Time Series Analysis in Health Training Course

Professional Development Training Course Outline

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

Course Introduction

Time Series Analysis in Health is a cutting-edge field that leverages advanced data analytics, machine learning, and predictive modeling to interpret sequential medical and healthcare data over time. With the rapid growth of electronic health records (EHRs), wearable health devices, ICU monitoring systems, and real-time biosensors, healthcare organizations are increasingly relying on time series forecasting, anomaly detection, and clinical trend analysis to improve patient outcomes. Time Series Analysis in Health Training Course is designed to equip learners with the ability to analyze temporal health data using modern tools such as Python, R, ARIMA models, LSTM neural networks, and AI-driven forecasting systems.

The course emphasizes practical applications in disease prediction, epidemic forecasting, patient monitoring, hospital resource optimization, and personalized medicine. Participants will gain hands-on experience in transforming raw health data into actionable insights using statistical modeling, deep learning for sequential data, and real-time health analytics dashboards. By the end of the training, learners will be capable of building robust predictive healthcare models that support clinical decision-making, improve operational efficiency, and enhance public health surveillance systems using data-driven healthcare intelligence.

Programme Curriculum

Time Series Analysis in Health Training Course

Introduction

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Course Duration

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Course Objectives

1. Master Time Series Forecasting in Healthcare Analytics
2. Apply ARIMA, SARIMA, and Exponential Smoothing Models in medical datasets
3. Develop AI-powered Predictive Healthcare Models
4. Analyze Electronic Health Records (EHR) Temporal Patterns
5. Implement LSTM and Deep Learning for Medical Time Series
6. Detect anomalies in patient vital signs monitoring systems
7. Forecast disease outbreaks and epidemic trends
8. Optimize hospital resource allocation using predictive analytics
9. Build real-time health monitoring dashboards
10. Apply statistical and machine learning techniques in clinical data
11. Improve patient outcome prediction using temporal data modeling
12. Integrate wearable device data into healthcare forecasting systems
13. Enable data-driven decision-making in healthcare systems

Target Audience

1. Healthcare Data Scientists
2. Medical Researchers & Epidemiologists
3. Clinical Analysts & Biostatisticians
4. Public Health Professionals
5. AI/ML Engineers in Healthcare
6. Hospital IT & Health Informatics Specialists
7. Graduate Students in Data Science or Medicine
8. Policy Makers in Health Systems Planning

Course Modules

Module 1: Introduction to Time Series in Healthcare

- Fundamentals of temporal data in medicine
- Healthcare data sources (EHR, ICU, wearable devices)
- Time-based patterns in patient monitoring
- Case study: ICU patient vital tracking system
- Healthcare data lifecycle overview

Module 2: Statistical Foundations for Time Series

- Mean, variance, autocorrelation concepts
- Stationarity in medical datasets
- Trend and seasonality analysis
- Case study: Seasonal flu pattern detection
- Data preprocessing techniques

Module 3: Python for Healthcare Time Series

- Pandas and NumPy for medical data
- Data cleaning and transformation
- Visualization using Matplotlib & Seaborn
- Case study: Heart rate monitoring dataset
- Handling missing medical data

Module 4: ARIMA & SARIMA Models

- Auto-Regressive Integrated Moving Average
- Seasonal modeling in healthcare
- Parameter tuning (p, d, q)
- Case study: Hospital admission forecasting
- Model evaluation metrics

Module 5: Exponential Smoothing Techniques

- Simple, Holt, Holt-Winters models
- Trend and seasonality smoothing
- Forecasting patient inflow
- Case study: Emergency room demand prediction
- Accuracy comparison methods

Module 6: Machine Learning for Time Series

- Regression-based forecasting models
- Feature engineering for temporal data
- Model training and validation
- Case study: Diabetes progression prediction
- Performance evaluation

Module 7: Deep Learning for Health Time Series

- Introduction to neural networks
- LSTM and GRU architectures
- Sequential dependency modeling
- Case study: ICU mortality prediction
- Model optimization techniques

Module 8: Anomaly Detection in Healthcare

- Outlier detection methods
- Real-time monitoring systems
- Detecting abnormal vital signs
- Case study: Cardiac arrest early warning system

- Threshold-based alert systems

Module 9: Epidemic & Disease Forecasting

- Infectious disease modeling
- Time series epidemiology
- Trend prediction of outbreaks
- Case study: COVID-19 wave forecasting
- Public health response modeling

Module 10: Wearable Device Data Analytics

- IoT health data streams
- Continuous patient monitoring
- Signal processing techniques
- Case study: Smartwatch heart rate analytics
- Data synchronization challenges

Module 11: Hospital Resource Optimization

- Bed occupancy forecasting
- Staff scheduling models
- Supply chain prediction
- Case study: ICU bed demand planning
- Cost optimization strategies

Module 12: Real-Time Health Dashboards

- Dashboard design principles
- Power BI/Tableau integration
- Live data streaming systems
- Case study: Hospital performance dashboard
- KPI tracking systems

Module 13: Advanced Forecasting Techniques

- Hybrid statistical + AI models
- Ensemble learning methods
- Bayesian forecasting approaches
- Case study: Chronic disease progression
- Model stacking techniques

Module 14: Ethical & Regulatory Aspects

- Data privacy in healthcare
- HIPAA/GDPR considerations
- Bias in predictive models
- Case study: Ethical AI in diagnosis
- Responsible AI frameworks

Module 15: Capstone Project

- End-to-end healthcare analytics pipeline

- Real-world dataset application
- Model building & deployment
- Case study: Predictive hospital system
- Final presentation & evaluation

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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