

# AlgoTrading101

## Full Syllabus Overview

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Learn | Trade | Raise Funds

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# AlgoTrading101 – AT101 + PT101

**AlgoTrading101 consists of 2 main courses:**

- AT101: Algorithmic Trading Immersive Course
- PT101: Practical Python for Finance & Trading Masterclass

## AT101: Algorithmic Trading Immersive Course

### Key Learning Objectives

Note: This list are broad learning objectives not specific lectures

- 1. Here's What You Are In For!**
  - a. What is an Algo Trading Robot, its key traits and code structure
  - b. What makes a successful Algo Trader
  - c. How to set up and navigate your infrastructure/coding software
- 2. Programming Basics 1: Variables and Conditional**
  - a. Basics of our coding language (MQL4)
  - b. Syntax, Variables, Operations and Conditional Expressions
- 3. Robot 1: Adeline - Our First Robot!**
  - a. Background to Forex markets, chart reading, basic indicators
  - b. Coding Adeline together
  - c. Testing Adeline using past data
  - d. Brief look at modelling quality
- 4. Uncommon Common Sense. Design Effective And Logical Robots**
  - a. Overview of our Strategy Development Guide
    - i. Preliminary Research
    - ii. Backtesting
    - iii. Optimisation
    - iv. Live Execution
  - b. Pros and Cons of an Algo Trading Robot
  - c. Mathematical Expectations of our robots' performance
- 5. Garbage In, Garbage Out. Understanding Data**
  - a. Data Sources and Storage
  - b. A look at the importance of data cleanliness
  - c. Cleaning data (basic)
  - d. Bad ticks, inaccurate testing and market tricksters
- 6. Programming Basics 2: Loops**
  - a. Learning how to code loops
  - b. Practice Exercises for Loops
- 7. Robot 2: Belinda - Utilising Volatility!**
  - a. Our first measure of volatility (ATR)
  - b. Introducing Belinda, the improved version of Adeline
  - c. Coding and testing Belinda
- 8. To Buy Big or Small? Position Sizing and Money Management**
  - a. Understanding trade/bet size (how much to trade per position) using a coin flip game
  - b. Designing a bet sizing algorithm based on account size
  - c. Coding our bet sizing algorithm
- 9. Robot 2A: Belinda Upgraded (No Gambler's Ruin for Me!)**
  - a. Implementing our bet sizing algorithm in Belinda

**10. Where To Start? Idea Generation and Expectations**

- a. Setting expectations for our robots based on our resources, personality, skill set, lifestyle and goals
- b. Sources of trading ideas
- c. A look at the different types of strategies
- d. Grading ideas - Introducing our framework for vetting ideas
- e. How to fight against big hedge funds

**11. Programming Basics 3: Functions, Time and Self-Learning**

- a. Learn to learn programming
- b. Code errors and debugging
- c. Coding Functions
- d. Practice Exercises for Functions

**12. Relevant Statistics 101!**

- a. Statistical significance and Law of Large numbers and their role in robot testing
- b. Deriving suitable minimum sample size for our backtests

**13. Understanding Robot Behaviour and Robustness: Backtesting!**

- a. Ensuring code accuracy
- b. Types of market condition
- c. Testing for Robustness
  - i. Period Robustness
  - ii. Timeframe Robustness
  - iii. Seasonal Robustness
  - iv. Instrument Robustness
- d. Building robots for strategic market conditions
- e. Stress testing our robots through black swans
- f. The butterfly Effect – Backtest bias via start point selection
- g. Grading the performance of our robots

**14. Programming Basics 4: Arrays And Indicators**

- a. A look at our mentality towards Indicators
- b. Math behind Indicators
- c. Coding Arrays and Indicators

**15. Robot 3: Clarissa – Playing with Time**

- a. Understanding the Datetime data type
- b. Coding rules revolving date and time manipulation
- c. Introducing and coding Clarissa – our robot that uses time entries

**16. What A Mess - Managing Trades, Orders and Positions**

- a. Order limitations by your brokers
- b. Coding our customised order function
- c. Multiple order management
- d. Modelling transaction cost, spreads and slippage

**17. Robot 4: Desiree – Trade like the Turtles**

- a. The history of the Turtle Traders
- b. Introducing and coding a simplified turtle strategy

**18. Design Theories I - Improving Robots By Manipulating Time, Entries and Exits**

- a. Profitability in different timeframes
- b. Deriving optimal stop loss levels
- c. Comparing the importance of entries vs exits
- d. Analysing asymmetrical long and short rules

**19. Add A Twist To Your Orders - Advanced Order Management**

- a. Breakeven and trailing stops
- b. Hiding from your broker - Creating virtual stops and take profit orders

**20. Robot 5: Desiree 2.0**

**21. Buff Up Your Robot Responsibly - Optimisation Without Curve Fitting**

- a. Objective Functions, Robustness and Curve Fitting
- b. 10 Ways to minimise curve fitting
- c. Degrees of Freedom
- d. Parameter Robustness
- e. In and out-of-sample testing
- f. Optimisation Evaluation

**22. Perfect Your Bet Sizing - Advanced Position Sizing Methods**

- a. Relationship between sizing and trading frequency
- b. Gearing up and down with volatility
- c. Impossible Trinity of Sizing - Relationship between Leverage, % Risked and Stop Loss
- d. First Principles of sizing - Building customised sizing algorithms
- e. Other types of sizing - Kelly Criterion, Martingales and Anti-Martingales

**23. Robot 6: Elizabeth**

**24. Programming Basics 5: Clean Up Your Codes! Simple Is Fast!**

- a. Clean and robust coding
- b. MT4 Global Variables
- c. MQL4 Libraries

**25. Garbage In, Garbage Out Again. Advanced Data Cleaning (Part 1)**

- a. Creating custom timeframes
- b. Clean data, biased output

**26. Excel VBA – Using Excel Magic to Improve our Trading**

- a. Excel trading game
- b. Syntax
- c. Conditional statements
- d. Loops

**27. Garbage In, Garbage Out Again. Advanced Data Cleaning (Part 2)**

- a. Data time zone manipulation
- b. Defining "clean enough" data
- c. Scanning for errors
- d. Advanced data cleaning methodologies

**28. I Like Colors And Shapes - Adding Graphics**

- a. Creating a Dashboard: Graphics and Labels
- b. Creating trendlines and levels

**29. Ring Ring! Notify Yourself When Something Goes Wrong (Or Right)**

- a. Coding smartphone notifications
- b. Notify yourself during trade or price events

**30. Robot 7: Faye – Semi-Automated Trading**

**31. Connect with the outside world - Importing and Exporting Data out of our Trading Platform**

- a. Read and write information to Excel
- b. Build a spread logger

**32. Programming Basics 6: Trading Platform Nuances**

- a. Perfecting the little coding details
- b. Understanding trading and backtesting nuances

**33. Design Theories II - The "Secret Sauce"**

- a. Prudence-Behavioural Framework
- b. Alpha 1: Data
- c. Alpha 2: Global Macro
- d. Alpha 3: High-Frequency Trading

- e. Alpha 4: Market Microstructure
- f. Hybrid Model – Semi-Algorithmic Trading
- g. 5 Realities of Algorithmic Trading
- h. Crowd Behaviour – Outwitting the Masses

**34. Walking Forward - Advanced Optimisation**

- a. Walk Forward Optimisation
- b. Performance patterns, consistency and seasonality
- c. 3D Parameter space evaluation

**35. Looking Outwards - Trading On External Events**

- a. Feeding external data into MT4
- b. Trade on external events

**36. Robot 8: Gwen**

**37. Cash Is King! - Running Robots With Real Money**

- a. Paper versus Live trading
- b. Minimum Capital Determination
- c. Broker Selection
- d. Virtual Private Servers
- e. Downtime Prevention Protocol
- f. Hedging issues
- g. Strategy Monitor - Updating our robots regularly
- h. Live walk-forward optimisation
- i. Investor Marketplace

**38. Watch Her Well - Monitoring Your Robot(s)**

- a. Operational Risk Management
- b. Monitoring our robots
- c. When to manually intervene
- d. Reviewing performance
- e. Understanding Trading Psychology - Emotions during drawdowns

**39. Final Project**

- a. Design, build and test a strategy
- b. Execute on an investor marketplace

## PT101: Practical Python for Finance & Trading Masterclass

**We will be covering the following categories of strategies:**

- Correlation (If A moves, trade B)
- Cointegration (Mean reversion: When A and B moves apart, we bet they will revert)
- Text analysis (Machine Learning)
- Imagery detection/analysis (Machine Learning)
- Web scrapping (Scrap data from job and restaurant review sites etc)
- Web API (Put data from online portals like Google Trends)
- Alternative data (Credit card, Location data etc)

The full chapter list for PT101 is not finalised yet. We will update this syllabus when it is.

Note: The listed content of AT101 and PT101 may be subject to change – we are constantly adding new content.