Course:
Algorithmic Trading in Investment Funds

Course Description

This course explains what the Algorithmic trading is, the three core categories of Algorithmic trading, its history and how the Algorithmic trading expanded in the modern landscape. It also elaborates on the Volume-Weighted Average Price (VWAP), the Time-Weighted Average Price (TWAP) and the Percentage of Volume (POV) that are basic algorithmic trading strategies used to minimize market impact.

Algorithmic trading is the systematic use of computer programs to identify, select, and execute trades based on pre-defined rules or models. The defining characteristics of algorithmic trading are repeatability, discipline, speed, and scale.

The course provides the use VWAP, TWAP and POV, their applications and refers to the difference between VWAP and TWAP orders. It also explains in brief the "slippage" and elaborates on the market microstructure.

It also elaborates on the popular algorithms and refers to trend signals, momentum signals, as well as it provides examples of notable practitioners in trend following and momentum strategies.

Trend following and momentum strategies are systematic trading approaches based on the idea that prices tend to move in persistent directions over time.

Furthermore, this course explains the idea of "mean reversion", the Ornstein-Uhlenbeck process, as well as it explains in brief what the Statistical Arbitrage strategies typically involve.

This course provides a practical example of pairs trading and refers to the ETF/Futures Basis Trade, Triangular FX Arbitrage and Crypto Triangular Arbitrage. It elaborates on Machine Learning and AI-Based Strategies for Algorithmic Trading and explains the predictive forecasting, forecasting methods, Natural Language Processing (NLP), Reinforcement Learning (RL), as well as it provides examples and formulas.

Topics covered

The course is split into the following sections:

Section 1: Introduction

- Broad Definitions
- Three Core Categories
- The Business Case for Automation
- Critical Risk Categories
- Building Professional Trading Systems
- Early Foundations: Program Trading Era
- Regulatory Catalysts: Early 2000s Acceleration
- The Expansion
- Modern Landscape

Section 2: Basic Algorithms

- Volume-Weighted Average Price (VWAP)
  - VWAP Uses
  - VWAP Benefits
  - VWAP Limitations and Risks
  - Applications

- Time-Weighted Average Price (TWAP)
    - TWAP in practice
    - TWAP formulas
    - TWAP for the markets
    - TWAP Orders
- VWAP vs TWAP
- Percentage of Volume (POV) Strategy
- Dark Pools

Section 3: Market Microstructure

- The Electronic Limit Order Book
- Liquidity Discovery and Hidden Depth
- Slippage
    - Price Slippage
- Latency Challenges and Microstructure Noise
- Auction Mechanisms and Venue Dynamics
- Other causes of price dynamics
- Order changes in various venues
- Data Pipeline Foundation
- Research Hygiene and Back testing Rigor
    - Research Hygiene
- Production System Architecture
- Architecture in detail

Section 4: Popular Algorithms

- Trend Following and Momentum
- Trend Following vs Momentum Example
- Trend Signals
- Momentum Signals
- Notable Practitioners – Trend Followers
- Notable Practitioners – Momentum
- Things to note

Section 5: Mean Reversion and Statistical Arbitrage

- Mean Reversion
- Observable Mean Reversion Patterns
- Ornstein-Uhlenbeck process
    - Main properties
- Statistical Arbitrage
- Comparison of other strategies
- Implementation Framework
- Strategic Advantages
- Critical Risk Factors
- Leading Statistical Arbitrage Desks
- Interest Rate Modelling Applications
- Energy & Commodities Trading
- Energy Trading History & Modern Applications

- Pairs Trading – A practical example
  - Step 1: Parameter Estimation
  - Step 2: Trading Rules Framework
  - Step 3: Trade Execution
  - Step 4: Profit Calculation and Risk Management
- Why Ornstein-Uhlenbeck Works
- Cross-Market Arbitrage
- ETF / Futures Basis Trade
- Triangular FX Arbitrage
- Crypto Triangular Arbitrage
- Strategy comparison
- Event-Driven Algorithmic Trading
- Event Categories & Market Impact
- Execution Timeline Advantage
- Natural Language Processing
- Risk Management Architecture
- Infrastructure Requirements
- Challenges and Market Competition
- Scenario
- Trading Flow

Section 6: Machine Learning and AI-Based Strategies for Algorithmic Trading

- Predictive Forecasting
- Forecasting Methods
  - Forecasting Methods – Time Series
- Sentiment Analysis and Alternative Data
- Natural Language Processing (NLP)
- Reinforcement Learning
  - Reinforcement Learning (RL) Strategies
- Risk Management and Portfolio Optimization
- Examples of Algorithms
- Practical Example: Long Short-Term Memory
- LSTM in practice
- Hidden Layers
- Training and Validation Flow
- Deep Dive: the forget gate
- Formula
- Numerical Example
- Input vs Parameters
- Reminder on Gates
- How is the cell state updated?
- Usefulness of LSTM models
- Example: K-Means Clustering
- K-Means Clustering
  - Example
  - Results
- Summing Up

Course Duration

This course may take up to 5 hours to be completed. However, actual study time differs as each learner uses their own training pace.

The course is addressed to:

This course is addressed to all individuals who are involved in Investment Firms (forex, brokers, etc) and Funds' industry such as:

- Executive Directors, Non-executive directors, Senior Managers, Compliance Officers, Risk Managers, Product Managers, Portfolio Managers, Investment Advisors, Dealers, Marketing Managers and in general employees of investment firms, Funds and Fund Managers.
- Fund Administrators
- Fund consultants
- Internal Auditors
- Professionals in the Funds' industry
- Lawyers

It is also suitable to professionals pursuing CPD for the renewal of CySEC Certificate (CySEC Basic and CySEC Advance Certificate) or other relevant professional certificates in other jurisdictions.

Training Method

The course is offered fully online using a self-paced approach. The learning units consist of power point presentations. Learners may start, stop and resume their training at any time.

At the end of the course, participants take a Quiz to complete the course and earn a Certificate of Completion once the quiz has been passed successfully.

Accreditation and CPD Recognition

The course may be accredited by regulators and other bodies for up 5 CPD Units, that require CPD training in financial and other regulation.

Eligibility criteria and CPD Units are verified directly by your association or other bodies in which you hold membership.

Registration and Access

To register to this course, click on the *Take this course* button to pay online and receive your access instantly. If you are purchasing this course on behalf of others, please be advised that you will need to create or use their personal profile before finalizing your payment.

Access to the course is valid for 90 days.

If you wish to receive an invoice instead of paying online, please Contact us by email. Talk to us for our special Corporate Group rates.

Instructor

With more than 10 years of experience, Nektarios is an expert in the financial services industry, having worked in key roles at investment funds, CIFs and other service providers. His exposure to the industry allowed him to gain knowledge in a variety of vital investment functions.

Complementing his practical knowledge of the industry, Nektarios also holds a number of professional and academic qualifications, including CySEC's Advance Certification. He is currently employed by an Investment Fund.