

3.3.3.9 Quantitative Finance

Quantitative Finance is a multidisciplinary honours-track programme that combines mathematics, finance and computing with a practical orientation that is designed for high-calibre students who wish to become professionals in the finance industry. The explosive growth of computer technology, globalisation, and theoretical advances in finance and mathematics have resulted in quantitative methods playing an increasingly important role in the financial services industry and the economy as a whole. New mathematical and computational methods have transformed the investment process and the financial industry. Today banks, investment firms, and insurance companies turn to technological innovation to gain competitive advantage. Sophisticated mathematical models are used to support investment decisions, to develop and price new securities and innovative products or to manage risk. Hence there is an increasing demand from the industry for persons with a high level of quantitative and analytical skills.

Programme Structure and Curriculum Rationale

The programme is conducted jointly by the Faculty of Science, NUS Business School and School of Computing. The curriculum is multidisciplinary with coverage in the following areas:

1. Mathematical Theory and Tools
2. Statistical Tools
3. Computing Theory and Techniques
4. Financial Theory and Principles
5. Core Financial Product Knowledge

The Quantitative Finance course enables students to have an integrated overview of how mathematical methods and computing techniques are applied to finance. With rapid developments of new financial products requiring quantitative skills, the curriculum also provides students with solid financial product knowledge and the know-how for creating new structured financial products.

Career Prospects

Career opportunities are available in financial institutions such as banks, securities firms, insurance companies, investment companies, IT firms that support the financial institutions and multinationals. Graduates could find jobs in financial product development and pricing, risk management, derivatives pricing, hedging and trading, quantitative modelling, IT support for derivatives trading and risk management, investment decision support, quantitative portfolio management and asset management and wealth management.

Graduation Requirements

To be awarded a B.Sc. or B.Sc. (Hons.) with a primary major in Quantitative Finance, candidates must satisfy the following:

MODULE LEVEL	MAJOR REQUIREMENTS	CUMULATIVE MAJOR MCS
Level-1000 (16 MCs)	Pass CS1010 / CS1010E / Programming Methodology* CS1010S/ CS1010X/ CS1101S ACC1701 Accounting for Decision Makers MA1101R Linear Algebra I MA1102R Calculus * CS1101S (4MCs wef AY2018/19) may be read as an alternative to CS1010% (4MCs) to facilitate relevant programmes. e.g. Double Degree Programme with School of Computing. Registration for this module is subject to host availability.	16
Level-2000 (20-21 MCs)	Pass FIN2704 Finance MA2213 Numerical Analysis I or DSA2102 Essential Data Analytics Tools: Numerical Computation MA2216 / Probability ST2131 MA2108 / Mathematical MA2108S Analysis I MA2104 Multivariate Calculus	36-37

MODULE LEVEL	MAJOR REQUIREMENTS	CUMULATIVE MAJOR MCS
Level-3000 (28 MCs)	Pass QF3101 Investment Instruments: Theory and Computation MA3269 Mathematical Finance I ST3131 Regression Analysis Two modules from the following: <ul style="list-style-type: none"> • MA3220 Ordinary Differential Equations • MA3236 Nonlinear Programming • MA3252 Linear and Network Optimisation • MA3264 Mathematical Modelling Two modules from the following: <ul style="list-style-type: none"> • FIN3701 Corporate Finance • FIN3703 Financial Markets • FIN3713 Bank Management • FIN3714 Financial Risk Management 	64-65

MODULE LEVEL	MAJOR REQUIREMENTS	CUMULATIVE MAJOR MCS
Level-4000 and above (32 MCs)	Pass QF4199 Honours Project in Quantitative Finance QF4102 Financial Modelling MA4269 Mathematical Finance II Three modules from the following: • QF5210 Financial Time Series: Theory and Computation • FIN4711 Research Methods in Finance • FIN4761 Seminar in Finance • MA4254 Discrete Optimisation • MA4255 Numerical Partial Differential Equations • MA4260 Stochastic Operations Research • MA4264 Game Theory • ST4233 Linear Models • ST4245 Statistical Methods for Finance • MA5245 Advanced Financial Mathematics • MA5248 Stochastic Analysis in Mathematical Finance	96-97

SUMMARY OF REQUIREMENTS	B.SC.	B.SC. (HONS.)
University Requirements	20 MCs	20 MCs
Faculty Requirements	12 MCs*	12 MCs*
Major Requirements	64-65 MCs	96-97 MCs
Unrestricted Elective Modules	23-24 MCs	31-32 MCs
Total	120 MCs	160 MCs

* Up to 4 MCs of Faculty requirements of the total of 16 MCs required for the B.Sc. (Hons.) programme are fulfilled through the reading of MA/CS modules within the major.

Students of the B.Sc. and B.Sc. (Hons.) programmes are required to fulfil the remaining 12 MCs of

Faculty requirements from any three (3) of the following subject groups: Chemical Sciences, Life Sciences, Physical Sciences and Multidisciplinary & Interdisciplinary Sciences, but not from the following subject groups: Computing Sciences and Mathematical & Statistical Sciences.

To apply for this major, please refer to the application procedure given in <http://ww1.math.nus.edu.sg/undergraduates.aspx?f=UP-QF#scrolltop> for details regarding the admission requirements and the application form.