Digital Morphogenesis 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

Introduction

Digital Morphogenesis is an advanced interdisciplinary discipline that merges computational design, generative algorithms, biomimicry, AI-driven architecture, parametric modeling, and data-driven fabrication to create adaptive, self-evolving digital and physical systems. Digital Morphogenesis Training Course equips learners with cutting-edge capabilities in algorithmic form-finding, AI-assisted design intelligence, simulation-based optimization, and next-generation digital fabrication workflows. Participants will explore how nature-inspired computational logic can be translated into scalable design systems used in architecture, product design, urban systems, robotics, and immersive digital environments.

In an era defined by Industry 5.0, artificial intelligence integration, sustainable design innovation, and smart material systems, Digital Morphogenesis stands at the intersection of creativity and computation. This course enables professionals and students to master parametric ecosystems, generative AI design pipelines, evolutionary algorithms, and computational geometry to build intelligent, adaptive, and optimized design solutions. By combining theory, hands-on labs, and real-world simulations, learners will develop the ability to design systems that evolve, respond, and self-optimize in real time

Programme Curriculum

Digital Morphogenesis Training Course

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Course Duration

10 days

Course Objectives

1. Master Generative AI Design Systems
2. Understand Computational Morphogenesis Principles
3. Develop skills in Parametric & Algorithmic Modeling
4. Apply Biomimicry in Digital Design Systems
5. Build AI-driven Architectural Workflows
6. Optimize structures using Evolutionary Algorithms
7. Integrate Simulation-Based Design Intelligence
8. Learn Data-Driven Fabrication Techniques
9. Explore Smart Materials & Adaptive Systems
10. Design using Computational Geometry Frameworks
11. Implement Digital Twin Technologies
12. Create Sustainable Generative Ecosystems
13. Apply Human-AI Collaborative Design Processes

Target Audience

- Architecture students & professionals
- Industrial & product designers
- Urban planners & smart city developers
- AI & computational design researchers
- Game design & VFX artists
- Engineering and robotics innovators
- Fabrication & digital manufacturing experts
- Creative technologists & innovation consultants

Course Modules

Module 1: Foundations of Digital Morphogenesis

- Introduction to morphogenetic theory
- Biological inspiration in computation
- History of generative design
- Systems thinking fundamentals
- Case Study: Antoni Gaudí’s organic architecture reinterpretation

Module 2: Computational Design Principles

- Algorithmic thinking basics
- Rule-based design systems
- Parametric relationships
- Data structures for design
- Case Study: Zaha Hadid Architects workflow systems

Module 3: Generative AI in Design

- AI-driven ideation models
- Prompt-based design generation
- Neural design networks
- Creative automation tools
- Case Study: AI-generated architectural prototypes (Hypar systems)

Module 4: Parametric Modeling

- Grasshopper & node-based design
- Dynamic parameter control
- Adaptive geometries
- Constraint-based systems
- Case Study: Beijing National Stadium structural logic

Module 5: Evolutionary Algorithms

- Genetic algorithms in design
- Fitness optimization models
- Iterative design evolution
- Multi-objective optimization
- Case Study: Airbus structural optimization projects

Module 6: Biomimicry Systems

- Nature-inspired algorithms
- Self-organizing systems
- Cellular structures
- Adaptive growth patterns
- Case Study: Eastgate Centre passive cooling system

Module 7: Computational Geometry

- Mesh generation systems
- Surface subdivision techniques
- Voronoi and fractal systems
- Spatial transformations
- Case Study: ICD/ITKE Research Pavilion

Module 8: Digital Fabrication

- CNC, 3D printing, robotic fabrication
- Material-aware design

- Toolpath generation
- Additive manufacturing systems
- Case Study: MX3D 3D-printed bridge

Module 9: Simulation-Based Design

- Structural simulation tools
- Environmental analysis systems
- Physics-based modeling
- Stress and load optimization
- Case Study: Skyscraper wind simulation systems

Module 10: Smart Materials & Responsive Systems

- Shape-memory materials
- Responsive facades
- Adaptive surfaces
- Sensor-integrated systems
- Case Study: Media-TIC Building Barcelona

Module 11: AI + Human Collaboration Design

- Co-creative AI systems
- Human-in-the-loop design
- Design intelligence augmentation
- Ethical AI in design
- Case Study: Autodesk generative design platform

Module 12: Digital Twins & Real-Time Systems

- Virtual-physical synchronization
- IoT integration
- Real-time monitoring systems
- Predictive modeling
- Case Study: Singapore Smart City digital twin

Module 13: Urban Morphogenesis

- Generative city planning
- Adaptive infrastructure systems
- Crowd simulation modeling
- Sustainable urban ecosystems
- Case Study: Masdar City development

Module 14: Advanced Computational Workflows

- Multi-software integration
- Pipeline automation
- Cloud-based design systems
- Data interoperability
- Case Study: Foster + Partners digital workflows

Module 15: Capstone Project – Morphogenetic System Design

- End-to-end generative project
- AI + parametric integration
- Simulation + fabrication output
- Presentation & critique
- Case Study: Student-led adaptive pavilion systems

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

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

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