# Project Assessment, Group Project: Student Guide

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| **Title** | Trading Strategies |
| **Due Date** | Part A: End of Week 8, Sunday 9:00pm 9-Nov-2025<br>Part B: End of Week 10, Sunday 9:00pm 16-Nov-2025 |
| **Weighting** | Part A: 15%<br>Part B: 15% |
| **Task** | Written Report |
| **Word Limit** | Part A: 1,500 Word maximum excluding charts, tables, diagrams, etc.<br>Part B: 1,000 Word maximum excluding charts, tables, diagrams, etc. |
| **Submission** | Via Moodle |

## 1. Overview & Goals

This group project assessment provides the opportunity to apply quantitative analysis to the development of and/or evaluation of trading strategies. You will work collaboratively within a team to analyse financial data and implement quantitative research, such as conducting backtests and/or developing models, preferably based on real historical intraday data.

### 1.1. Learning Outcomes Assessed

This assessment addresses the following Course Learning Outcomes (CLOs):

- Demonstrate an in-depth understanding of the principles, practices, and complexities of financial technology and innovation within global financial systems
- Critically analyse and evaluate real financial problems using technological solutions and data driven decision making frameworks
- Collaborate effectively within diverse teams to deliver well-structured and professional group outputs that reflect critical thinking and strategic planning.

### 1.2. Goals / Objectives

The objectives of this assessment are to:

- Work collaboratively in a team environment to achieve shared goals
- Gain further experience in use of financial market microstructure data, including the ability to identify and select appropriate datasets for analysis

- Develop domain knowledge in an area of personal interest within trading markets
- Display problem solving skills useful in quantitative research such as initiative, creativity and original thinking.

## 2. Instructions

- **Preparation**: Review key concepts from lectures and readings.
- **Dataset:** You will need to source data to complete the Group Project. If you have trouble identifying a suitable dataset, contact the Course Convenor for further guidance.
- **Submission:** Both Part A & Part B require submission of:
    - Report – detailing methodology, analysis and conclusions as a PDF
    - Code or Spreadsheet – any computational scripts, e.g. Python, R or spreadsheets, e.g. Excel, used for analysis
    - AI Transparency – if AI tools (e.g. ChatGPT, ML models) are used, students must document their usage and provide justification.

In summary, as a team, you will submit two (2) well structured reports, incorporating your research and analysis results with critical reflection. Higher marks will be awarded to projects that use logical data driven arguments and display understanding that extends beyond the standard course materials.

## 3. Assessment: Part A

### Step 1: Team Formation & Role Allocation

Students must form teams and submit their group details via Moodle. If no selection is made, automatic allocation will be made by the Course Convenor. It will also be helpful if you allocate roles to all team members.

### Step 2: Project Topic Selection

As per the Course Outline the scope for topic selection is quite broad, but typically the Group Project will involve

- Design and backtest a trading strategy using historical intraday market data
- As an alternative, modelling & analysis of a key trading strategy input.

### Step 3: Data Sourcing, Data Processing & Background Analysis

- Source data for your topic, then clean the data, if applicable
- Perform any necessary background analysis, e.g. statistics & microstructure metrics

### Step 4: Trading Plan Development

- Construct a set of well defined rules to implement your trading strategy.

### Step 5: Backtesting & Out of Sample Testing

- Conduct initial quantitative analysis based on a limited data sample.

## 4. Assessment: Part B

### Step 6: Strategy Evaluation

- Review initial analysis, add any further performance, risk & other relevant metrics.

### Step 7: Strategy Refinement

- Explore ways to refine your trading strategy, such as optimisation of key parameters in the trading plan and/or conducting further research and analysis
- Include an explanation of any changes made to your trading strategy
- Repeat the backtest.

### Step 8: Critical Reflection

- What are the strengths and limitations of your work ? Please include data to support your arguments and/or tables, charts etc.
- Provide your top three (3) recommendations to improve the implementation of your analysis in a real world setting and explain your reasoning.

### Step 9: Peer Evaluation

Using Moodle Team Evaluation Tool, you will be required to provide feedback on your peers with respect to:

- Engagement and participation, technical contribution, communication and collaboration, Timeliness and reliability, Initiative and critical thinking
- Comment on the contribution, any challenges & possible differentiation for your peers.

# Appendix A: Design & Backtest a Trading Strategy

## A.1: Team Formation & Role Allocation

Students must form teams and submit their group details via Moodle. If no selection is made, automatic allocation will be made by the Course Convenor. You don't need to notify the Course Convenor about your choice of groups unless you have a non-standard request.

It will also be helpful if you allocate roles to all team members, typical teams consist of:

- Trading – usually involves deep financial market and financial product knowledge, e.g. market microstructure, derivatives versus cash products
- Quantitative Analysis – statistical analysis and mathematical modelling
- Technology – in this context will be coding, but usually also includes physical hardware
- Sales – in this context would focus on writing the reports
- Risk – in this context has a specific focus on trading strategy evaluation and refinement.

## A.2: Trading Strategy Selection

- Provide a clear statement of your trading strategy and include all key assumptions necessary for implementation
- Please also include an explanation on why you selected the specific trading strategy
- Design and backtest a trading strategy using historical intraday market data

The following questions may provide a systematic way to select your trading strategy:

- What is your 'Edge' ? What areas of markets interest you ?
- What Time Horizon do you prefer ? High, Medium, Low Frequency
- What Asset Class do you find interesting ? What Asset Class do you understand best ? Select between Equities, ETFs, Cryptocurrencies, Fixed Income, Currencies, Commodities, New Economy Markets, e.g. Carbon Credits, ESG Strategies
- What Data can you access ? All students have access to Factset
- Which Trading Strategies do you understand best or wish to learn more about ? Market Making, Directional, Arbitrage

## A.3: Data Sourcing, Data Processing & Background Analysis

- Obtain a dataset for your topic, then use a tool of your choice (e.g. Excel, Python, R) to clean the data, if applicable
- Split the data in preparation for backtesting and out-of-sample testing
- Perform any necessary background analysis, e.g. statistics & microstructure metrics

## A.4: Trading Plan Development

- Formulate a trading plan for your strategy, the following steps are recommended:

- Trade Entry Criteria
- Trade Exit Criteria
- Position Size Determination
- Trade Execution Rules.

## A.5: Backtesting & Out of Sample Testing

- Using an initial but limited data sample, perform a backtest by applying your trading strategy to historical data to simulate how it would have performed in the past
- Calibrating your trading strategy on the initial dataset, then conduct out-of-sample testing on a separate unseen portion of historical data
- Provide introductory evaluation of the backtest & out-of-sample results with respect to:
  - Performance analytics, e.g. total & annualised returns, CAGR, number of trades, win rate, alpha, beta & correlation
  - Risk measures, e.g. volatility, average true range (ATR), value-at-risk, expected shortfall, maximum drawdown
  - Risk return metrics, e.g. Sharpe, Sortino, Treynor & Information Ratios
  - Equity curve of cumulative returns over the test period
  - Other metrics, e.g. turnover, capacity, P&L + holding period distributions
- [Advanced students can attempt forward testing by application of your trading strategy using real time data, without actual execution, to simulate how strategy performance in a live environment and observe operational factors like data lags, execution frequency, and dynamic market conditions.]

## A.6: Strategy Evaluation

Review the initial analysis from your backtest, then add further

- Performance analytics, as appropriate
- Risk assessment measures
- Risk / Return metrics
- Other metrics, if relevant.

## A.7: Strategy Refinement

Explore ways to refine your trading strategy, such as:

- Optimisation of key parameters in the trading plan
- Further research and analysis, i.e. algorithm modifications for
  - More realistic modelling, e.g. transaction costs, short selling restrictions
  - Market announcements, e.g. company earnings, event flags, sentiment analysis
  - Seasonality and/or time of day effects.
  - Price prediction model improvements, e.g. AI / ML / advanced statistics
  - Risk management improvements, e.g. advanced inventory management, adverse selection models, volatility indicators, advanced liquidity measures
- Repeat the backtest with the refined trading strategy, i.e. conduct a new backtest that incorporates any changes to the original trading plan
- Compare the results between your initial and subsequent backtest.

# Appendix B: Key Trading Strategy Inputs

An alternative to designing and implementing a trading strategy is to conduct modelling and analysis on a key input to a trading strategy. Below are potential topics for a Group Project.

## B.1: Market Microstructure

- Intraday Volatility Calculations, e.g. data selection, optimal historical holding period, fundamental vs. transitory volatility, other metrics such as average true range (ATR)
- Intraday Price Prediction Models, e.g. combine Order Book and Trade Feed data or use of Artificial Intelligence (AI) / Machine Learning (ML) models
- Adverse Selection models such as Probability of Informed Trading, e.g. analysis of Trade Feed data using Broker IDs.

## B.2: Market Making

- Target Profit Analysis, i.e. Spread measurement, trading volume & risk analysis across an entire market (e.g. Stocks, ETFs) to identify the optimal use of capital
- Inventory Management, e.g. develop an Inventory model that accounts for advanced issues such as intraday volatility, adverse selection, extreme stress, market impact, multi asset hedging, multi venue allocation, time of day effects
- Market Order Analysis, e.g. order size, arrival rates, time of day effects
- Optimal Execution, e.g. when to use market vs. limit orders based on Order Book & Trade Feed data.

If you are interested in exploring any of the above topics, contact the Course Convenor for further information.

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## Part A: Assessment Criteria & Feedback Guidance

| Criteria | HD (85-100%) | D (75-84%) | C (65-74%) | P (50-64%) | F (<50%) |
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| Project Topic Selection (15%) | Topic Selection is very challenging, clearly defined, logical, reasonable & well-structured. | Topic Selection is moderate to advanced, with some scope for refinement. | Topic Selection difficulty is moderate with potential for higher levels of sophistication. | Topic Selection is basic and lacks clarity. | Topic Selection is unclear, lacks coherence, or has fundamental flaws. |
| Data Sourcing, Data Processing & Background Analysis (20%) | Data & Background Analysis complexity is very challenging, clear, logical & well-structured. Uses advanced models and excellent explanation of work. | Data & Background Analysis complexity is moderate to advanced. Demonstrates good modelling with room for improvement. | Data & Background Analysis complexity is moderate with appropriate implementation. Further explanation is required. | Data & Background Analysis is basic, lacks clarity in methodology or assumptions. Limited explanation of work. | Data & Background Analysis is unclear, lacks coherence, or has methodological flaws. Fails to perform basic work correctly. |
| Trading Plan Development (30%) | Trading Plan Development is comprehensive, showing insightful understanding. | Trading Plan Development is strong, although improvements are possible. | Trading Plan Development is adequate but lacks depth. | Trading Plan Development is very basic or contains errors. | Trading Plan Development does not exist or major flaws in execution. |
| Backtesting & Out of Sample Testing (35%) | Executes comprehensive backtesting. Uses additional metrics effectively and provides insightful evaluation. | Conducts solid backtesting, although some improvements could be made. | Performs backtesting adequately but either lacks depth and/or has limited evaluation of results. | Provides very basic backtesting or contains basic errors. Critical evaluation of results is also basic. | No backtesting, or major flaws in execution. Lacks critical evaluation of results. |

## Part B: Assessment Criteria & Feedback Guidance

| Criteria | HD (85-100%) | D (75-84%) | C (65-74%) | P (50-64%) | F (<50%) |
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| Strategy Evaluation (20%) | Strategy Evaluation is comprehensive. Uses additional metrics effectively and provides insightful evaluation. | Strategy Evaluation is solid, although some improvements could be made in the analysis or evaluation. | Strategy Evaluation is performed adequately, but either lacks depth and/or has limited evaluation of results. | Strategy Evaluation is very basic or contains basic errors. Critical evaluation of results is also basic. | Strategy Evaluation does not exist or has major flaws in execution. Lacks critical evaluation of results. |
| Strategy Refinement (30%) | Strategy Refinement is comprehensive. Extra research & analysis is advanced and provides important insights. | Strategy Refinement is solid, with some improvements possible to the additional research & analysis. | Strategy Refinement is performed adequately, the additional research & analysis lacks depth. | Strategy Refinement is very basic or contains basic errors. Additional research & analysis is also basic. | Strategy Refinement does not exist or has major flaws in execution. Additional research & analysis is low quality. |
| Critical Reflection & Recommendations (25%) | Provides deep, evidence-based reflections on strengths and limitations. Proposes innovative and feasible improvements. | Offers well-supported critical reflections and recommendations. Some areas for deeper analysis or stronger justification. | Provides reasonable reflection but lacks depth or fails to fully justify recommendations. | Attempts reflection but lacks strong evidence or depth. Recommendations are vague or generic. | Minimal or no reflection. Recommendations are missing, unfeasible, or lack justification. |
| Group Collaboration & Contribution (25%) | Demonstrates exceptional teamwork. All members contribute equitably, leveraging diverse skills. Evidence of collaboration, role distribution & support. | Strong teamwork with clear contributions from all members. Some minor imbalances in workload, but overall well-coordinated effort. | Reasonable teamwork with most members contributing. Some imbalances in effort or unclear role distribution. | Limited teamwork. Unequal contribution or poor coordination. Issues with participation affect quality of work. | Lack of teamwork. Significant contribution imbalance, poor communication, or conflicts that impact project success. |