



PYTHON TRAINING

Trading Algorithm Financial Portfolio Optimization Python

Develop Python trading algorithms to optimize financial portfolios effectively. Master quantitative strategies for enhanced investment performance.

DURATION

48 hours

LEVEL

Intermediate

FORMAT

Instructor-Led

- Globally Recognized Certification

- Expert-Led Hands-On Training

- Flexible Scheduling

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COURSE OVERVIEW

This intermediate-level course, "Trading Algorithm Financial Portfolio Optimization Python," is meticulously designed for financial professionals, data analysts, and software developers eager to master the intersection of quantitative finance and Python programming. Over 48 intensive hours, participants will delve into the core principles of algorithmic trading, focusing on developing robust strategies for financial portfolio optimization. You will learn to leverage Python's powerful libraries to analyze market data, construct sophisticated trading algorithms, and manage investment risk effectively, transforming theoretical knowledge into practical, actionable skills for today's dynamic financial markets. This program goes beyond basic coding, equipping you with the expertise to design, backtest, and refine automated trading systems.

The curriculum emphasizes hands-on application, covering essential topics such as Modern Portfolio Theory, statistical arbitrage, mean-reversion strategies, and risk assessment models. Core technologies include Python with its rich ecosystem of financial and data science libraries like Pandas, NumPy, SciPy, Matplotlib, and scikit-learn, all crucial for data manipulation, statistical analysis, and machine learning integration in finance. By the end of this course, you will not only understand the theoretical underpinnings but also possess the practical ability to implement cutting-edge algorithmic strategies, leading to enhanced career opportunities in quantitative finance, fintech, and investment management.

Duration	48 hours
Level	Intermediate
Vendor	Python

COURSE CURRICULUM

01 Module 1: Foundations of Algorithmic Trading and Python for Finance

- Review of Python essentials for quantitative analysis (Numpy, Pandas)
- Financial data acquisition, cleaning, and manipulation (Yahoo Finance API, Quandl)
- Introduction to financial markets, instruments, and quantitative finance concepts
- Basic statistical concepts for financial time series analysis
- Setting up a robust development environment for financial applications

02 Module 2: Modern Portfolio Theory and Optimization Techniques

- Understanding risk and return: Expected return, standard deviation, covariance
- Markowitz Modern Portfolio Theory (MPT) and efficient frontier construction
- Capital Asset Pricing Model (CAPM) and Fama-French models
- Practical implementation of mean-variance optimization in Python (Scipy, CVXPY)
- Advanced portfolio allocation strategies (Black-Litterman, risk parity)

03 Module 3: Algorithmic Trading Strategy Development

- Types of algorithmic trading strategies: Mean reversion, momentum, arbitrage
- Technical analysis indicators and their programmatic implementation
- Event-driven trading strategies and news sentiment analysis
- Introduction to machine learning for signal generation in trading
- Building custom trading indicators and rule-based systems

04 Module 4: Backtesting, Performance Evaluation, and Risk Management

- Designing robust backtesting frameworks and methodologies
- Evaluating strategy performance: Sharpe Ratio, Sortino Ratio, Max Drawdown, CAGR
- Accounting for transaction costs, slippage, and market impact in backtests

- Value at Risk (VaR) and Conditional Value at Risk (CVaR) calculations
- Advanced risk management techniques: Stop-loss, position sizing, diversification

05 Module 5: Advanced Topics and Practical Deployment

- Introduction to live trading platforms and API integration
- Cloud deployment considerations for algorithmic trading systems
- Understanding market microstructure and high-frequency trading concepts
- Ethical considerations and regulatory compliance in algorithmic trading
- Capstone Project: Developing, optimizing, and presenting a complete algorithmic trading system

CAREER PATHWAYS

Graduates of this program are prepared for the following roles:

- > **Quantitative Analyst (Quant)**
- > **Algorithmic Trading Strategist**
- > **Fintech Developer specializing in Investment Platforms**

FREQUENTLY ASKED QUESTIONS

Q: What level of Python proficiency and financial knowledge is recommended before enrolling in this intermediate course?

Participants should have a solid intermediate understanding of Python programming, including familiarity with data structures, functions, and basic object-oriented concepts. While a foundational grasp of financial markets and investment concepts is beneficial, the course will cover essential quantitative finance principles. Previous experience with libraries like Pandas and NumPy is a strong advantage, as the course focuses on applying these tools rather than introductory Python syntax.

Q: How will this course specifically help me develop and implement a functional algorithmic trading strategy in a real-world context?

This course is highly practical, guiding you through the entire lifecycle of developing an algorithmic trading strategy. You'll learn to acquire and process financial data, apply various optimization techniques to construct robust portfolios, and design specific trading algorithms (e.g., mean reversion, momentum). Critically, you will gain hands-on experience with rigorous backtesting methodologies to validate your strategies and implement risk management protocols, culminating in a capstone project where you build and optimize a complete trading system, preparing you for real-world application and potential deployment.

Q: Which specific Python libraries and quantitative tools will I master for financial modeling and portfolio optimization throughout this program?

You will gain mastery over several key Python libraries essential for quantitative finance. These include Pandas for advanced data manipulation and financial time series analysis, NumPy for numerical operations, SciPy for statistical analysis and optimization algorithms (e.g., for portfolio optimization), Matplotlib and Seaborn for data visualization, and potentially scikit-learn for machine learning applications in signal generation. We will also explore specialized libraries like CVXPY for convex optimization and APIs for financial data acquisition, providing a comprehensive toolkit for modern financial analysis.

ABOUT COMPUTER PRIDE



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Take the next step in your technology career.

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