Cooling Policy, Finance, Innovation, and Implementation

- **National Cooling Action Plans** and integrated policy frameworks
- Cooling standards, regulations, procurement, and market transformation
- **Climate finance, green finance, carbon reduction, and investment**
- KPIs, monitoring, verification, and scalable implementation
- **Case Study:** National Cooling Action Plan methodology integrating buildings, appliances, refrigerants, cold chains, and energy systems

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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