Building Envelope Engineering 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

Building Envelope Engineering is a critical discipline in modern construction that focuses on the design, performance, and optimization of a building's external shell, including walls, roofs, façades, windows, insulation systems, air/vapor barriers, and thermal bridges. In today's rapidly evolving construction industry, high-performance building envelopes are essential for achieving energy efficiency, sustainability, green building certification, net-zero energy goals, and climate-resilient infrastructure. Building Envelope Engineering Training Course is designed to equip professionals with advanced knowledge in building physics, hygrothermal analysis, thermal performance optimization, air leakage control, waterproofing systems, and façade engineering technologies.

With increasing global demand for LEED-certified buildings, BREEAM compliance, carbon-neutral construction, and smart building integration, building envelope engineering has become a cornerstone of modern architectural and structural design. Participants will gain hands-on expertise in energy modeling, condensation risk analysis, façade system selection, high-performance insulation materials, and advanced construction detailing. The course integrates real-world case studies, simulation-based learning, and industry best practices to ensure professionals can design, evaluate, and troubleshoot complex building envelope systems for both commercial and residential projects.

Programme Curriculum

Building Envelope Engineering Training Course

Introduction

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Course Duration

5 days

Course Objectives

1. Master Building Envelope Performance Optimization Techniques
2. Understand Thermal Bridging Analysis and Mitigation Strategies
3. Apply Energy Efficiency Design Principles for Sustainable Buildings
4. Evaluate Air Tightness and Infiltration Control Systems
5. Develop skills in Moisture Control and Condensation Risk Management
6. Implement High-Performance Façade Engineering Solutions
7. Learn Green Building Certification Standards (LEED, BREEAM)
8. Analyze Hygrothermal Behavior of Building Materials
9. Design Net-Zero Energy Building Envelopes
10. Utilize Advanced Building Simulation and Modeling Tools
11. Optimize Insulation Systems for Climate-Specific Conditions
12. Integrate Smart Building Envelope Technologies (IoT & Sensors)
13. Conduct Lifecycle Assessment of Building Envelope Systems

Target Audience

1. Architects and Architectural Designers
2. Civil and Structural Engineers
3. Mechanical (HVAC) Engineers
4. Construction Project Managers
5. Sustainability and Green Building Consultants
6. Façade Engineers and Specialists
7. Building Inspectors and Quality Control Engineers
8. Real Estate Developers and Facility Managers

Course Modules

Module 1: Fundamentals of Building Envelope Systems

- Components of building envelope (walls, roofs, façades)
- Heat transfer mechanisms in buildings

- Role of envelope in energy efficiency
- Introduction to building physics principles
- Envelope performance benchmarking
- **Case Study:** Analysis of a high-rise commercial tower with poor thermal performance leading to high energy consumption and retrofit solutions.

Module 2: Thermal Performance & Energy Efficiency

- U-value and R-value calculations
- Thermal bridging identification
- Energy loss reduction strategies
- Passive design integration
- Climate-responsive envelope design
- **Case Study:** Passive cooling optimization in a tropical residential building reducing HVAC load by 35%.

Module 3: Moisture Control & Condensation Management

- Vapor diffusion and control layers
- Dew point analysis
- Mold and deterioration prevention
- Waterproofing systems design
- Climate-based moisture risk assessment
- **Case Study:** Hospital façade failure due to condensation issues and corrective redesign strategy.

Module 4: Air Tightness & Infiltration Control

- Air barrier system design
- Blower door testing methodology
- Leakage detection techniques
- Energy loss due to infiltration
- Sealing and detailing best practices
- **Case Study:** Office building achieving 40% energy savings after air leakage remediation program.

Module 5: Façade Engineering & Material Technology

- Curtain wall systems and glazing technologies
- High-performance insulation materials
- Smart glass and dynamic façades
- Structural glazing systems
- Fire safety and façade integrity
- **Case Study:** Smart façade implementation in a commercial skyscraper improving daylighting and reducing cooling demand.

Module 6: Sustainable & Green Building Design

- LEED and BREEAM compliance requirements
- Embodied carbon in building envelopes
- Sustainable material selection
- Renewable energy integration in envelopes
- Net-zero building strategies
- **Case Study:** Green-certified university campus achieving net-zero operational energy.

Module 7: Digital Modeling & Simulation Tools

- BIM integration for envelope design
- Energy modeling software applications
- Thermal simulation techniques
- CFD analysis for façade performance
- Digital twin technology in buildings
- **Case Study:** BIM-based redesign of a stadium envelope improving ventilation and reducing energy costs.

Module 8: Advanced Envelope Systems & Smart Technologies

- IoT-enabled smart façades
- Adaptive building envelopes
- Phase change materials (PCM)
- Responsive shading systems
- Future trends in envelope engineering
- **Case Study:** Smart office building with automated shading system reducing peak cooling loads 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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