Epidemiological Modeling Tools Training Course

Professional Development Training Course Outline

Category	Veterinary and Animal Science	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Epidemiological Modeling Tools Training Course is designed to equip public health professionals, data scientists, and researchers with cutting-edge skills to simulate, predict, and analyze the spread of infectious diseases. Leveraging advanced computational models, AI-driven analytics, and real-time data integration, participants will gain practical expertise in disease outbreak forecasting, transmission dynamics, and public health intervention strategies. This course bridges the gap between theory and practice, enabling participants to make data-informed decisions that enhance population health outcomes.

Participants will engage in hands-on workshops, interactive simulation exercises, and case-study-driven learning to master tools such as SEIR models, agent-based models, and stochastic simulations. By combining statistical rigor with modern epidemiological techniques, the course empowers learners to address challenges like pandemic preparedness, resource allocation optimization, and policy impact evaluation. Graduates will emerge as proficient in predictive modeling, risk assessment, and evidence-based public health planning, making them invaluable assets in global health initiatives.

Programme Curriculum

Epidemiological Modeling Tools Training Course

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5 days

Course Objectives

1. Master SEIR, SIR, and agent-based modeling techniques for infectious diseases.
2. Apply real-time data analytics for outbreak prediction and surveillance.
3. Conduct risk assessment and scenario analysis for public health interventions.
4. Integrate machine learning and AI algorithms into epidemiological models.
5. Evaluate disease transmission dynamics using advanced simulation tools.
6. Optimize resource allocation and healthcare strategies during epidemics.
7. Develop policy impact models for effective decision-making.
8. Implement data visualization techniques for epidemiological reporting.
9. Perform sensitivity analysis and uncertainty quantification in models.
10. Conduct geospatial modeling to map disease spread.
11. Leverage open-source epidemiological software for practical applications.
12. Design scenario-based simulations to anticipate outbreak outcomes.
13. Enhance evidence-based public health planning using predictive modeling.

Target Audience

1. Public health professionals and epidemiologists
2. Data scientists and statisticians
3. Healthcare policy makers
4. Research scholars in epidemiology and biostatistics
5. NGO and global health program managers
6. Hospital administrators and health informatics specialists
7. Biotech and pharmaceutical professionals
8. Graduate students in public health and related fields

Course Modules

Module 1: Introduction to Epidemiological Modeling

- Overview of epidemiology and disease dynamics
- incidence, prevalence, R0
- Differences between deterministic and stochastic models
- Case studies: SARS, H1N1
- Introduction to software tools

Module 2: Compartmental Models (SIR, SEIR)

- Understanding SIR, SEIR, and SEIRS models
- Parameter estimation and model calibration

- Simulating outbreak scenarios
- Case Study: COVID-19 transmission modeling
- Hands-on exercises with R and Python

Module 3: Agent-Based and Individual-Based Models

- Concepts of agent-based modeling
- Defining agents, rules, and interactions
- Modeling heterogeneous populations
- Case Study: Influenza spread in urban settings
- Simulation exercises using NetLogo

Module 4: Stochastic and Probabilistic Modeling

- Introduction to stochastic processes in epidemiology
- Monte Carlo simulations
- Evaluating uncertainty and sensitivity
- Case Study: Ebola outbreak modeling
- Practical exercises with Python libraries

Module 5: Machine Learning in Epidemiology

- Applying ML algorithms to predict outbreaks
- Feature selection and model validation
- Real-time prediction using health data
- Case Study: Predicting dengue incidence
- Hands-on with TensorFlow and scikit-learn

Module 6: Geospatial and Network Modeling

- Mapping disease spread using GIS tools
- Social network analysis for transmission pathways
- Hotspot detection and cluster analysis
- Case Study: Malaria spread mapping in Africa
- Exercises using QGIS and Python

Module 7: Scenario Analysis and Policy Modeling

- Developing intervention strategies in simulations
- Cost-effectiveness analysis
- Evaluating public health policies
- Case Study: Vaccination strategies for measles
- Scenario-building exercises

Module 8: Data Visualization and Reporting

- Visualizing epidemic curves and model outputs
- Interactive dashboards for decision-makers
- Communicating uncertainty and predictions
- Case Study: COVID-19 dashboards worldwide
- Practical exercises with Tableau and Plotly

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

Start Date	End Date	Location	Price
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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