Energy Modeling in Buildings 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

Energy Modeling in Buildings is a cutting-edge, data-driven discipline that integrates building physics, simulation software, HVAC optimization, and sustainability analytics to design and operate high-performance, energy-efficient structures. As global demand for net-zero buildings, green construction, and carbon-neutral cities accelerates, energy modeling has become a critical skill for architects, engineers, and sustainability professionals. Energy Modeling in Buildings Training Course provides a comprehensive understanding of how to predict, analyze, and optimize building energy performance using advanced simulation tools and real-world datasets.

The course bridges theory and practice by combining building energy simulation (BES), BIM integration, climate-responsive design, renewable energy systems, and AI-driven optimization techniques. Participants will gain hands-on expertise in reducing energy consumption, operational costs, and carbon emissions, while improving occupant comfort and regulatory compliance. With increasing global emphasis on ESG standards, LEED certification, and climate resilience, this course prepares professionals to lead the transition toward sustainable built environments.

Programme Curriculum

Energy Modeling in Buildings Training Course

Introduction

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Course Duration

5 days

Course Objectives

1. Master building energy simulation (BES) techniques
2. Apply net zero energy building (NZEB) principles
3. Optimize HVAC system performance and efficiency
4. Analyze carbon footprint reduction strategies
5. Integrate BIM with energy modeling workflows
6. Use dynamic thermal simulation tools effectively
7. Evaluate renewable energy integration in buildings
8. Improve indoor environmental quality (IEQ) metrics
9. Conduct climate-responsive architectural design analysis
10. Implement energy efficiency retrofitting strategies
11. Understand building performance benchmarking systems
12. Apply AI and machine learning in energy forecasting
13. Achieve compliance with LEED, BREEAM, and EDGE certification standards

Target Audience

1. Architects and architectural designers
2. Mechanical and HVAC engineers
3. Energy consultants and auditors
4. Sustainability and ESG professionals
5. Construction and project managers
6. Urban planners and smart city developers
7. Building services engineers
8. Facility and operations managers

Course Modules

Module 1: Fundamentals of Building Energy Modeling

- Principles of thermodynamics in buildings
- Heat transfer mechanisms
- Energy balance concepts in built environments
- Overview of simulation tools
- Introduction to climate data usage in modeling

- **Case Study:** Energy analysis of a mid-rise office building in a tropical climate to reduce cooling loads by 18%.

Module 2: Building Information Modeling (BIM) Integration

- BIM workflow for energy modeling
- Data exchange between BIM and simulation tools
- Geometry simplification techniques
- Material property mapping for simulations
- Interoperability challenges and solutions
- **Case Study:** Converting a BIM model of a commercial complex into an energy simulation model for performance optimization.

Module 3: HVAC Systems and Energy Efficiency

- HVAC load calculation methods
- System sizing and optimization strategies
- Variable air volume (VAV) systems analysis
- Heat recovery and energy-saving technologies
- Smart HVAC control systems
- **Case Study:** Optimization of HVAC systems in a hospital reducing energy consumption by 22%.

Module 4: Climate-Responsive Design Strategies

- Passive design principles
- Orientation and shading analysis
- Natural ventilation modeling
- Thermal comfort standards
- Daylighting simulation techniques
- **Case Study:** Passive cooling design for a residential apartment reducing reliance on air conditioning by 30%.

Module 5: Renewable Energy Integration in Buildings

- Solar photovoltaic system modeling
- Wind and hybrid energy systems
- Net metering and energy storage systems
- Building-integrated photovoltaics (BIPV)
- Energy payback period analysis
- **Case Study:** Integration of rooftop solar PV in a university campus achieving 40% energy offset.

Module 6: Energy Simulation Tools and Software

- EnergyPlus, OpenStudio, DesignBuilder overview
- Parametric modeling techniques
- Sensitivity analysis in simulations
- Calibration of simulation models
- Data visualization and reporting
- **Case Study:** Simulation-based retrofit analysis of an old government building improving efficiency by 25%.

Module 7: Carbon Emissions and Sustainability Metrics

- Carbon accounting in buildings
- Life Cycle Assessment (LCA) basics
- Embodied vs operational carbon
- ESG reporting frameworks
- Carbon neutrality pathways
- **Case Study:** Carbon footprint reduction strategy for a retail mall achieving LEED Gold certification.

Module 8: Advanced AI and Optimization in Energy Modeling

- Machine learning for energy prediction
- Predictive maintenance in buildings
- Optimization algorithms for energy use
- Smart building automation systems
- IoT integration in energy monitoring
- **Case Study:** AI-based energy optimization in a smart office building reducing peak demand by 28%.

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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