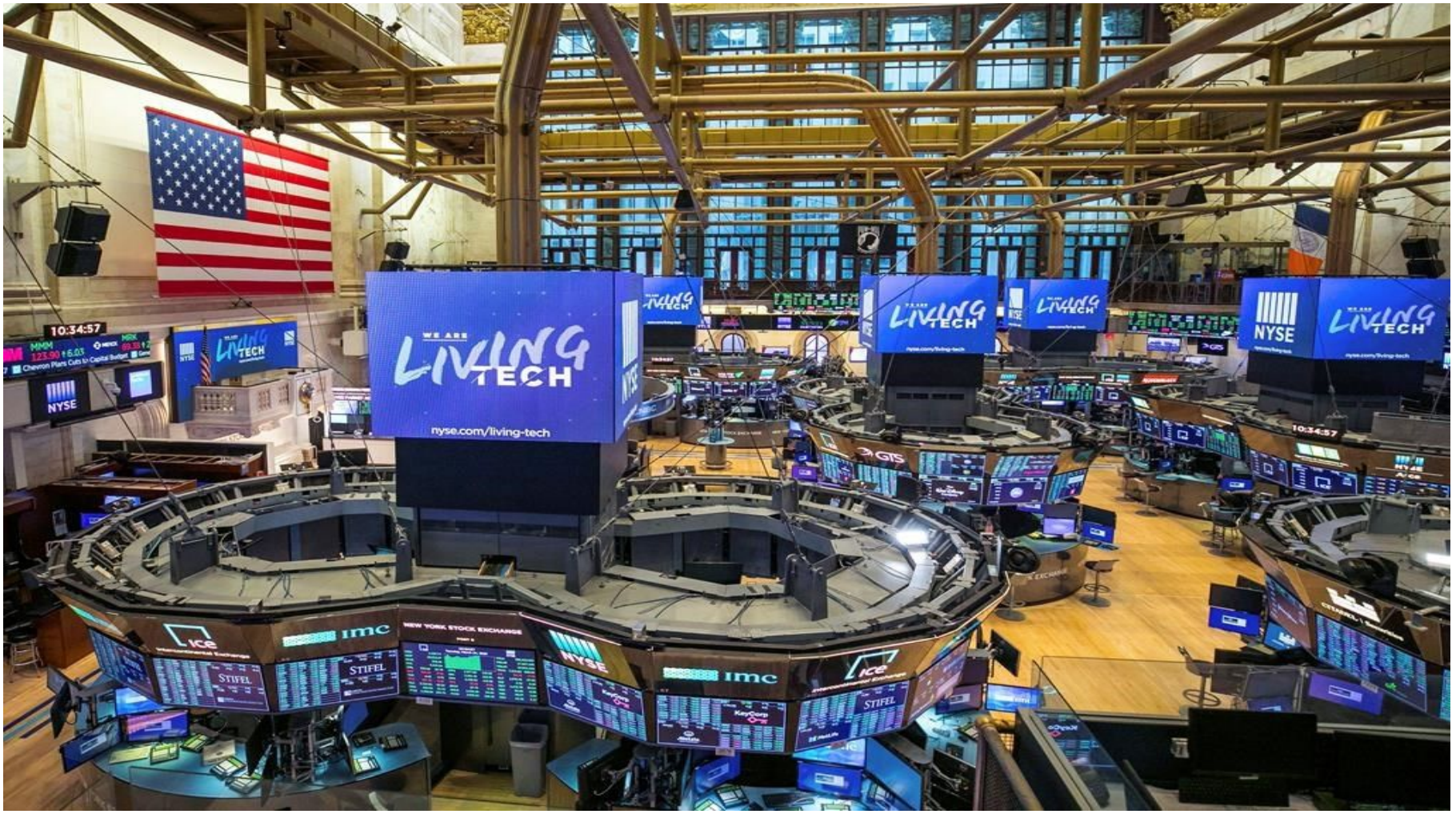
FINANCIAL MATHEMATICS AND STATISTICS HONOURS 2026



FINANCIAL MATHEMATICS AND STATISTICS HONOURS

Coursework: 3 core units (18 cp) + 1 selective unit (6 cp) = 24 cp

Semester 1: Two core units are compulsory for FM&S honours students as per FM&S Table A.

- STAT4528 Probability and Martingale Theory
- MATH4511 Arbitrage Pricing in Continuous Time

Semester 2: One core unit should be completed:

- MATH4512 Stochastic Analysis (core)
- MATH5551 Stochastics and Finance (suggested selective unit)

Honours research project in Financial Mathematics and Statistics: 24 cp

Selected topics:

- Asymmetric information in modelling of financial markets
- Stochastic PDEs in credit risk modelling
- Designing optimal contracts
- Pricing of superannuation guaranteed benefits
- Mean-field ranking games
- Machine learning for solving PDEs
- Portfolio optimisation with liquid American options
- For more project topics, see the handbook for Financial Mathematics and Statistics honours.

FINANCIAL MATHEMATICS AND STATISTICS HONOURS

FM&S honours program is designed to meet the need for high level quantitative and modelling skills in the banking and finance industries.

Financial Mathematics hinges on various mathematical tools such as:

- **Probability and martingale theory**
- **Itô stochastic calculus**
- **Stochastic differential equations**
- **Partial differential equations**
- **Stochastic optimal control and optimal stopping**
- **Stochastic backward differential equations**
- **Dynkin stochastic stopping games**
- **Stochastic differential games**
- **Statistics of stochastic processes**
- **Numerical methods for PDEs, SDEs, BSDEs, etc..**

Financial Mathematics research team:
Anna Aksamit, Ben Goldys, Marek Rutkowski, Zhou Zhou.

RECENT HONOURS PROJECTS

The following recent projects were recently completed by honours students in Financial Mathematics:

- **D. Ng: Valuation of contingent claims under counterparty risk, funding costs and collateralization.**
- **L. Bhim: Application of the Choquet integral to expected utility theory.**
- **E. Kim: Arbitrage pricing theory under multiple funding curves, collateralization and counterparty credit risk.**
- **K. Guo: A case study on mean field games.**
- **A. Zhang: Martingale optimal transport: From moving soil to hedging options.**
- **S. Yuan: Shot noise representations of Lévy processes with a view towards simulation.**
- **C. Sutherland: Performance of hedging strategies for credit default swaptions.**
- **J. P. Meyer: Multi-dimensional reflected backward stochastic difference equations.**
- **S. Zhang: Counterparty credit risk valuation under funding costs and collateralization.**
- **G. Lee: Credit portfolio loss distributions and Basel regulatory requirements.**
- **M. Denes: Game options in imperfect markets.**
- **S. Jiang: Manager-agent problems of a dynamic team project.**
- **D. Hyland: Exploratory optimal control: Applications to reinforcement learning.**
- **H. Xu: Optimal stopping problem and market algorithm for Bermudan swaption.**

RECENT HONOURS PROJECTS

- **M. Bickersteth: Multi curve pricing of SOFR derivatives.**
- **S. Janssen: Pathwise approaches to optimal stopping problem and Dynkin games.**
- **V. Xu: A study of compartmental models and their applications.**
- **W. Yang: Differential evolution approach to yield curve fitting.**
- **R. Wang: Optimal stopping and Dynkin games.**
- **B. Nielson: Machine learning techniques for solving high-dimensional PDEs.**
- **B. Lin: Principal-agent problem in continuous-time.**
- **Y. Ding: Pricing and hedging of cross-currency swap under multi-curve modeling.**
- **A. Mathison: Linear quadratic mean field games with applications to finance.**
- **R. Xiao: Dynamic set values for nonzero-sum games with multiple equilibriums.**
- **J. Osborne: Quickest detection of drift change in force of mortality.**
- **T. Papasavvas: The discrete and continuous time principal-agent problems and their multi-agent extensions.**
- **J. Steinbusch: Multi-armed bandits and their application in portfolio optimisation.**
- **H. Yan: Optimal stopping: Applications to deep learning.**

FINANCIAL MATHEMATICS AND STATISTICS HONOURS

Graduates are in very high demand by the finance industry in Australia and they can seek employment in a large variety of roles, such as:

- **Front office/desk quants who work on implementation of pricing and hedging models directly used by traders**
- **Model validating quants who independently implement pricing models in order to validate models used by the front office**
- **Research quants whose task is to invent and develop new pricing approaches and original models for new financial products**
- **Capital quants who work on modelling the banks credit exposures and capital requirements imposed by regulators, such as APRA,**
- **Quant developers who deal with computer programs for implementation of pricing models**
- **Statistical arbitrage quants who work on finding patterns in market data to support HFT (high-frequency trading) automated trading platform**

FINANCIAL MATHEMATICS AND STATISTICS HONOURS

Prospective employers for FM&S honours graduates:

- **Major retail banks:** CBA, NAB, ANZ, Westpac, Bank of Queensland, ...
- **Investment banks:** Macquarie Group, UBS, Credit Suisse, Goldman Sachs, HSBC, ...
- **Hedge funds:** K2 Asset Management, Platinum Asset Management, ...
- **Wealth management companies:** AMP, Vanguard Investment, Russell Investments, ...
- **Proprietary trading firms:** Optiver Asia Pacific, Propex Derivatives, Lepus, ...
- **Accountancy firms:** PricewaterhouseCoopers, Ernst and Young, Deloitte, KPMG, ...
- **Consulting firms:** Accenture, Ernst and Young, Deloitte Consulting, ...
- **Insurance companies and superannuation funds**
- **Specialised software companies**

FINANCIAL MATHEMATICS AND STATISTICS MAJOR

FM&S Major: coursework 42 cp + project 6 cp

Year 1: 12 cp

- 12cp = 6cp calculus + 3cp algebra + 3cp statistics (MATH1005/1905 Mathematical Thinking with Data)

  or

- 12cp = 3cp calculus + 3cp algebra + 6cp data science (DATA1001 Foundations of Data Science)

Year 2: 18cp core units

- Semester 1

  STAT2011/2911 Probability and Estimation/Probability and Statistical Models (core)

- Semester 2

  MATH2070/2970 Optimization and Financial Mathematics (core)

  DATA2002/2902 Data Analytics: Learning from Data (core)

Year 3: 18 cp: 12cp core units + 6cp interdisciplinary project (FMAT3888 or SCPU3001)

- Semester 1

  STAT3021/3921 Stochastic Processes (core)

- Semester 2

  MATH3075/3975 Financial Derivatives (core)

  FMAT3888 Project in Financial Mathematics (Semester 2)

  or

  SCPU3001 Science Interdisciplinary Project (Semester 1 or 2)