Epidemiological Modeling with R Training Course

Professional Development Training Course Outline

Category	Research and Data Analysis	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

In an era dominated by data-driven decision-making, epidemiological modeling has become a cornerstone of public health strategy and infectious disease management. Leveraging the power of R programming, this course equips professionals with cutting-edge skills to analyze, visualize, and predict disease patterns with precision and efficiency. Participants will explore statistical modeling, time-series forecasting, and stochastic simulations, gaining practical expertise in real-world epidemiological scenarios. Whether assessing outbreak trajectories, evaluating intervention strategies, or designing surveillance systems, learners will harness the full potential of R-based analytical frameworks.

Epidemiological Modeling with R Training Course is tailored for public health experts, data scientists, and healthcare policymakers seeking to translate complex epidemiological data into actionable insights. Through hands-on exercises, interactive case studies, and state-of-the-art modeling techniques, participants will master reproducible research, predictive analytics, and scenario-based simulations. By integrating machine learning algorithms, GIS mapping, and data visualization tools, the course ensures a comprehensive understanding of disease dynamics in both endemic and pandemic contexts. Graduates will emerge ready to tackle pressing global health challenges with confidence, leveraging the power of R-driven epidemiology.

Programme Curriculum

Epidemiological Modeling with R Training Course

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5 days

Course Objectives

1. Master the fundamentals of epidemiological modeling using R.
2. Develop expertise in time-series analysis for infectious diseases.
3. Apply compartmental models to real-world outbreaks.
4. Implement stochastic simulations for predictive modeling.
5. Utilize machine learning techniques for epidemiological forecasting.
6. Conduct spatial epidemiology analysis with GIS integration.
7. Analyze disease transmission dynamics in various populations.
8. Interpret and visualize complex public health datasets.
9. Evaluate intervention strategies through scenario modeling.
10. Perform risk assessment and outbreak prediction using R.
11. Ensure reproducible research with R Markdown and scripts.
12. Integrate real-time epidemiological surveillance data into models.
13. Translate modeling insights into evidence-based public health policies.

Target Audience

1. Epidemiologists and public health professionals
2. Data scientists and statisticians
3. Healthcare policymakers and planners
4. Biostatisticians
5. Infectious disease researchers
6. Graduate students in public health and data science
7. Hospital and clinical data analysts
8. NGOs and international health organization staff

Course Modules

Module 1: Introduction to Epidemiological Modeling and R

- Overview of epidemiological concepts
- Installing and configuring R and RStudio
- Introduction to data structures in R

- Basic data manipulation and cleaning
- Case Study: Analysis of historical influenza outbreak data

Module 2: Descriptive Epidemiology and Data Visualization

- Exploratory data analysis in R
- Visualization with ggplot2 and plotly
- Mapping disease trends with GIS tools
- Creating interactive dashboards
- Case Study: Visualizing COVID-19 trends across regions

Module 3: Compartmental Models

- Understanding model compartments and assumptions
- Writing SIR/SEIR models in R
- Parameter estimation and sensitivity analysis
- Simulation of disease spread scenarios
- Case Study: Modeling measles outbreaks in a community

Module 4: Stochastic and Agent-Based Modeling

- Introduction to stochastic processes in epidemiology
- Implementing Monte Carlo simulations in R
- Agent-based modeling for heterogeneous populations
- Scenario-based outbreak predictions
- Case Study: Ebola outbreak simulation using stochastic models

Module 5: Time-Series Analysis and Forecasting

- Principles of epidemic curve modeling
- ARIMA and Prophet models for disease forecasting
- Evaluating forecast accuracy with cross-validation
- Seasonal and trend decomposition
- Case Study: Forecasting dengue fever incidence

Module 6: Machine Learning for Epidemiology

- Supervised and unsupervised learning algorithms
- Predictive modeling for outbreak detection
- Feature selection and model validation
- Integration of clinical and environmental data
- Case Study: Predicting influenza hotspots with random forests

Module 7: Intervention Analysis and Policy Modeling

- Modeling vaccination strategies
- Impact of quarantine and social distancing measures
- Cost-benefit analysis of interventions
- Scenario simulations for health policy decisions
- Case Study: Evaluating COVID-19 vaccination impact

Module 8: Advanced Applications and Reproducible Research

- Automating workflows with R scripts
- Reporting with R Markdown and Shiny dashboards
- Integrating real-time epidemiological data
- Publishing reproducible models for public health
- Case Study: Real-time surveillance dashboard for influenza

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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