Net-Zero Energy Buildings (NZEB) Training Course

Professional Development Training Course Outline

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

Course Introduction

Net-Zero Energy Buildings (NZEB) Training Course is designed to equip learners with advanced knowledge in sustainable architecture, carbon-neutral construction, and energy-efficient building systems. As the global construction industry shifts toward decarbonization, ESG compliance, green infrastructure, and climate-resilient urban development, NZEBs are becoming the benchmark for future-ready built environments. This course integrates renewable energy systems, passive design strategies, smart building technologies, and energy modeling tools to enable participants to design and manage buildings that produce as much energy as they consume annually.

With increasing global emphasis on net-zero carbon emissions, LEED certification, green building codes, and climate action frameworks, professionals must adapt to innovative construction practices and digital energy optimization tools. This training provides a comprehensive blend of theory, simulation, and real-world application, enabling learners to master solar integration, HVAC optimization, building energy analytics, IoT-based smart monitoring, and lifecycle sustainability assessment. By the end of the course, participants will be capable of leading next-generation sustainable building projects aligned with global net-zero targets and climate neutrality goals.

Programme Curriculum

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Course Duration

5 days

Course Objectives

1. Understand principles of Net-Zero Energy Building design and operations
2. Apply green building certification frameworks (LEED, BREEAM, EDGE)
3. Analyze building energy efficiency and carbon footprint reduction strategies
4. Design passive solar architecture and climate-responsive buildings
5. Integrate renewable energy systems (solar PV, wind microgrids)
6. Optimize HVAC systems for energy conservation and smart control
7. Implement building energy modeling (BEM) and simulation tools
8. Explore IoT and smart sensors for real-time energy monitoring
9. Evaluate life cycle assessment (LCA) of sustainable materials
10. Develop net-zero retrofit strategies for existing buildings
11. Apply AI and data analytics in smart building management
12. Align projects with ESG reporting and carbon neutrality goals
13. Prepare for global climate resilience and sustainable urban planning

Target Audience

1. Architects and Urban Planners
2. Civil and Structural Engineers
3. Energy Consultants and Auditors
4. Construction Project Managers
5. Sustainability and ESG Professionals
6. Government and Municipal Planners
7. Real Estate Developers
8. HVAC and Building Systems Engineers

Course Modules

Module 1: Fundamentals of Net-Zero Energy Buildings

- Concept of NZEB and global sustainability standards
- Energy balance: consumption vs generation
- Net-zero carbon vs net-zero energy distinction
- Regulatory frameworks and building codes

- Introduction to carbon neutrality pathways
- **Case Study:** Bullitt Center (Seattle) – World's leading commercial net-zero building

Module 2: Sustainable Architecture & Passive Design

- Climate-responsive architectural design
- Natural ventilation and daylight optimization
- Building orientation and shading strategies
- Thermal insulation and envelope efficiency
- Passive heating and cooling systems
- **Case Study:** BedZED Eco-Village (UK) passive design success model

Module 3: Renewable Energy Integration in Buildings

- Solar photovoltaic system design
- Wind and hybrid microgrid systems
- Battery storage and smart energy distribution
- Net metering and energy export systems
- Off-grid vs grid-connected NZEB models
- **Case Study:** The Edge Building (Amsterdam) solar-integrated smart office

Module 4: Energy Modeling & Simulation Tools

- Building Energy Modeling (BEM) fundamentals
- Software tools (EnergyPlus, IESVE, DesignBuilder)
- Simulation of energy performance scenarios
- Optimization of building systems
- Data-driven design decisions
- **Case Study:** Singapore Green Mark Platinum buildings using advanced simulation

Module 5: Smart Buildings & IoT Systems

- IoT sensors for energy monitoring
- Smart lighting and adaptive control systems
- AI-driven building automation
- Occupancy-based energy optimization
- Predictive maintenance systems
- **Case Study:** Salesforce Tower smart energy ecosystem (San Francisco)

Module 6: HVAC Optimization & Energy Efficiency

- High-efficiency HVAC system design
- Heat recovery ventilation systems
- Variable refrigerant flow (VRF) systems
- Demand-controlled ventilation strategies
- Energy-efficient cooling technologies
- **Case Study:** Pearl River Tower HVAC-integrated wind-assisted cooling design

Module 7: Sustainable Materials & Life Cycle Assessment

- Low-carbon construction materials
- Embodied energy analysis

- Recycling and circular construction economy
- Green concrete and bio-based materials
- LCA methodologies and tools
- **Case Study:** One Angel Square (UK) sustainable material optimization model

Module 8: Net-Zero Retrofitting & Urban Sustainability

- Retrofitting existing buildings to NZEB standards
- Energy auditing and benchmarking
- Urban-scale decarbonization strategies
- Smart cities and digital twins
- Policy-driven sustainability transformation
- **Case Study:** Empire State Building retrofit energy reduction project

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
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:

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