Predictive Modeling and Forecasting in R/Python 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 today's data-driven world, organizations across sectors are increasingly leveraging predictive modeling and forecasting techniques to anticipate trends, reduce risks, and gain competitive advantage. Predictive Modeling and Forecasting in R/Python Training Course is designed to equip learners with advanced data analytics, machine learning algorithms, and time-series forecasting models using the two most powerful programming languages in data science – R and Python. By combining hands-on coding experience with real-world datasets, learners will gain proficiency in building robust, scalable, and interpretable models to drive actionable business insights.

With a focus on machine learning, statistical modeling, and forecasting analytics, this course emphasizes practical application over theory. Learners will explore supervised and unsupervised learning, ARIMA models, Prophet forecasting, deep learning approaches, and ensemble methods. Whether you're aiming to forecast stock prices, predict customer churn, or model energy consumption patterns, this course provides the foundational and advanced skills needed to become an expert in predictive analytics using open-source tools.

Programme Curriculum

Predictive Modeling and Forecasting in R/Python Training Course

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Course Objectives

1. Understand the fundamentals of predictive analytics and forecasting models.
2. Apply machine learning algorithms for prediction using R and Python.
3. Build time series forecasting models (ARIMA, Exponential Smoothing).
4. Implement Facebook's Prophet model for business trend forecasting.
5. Use regression techniques (Linear, Lasso, Ridge) for model optimization.
6. Explore ensemble methods like Random Forests and XGBoost for enhanced accuracy.
7. Conduct data preprocessing and feature engineering for better predictions.
8. Evaluate models using cross-validation and performance metrics.
9. Visualize results using data visualization libraries (ggplot2, matplotlib, seaborn).
10. Create predictive pipelines for end-to-end automation.
11. Deploy models using Dashboards, Shiny Apps, or REST APIs.
12. Work with real-world datasets across industries for practical understanding.
13. Integrate deep learning techniques for complex forecasting problems.

Target Audience

1. Data Analysts & Data Scientists
2. Business Intelligence Professionals
3. Statisticians & Economists
4. AI/ML Engineers
5. Financial & Marketing Analysts
6. Operations & Supply Chain Professionals
7. Academic Researchers & Students
8. IT & Software Professionals transitioning into Data Science

Course Duration: 5 days

Course Modules

Module 1: Introduction to Predictive Modeling

- Overview of predictive analytics and use cases
- Types of models: classification vs regression
- Introduction to R and Python environments
- Installing key libraries (scikit-learn, forecast, caret)
- Loading and exploring datasets
- **Case Study:** Predicting customer churn in telecom

Module 2: Data Preprocessing and Feature Engineering

- Handling missing values and outliers
- Encoding categorical data
- Feature scaling and normalization
- Feature selection techniques
- Dimensionality reduction (PCA)
- **Case Study:** Improving loan prediction accuracy

Module 3: Supervised Learning Algorithms

- Linear and logistic regression models
- Decision trees and random forests
- Model tuning using grid search
- Classification metrics (accuracy, F1-score)
- Overfitting and regularization
- **Case Study:** Classifying cancer types from gene data

Module 4: Time Series Forecasting Basics

- Time series components and decomposition
- Stationarity and differencing
- Autocorrelation and PACF
- AR, MA, and ARIMA models
- Forecasting accuracy measures (RMSE, MAPE)
- **Case Study:** Forecasting retail sales volume

Module 5: Advanced Forecasting Techniques

- Exponential smoothing (ETS, Holt-Winters)
- Forecasting with Prophet (trend + seasonality)
- Multivariate forecasting with VAR
- Modeling holiday effects and seasonality
- Forecasting anomalies and outliers
- **Case Study:** Predicting electricity demand

Module 6: Machine Learning for Prediction

- K-Nearest Neighbors (KNN), SVM
- Ensemble methods: Gradient Boosting, XGBoost
- Model interpretation and explainability
- Cross-validation and performance tuning
- Hyperparameter optimization techniques
- **Case Study:** Credit card fraud detection

Module 7: Deep Learning for Predictive Analytics

- Introduction to neural networks and Keras
- LSTM networks for time series forecasting
- Training and evaluating deep models
- GPU acceleration and batch processing
- Hybrid models: ML + DL approaches
- **Case Study:** Predicting stock market trends using LSTM

Module 8: Model Deployment and Automation

- Creating predictive dashboards in R (Shiny) & Python (Dash)
- Model serialization (Pickle, RDS)
- Building and testing REST APIs
- Scheduling and automation (cron, Airflow)
- Monitoring models in production
- **Case Study:** Real-time forecasting system for e-commerce

Training Methodology

- Hands-on coding sessions using Jupyter Notebooks and RStudio

- Real-world case studies and industry projects
- Interactive quizzes and assignments for concept reinforcement
- Peer-reviewed capstone projects for applied learning
- Live instructor-led sessions and discussion forums
- Access to cloud-based datasets and notebooks

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

Start Date	End Date	Location	Price
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:

Register Online Now

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com