# Predictive Analytics for Inventory and Demand Planning Training Course



27 - 31 Dec 2026

Manama

4400 € (Per Person)

Ref: #IM4971_242193

## Course Introduction / Overview:

This comprehensive training course is designed to transition professionals from traditional, reactive inventory management to a proactive, data-driven approach using predictive analytics. In today's volatile market, accurate demand forecasting is the cornerstone of an efficient supply chain, directly impacting profitability by minimizing stockouts and reducing excess inventory costs. This program provides a complete journey, starting with the fundamental principles of statistical forecasting and progressing to the application of advanced machine learning models. Participants will explore the concepts championed by forecasting experts like Spyros Makridakis, whose work in "Forecasting: Methods and Applications" has shaped the field, understanding how to apply these theories in a modern business context. BIG BEN Training Center has structured this course to be intensely practical, ensuring that attendees not only grasp the theory behind models like ARIMA and Exponential Smoothing but also learn how to implement and validate them. By mastering predictive forecasting techniques, participants will be empowered to enhance forecast accuracy, optimize inventory levels, and drive strategic decision-making within their organizations.

## Target Audience / This training course is suitable for:

- Supply Chain Managers.
- Demand Planners and Forecasters.
- Inventory Control Analysts and Specialists.
- Operations Managers.
- Procurement and Purchasing Professionals.
- Data Analysts and Business Intelligence Professionals.
- Logistics and Distribution Managers.
- S&OP (Sales and Operations Planning) Coordinators.
- Retail Category Managers.
- E-commerce Operations Leads.

## Target Sectors and Industries:

- Retail and E-commerce.
- Manufacturing and Industrial Production.
- Consumer Packaged Goods (CPG).
- Pharmaceuticals and Healthcare.
- Automotive and Aerospace.
- Logistics and Third-Party Logistics (3PL).
- Food and Beverage.
- Technology and Electronics.
- Government and Public Sector Agencies.

## Target Organizations Departments:

- Supply Chain and Logistics.
- Planning and Forecasting.
- Operations Management.
- Procurement and Sourcing.
- Finance and Accounting.
- Business Analytics and Data Science.
- Sales and Marketing.
- Information Technology (IT).

## Course Offerings:

By the end of this course, the participants will have able to:

- Master a range of statistical forecasting models for time-series analysis.
- Implement machine learning algorithms for complex demand prediction scenarios.
- Develop a robust framework for data preparation and feature engineering.
- Optimize safety stock levels and reorder points using predictive insights.
- Improve overall forecast accuracy and reduce the bullwhip effect in the supply chain.
- Evaluate and select the most appropriate forecasting model for different products.
- Integrate predictive forecasts into the Sales and Operations Planning (S&OP) process.
- Communicate forecasting results and model limitations effectively to stakeholders.

## Course Methodology:

The training methodology at BIG BEN Training Center is centered on active, experiential learning to ensure participants can immediately apply their new skills. This course moves beyond theoretical lectures by immersing attendees in a dynamic learning environment. A significant portion of the training is dedicated to hands-on workshops and practical labs where participants will work with real-world datasets to build, test, and refine forecasting models. We utilize a blend of instructional techniques, including expert-led presentations on core concepts, interactive group discussions to analyze complex demand patterns, and collaborative problem-solving sessions. Case studies from various industries will be dissected to understand the successful application of predictive analytics in solving inventory challenges. Participants will receive continuous, constructive feedback from the instructor throughout the course. This blended approach ensures a deep understanding of both the strategic importance and the technical execution of predictive forecasting, empowering attendees to drive tangible improvements in their organizations.

## Course Agenda (Course Units):

### Unit One: Foundations of Demand Planning and Forecasting

- The Strategic Role of Forecasting in Supply Chain Management.
- Understanding Demand Patterns: Seasonality, Trends, and Cyclicality.
- Key Performance Indicators (KPIs) for Forecast Accuracy (MAPE, RMSE, MAE).
- Introduction to Traditional Forecasting Methods.
- Data Collection, Cleansing, and Preparation for Analysis.
- The Bullwhip Effect and Its Impact on Inventory.
- Collaborative Planning, Forecasting, and Replenishment (CPFR) Concepts.

### Unit Two: Statistical Time-Series Forecasting Models

- Decomposition of Time-Series Data.
- Moving Averages and Weighted Moving Averages.
- Single, Double, and Triple (Holt-Winters) Exponential Smoothing.
- Introduction to Stationarity and Differencing.
- Autoregressive Integrated Moving Average (ARIMA) Models.
- Identifying Autocorrelation (ACF) and Partial Autocorrelation (PACF).
- Model Selection Criteria (AIC and BIC).

### Unit Three: Introduction to Predictive Analytics and Machine Learning

- Transitioning from Statistical to Machine Learning Models.
- Supervised vs. Unsupervised Learning in Forecasting.
- Linear and Multiple Regression for Demand Prediction.
- Understanding Decision Trees and their Application.
- Feature Engineering: Creating Predictors from Raw Data.
- Handling Missing Values and Outliers in Datasets.
- Model Validation Techniques: Cross-Validation and Holdout Sets.

## Unit Four: Advanced Machine Learning for Demand Forecasting

- Ensemble Methods: Random Forests and Gradient Boosting (XGBoost).
- Leveraging External Variables for Enhanced Forecasting (e.g., promotions, economic indicators).
- Introduction to Neural Networks for Time-Series Prediction.
- Long Short-Term Memory (LSTM) Networks for Sequential Data.
- Clustering Techniques for Product Segmentation and Demand Profiling.
- Understanding Model Interpretability with SHAP and LIME.
- Hyperparameter Tuning for Optimal Model Performance.

## Unit Five: Strategic Implementation and Inventory Optimization

- Integrating Predictive Forecasts into Inventory Policy.
- Calculating and Optimizing Safety Stock Levels.
- Linking Demand Planning with Sales and Operations Planning (S&OP).
- Techniques for New Product Introduction (NPI) Forecasting.
- Monitoring Forecast Performance and Model Retraining Strategies.
- Presenting and Visualizing Forecasting Insights for Stakeholders.
- The Future of Forecasting: AI, Demand Sensing, and Automation.

# FAQ:

## Qualifications required for registering to this course?

There are no requirements.

## How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

## Something to think about:

As predictive models become more autonomous, what is the evolving role of the human demand planner in overseeing, interpreting, and ethically guiding AI-driven forecasting decisions?

## What unique qualities does this course offer compared to other courses?

This course distinguishes itself by providing a holistic and integrated framework that bridges the gap between classical statistical forecasting and modern machine learning techniques. While many programs focus on one or the other, this curriculum is meticulously designed to show how these methods complement each other in a real-world business environment. We move beyond a purely theoretical or tool-specific approach, emphasizing the strategic application of these models to solve tangible inventory and demand challenges. The focus is on building a deep, intuitive understanding of how to select, implement, and validate the right model for a specific context, from managing intermittent demand to forecasting new product launches. Participants will not just learn algorithms; they will learn the art and science of forecasting. The course's emphasis on practical implementation, feature engineering, and linking predictive insights directly to inventory policy and S&OP processes ensures that attendees leave with a comprehensive skill set that is immediately applicable for driving efficiency and profitability in their supply chains.