Master of Science (MSc) Program in Mathematics (Financial Mathematics and Statistics)

Program Director:

Yue Kuen KWOK, Professor of Mathematics

The Master of Science program in Mathematics (Financial Mathematics and Statistics) aims to prepare students with science or engineering background for high-tech careers in the banking and financial sectors in Hong Kong. The curriculum provides training in statistical and computing tools in quantitative finance and risk management, and the understanding of financial models and their applications on derivative products traded in the markets. This degree program upgrades students' knowledge of mathematical methods, probability, statistics and stochastic calculus beyond the Bachelor's level of Mathematics. Also, through the courses on the quantitative aspects of pricing exotic derivative products and managing portfolio of assets, students will attain a real understanding of the underlying assumptions and the ability to critically ascertain the applicability and limitations of various mathematical models in derivative pricing and credit risk analysis.

The current state of advanced technology in the financial industry includes mathematical modeling of structured financial instruments, quantitative risk analysis and dynamical asset allocation. Implementation of all these tasks may require medium to large scale computations. Graduates from this program will be suited for jobs involved in financial product development and pricing (custom derivatives, insurance products etc.), investment decision support and fund management (asset allocation, portfolio selection etc.), risk management (portfolio immunization and management, hedging of exchange rate, interest rate or commodities risks).

On completion of the program, students are expected to have:

- A broad knowledge and an understanding of the financial products commonly traded in the markets and various practical aspects of risk management.
- The ability to apply mathematical and statistical tools to construct quantitative models in derivative pricing, quantitative trading strategies, risk management, and scenario simulation, including appropriate solution methods and interpretation of results.

Admission Requirements

Applicants must hold a bachelor's degree in Mathematics, Engineering or Physical Sciences or an equivalent qualification from a recognized university or tertiary institution.

Program fee

The program fee for the completion of 30 credits is $90,000, and the per credit fee for the program is $3,000.

Curriculum

To graduate from the MSc program, each student is required to complete 30 credits, including

- 6 credits of foundation courses
- 9 credits of financial mathematics courses
- 9 credits of statistics courses
- 6 credits of free electives* and / or independent project# (MAFS 610)

* *Free electives can be any mathematics course at 300-level or above, or any course outside the department at 500-level course or above.*

\# *Number of credits earned from an independent project can be 3 to 6 credits*

Foundation courses

MATH	531	Advanced Numerical Methods I	[3-0-0:3]
MATH	541	Advanced Probability Theory I	[3-0-0:3]
MATH	551	Mathematical Methods in Science and Engineering I	[3-0-0:3]
MAFS	501	Stochastic calculus	[3-0-0:3]
MAFS	502	Advanced Probability and Statistics	[3-0-0:3]

Financial Mathematics courses

MATH	571	Mathematical Models of Financial Derivatives	[3-0-0:3]
MATH	572	Interest Rate Models	[3-0-0:3]
MAFS	521	Mathematical Models of Investment	[3-0-0:3]
MAFS	523	Advanced Credit Risk Models	[3-0-0:3]
MAFS	524	Software Development with C++ for Quantitative Finance	[3-0-0:3]
MAFS	525	Computational Methods for Pricing Structural Products	[3-0-0:3]
MAFS	601	Special Topics in Financial Mathematics	[2-4 credits]

Statistics courses

MATH	542	Advanced Probability Theory II	[3-0-0:3]
MATH	543	Advanced Mathematical Statistics I	[3-0-0:3]
MATH	544	Advanced Mathematical Statistics II	[3-0-0:3]
MATH	545	Stochastic Processes	[3-0-0:3]
MATH	546	Time Series Analysis	[3-0-0:3]
MAFS	511	Advanced Data Analysis with Statistical Programming	[3-0-0:3]
MAFS	512	Applied Multivariate Analysis	[3-0-0:3]
MAFS	513	Quantitative Analysis of Financial Time Series	[3-0-0:3]
MAFS	522	Quantitative and Statistical Risk Analysis	[3-0-0:3]

Credit transfer may be granted to students in recognition of studies satisfactorily completed in another university or tertiary institution. Applications must be made to the Department within students' first semester of study after admission. All credit transfer must be approved by the Program Director and is subject to University regulations governing credit transfer.

Graduation Requirements

Students must complete the program with a graduation grade average (GGA) of B grade or above.