Thermal Energy Recovery Systems (TERS) Training Course

Professional Development Training Course Outline

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

Course Introduction

Thermal Energy Recovery Systems (TERS) are at the forefront of modern energy efficiency, industrial decarbonization, and sustainable engineering solutions. As global industries shift toward net-zero emissions, waste heat utilization, and circular energy systems, the ability to capture and reuse thermal energy has become a critical competitive advantage. Thermal Energy Recovery Systems (TERS) Training Course provides a comprehensive understanding of waste heat recovery technologies, thermodynamic optimization, heat integration strategies, and advanced energy recovery architectures used across industrial, commercial, and power generation sectors.

This program is designed to equip engineers, energy managers, and technical professionals with practical and analytical skills in thermal energy auditing, system design, performance enhancement, and carbon footprint reduction. Participants will explore real-world applications in industries such as cement, steel, petrochemical, food processing, HVAC systems, and renewable energy integration, enabling them to implement high-impact energy recovery solutions, cost-saving innovations, and sustainability-driven engineering practices.

Programme Curriculum

Thermal Energy Recovery Systems (TERS) Training Course

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Course Duration

5 days

Course Objectives

1. Understand fundamentals of thermal energy recovery and heat transfer optimization
2. Identify and evaluate industrial waste heat sources and recovery opportunities
3. Design efficient heat exchanger networks and recovery systems
4. Apply thermodynamic principles in energy optimization
5. Analyze energy balance and heat integration techniques
6. Develop skills in combined heat and power (CHP) systems
7. Improve industrial efficiency through waste heat recovery boilers and economizers
8. Implement carbon reduction and sustainability strategies
9. Conduct energy audits and system performance assessments
10. Integrate renewable energy with thermal recovery systems
11. Evaluate economic feasibility using life cycle cost analysis (LCCA)
12. Apply digital tools for energy monitoring and predictive optimization
13. Develop compliance knowledge for global energy efficiency standards (ISO 50001)

Target Audience

1. Mechanical and Energy Engineers
2. Industrial Plant Managers
3. HVAC and Process Engineers
4. Renewable Energy Consultants
5. Sustainability and ESG Professionals
6. Power Plant Operators and Technicians
7. Manufacturing and Process Industry Specialists
8. Graduate Engineers and Technical Students

Course Modules

Module 1: Fundamentals of Thermal Energy Recovery

- Basics of heat transfer-conduction, convection, radiation
- Energy conservation laws and thermodynamics
- Types of waste heat sources in industries
- Introduction to energy recovery technologies
- **Case Study:** Cement kiln waste heat utilization system

Module 2: Waste Heat Identification & Analysis

- Thermal energy mapping techniques
- Flue gas and exhaust heat assessment
- Temperature-enthalpy analysis
- Heat loss quantification methods
- **Case Study:** Steel manufacturing waste heat recovery audit

Module 3: Heat Exchanger Systems Design

- Types of heat exchangers
- Heat exchanger network optimization
- Fouling and efficiency degradation control
- Material selection for high-temperature systems
- **Case Study:** Petrochemical plant heat exchanger retrofit

Module 4: Pinch Analysis & Energy Integration

- Composite curves and pinch technology
- Minimum energy requirement calculation
- Process integration strategies
- Energy targeting techniques
- **Case Study:** Refinery energy integration optimization

Module 5: Combined Heat and Power (CHP) Systems

- Cogeneration principles and configurations
- Gas turbines and steam turbine integration
- Efficiency improvement strategies
- Load balancing and operational control
- **Case Study:** Hospital CHP energy optimization system

Module 6: Industrial Waste Heat Recovery Technologies

- Economizers and recuperators
- Organic Rankine Cycle (ORC) systems
- Heat recovery steam generators (HRSG)
- Thermal storage systems
- **Case Study:** Glass manufacturing heat recovery implementation

Module 7: Digitalization & Smart Energy Systems

- IoT-based thermal monitoring systems
- AI-driven predictive energy optimization
- Digital twin modeling for thermal systems
- Energy management software tools
- **Case Study:** Smart factory predictive heat optimization

Module 8: Sustainability, Economics & Policy

- Carbon footprint reduction strategies
- Cost-benefit and ROI analysis
- Energy regulations and ISO 50001 compliance
- ESG reporting and sustainability frameworks

- **Case Study:** Food processing plant net-zero transition model

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- 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

Start Date	End Date	Location	Price
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

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now

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