Urban Climate Modeling 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

Urban Climate Modeling is a cutting-edge interdisciplinary field that integrates climate science, geospatial analytics, artificial intelligence, remote sensing, and urban planning to understand and simulate microclimatic conditions in rapidly growing cities. With escalating challenges such as urban heat island effects, air pollution, extreme weather events, and climate-induced stress, this training course equips participants with advanced skills to analyze, model, and mitigate urban climate risks using state-of-the-art computational tools and data-driven approaches. Urban Climate Modeling Training Course emphasizes high-resolution climate modeling, GIS-based spatial analysis, and predictive environmental simulation frameworks for sustainable urban development.

In today's era of climate resilience, smart cities, and Net-Zero urban transitions, Urban Climate Modeling has become a critical decision-support system for governments, researchers, and urban developers. This training provides hands-on exposure to tools such as WRF (Weather Research and Forecasting), ENVI-met, ArcGIS, QGIS, Python-based climate analytics, and machine learning models for environmental prediction. Participants will gain practical expertise in urban heat mapping, wind flow simulation, thermal comfort assessment, carbon footprint modeling, and climate adaptation strategies, enabling them to design resilient, sustainable, and data-informed urban environments.

Programme Curriculum

Urban Climate Modeling Training Course

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Course Duration

5 days

Course Objectives

1. Understand fundamentals of Urban Climate Science & Microclimate Dynamics
2. Apply Geospatial Analysis (GIS & Remote Sensing) for urban climate mapping
3. Develop Urban Heat Island (UHI) intensity assessment models
4. Use WRF (Weather Research and Forecasting Model) for climate simulation
5. Perform ENVI-met microclimate simulations for urban environments
6. Analyze air quality dispersion and pollution modeling systems
7. Integrate AI & Machine Learning for climate prediction analytics
8. Design climate-resilient smart city planning frameworks
9. Conduct thermal comfort and heat stress index evaluation
10. Build 3D urban environmental modeling systems
11. Utilize Python for climate data processing and visualization
12. Develop climate adaptation and mitigation strategies for cities
13. Support Net-Zero emissions and sustainable urban development goals

Target Audience

1. Urban Planners & City Developers
2. Environmental Scientists & Climatologists
3. GIS Analysts & Remote Sensing Specialists
4. Civil & Environmental Engineers
5. Smart City Consultants
6. Government Policy Makers & Urban Authorities
7. Data Scientists in Climate & Environment Sector
8. University Researchers & Graduate Students

Course Modules

Module 1: Fundamentals of Urban Climate Systems

- Urban energy balance and atmospheric processes
- Microclimate vs macroclimate understanding

- Climate variability in urban landscapes
- Urban heat island formation mechanisms
- Introduction to climate resilience frameworks
- **Case Study:** Analysis of heat island intensity in a rapidly urbanizing metropolitan area using satellite data.

Module 2: GIS & Remote Sensing for Climate Analysis

- Spatial data acquisition and preprocessing
- Land surface temperature mapping
- NDVI and vegetation index analysis
- Urban land-use classification techniques
- Satellite-based climate monitoring systems
- **Case Study:** Using Landsat data to map vegetation loss and rising surface temperatures in expanding cities.

Module 3: Urban Heat Island (UHI) Modeling

- UHI measurement methodologies
- Surface vs atmospheric heat islands
- Thermal imaging and data interpretation
- Heat vulnerability mapping
- Cooling strategies and mitigation models
- **Case Study:** Assessment of UHI mitigation through urban green corridors in a tropical city.

Module 4: WRF Climate Modeling System

- Introduction to mesoscale atmospheric modeling
- WRF model setup and configuration
- Boundary and initial condition processing
- Weather simulation and validation
- Climate scenario analysis
- **Case Study:** Simulating extreme rainfall events for flood-prone urban zones using WRF.

Module 5: ENVI-met Microclimate Simulation

- 3D urban environment modeling
- Building geometry and surface materials input
- Wind flow and radiation simulation
- Thermal comfort indices analysis
- Scenario-based urban design testing
- **Case Study:** Evaluating pedestrian thermal comfort in high-density urban districts.

Module 6: Air Quality & Pollution Dispersion Modeling

- Urban air pollution sources and dynamics
- Dispersion modeling techniques
- PM2.5 and NOx analysis
- Traffic emissions modeling
- Health risk assessment frameworks
- **Case Study:** Modeling traffic-related air pollution exposure near major highways.

Module 7: AI & Machine Learning for Climate Prediction

- Predictive climate analytics fundamentals
- Time series forecasting of temperature trends
- Deep learning for environmental data
- Climate anomaly detection systems
- Big data integration for climate insights
- **Case Study:** Machine learning-based prediction of urban temperature spikes during heatwaves.

Module 8: Smart Cities & Climate Resilience Planning

- Climate-resilient infrastructure design
- Green building and urban greening strategies
- Carbon neutrality planning models
- Disaster risk reduction frameworks
- Sustainable urban governance systems
- **Case Study:** Designing a net-zero emission smart district using integrated climate modeling tools

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

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