Time Series Analysis for Market Risk Training Course

Professional Development Training Course Outline

Category	Risk Management	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The modern financial landscape is characterized by high-frequency trading, volatile markets, and rapidly evolving regulatory compliance. For financial institutions to maintain stability and competitive edge, robust risk management is non-negotiable. Time Series Analysis for Market Risk Training Course introduces the rigorous, quantitative methods of Time Series Analysis the essential tool for dissecting historical market data to predict future volatility and calculate potential losses accurately. Mastering these techniques is crucial for effective Value at Risk (VaR) modeling, stress testing, and implementing sophisticated algorithmic trading strategies. Professionals must move beyond simple statistics to embrace advanced methodologies like GARCH models, Vector Autoregressive (VAR) models, and modern Deep Learning (LSTM) applications to ensure their risk models are both predictive and resilient against market shocks.

This comprehensive program is designed to bridge the gap between theoretical econometrics and practical Market Risk application. Participants will gain hands-on experience using industry-standard tools like Python and R to analyze financial time series data including equities, fixed income, and commodities. We focus on achieving model stationarity, detecting volatility clustering, and performing accurate long-term forecasting. The final goal is to empower risk managers, quantitative analysts, and financial engineers with the skill set to build, validate, and critically interpret next-generation risk models, directly contributing to sound capital allocation and meeting stringent Basel IV requirements. This training is your critical step toward becoming a leader in Quantitative Risk Management.

Programme Curriculum

Time Series Analysis for Market Risk Training Course

Introduction

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Course Duration

5 days

Course Objectives

1. Model Volatility Clustering using advanced GARCH-family models for accurate market turbulence prediction.
2. Implement and critically evaluate classical ARIMA and SARIMA models for financial time series forecasting and trend identification.
3. Achieve and test for stationarity in non-stationary financial data using appropriate differencing and Unit Root Tests
4. Calculate and backtest Value at Risk (VaR) and Expected Shortfall (ES) using Historical Simulation, Parametric VaR, and GARCH-based methods.
5. Apply Vector Autoregressive (VAR) and Vector Error Correction (VEC) models for analyzing multi-asset correlation and systemic risk.
6. Utilize High-Frequency Data techniques and assess the impact of market microstructure noise on volatility estimation.
7. Integrate Machine Learning models, specifically LSTM Neural Networks, for superior Non-Linear Time Series prediction.
8. Perform Stress Testing and Scenario Analysis to assess portfolio resilience under extreme but plausible tail risk events.
9. Master Model Validation and Backtesting methodologies to ensure regulatory compliance and model soundness.
10. Analyze and model the dynamics of interest rate curves and credit spread volatility using time series methods.
11. Develop practical skills in Python for Financial Econometrics implementation.
12. Understand the relationship between time series analysis, Market Liquidity Risk, and Counterparty Credit Risk (CCR) exposure.
13. Apply time series decomposition to isolate Trend, Seasonality, and Cyclicality in market data for better trading signal generation.

Target Audience

1. Market Risk Analysts and Managers
2. Quantitative Analysts (Quants)
3. Financial Data Scientists
4. Portfolio Managers and Investment Strategists
5. Financial Regulators and Auditors
6. Trading Strategists and Algorithmic Developers
7. Financial Engineers and Risk IT Specialists
8. Postgraduate students specializing in Financial Econometrics or Computational Finance

Course Modules

Module 1: Foundations of Financial Time Series

- Introduction to Stochastic Processes and Financial Data Characteristics.
- Log Returns and Simple Returns and Data Pre-processing in Python/R.
- Stationarity, Auto-Correlation, and Partial Auto-Correlation functions.
- Case Study: Diagnosing Non-Stationarity in the S&P 500 daily returns using the Augmented Dickey-Fuller Test.
- White Noise and Random Walk Models.

Module 2: Classical Univariate Models

- Autoregressive and Moving Average models.
- ARIMA and SARIMA modeling for trend and seasonality.
- The Box-Jenkins Methodology for model selection.
- Case Study: Forecasting a Commodity Futures Price using a seasonally-adjusted SARIMA model.
- Residual analysis and Ljung-Box Test.

Module 3: Modeling Market Volatility: ARCH and GARCH

- The phenomenon of Volatility Clustering in financial markets.
- Introduction to the ARCH (Autoregressive Conditional Heteroskedasticity) model.
- Implementing the GARCH (Generalized ARCH) model for volatility forecasting.
- Case Study: Estimating and forecasting the VaR of a major global bank's equity portfolio using a GARCH (1,1) model.
- EGARCH and GJR-GARCH to capture the leverage effect.

Module 4: Multi-Asset and Systemic Risk Models

- Vector Autoregressive (VAR) models for multiple correlated time series.
- Analyzing Impulse Response Functions and Granger Causality.
- Cointegration and the Vector Error Correction (VEC) Model.
- Case Study: Analyzing the transmission of volatility shocks between US, European, and Asian Equity Market Indexes using a VAR-GARCH model.
- Dynamic Conditional Correlation for evolving portfolio correlations.

Module 5: Value at Risk (VaR) and Expected Shortfall (ES)

- Parametric VaR and Historical Simulation VaR.
- Monte Carlo Simulation for VaR and ES calculation.

- Expected Shortfall (ES) as a coherent risk measure
- Case Study: Calculating and comparing VaR and ES for a Fixed Income Portfolio under different confidence levels and holding periods.
- Kupiec's POF Test and Christoffersen's Test.

Module 6: Advanced ML for Time Series in Risk

- Introduction to Recurrent Neural Networks and Long Short-Term Memory networks.
- ML-based approaches for Non-Linear and High-Dimensional forecasting.
- Feature engineering from financial time series
- Case Study: Developing an LSTM model to predict the probability of a market "crash" on the FX Market.
- Comparing LSTM performance against traditional GARCH models.

Module 7: Interest Rate and Credit Risk Time Series

- Modeling the Term Structure of Interest Rates using the Nelson-Siegel and Svensson models.
- Time series analysis of Credit Spreads and CDS indices.
- Forecasting Interest Rate Volatility for derivatives pricing
- Case Study: Using time series techniques to forecast potential future increases in Corporate Bond Default Rates based on macroeconomic indicators and yield curve movements.
- The relationship between systemic market risk and Liquidity Risk duration.

Module 8: Model Implementation and Regulatory Compliance

- Best practices for Code Reproducibility and Git version control.
- Model documentation and establishing a Model Validation framework.
- Meeting Basel and IFRS 9 requirements for market risk and impairment.
- Case Study: Building a full VaR and ES model for a diversified Hedge Fund Portfolio, including backtesting and a regulatory compliance report.
- Climate Risk and AI governance in financial modeling.

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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