NUS | Faculty of Science
National University of Singapore

MATHEMATICS/APPLIED MATHEMATICS/ QUANTITATIVE FINANCE FAQs
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MATHEMATICS/APPLIED MATHEMATICS

1. **What is the difference between the Major in Mathematics and Major in Applied Mathematics?**
Both majors share common essential modules that are compulsory. These provide the basic background knowledge in mathematics.

   To major in Mathematics, students study topics such as algebra, analysis, geometry and topology which focus more on foundations, theory, and proving techniques. To major in Applied Mathematics, students focus more on mathematics that deal with applications, including modeling and algorithms. We offer a variety of subjects including financial mathematics, coding theory, numerical analysis and optimisation.

2. **What is the difference between mathematics and quantitative finance?**
While both the majors in Mathematics and Quantitative Finance target students who are mathematically inclined, the Quantitative Finance major is specifically designed for students who want to pursue a career in the finance industry. The Mathematics curriculum contains core modules in various areas of mathematics while the Quantitative Finance curriculum contains core modules in foundation mathematics, and mathematical finance in addition to a number of finance modules offered by the Business School.

   Furthermore, the Quantitative Finance major is a restricted major with a limit to its cohort size. This means that interested students need to go through another application process after successful admission to the Faculty of Science.

3. **What is the difference between mathematics and statistics?**
Mathematics deals with numbers, discrete and continuous quantities, geometric figures and images, etc in all their generalities. It ranges from the most abstract and fundamental theories in pure mathematics to the most concrete methods and practical algorithms in applied mathematics. An undergraduate Mathematics Major paves the way for a variety of quantitative disciplines at the postgraduate level, including statistics, economics and management science.

   On the other hand, statistics deals with the collection and analysis of data and information in surveys, experiments, databases, etc in order to reach conclusions or decide on a suitable course of action.

4. **Would I be learning mathematics that is different from mathematics taught in Junior Colleges (JCs)?**
The topics are mostly new and are at a higher level than what is required in JC. Students should also expect some changes in the emphasis of, and the way they deal with materials. Students would need to develop analytical skills and learn more on fundamental ideas, proving techniques as well as application of mathematical theories.

5. **I am admitted to the Faculty of Science for a particular major other than mathematics, can I still read a second major in mathematics or applied mathematics?**
Yes, students may read a second major in mathematics as long as they meet the pre-requisites to read the required mathematics modules. Please note that there is no second major in applied mathematics.

6. What are the job prospects for mathematics graduates?

Mathematics, statistics and data science graduates are much in demand wherever quantitative analysis is needed and/or rigorous, objective, critical analysis is valued. They are widely employed in commerce, industry and government sectors.

The various areas that our mathematics graduates can build a career include operations management, financial analysis, risk management, information processing, infocommunications technology, administration, education and research.

The following are some examples:

Area	Examples of Job	Institution
Administration	Administrator	Government and private sectors
Education	Teacher/Educator Curriculum developer Editor (e.g. textbooks, financial journals etc)	Ministry of Education, schools, Junior Colleges, polytechnics, publishers
Financial analysis	Financial analyst Financial planner Actuary Financial engineer Fund manager	Banks, financial services institutes, (e.g. insurance / reinsurance, wealth management, asset management, hedge funds etc)
Information Management	Data analyst Cryptanalyst	DSO National Laboratories (DSO), Ministry of Defence (MINDEF)
Information Technology	Software engineer Multimedia architect	International Business Machines Corporation (IBM), Hewlett-Packard (HP), Institute for Infocomm Research (I2R), game design firms
Operations Management	Operations Research Analyst	Singapore Airlines (SIA), Port of Singapore Authority (PSA), logistics companies
Research	University lecturer Researcher	Academic institutions, research / scientific organisations

7. Are the mathematics modules taught in the course relevant to industry/real world?

Many mathematics modules in the course prepare a mathematics major student with the relevant skills to work in specific areas.

Mathematics training in general also equips students with the analytical skills that are essential in many jobs in professional and executive careers.

The table below gives some examples:

Real World Application	Areas in Mathematics
Internet: search engines, compression	Graph theory, linear algebra, wavelets
Confidentiality	Number theory, cryptology/combinatorics
Global reconnaissance	Signal / image processing, data mining
Options valuation	Black-Scholes model and Monte Carlo simulation
Analysis of the human genome	Data mining, pattern recognition, algorithms
Rational drug design	Data mining, combinatorics, statistics
MRI and CAT Imaging	Integral geometry, Fourier analysis, wavelet
Aerodynamic design	Differential equations
Visual effect	Computer graphics, differential equations
Modeling of oceans and atmosphere	Wavelets, statistics, numerical analysis
Earthquake analysis and prediction	Statistics, dynamical systems/turbulence

QUANTITATIVE FINANCE

8. **What kind of personality / aptitude is suitable for this major?**
   We select students who are strong in mathematics and who are interested in banking and finance. Basically, students need to be able to understand courses offered by five different departments.

9. **How would I know for sure that I stand a chance in being admitted? Based on my results?**
   The selection of students depends very much on the number of students who express interest to read and apply for this major. We are unable to give a definite answer until all applications are reviewed.

10. **Are all applicants required to be interviewed?**
    Not necessarily. The review committee may shortlist some students for interview depending on the selection criteria, which may not be the same for every intake as it depends on the number and quality of applications received.

11. **If I were unsuccessful in gaining admission, can I appeal for reconsideration or apply again in the following year?**
    In general, appeals or reapplications will not be considered.

12. **What sort of career prospects would I have in Singapore?**
    We expect students to have good opportunities in the financial services and banking sectors. Career prospects are expected to improve as Singapore becomes a financial and infocommunications hub in Asia, and the demand for graduates in quantitative finance background increases.

13. **How do the job prospects and starting salary for graduates with this major compare with those from other degree programmes?**
    Majority of the graduates from this major go into banking and finance industries, both locally and globally. While the salary structure is subject to the economy, based on available data, our graduates have been receiving good starting pay.

DOUBLE MAJOR IN MATHEMATICS/APPLIED MATHEMATICS AND ECONOMICS

14. **What is special about this double major?**
    The disciplines of mathematics and economics closely relate to, and are natural complements of each other. On the one hand, mathematical methods are indispensable to the development of economic theory and analysis. On the other hand, economics provides a variety of important problems for mathematics such as those in optimisation and operations research.

15. **Do I have to apply for this double major?**
    Prospective students who are keen to read this double major combination beginning their first year in NUS may apply for direct admission. Admission requirements can be found at
    http://ww1.math.nus.edu.sg/undergraduates.aspx?f=UP-MAEC.

16. **If I missed the application for direct admission, can I apply in the following year?**
    To provide an additional and more streamlined avenue for students of one department to do a second major in another department, each of the Department of Mathematics at the Faculty of Science and the Department of Economics at the Faculty of Arts and Social Sciences will call for a special round of applications in June every year, which will only be opened to its own students beginning their second year in August of the same year.

17. **What are the career opportunities?**
    Career opportunities are aplenty, for those with the right skill sets and aptitudes. In this double major, students learn both the theory and applications of modern economics within advanced mathematical frameworks. The training that students receive ranges from probability theory through numerical analysis to economic analysis, computational as well as optimisation techniques which are much sought after in the complex world of business and industry.

Graduates are employed in a variety of areas, including banking, financial services and government agencies. Many have also gone on to graduate study in areas such as statistics, economics, decision science and quantitative finance. The more entrepreneurial graduates have also set up their own business ventures.

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