Algorithmic Portfolio Construction Training Course

Professional Development Training Course Outline

Category	Capital Markets and Investment	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Algorithmic Portfolio Construction Training Course is designed to provide finance professionals, quantitative analysts, and investment managers with an in-depth understanding of modern portfolio construction using algorithmic and data-driven techniques. This course integrates cutting-edge financial modeling, machine learning applications, and quantitative risk management strategies to enhance portfolio performance and optimize investment outcomes. Participants will explore advanced algorithmic strategies, factor-based investing, and dynamic asset allocation methods while leveraging Python and R for implementation. Emphasis is placed on both theoretical frameworks and practical case studies to ensure participants can translate knowledge into actionable investment decisions.

With the increasing complexity of global financial markets and the demand for high-performance portfolios, mastering algorithmic portfolio construction has become essential. This course equips participants with the technical skills, analytical frameworks, and strategic insights needed to implement algorithmic trading models and optimize multi-asset portfolios. By combining statistical analysis, machine learning techniques, and real-world portfolio case studies, participants will gain the competence to enhance investment performance, manage risk efficiently, and contribute to organizational growth.

Programme Curriculum

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Course Objectives

1. Understand the principles of algorithmic portfolio construction and quantitative investment strategies
2. Apply Python and R programming for portfolio optimization and backtesting
3. Analyze risk and return using modern portfolio theory and factor models
4. Develop multi-asset and dynamic allocation strategies
5. Implement machine learning techniques for predictive asset allocation
6. Understand transaction cost modeling and execution strategies
7. Apply performance measurement and attribution analysis
8. Explore systematic trading strategies and algorithmic signal generation
9. Evaluate portfolio rebalancing and optimization techniques
10. Integrate ESG and alternative data factors into portfolio models
11. Conduct scenario analysis and stress testing of portfolios
12. Apply quantitative methods for portfolio risk mitigation
13. Solve real-world investment challenges through applied case studies

Organizational Benefits

- Improved portfolio performance and risk-adjusted returns
- Enhanced decision-making through quantitative analysis
- Integration of machine learning and advanced analytics in investments
- Reduction of human bias in portfolio management
- Streamlined portfolio rebalancing and optimization processes
- Efficient asset allocation across multiple markets and instruments
- Improved compliance and reporting through systematic models
- Enhanced team skillsets in algorithmic and data-driven finance
- Greater adaptability to market volatility and emerging trends
- Strengthened competitive advantage in financial management

Target Audiences

1. Investment managers
2. Portfolio analysts
3. Quantitative researchers

4. Financial engineers
5. Risk managers
6. Hedge fund professionals
7. Wealth management advisors
8. Data scientists in finance

Course Duration: 10 days

Course Modules

Module 1: Introduction to Algorithmic Portfolio Construction

- Overview of algorithmic trading in portfolio management
- History and evolution of quantitative investment strategies
- Introduction to factor-based investing
- Key performance metrics for portfolios
- Challenges and opportunities in algorithmic portfolio management
- Case study: Implementation of an algorithmic equity portfolio

Module 2: Python and R for Portfolio Construction

- Python libraries for financial analysis and optimization
- R packages for portfolio risk and performance measurement
- Data visualization and reporting in Python and R
- Integration of historical market data for backtesting
- Automation of portfolio analytics
- Case study: Python-based portfolio optimization simulation

Module 3: Risk and Return Analysis

- Understanding risk-adjusted return metrics
- Covariance and correlation analysis
- Value at Risk (VaR) and Conditional VaR calculations
- Portfolio diversification strategies
- Factor models for risk decomposition
- Case study: Multi-factor risk assessment of a global portfolio

Module 4: Multi-Asset Portfolio Optimization

- Asset allocation principles
- Optimization techniques for multi-asset portfolios
- Constraints and portfolio limits management
- Rebalancing strategies for efficiency

- Incorporating alternative assets
- Case study: Multi-asset portfolio optimization using Python

Module 5: Machine Learning in Portfolio Construction

- Supervised and unsupervised learning for asset prediction
- Feature selection and model evaluation
- Predictive analytics for portfolio performance
- Algorithmic signal generation
- Integration of machine learning into risk models
- Case study: ML-driven predictive allocation for equities

Module 6: Transaction Costs and Execution Strategies

- Modeling transaction costs
- Optimal execution strategies
- Market impact analysis
- Slippage and liquidity considerations
- Minimizing trading costs through algorithms
- Case study: High-frequency trading cost optimization

Module 7: Performance Measurement and Attribution

- Portfolio return decomposition
- Attribution analysis across asset classes
- Benchmarking strategies
- Performance evaluation of algorithmic models
- Reporting and visualization of results
- Case study: Attribution analysis of an ETF portfolio

Module 8: Systematic Trading Strategies

- Momentum, mean-reversion, and statistical arbitrage
- Backtesting systematic strategies
- Integrating trading signals with portfolios
- Risk management in systematic trading
- Combining multiple strategies for enhanced performance
- Case study: Implementing a systematic momentum strategy

Module 9: Portfolio Rebalancing and Optimization Techniques

- Periodic vs. dynamic rebalancing
- Rebalancing triggers and thresholds
- Portfolio optimization under constraints
- Risk parity and equal-weighting approaches
- Backtesting rebalancing strategies
- Case study: Rebalancing a global equity portfolio

Module 10: ESG Integration and Alternative Data

- Incorporating ESG factors in portfolios
- Alternative data sources for investment decisions
- Quantitative integration of non-traditional data
- Risk-adjusted ESG portfolio evaluation
- Multi-factor ESG portfolio modeling
- Case study: ESG portfolio construction using alternative datasets

Module 11: Scenario Analysis and Stress Testing

- Simulating market shocks and stress conditions
- Scenario-based risk analysis
- Sensitivity testing of portfolio allocations
- Evaluating portfolio resilience under stress
- Contingency planning for extreme events
- Case study: Stress-testing a fixed-income portfolio

Module 12: Advanced Quantitative Risk Mitigation

- Tail risk management
- Hedging strategies using derivatives
- Portfolio insurance techniques
- Volatility and correlation management
- Scenario optimization for risk mitigation
- Case study: Hedging strategies for equity portfolios

Module 13: Real-World Portfolio Challenges

- Market volatility management
- Handling missing or noisy data
- Adapting strategies for emerging markets
- Integrating multi-asset portfolios in practice
- Compliance and regulatory considerations
- Case study: Solving practical investment challenges

Module 14: Backtesting and Model Validation

- Historical data testing and validation
- Walk-forward testing techniques
- Model performance evaluation
- Identifying model weaknesses
- Mitigating overfitting and bias
- Case study: Validating a predictive trading algorithm

Module 15: Final Project and Capstone

- Design and implementation of an algorithmic portfolio
- End-to-end portfolio construction workflow
- Performance evaluation and benchmarking
- Risk management and optimization review
- Presentation and defense of portfolio results
- Case study: Capstone portfolio construction project

Training Methodology

- Interactive lectures with real-world examples
- Hands-on exercises in Python and R
- Live portfolio simulations and backtesting
- Group discussions and problem-solving sessions
- Case study analysis and applied projects
- Q&A and expert 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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