Generative Design in Architecture Training Course

Professional Development Training Course Outline

Category	Architectural Engineering	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Generative Design in Architecture is revolutionizing the way buildings, spaces, and urban environments are conceived by integrating computational design, artificial intelligence, parametric modeling, and algorithm-driven creativity. Generative Design in Architecture Training Course empowers architects, designers, and engineers to move beyond traditional design methods and embrace AI-powered architectural innovation, data-driven design optimization, and computational creativity workflows. Participants will learn how to generate multiple high-performance design solutions using tools such as Grasshopper, Rhino, Dynamo, and AI-based generative design platforms, enabling faster decision-making and more sustainable outcomes.

In today's rapidly evolving built environment industry, generative design is a key driver of smart cities, sustainable architecture, BIM integration, and performance-based design optimization. This course bridges the gap between architecture and emerging technologies, allowing professionals to create structures that are not only aesthetically advanced but also environmentally responsive and structurally efficient. By leveraging machine learning in architecture, algorithmic design systems, and cloud-based simulation tools, learners will gain the ability to transform complex design challenges into optimized, intelligent, and future-ready architectural solutions.

Programme Curriculum

Generative Design in Architecture Training Course

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Course Duration

10 days

Course Objectives

1. Understand fundamentals of Generative Design in Architecture and computational design thinking
2. Apply parametric modeling techniques using Grasshopper and Rhino
3. Integrate Artificial Intelligence (AI) in architectural design workflows
4. Develop skills in algorithmic and rule-based design systems
5. Use BIM-integrated generative design for smart building solutions
6. Optimize building performance using data-driven simulation tools
7. Explore sustainable architecture and energy-efficient design systems
8. Create multi-variant design iterations using generative algorithms
9. Apply machine learning for spatial optimization and form generation
10. Implement cloud-based collaborative design environments
11. Enhance decision-making using performance-based architectural analysis
12. Develop innovative solutions for urban design and smart city planning
13. Master workflows for future-ready digital architecture and AI-assisted design

Target Audience

1. Architects and Architectural Designers
2. Urban Planners and City Designers
3. Interior Designers and Spatial Designers
4. Civil and Structural Engineers
5. BIM Specialists and CAD Technicians
6. Architecture Students and Research Scholars
7. Computational Design Enthusiasts
8. Construction Technology and PropTech Professionals

Course Modules

Module 1: Introduction to Generative Design in Architecture

- Evolution of computational architecture
- Principles of generative systems
- Role of AI in design innovation

- Parametric vs traditional design
- Overview of digital architecture tools
- **Case Study:** Zaha Hadid Architects' parametric design approach

Module 2: Computational Design Thinking

- Algorithmic thinking fundamentals
- Design logic structuring
- Rule-based modeling systems
- Design iteration strategies
- Creative coding basics
- **Case Study:** ICD/ITKE Research Pavilion, University of Stuttgart

Module 3: Parametric Modeling with Grasshopper

- Grasshopper interface and workflow
- Parametric geometry creation
- Data-driven design structures
- Adaptive design components
- Visual scripting techniques
- **Case Study:** Beijing National Stadium (Bird's Nest) design logic

Module 4: Rhino for Advanced Architectural Modeling

- 3D modeling techniques
- Surface and mesh generation
- Complex geometries creation
- Integration with Grasshopper
- Visualization techniques
- **Case Study:** Heydar Aliyev Center

Module 5: AI in Architectural Design

- Machine learning fundamentals
- AI-assisted form generation
- Predictive design modeling
- Neural networks in architecture
- AI design tools overview
- **Case Study:** Autodesk Generative Design projects

Module 6: BIM and Generative Design Integration

- BIM workflow fundamentals
- Generative BIM coordination
- Data exchange systems
- Clash detection automation
- Digital twin integration
- **Case Study:** Singapore Smart Nation BIM initiative

Module 7: Algorithmic Design Systems

- Rule-based design logic

- Recursive design algorithms
- Evolutionary design systems
- Parametric constraints setup
- Optimization loops
- **Case Study:** Foster + Partners' algorithmic skyscrapers

Module 8: Sustainable Generative Architecture

- Energy-efficient design modeling
- Environmental simulation tools
- Carbon footprint optimization
- Climate-responsive architecture
- Green building automation
- **Case Study:** The Edge Building, Amsterdam

Module 9: Performance-Based Design Optimization

- Structural performance analysis
- Wind and load simulation
- Lighting optimization systems
- Acoustic performance modeling
- Iterative refinement methods
- **Case Study:** Shanghai Tower aerodynamic design

Module 10: Urban Generative Design Systems

- Smart city modeling
- Urban density optimization
- Infrastructure simulation
- Spatial planning algorithms
- Transport network design
- **Case Study:** Masdar City, UAE

Module 11: Machine Learning for Architecture

- Data training models
- Predictive spatial analysis
- Pattern recognition in design
- AI clustering for space planning
- Generative adversarial networks (GANs)
- **Case Study:** AI-driven housing layouts research projects

Module 12: Digital Fabrication and Prototyping

- CNC and 3D printing workflows
- Parametric fabrication techniques
- Material behavior simulation
- Rapid prototyping systems
- Robotic construction methods
- **Case Study:** 3D printed architectural structures by ICON

Module 13: Cloud-Based Collaborative Design

- Real-time design collaboration
- Cloud BIM platforms
- Version control systems
- Distributed design workflows
- Remote simulation tools
- **Case Study:** BIM 360 collaborative construction projects

Module 14: Advanced Visualization Techniques

- Real-time rendering engines
- VR and AR in architecture
- Immersive design experiences
- Unreal Engine workflows
- Photorealistic visualization
- **Case Study:** Walkthrough simulations for mega projects

Module 15: Final Generative Design Studio Project

- End-to-end design workflow
- Problem statement definition
- Multi-iteration generative modeling
- Optimization and refinement
- Professional presentation techniques
- **Case Study:** Student-led smart eco-city prototype

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	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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