BLACKBIRD FOR TRAINING

Advanced Data Analytics & Predictive Strategies with R

5 – 9 July 2027
Rome (Italy)



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Why This Course

As data-driven decision-making becomes a cornerstone of business success, the ability to leverage advanced analytical and machine learning capabilities is essential. The Advanced R Programming for Predictive Analytics and Machine Learning Program is an intensive 1-week course designed to equip data scientists, analysts, and technical professionals with the expertise to design, implement, and deploy sophisticated predictive models using R's powerful ecosystem.

Combining theoretical depth with practical application, this course enables participants to master advanced programming concepts, apply state-of-the-art machine learning algorithms, and create dynamic data visualizations and dashboards. By the end of the program, participants will have the skills to build scalable, high-performance predictive analytics solutions using real-world data.

What You'll Learn and Practice

By completing this program, participants will:

- Master advanced R programming concepts for high-efficiency data processing.
- Build and evaluate complex predictive and machine learning models.
- Design interactive data visualizations and dashboards for storytelling and insight.
- Apply time series modeling and forecasting for trend and anomaly detection.
- Deploy and optimize R-based models for real-world analytical applications.

The Program Flow

Day 1: Advanced R Programming and Data Manipulation

- Functional programming, iteration, and parallel processing in R.
- Advanced data manipulation with dplyr, data. table, and tidyverse.
- Efficient memory and performance management in large datasets.
- Connecting R with SQL databases and big data sources.

Day 2: Advanced Data Visualization and Reporting

- Building advanced visualizations with ggplot2 and extensions.
- Creating interactive visualizations using plotly and shiny.
- Automated reporting with R Markdown, flexdashboard, and APIs.
- Geospatial visualization using sf and leaflet packages.



Day 3: Machine Learning and Predictive Modeling

- Supervised learning algorithms: Random Forests, SVM, XGBoost.
- Unsupervised learning: clustering, PCA, and dimensionality reduction.
- Model selection, validation, and hyperparameter tuning.
- Ensemble methods and stacking for enhanced predictive accuracy.

Day 4: Time Series Analysis and Forecasting

- Advanced forecasting models: ARIMA, Prophet, and exponential smoothing.
- Multivariate and seasonal time series modeling.
- Anomaly detection and change-point analysis.
- Deep learning for sequences: LSTM networks in R.

Day 5: Advanced Topics and Real-world Applications

- Natural Language Processing NLP for text analytics.
- Network analysis and graph theory applications.
- Bayesian inference and hierarchical modeling with rstanarm.
- Deploying and scaling R models in production environments via APIs and containers.

Individual Impact

- Gain mastery of advanced R programming and analytical workflows.
- Build end-to-end predictive models with practical deployment strategies.
- Strengthen skills in visualization, time series forecasting, and machine learning.
- Develop a portfolio-ready project showcasing applied data science expertise.

Organizational Impact

- Enhance organizational analytics capabilities and predictive performance.
- Improve data-driven decision-making through robust modeling and visualization.
- Enable scalable, reproducible data science workflows using open-source tools.
- Accelerate digital transformation through automated and intelligent insights.

Training Methodology

The program blends technical depth with hands-on application through:

- Live coding demonstrations and guided programming exercises.
- Case studies using real-world datasets across business and research domains.
- Group workshops on model deployment, optimization, and presentation.
- Expert-led discussions on emerging trends in R and data science.



Beyond the Course

Upon completion, participants will be equipped to develop, deploy, and optimize predictive analytics and machine learning models using R, enhancing both technical and strategic decision-making capabilities.

Graduates of this program will emerge as advanced R practitioners and data science leaders — capable of transforming data into actionable intelligence across diverse industries.

