UNSW Course Outline

# FINS3666 Trading and Market Making - 2024

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## General Course Information

**Course Code :** FINS3666
**Year :** 2024
**Term :** Term 3
**Teaching Period :** T3
**Is a multi-term course? :** No
**Faculty :** UNSW Business School
**Academic Unit :** School of Banking and Finance
**Delivery Mode :** In Person
**Delivery Format :** Standard
**Delivery Location :** Kensington
**Campus :** Sydney
**Study Level :** Undergraduate
**Units of Credit :** 6

**Useful Links**

Handbook Class Timetable

## Course Details & Outcomes

### Course Description

The course provides a practical insight into quantitative trading. It provides students with a comprehensive understanding of quantitative analysis in financial markets, emphasizing risk management and the development of effective trading strategies. Through theoretical concepts,

practical exercises, and real-world applications, students gain knowledge in statistical analysis, algorithmic trading, market microstructure, risk management, and back testing. By the end of the course, students will have acquired the skills to analyse financial data, assess market dynamics, manage risks, and evaluate the performance of trading strategies through back testing.

## Course Aims

This course aims to:

1. Understand the role and importance of quantitative analysis in financial markets.
2. Gain knowledge of different trading strategies and their application in quantitative trading.
3. Develop skills in statistical analysis, modeling, and data interpretation for trading strategy development.
4. Learn how to assess and manage risks associated with trading strategies and evaluate their performance through back testing.

## Relationship to Other Courses

Prerequisites for the course are FINS2624.

Knowledge of statistical analysis and programming will be advantageous.

The course is related to FINS3635 on Options, Futures, and Risk Management

# Course Learning Outcomes

| Course Learning Outcomes | Program learning outcomes |
|---|---|
| CLO1 : Knowledge: Students will demonstrate a solid understanding of quantitative analysis in financial markets, including the different trading strategies employed and the importance of risk management. | • PLO1 : Business Knowledge<br>• PLO2 : Problem Solving<br>• PLO3 : Business Communication<br>• PLO5 : Responsible Business Practice |
| CLO2 : Application: Students will be able to apply statistical analysis and modeling techniques to derive insights from financial data, enabling them to develop and evaluate trading strategies. | • PLO1 : Business Knowledge<br>• PLO2 : Problem Solving<br>• PLO4 : Teamwork |
| CLO3 : Skills: Students will develop practical skills in back testing and performance evaluation, including the ability to design, conduct, and interpret back tests to assess the performance of trading strategies. They will also learn how to evaluate and optimize trading strategies based on the results obtained. | • PLO1 : Business Knowledge<br>• PLO2 : Problem Solving<br>• PLO3 : Business Communication |
| CLO4 : Critical Thinking: Students will develop critical thinking skills in assessing market microstructure, analyzing order book dynamics, and understanding the impact of market liquidity on trading strategies. | • PLO1 : Business Knowledge<br>• PLO2 : Problem Solving |

| Course Learning Outcomes | Assessment Item |
|---|---|
| CLO1 : Knowledge: Students will demonstrate a solid understanding of quantitative analysis in financial markets, including the different trading strategies employed and the importance of risk management. | • Individual Assessments<br>• Project Assessments<br>• Final Assessments |
| CLO2 : Application: Students will be able to apply statistical analysis and modeling techniques to derive insights from financial data, enabling them to develop and evaluate trading strategies. | • Individual Assessments<br>• Project Assessments<br>• Final Assessments |
| CLO3 : Skills: Students will develop practical skills in back testing and performance evaluation, including the ability to design, conduct, and interpret back tests to assess the performance of trading strategies. They will also learn how to evaluate and optimize trading strategies based on the results obtained. | • Project Assessments<br>• Final Assessments |
| CLO4 : Critical Thinking: Students will develop critical thinking skills in assessing market microstructure, analyzing order book dynamics, and understanding the impact of market liquidity on trading strategies. | • Individual Assessments<br>• Project Assessments<br>• Final Assessments |

## Learning and Teaching Technologies

Moodle - Learning Management System | Echo 360

## Learning and Teaching in this course

This course aims to provide a practical introduction to quantitative trading, hence the teaching approach will be a mixture of lectures & guest speakers, group discussions and market simulations. This course consists of weekly three hour sessions. Guest speakers are included to give 'career focused' education, designed to enhance, NOT replace the lecture content.

To enhance Career Focussed Education we have a number of teaching aims.

- Create a climate of engagement, dialogue and ongoing feedback between students and teaching staff regarding the course content, teaching strategies, learning experiences and outcomes (Guidelines on Learning that Inform Teaching at UNSW (GLIT) numbers 2,7,10);
- Cater for a variety of learning preferences and abilities by providing a range of learning activities and teaching methods (GLIT number 9);
- Develop independent learning skills and create an environment that both provides structure and guidance as well as encouraging students to extend their learning (GLIT numbers 2,11);
- Develop skills in collaboration and teamwork, which is directly relevant to the skills required

of a Finance professional (GLIT numbers 6, 14).

# Assessments

## Assessment Structure

| Assessment Item | Weight | Relevant Dates | Program learning outcomes |
|---|---|---|---|
| Individual Assessments Assessment Format: Individual | 30% | Start Date: Class Participation is required throughout the term, while the Mid Term Quiz will be held in Week 5.<br>Due Date: Week 5: 07 October - 13 October | • PLO1 : Business Knowledge<br>• PLO2 : Problem Solving<br>• PLO3 : Business Communication<br>• PLO4 : Teamwork<br>• PLO7 : Leadership Development |
| Project Assessments Assessment Format: Group | 30% | Due Date: Week 7: 21 October - 27 October | • PLO1 : Business Knowledge<br>• PLO2 : Problem Solving<br>• PLO3 : Business Communication<br>• PLO4 : Teamwork<br>• PLO7 : Leadership Development |
| Final Assessments Assessment Format: Individual | 40% | Due Date: The Final Exam will be set by the university during the examination period. | • PLO1 : Business Knowledge<br>• PLO2 : Problem Solving |

## Assessment Details

### Individual Assessments

**Assessment Overview**

Individual assessments include quizzes, online assignments, and class contributions made during the term that assess the degree of knowledge, application, and critical thinking learned throughout the course.

Assesses: PLO1, PLO2, PLO3, PLO4, PLO5, PLO6, PLO7

**Course Learning Outcomes**

- CLO1 : Knowledge: Students will demonstrate a solid understanding of quantitative analysis in financial markets, including the different trading strategies employed and the importance of risk management.
- CLO2 : Application: Students will be able to apply statistical analysis and modeling techniques to derive insights from financial data, enabling them to develop and evaluate trading strategies.
- CLO4 : Critical Thinking: Students will develop critical thinking skills in assessing market microstructure, analyzing order book dynamics, and understanding the impact of market

liquidity on trading strategies.

**Detailed Assessment Description**

| Weight | Assessment Name | Assessment Due Date / Timing |
|---|---|---|
| 10% | Class contribution | On-going, weeks 1-10 |
| 20% | Mid-term Quiz (online) | Week 5 (Day/time in Week 1 Moodle announcement) |

**Class contribution 10%**

Class contribution refers to the active and meaningful participation during lectures and discussions. It goes beyond merely attending classes and involves engaging in discussions, sharing perspectives, asking questions, and contributing insights that enhance the learning experience for both oneself and fellow classmates.

**Mid-term Quiz 20%**

The midterm quiz will encompass content from lectures conducted in weeks 1 to 4. The primary emphasis of the quiz will be on the hands-on implementation of the concepts covered during this period.

The quiz will be online via Moodle and will need to be completed in 2 hours.

**Assignment submission Turnitin type**

Not Applicable

**Generative AI Permission Level**

**Simple Editing Assistance**

In completing this assessment, you are permitted to use standard editing and referencing functions in the software you use to complete your assessment. These functions are described below. You must not use any functions that generate or paraphrase passages of text or other media, whether based on your own work or not.
If your Convenor has concerns that your submission contains passages of AI-generated text or media, you may be asked to account for your work. If you are unable to satisfactorily demonstrate your understanding of your submission you may be referred to UNSW Conduct & Integrity Office for investigation for academic misconduct and possible penalties.
For more information on Generative AI and permitted use please see here.

## Project Assessments

**Assessment Overview**

Project assessment involves primarily working in small teams to apply the quantitative analysis, modeling techniques, and trading strategies learned throughout the course. Some individual components may be included where the case may arise.

Assesses: PLO1, PLO2, PLO3, PLO4, PLO7

**Course Learning Outcomes**

- CLO1 : Knowledge: Students will demonstrate a solid understanding of quantitative analysis in financial markets, including the different trading strategies employed and the importance of risk management.
- CLO2 : Application: Students will be able to apply statistical analysis and modeling techniques to derive insights from financial data, enabling them to develop and evaluate trading strategies.
- CLO3 : Skills: Students will develop practical skills in back testing and performance evaluation, including the ability to design, conduct, and interpret back tests to assess the performance of trading strategies. They will also learn how to evaluate and optimize trading strategies based on the results obtained.
- CLO4 : Critical Thinking: Students will develop critical thinking skills in assessing market microstructure, analyzing order book dynamics, and understanding the impact of market liquidity on trading strategies.

**Detailed Assessment Description**

| Weight | Assessment Name | Assessment Due Date / Timing |
|---|---|---|
| 30% | Group Project | Week 7 |

**Group Project 30%**

The group project offers an opportunity for collaborative work in applying quantitative analysis to practical problems. You can choose to examine a research paper, design a trading strategy or even evaluate the merits of specific trading styles. The scope of the project is very broad. Higher marks will be awarded to projects that provide genuine insight.

The group projects will be presented in class during week 7 with a short discussion to follow.

**Assignment submission Turnitin type**

Not Applicable

Generative AI Permission Level

**Assistance with Attribution**

This assessment requires you to write/create a first iteration of your submission yourself. You are then permitted to use generative AI tools, software or services to improve your submission in the ways set out below.
Any output of generative AI tools, software or services that is used within your assessment must be attributed with full referencing.
If outputs of generative AI tools, software or services form part of your submission and are not appropriately attributed, your Convenor will determine whether the omission is significant. If so, you may be asked to explain your submission. If you are unable to satisfactorily demonstrate your understanding of your submission you may be referred to UNSW Conduct & Integrity Office for investigation for academic misconduct and possible penalties.
For more information on Generative AI and permitted use please see here.

## Final Assessments

Assessment Overview

Final assessments consist primarily of a final examination that assesses the knowledge and applications of the course. Other types of assessment may be included.

Assesses: PLO1, PLO2, PLO5, PLO6

Course Learning Outcomes

- CLO1 : Knowledge: Students will demonstrate a solid understanding of quantitative analysis in financial markets, including the different trading strategies employed and the importance of risk management.
- CLO2 : Application: Students will be able to apply statistical analysis and modeling techniques to derive insights from financial data, enabling them to develop and evaluate trading strategies.
- CLO3 : Skills: Students will develop practical skills in back testing and performance evaluation, including the ability to design, conduct, and interpret back tests to assess the performance of trading strategies. They will also learn how to evaluate and optimize trading strategies based on the results obtained.
- CLO4 : Critical Thinking: Students will develop critical thinking skills in assessing market microstructure, analyzing order book dynamics, and understanding the impact of market liquidity on trading strategies.

Detailed Assessment Description

| Weight | Assessment Name | Assessment Due Date / Timing | |
|---|---|---|---|

40% Final Exam During UNSW Final Exam Period

**Final Exam 40%**

The final exam will encompass content from lectures conducted in weeks 1 to 10. The primary emphasis of the exam will be on the hands-on implementation of the concepts covered during this period.

**Assignment submission Turnitin type**

Not Applicable

**Generative AI Permission Level**

**Simple Editing Assistance**

In completing this assessment, you are permitted to use standard editing and referencing functions in the software you use to complete your assessment. These functions are described below. You must not use any functions that generate or paraphrase passages of text or other media, whether based on your own work or not.
If your Convenor has concerns that your submission contains passages of AI-generated text or media, you may be asked to account for your work. If you are unable to satisfactorily demonstrate your understanding of your submission you may be referred to UNSW Conduct & Integrity Office for investigation for academic misconduct and possible penalties.
For more information on Generative AI and permitted use please see here.

# General Assessment Information

As a student at UNSW you are expected to display academic integrity in your work and interactions. Where a student breaches the UNSW Student Code with respect to academic integrity, the University may take disciplinary action under the Student Misconduct Procedure. To assure academic integrity, you may be required to demonstrate reasoning, research and the process of constructing work submitted for assessment.

To assist you in understanding what academic integrity means, and how to ensure that you do comply with the UNSW Student Code, it is strongly recommended that you complete the Working with Academic Integrity module before submitting your first assessment task. It is a free, online self-paced Moodle module that should take about one hour to complete.

**Grading Basis**

Standard

Requirements to pass course

In order to pass this course students must:

- Achieve a composite mark of at least 50 out of 100
- Engage actively in course learning activities and attempt all assessment requirements
- Meet any additional requirements specified in the assessment details
- Meet the specified attendance requirements of the course (see Schedule section).

# Course Schedule

| Teaching Week/Module | Activity Type | Content |
|---|---|---|
| Week 1 : 9 September - 15 September | Lecture | Introduction to Quantitative Trading<br>• Understanding the role of quantitative analysis in financial markets<br>• Overview of different trading strategies including Market Making vs Prop Trading<br>• Importance of risk management in quantitative trading |
| Week 2 : 16 September - 22 September | Lecture | Applying Statistical Methods<br>• Data analysis and pre-processing<br>• Statistical techniques<br>• Modelling tools Time series analysis for forecasting price movements Regression analysis for identifying relationships between variables |
| Week 3 : 23 September - 29 September | Lecture | Algorithmic Trading<br>• Introduction to algorithmic trading concepts<br>• Advantages of algorithmic trading<br>• Different order types and their applications<br>• Execution strategies and tactics in algorithmic trading<br>• Utilizing trading platforms and APIs for algorithmic trading |
| Week 4 : 30 September - 6 October | Lecture | Market Microstructure<br>• Understanding the structure and dynamics of financial markets<br>• Order book analysis and interpreting market depth<br>• Analysing trade flow<br>• Impact of market liquidity on trading strategies |
| Week 5 : 7 October - 13 October | Lecture | Know Your Alpha<br>• Understanding your edge<br>• Alpha vs Beta<br>• Alpha Decay<br>• Strategy robustness and implementation strategy |
| | Assessment | Mid-term Quiz (online) - Day/time announced in Moodle |
| Week 6 : 14 October - 20 October | Other | Flexibility week - NO LECTURES |
| Week 7 : 21 October - 27 October | Group Work | Group presentations |
| Week 8 : 28 October - 3 November | Lecture | Risk Management and Optimization<br>• Introduction to risk metrics and measures in trading<br>• Strategy selection and diversification<br>• Role of optimization in managing risk-return trade-offs |
| Week 9 : 4 November - 10 November | Lecture | Backtesting and Performance Evaluation<br>• Importance of backtesting in evaluating trading strategies<br>• Setting up a backtesting environment<br>• Conducting backtests and interpreting results<br>• Performance evaluation metrics for trading strategies |
| Week 10 : 11 November - 17 November | Lecture | Strategy Refinement and Implementation<br>• Improving and refining trading strategies based on backtest results<br>• Implementing strategies in live trading environments<br>• Risk management in live trading scenarios<br>• Review and conclusion of the course |

## Attendance Requirements

Students are expected to attend all classes in person and encouraged to review lecture

recordings. In addition, part of the assessment for the course will be based on your weekly contribution to the class.

## General Schedule Information

Note: for more information on the UNSW academic calendar and key dates including study period, exam, supplementary exam and result release, please visit: https://student.unsw.edu.au/new-calendar-dates

# Course Resources

## Prescribed Resources

There is no prescribed textbook.

However the following readings are recommended:

- Marco Avellaneda & Sasha Stoikov, "High-frequency trading in a limit order book"
- Ernest P. Chan, "Quantitative Trading"
- Professor Steven S. Skiena, "Calculated Bets"
- Aldridge, Irene, "High-Frequency Trading: A Practical Guide to Algorithmic Strategies and Trading Systems"
- Nate Silver, "The Signal And The Noise: The Art And Science Of Prediction"
- Peter L. Bernstein, "Against the Gods: The Remarkable Story of Risk"
- Peter L. Bernstein "Capital Ideas: The Improbable Origins of Modern Wall Street"
- Glynis M. Breakwell,  "The Psychology of Risk"

Other optional readings will also be posted to Moodle during the course.

## Course Evaluation and Development

Feedback is regularly sought from students and continual improvements are made based on this feedback. At the end of this course, you will be asked to complete the myExperience survey, which provides a key source of student evaluative feedback. Your input into this quality enhancement process is extremely valuable in assisting us to meet the needs of our students and provide an effective and enriching learning experience. The results of all surveys are carefully considered and do lead to action towards enhancing educational quality.

# Staff Details

| Position | Name | Email | Location | Phone | Availability | Equitable Learning Services Contact | Primary Contact |
|---|---|---|---|---|---|---|---|
| Convenor | Shane Miller | | | | UNSW Business School: Room 371, each Thursday 4:00pm | No | Yes |

# Other Useful Information

## Academic Information

### COURSE POLICIES AND SUPPORT

The Business School expects that you are familiar with the contents of this course outline and the UNSW and Business School learning expectations, rules, policies and support services as listed below:

- Program Learning Outcomes
- Academic Integrity and Plagiarism
- Student Responsibilities and Conduct
- Special Consideration
- Protocol for Viewing Final Exam Scripts
- Student Learning Support Services

Further information is provided on the Policies and Guidelines page.

Students may not circulate or post online any course materials such as handouts, exams, syllabi or similar resources from their courses without the written permission of their instructor.

### STUDENT LEARNING OUTCOMES

The Course Learning Outcomes (CLOs) – under the Outcomes tab – are what you should be able to demonstrate by the end of this course, if you participate fully in learning activities and successfully complete the assessment items.

CLOs also contribute to your achievement of the Program Learning Outcomes (PLOs), which are developed across the duration of a program. PLOs are, in turn, directly linked to UNSW graduate capabilities. More information on Coursework PLOs is available on the Policies and Guidelines page. For PG Research PLOs, including MPDBS, please refer to UNSW HDR learning outcomes.

## Academic Honesty and Plagarism

As a student at UNSW you are expected to display academic integrity in your work and interactions. Where a student breaches the UNSW Code of Conduct with respect to academic integrity, the University may take disciplinary action. To assure academic integrity, you may be

required to demonstrate reasoning, research and the process of constructing work submitted for assessment.

To assist you in understanding what academic integrity means, and how to ensure that you do comply with the UNSW Code of Conduct, it is strongly recommended that you complete the Working with Academic Integrity module before submitting your first assessment task. It is a free, online self-paced Moodle module that should take about one hour to complete.

## Submission of Assessment Tasks

### SHORT EXTENSIONS

Short Extension is a new process that allows you to apply for an extended deadline on your assessment without the need to provide supporting documentation, offering immediate approval during brief, life-disrupting events. Requests are automatically approved once submitted.

Short extensions are ONLY available for some assessments. Check your course outline or Moodle to see if this is offered for your assessments. Where a short extension exists, all students enrolled in that course in that term are eligible to apply. Further details are available the UNSW Current Students page.

### SPECIAL CONSIDERATION

You can apply for special consideration when illness or other circumstances beyond your control interfere with your performance in a specific assessment task or tasks, including online exams. Special consideration is primarily intended to provide you with an extra opportunity to demonstrate the level of performance of which you are capable.

Applications can only be made online and will NOT be accepted by teaching staff. Applications will be assessed centrally by the Case Review Team, who will update the online application with the outcome and add any relevant comments. The change to the status of the application immediately sends an email to the student and to the assessor with the outcome of the application. The majority of applications will be processed within 3-5 working days.

For further information, and to apply, see Special Consideration on the UNSW Current Students page.

### LATE SUBMISSION PENALTIES

### LATE SUBMISSION PENALTIES

For assessments other than examinations, late submission will incur a penalty of 5% per day or part thereof (including weekends) from the due date and time. An assessment will not be accepted after 5 days (120 hours) of the original deadline unless special consideration has been approved. In the case of an approved Equitable Learning Plan (ELP) provision, special consideration or short extension, the late penalty applies from the date of approved time extension. After five days from the extended deadline, the assessment cannot be submited.

An assessment is considered late if the requested format, such as hard copy or electronic copy, has not been submitted on time or where the 'wrong' assessment has been submitted.

For assessments which account for 10% or less of the overall course grade, and where answers are immediately discussed or debriefed, the LIC may stipulate a different penalty. Details of such late penalties will be available on the course Moodle page.

### FEEDBACK ON YOUR ASSESSMENT TASK PERFORMANCE

Feedback on student performance from formative and summative assessment tasks will be provided to students in a timely manner. Assessment tasks completed within the teaching period of a course, other than a final assessment, will be assessed and students provided with feedback, with or without a provisional result, within 10 working days of submission, under normal circumstances. Feedback on continuous assessment tasks (e.g. laboratory and studio-based, workplace-based, weekly quizzes) will be provided prior to the midpoint of the course.

## Faculty-specific Information

### PROTOCOL FOR VIEWING FINAL EXAM SCRIPTS

UNSW students have the right to view their final exam scripts, subject to a small number of very specific exemptions. The UNSW Business School has set a protocol under which students may view their final exam script. Individual schools within the Faculty may also set up additional local processes for viewing final exam scripts, so it is important that you check with your School.

If you are completing courses from the following schools, please note the additional school-specific information:

- Students in the **School of Accounting, Auditing & Taxation** who wish to view their final examination script should also refer to this page.

- Students in the **School of Banking & Finance** should also refer to this page.
- Students in the **School of Information Systems & Technology Management** should also refer to this page.

## COURSE EVALUATION AND DEVELOPMENT

Feedback is regularly sought from students and continual improvements are made based on this feedback. At the end of this course, you will be asked to complete the myExperience survey, which provides a key source of student evaluative feedback. Your input into this quality enhancement process is extremely valuable in assisting us to meet the needs of our students and provide an effective and enriching learning experience. The results of all surveys are carefully considered and do lead to action towards enhancing educational quality.

## QUALITY ASSURANCE

The Business School is actively monitoring student learning and quality of the student experience in all its programs. A random selection of completed assessment tasks may be used for quality assurance, such as to determine the extent to which program learning goals are being achieved. The information is required for accreditation purposes, and aggregated findings will be used to inform changes aimed at improving the quality of Business School programs. All material used for such processes will be treated as confidential.

## TEACHING TIMES AND LOCATIONS

Please note that teaching times and locations are subject to change. Students are strongly advised to refer to the Class Timetable website for the most up-to-date teaching times and locations.