

Chart your pathway ▲
TRANSFORMATIVE SCIENCE EDUCATION
Embrace lifelong learning ▼

FUTURE-PROOF
FOR
KNOWLEDGE
ECONOMY

NUS SCIENCE



▼ Empower your learning



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NUS FACULTY OF SCIENCE

AN OVERVIEW

Distinguished Record

NUS is one of the prime movers in shaping Singapore's scientific landscape in education and research.

- More than 90 years of experience in providing quality science education
- One of the largest faculties in NUS with seven departments: Biological Sciences, Chemistry, Food Science and Technology, Mathematics, Pharmacy, Physics, and Statistics and Applied Probability
- One of the best universities in the world for science education
- Ranked by Quacquarelli Symonds as the top university in Asia for many science subjects

Holistic Learning

You will experience an enriching educational journey, both in and outside the classroom.

- Home to about 4,700 undergraduates and 1,200 postgraduate students
- Opportunities to engage award-winning professors in cutting-edge research
- Vibrant campus and student life

Diverse Learning Choices

You have the flexibility to plan your learning pathways based on your interests and career aspirations.

- 13 primary majors, seven second majors, 16 minors, several concurrent degree programmes as well as double majors, double degrees, joint degrees, multidisciplinary and cross-faculty programmes
- Enhancement programmes to broaden your academic horizons, like undergraduate research programmes, local and overseas internships, and inter- and multidisciplinary boutique programmes in Mathematics and Science

Global Outlook

Study abroad programmes open the door to a global learning experience, broadening your intellectual and global outlook.

- More than 800 students gained overseas experience in Academic Year 2018/2019
- Collaborations with over 300 overseas partner universities offer exposure to different cultures overseas and academic environments

Career Prospects

Our graduates are employed in high-growth and high-impact industries.

- Career opportunities for graduates in key industries that drive Singapore's economic growth, such as biomedical sciences, consumer businesses, data analytics, education, financial services, healthcare, infocommunication technologies, safety and security, research and development, and urban solutions and sustainability
- Training in specialised domain knowledge and life skills such as critical thinking, problem-solving and interpersonal skills, which enhance employability and career mobility

NEW! ACADEMIC PROGRAMMES

The Faculty of Science continues to increase our suite of academic programmes to provide students with the breadth and depth of educational training to face an increasingly complex future and to be prepared for careers in today's globalised workplace.

Bachelor of Pharmacy (Hons)

The current four-year flagship programme will be transformed into a fully integrated curriculum - its signature feature - in Academic Year 2020/2021. The overhauled curriculum combines with modern pedagogy to develop healthcare practitioners who are competent in navigating the dynamic health system and are prepared for the challenges of contemporary practice. You will be trained as care providers, health advocates, communicators, collaborators, scholar-innovators, leader-managers and professionals (see page 10).

Minor in Bioinformatics

This programme provides broad coverage of theory and applications of bioinformatics, in fields related to the life sciences and medicine, as well as programming skills and practice in applying them. It equips students from multiple disciplines to become bioinformatics professionals, a growing area of expertise, upon graduation. This programme will be launched in Academic Year 2021/2022.

Master of Science in Forensic Science

This multidisciplinary programme, synergising law and science, covers the fundamental concepts of scientific techniques used in forensic investigations, and knowledge in various branches of forensic science to equip students with skills in the profession (see page 6).

Master of Science in Data Science and Machine Learning

This interdisciplinary programme, designed to nurture data science professionals, incorporates learning from fields such as computer science, mathematics and statistics, as well as data analytics and machine learning. The programme is supported by leading NUS researchers and data scientists from industry, and offers multiple data science specialisations (see pages 9, 12).

RESEARCH OPPORTUNITIES FOR STUDENTS

Overview

The Faculty of Science is home to different clusters of research excellence, both in fundamental research to create knowledge, and applied research to spur innovation.

Apart from the final year project which you are required to, or may undertake, during your Honours year, we have various research programmes which offer you opportunities to pursue independent research projects.

Through these programmes, you will develop valuable research skills, cultivate critical thinking and problem-solving skills, as well as sharpen communication and presentation skills. Some of these programmes are:

- **Undergraduate Research Opportunities Programme in Science (UROPS):** 2nd or 3rd year undergraduate students can experience scientific research and discovery by participating in research projects (see page 18).
- **Special Programme in Science (SPS):** You can undertake an integrative research project in a team on areas of contemporary science to understand an interdisciplinary approach to science (see page 17).
- **Overseas Summer Research Programmes:** You will go abroad to conduct research in the laboratories of partner universities during the NUS vacation period (see page 19).

The Data Analytics Consulting Centre has a programme where you can be involved in consulting projects with industry. Under this programme, you will get to prepare for a career in data science by learning how to handle complex datasets and solve real-world problems.

Faculty members are collaborating with other academic institutions and partners to establish national research clusters in microscopy (SingaScope) and in mass spectrometry (SingMass, or Singapore National Laboratory for Mass Spectrometry). You will have the opportunity to access key microscopy resources and mass spectrometry tools for your research.

Research Institutes and Centres

You may also have opportunities to participate in the research work of some of the research institutes and centres in NUS. These include:

- Centre for Advanced 2D Materials
- Centre for Bioluminescence
- Centre for Ion Beam Applications
- Centre for Quantitative Finance
- Centre for Quantum Technologies
- Centre for Wavelets, Approximation and Information Processing
- Chemical, Molecular and Materials Analysis Centre
- Data Analytics Consulting Centre
- Institute for Mathematical Sciences
- Institute of Data Science
- Life Sciences Institute
- Mechanobiology Institute
- NUS Environmental Research Institute
- Pharmaceutical Innovation and Research Centre
- Protein and Proteomics Centre
- Risk Management Institute
- Singapore Centre on Environmental Life Sciences Engineering
- Singapore Synchrotron Light Source
- Solar Energy Research Institute of Singapore
- Tropical Marine Science Institute

Research Areas within Faculty of Science

BIOLOGICAL SCIENCES

- **Molecular Cell and Developmental Biology:** Agro and Aqua Biology; Disease Models (Plant and Animal); Infection Science; Molecular and Cellular Dynamics; Protein Dynamics and Drug Design
- **Biophysical Sciences:** Bioimaging Sciences; Computational Biology; Mechanobiology; Protein Science and Proteomics; Structural Biology
- **Ecology, Evolution and Biodiversity:** Animal Behaviour; Community Ecology; Conservation Biology; Darwin and Wallace; Environmental Biology; Phylogeny and Biogeography Systematics

CHEMISTRY

- **Advanced Materials:** Two Dimensional (2D) Materials; Energy Materials; Graphene and Nanocarbons; Luminescent Biomarkers; Nanomaterials; Organic Optoelectronic Materials
- **Organic Chemistry:** Asymmetric Synthesis; Organic Catalysis; Transition Metal Catalysis
- **Chemical Biology and Medicinal Chemistry:** Development of Therapeutic Agents; Synthesis of Bioactive Molecules; Synthetic Biology
- **Computational Chemistry and Simulation:** Molecular Dynamics; Nanoscale Modelling
- **Environmental Chemistry:** Carbon Dioxide Fixation; Green Chemistry; Sensors; Water Eco-Efficiency

FOOD SCIENCE AND TECHNOLOGY

Flavour and Sensory Science; Food Chemistry and Analysis; Food Fermentation; Food Microbiology and Safety; Food Preference and Consumer Studies; Food Processing and Engineering; Functional Foods; Human Nutrition; Plant-Based and Alternative Proteins; Sustainable Food Production

LEE KONG CHIAN NATURAL HISTORY MUSEUM

- **Biodiversity Research:** Species Discovery with Next-Generation Sequencing; Environmental DNA; Taxonomy; Systematics; Conservation of Southeast Asia's Fauna

MATHEMATICS

- **Pure Mathematics:** Algebra and Number Theory; Combinatorics and Graph Theory; Dynamical Systems; Geometry and Topology; Mathematical Logic and Theoretical Computer Science; Partial Differential Equations and Geometric Analysis; Probability; Real, Functional and Harmonic Analysis; Representation Theory and Automorphic Forms
- **Applied and Computational Mathematics:** Computational Biology and Bioinformatics; Data Science; Imaging and Vision Science; Mathematical Finance and Mathematical Economics; Numerical Analysis and Scientific Computing; Optimisation

PHARMACY

- **Drug Discovery and Design:** Computational Modelling and Informatics; Natural Products and Traditional Chinese Medicine; Rational Drug Discovery
- **Health Services Research:** Clinical Pharmacy and Pharmacy Practice; Disease Control and Management; Pharmacoeconomics
- **Pharmaceutical Biology and Drug Disposition:** Disease Etiology, Biomarkers and Targets; Pharmacokinetics and Pharmacodynamics
- **Pharmaceutical Technology and Innovative Therapeutics:** Formulation and Processing; Innovative Nano-Therapeutics; Smart Drug Delivery and Novel Biosystems

PHYSICS

- **Advanced Materials:** Two Dimensional (2D) Materials; Nanostructures and Energy; Organic Semiconductors; Oxides; Spectroscopies; Nonlinear Optics; Surface Science
- **Biological and Soft Matter Physics:** Biopolymers; Mechanics of Biomolecules; Single-Molecule Manipulation and Imaging
- **Ion Beam Science and Technology:** Proton Beam Writing; Proton Microscopy; Radiobiology
- **Theoretical and Computational Physics:** Astrophysics and Cosmology; Condensed Matter Physics; Electromagnetics and Acoustics; Quantum Control; Nonlinear Dynamics and Complex Systems; String Theory
- **Quantum Information Technologies:** Cold Atoms and Molecules; Atom and Ion Trapping; Cryptography; Quantum Entanglement and Information Theory; Quantum Optics and Atom-Photon Interaction

STATISTICS AND APPLIED PROBABILITY

- **Applications:** Ageing Population; Biostatistics; Clinical Trials; Computational Biology; Environmental Statistics; Epidemiology; Eye Disease Modelling; Financial and Business Statistics; Genetics and Genomics; Infectious Disease Modelling; Medical Diagnostic Imaging; Networks; Neural Science; Nutritional Science; Pharmaceutical Data; Psychiatry Data
- **Statistical Methodology and Probability Theory:** Artificial Intelligence; Bayesian Inference; Big Data; Classification; Change Point; Computational Statistics; Deep Learning; Dimension Reduction; Distributional Approximation; Empirical Likelihood; Functional Data Analysis; High Dimensional Data Analysis; Longitudinal and Panel Data Analysis; Machine Learning; Manifold and Non-Euclidean Data; Monte-Carlo Methods; Prediction and Forecasting; Random Matrix; Smoothing Methods and Nonparametric Statistics; Spatial Data Analysis; Sequential Analysis; Stein's Methods; Survival Analysis; Variable Selection and Screening

DEPARTMENT OF BIOLOGICAL SCIENCES

Possible Careers

Biotechnologist
Clinical analyst
Clinical trial coordinator
Conservation biologist
DNA profiling scientist
Educator
Environmental sustainability specialist
Forensic scientist
Lawyer
Medical technologist
Parks manager
Process engineer
Prosecutor
Public health officer
Quality control specialist
Senior crime scene specialist

Examples of Industries/Sectors

Agriculture
Biomedical sciences
Biotechnology
Conservation and sustainability
Education
Environmental technology
Food production
Government agencies
Healthcare
Horticulture-related agencies
Law enforcement
Pharmaceuticals
Research and development
Scientific services

Undergraduate Programmes

B.SC. (HONS) AND B.SC. IN LIFE SCIENCES

This undergraduate course in biological and biomedical sciences provides foundational knowledge vital to all areas of life sciences in the first year of study. Selection of relevant advanced-level modules paves the way to one of three specialisations and the many diverse disciplines in life sciences.

Honours students can either pursue a general Honours degree or one of these specialisations:

- **Biomedical Science:** This focuses on human health and diseases, and its goal of clinical solutions.
- **Molecular and Cell Biology:** This emphasises the fundamental physical, chemical and biological mechanisms of living organisms.
- **Environmental Biology:** This affirms the importance and relevance of biodiversity and ecology, and their applications towards evolutionary understanding and environmental conservation.

JOINT DEGREE PROGRAMME NUS B.SC. (HONS) IN LIFE SCIENCES WITH UNIVERSITY OF DUNDEE B.SC. (HONS) IN BIOLOGICAL SCIENCES/BIOMEDICAL SCIENCES

This special programme for Life Sciences Majors includes the unique opportunity for the final Honours year and research project to be conducted in the partner university.

There are three areas of focus to choose from - Drug Design and Discovery; Developmental Biology; and Plant Science (see page 16).

For information on the department's Second Major and Minor courses, please refer to "Admissions Information".

Graduate Programmes

M.SC./PH.D. BY RESEARCH

Possible research areas include: Biophysical Sciences; Cell, Molecular and Developmental Biology; and Ecology, Evolution and Biodiversity.

NEW! M.SC. IN FORENSIC SCIENCE BY COURSEWORK

The M.Sc. in Forensic Science (see page 3) aims to equip you with the key knowledge and capabilities to:

- Understand the fundamental concepts and principles behind the application of scientific techniques to forensic investigations and the criminal justice system.
- Explore the different basic and advanced techniques used in forensic investigation.
- Enhance hands-on advanced problem-solving skills by applying knowledge gained to come up with innovative solutions to forensic science-related problems.

DEPARTMENT OF CHEMISTRY

Undergraduate Programmes

B.SC. (HONS) AND B.SC. IN CHEMISTRY

NUS' B.Sc. (Hons) in Chemistry programme is accredited by the Royal Society of Chemistry.

In Years 1 and 2, you will focus on the fundamental principles and applications of chemistry, divided into Inorganic, Organic and Physical Chemistry.

Honours students can either pursue a general Honours degree or one of these specialisations:

- **Materials Chemistry:** This covers the synthesis, characterisations and applications of polymers, inorganic and organic solids and devices.
- **Medicinal Chemistry:** This covers the design and synthesis of compounds as potential drugs, the identification of their functional groups and interactions with targets, as well as the methods used to assay the compounds.
- **Environment and Energy:** This covers the techniques used for environmental sampling and analysis, the chemistry and physics of energy generation and conversion processes, and their impact on energy policies.

You will also have a choice of pursuing a Final Year Internship or Project in your fourth year of study.

DOUBLE MAJOR IN CHEMISTRY AND FOOD SCIENCE

(Jointly offered with the Department of Food Science and Technology)

You will gain understanding on important aspects of food beyond its physical and chemical properties, in this direct admission course (see page 8).

For information on the department's Second Major and Minor courses, please refer to "Admissions Information".

Graduate Programmes

M.SC./PH.D. BY RESEARCH

Possible research areas include: Analytical Sciences; Catalysis; Computation, Modelling and Spectroscopy; Inorganic and Organic Chemistry; Materials Science; Medicinal Chemistry; Chemical Biology; and Surface Science.

M.SC. IN CHEMISTRY FOR ENERGY AND ENVIRONMENT BY COURSEWORK

You will acquire knowledge of the latest energy and environmental technologies, and modern materials design, synthesis strategies, advanced characterisation and analytical techniques.

M.SC. IN CHEMISTRY BY COURSEWORK

This one-year programme provides a broad scientific foundation in chemistry for advanced positions in the chemical industries and degree programmes such as the Ph.D. in Chemistry.

JOINT M.SC. IN INDUSTRIAL CHEMISTRY BY COURSEWORK

(Jointly offered with the Technical University of Munich)

You will gain specialised knowledge in selected areas of technology in the pharmaceutical and chemical industries.

Possible Careers

Chemical scientist
Educator
Forensic scientist
Materials scientist
Patent specialist
Quality control scientist
Researcher
Water treatment scientist

Examples of Industries/Sectors

Biochemicals
Chemicals
Education
Energy
Engineering
Government agencies
Manufacturing
Pharmaceuticals
Research and development
Specialty chemicals



Department of Biological Sciences

National University of Singapore
Blk S3, Level 5, 16 Science Drive 4
Singapore 117558

(65) 6516 2698
dbsbox2@nus.edu.sg (Life Sciences Undergraduate Programme)
dbsbox6@nus.edu.sg (Graduate Programme)
dbsbox37@nus.edu.sg (M.Sc. in Forensic Science Programme)
www.dbs.nus.edu.sg
www.lifesciences.nus.edu.sg
www.dbs.nus.edu.sg/education/FSMSC.html



Department of Chemistry

National University of Singapore
Blk S8, Level 3, 3 Science Drive 3
Singapore 117543

(65) 6516 6361 / (65) 6516 2922
chmbox3@nus.edu.sg
www.chemistry.nus.edu.sg

DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY

Possible Careers

Educator
Flavourist
Food scientist
Food specialist
Food technologist
Nutritionist
Regulatory affairs officer
Researcher

Examples of Industries/Sectors

Consumer insights
Consumer products
Education
Flavours and fragrances
Food ingredients
Food production and processing
Food testing laboratories
Government agencies
Healthcare
Pharmaceuticals
Quality control
Research and development

Undergraduate Programmes

B.SC. (HONS) AND B.SC. IN FOOD SCIENCE AND TECHNOLOGY

The degree programmes cover the full educational spectrum of food science and technology, with emphasis on four themes: Food Quality and Safety; New Food Product Innovation; Food Processing; and Nutrition.

It is the only International Union of Food Science and Technology (IUFoST) accredited degree in Singapore, certified by IUFoST for meeting international standards and guidelines.

All undergraduate students are guaranteed entry into the Professional Placement Programme, which enables you to put learning into practice through workplace experience.

DOUBLE MAJOR IN CHEMISTRY AND FOOD SCIENCE

(Jointly offered with the Primary Major in Chemistry)

You will gain understanding on important aspects of food beyond its physical and chemical properties, in this direct admission course (see page 7).

For information on the department's Double Major in Chemistry and Food Science, please refer to "Admissions Information".

Graduate Programmes

M.SC. IN FOOD SCIENCE AND HUMAN NUTRITION BY COURSEWORK

This covers advanced topics including Food Bioscience (Microbiology and Safety, Fermentation); Evidence-based Functional Foods; Human Nutrition; Modern Analytical Science; and Modern Food Processing Technology.

M.SC./PH.D. IN FOOD SCIENCE AND TECHNOLOGY BY RESEARCH

Possible research areas include: Food Biotechnology; Food Chemistry and Analysis; Food Microbiology and Safety; Food Processing and Engineering; and Human Nutrition.

DEPARTMENT OF MATHEMATICS

Undergraduate Programmes

B.SC. (HONS) AND B.SC. IN MATHEMATICS

You will learn fundamental mathematical concepts in areas including Algebra; Differential Equations; Geometry and Topology; Logic; Number Theory and Combinatorics; and Real and Complex Analysis, with a focus on mathematical foundations and fundamental techniques.

B.SC. (HONS) AND B.SC. IN APPLIED MATHEMATICS

You will study mathematical methods and problem-solving techniques that are applied in science, engineering and computer science.

Honours students can either pursue a general Honours degree or one of these specialisations:

- **Operations Research and Financial Mathematics:** This covers the application of analytical methods and mathematical models to solve problems in areas like industrial engineering, operations management and finance.
- **Mathematical Modelling and Data Analytics:** This covers the use of mathematical models and numerical analysis to manage and analyse massive datasets.

B.SC. (HONS) AND B.SC. IN QUANTITATIVE FINANCE

This multidisciplinary course covers mathematical theory and applications, statistical tools, computing theory and techniques, financial theory and principles, and core financial products.

B.SC. (HONS) IN DATA SCIENCE AND ANALYTICS

This four-year direct Honours programme is designed with sufficient technical depth to equip graduates with the ability to develop novel analytical tools for new scientific applications and industry problems. It is jointly offered by the Department of Statistics and Applied Probability and the Department of Mathematics, in conjunction with the Department of Computer Science in the School of Computing (see page 13).

SPECIAL PROGRAMME IN MATHEMATICS

This specially designed programme for selected students with a strong passion and aptitude for

mathematical sciences comprises modules in foundational mathematics. This prepares you for graduate programmes and careers in the mathematical sciences (see page 17).

For information on the department's Second Major and Minor courses, please refer to "Admissions Information".

Graduate Programmes

M.SC. IN MATHEMATICS BY COURSEWORK

This programme for mathematics teachers and professionals enables them to upgrade their professional skills and qualifications through advanced training.

M.SC. IN QUANTITATIVE FINANCE BY COURSEWORK

This programme, jointly offered by the Department of Mathematics and the Department of Statistics and Applied Probability, with the Department of Economics in the Faculty of Arts and Social Sciences, equips you with advanced knowledge in quantitative finance, and its use in the financial industry.

NEW! M.SC. IN DATA SCIENCE AND MACHINE LEARNING BY COURSEWORK

This one-year full-time programme will help meet the growing demand for Big Data professionals by transforming graduates with Bachelor degrees in quantitative science (e.g. mathematics, applied mathematics, statistics and physics) into practitioners. The M.Sc. in Data Science and Machine Learning is offered jointly by the Department of Mathematics, the Department of Statistics and Applied Probability, and the Department of Computer Science in the School of Computing, with support from the Faculty of Engineering, and the Saw Swee Hock School of Public Health (see pages 3, 12).

M.SC./PH.D. BY RESEARCH

Possible research areas include: Pure Mathematics; Applied Mathematics; and Financial Mathematics.

Possible Careers

Actuary
Blockchain developer
Business analyst
Computer programmer
Cryptanalyst
Data analyst
Data scientist
Educator
Financial analyst
Financial engineer
Fund manager
Operations research analyst
Quantitative modelling analyst
Researcher
Risk management analyst
Software engineer

Examples of Industries/Sectors

Education
Financial services
Government agencies
Healthcare
Infocommunication technologies
Insurance
Operations management
Research and development
Safety and security
Transportation
Wealth management



Department of Food Science and Technology

National University of Singapore
Blk S14, Level 5, Science Drive 2
Singapore 117542

(65) 6516 1656
food@nus.edu.sg
www.fst.nus.edu.sg



Department of Mathematics

National University of Singapore
Blk S17, Level 4, 10 Lower Kent Ridge Road
Singapore 119076

(65) 6516 2738
AskMathUG@nus.edu.sg
ww1.math.nus.edu.sg

DEPARTMENT OF PHARMACY

Possible Careers

B. Pharm. (Hons)

Patient-Care Practice

Registered pharmacist
Community pharmacies
Healthcare services
Hospitals
Polyclinics
Leadership positions within public healthcare institutions

Non Patient-Care Areas

Clinical research coordinator
Regulatory specialist
Research associate
(Some positions in non Patient-Care areas may also require you to be a registered pharmacist with the Singapore Pharmacy Council)

B.Sc. (Hons) in Pharmaceutical Science

Leadership positions in pharmaceutical industry
Pharmaceutical scientist
Medical affairs specialist
Quality assurance scientist
Quality control scientist
Research associate
Regulatory specialist
Supply chain and logistics manager

Typical Sectors of Employment

Pharmaceuticals
Biomedical
Consumer healthcare
Medical devices

Examples of Industries/Sectors

Examples of Industries/Sectors

Clinical research
Clinical trials
Government agencies
Product regulation
Healthcare informatics
Pharmacovigilance
Sales and marketing

Basic sciences research
Clinical trials
Government agencies
Health product research, discovery and development, and regulation
Pharmaceutical manufacturing
Sales and marketing

Undergraduate Programmes Graduate Programmes

NEW! B.PHARM. (HONS) AND B.PHARM.

This four-year flagship programme educates graduates who, upon registration as pharmacists, may use their medication therapy expertise to benefit patients. To support our future healthcare focus, the current programme will be transformed into a fully integrated curriculum in Academic Year 2020/2021.

The programme integrates the roles of care provider, communicator, collaborator, leader-manager, health advocate and scholar-innovator. You can provide care collaboratively, improve health quality and patient safety, and innovate with health information technology.

The programme develops the professional identity of a pharmacist through experiential and classroom learning.

This is the only degree in Singapore recognised by the Singapore Pharmacy Council (SPC) for registration as a pharmacist (see page 3).

B.SC. (HONS) IN PHARMACEUTICAL SCIENCE

This four-year programme focuses on the pharmaceutical sciences, culminating in an understanding of drug discovery and development, and appreciation of the regulatory and commercial environment in the pharmaceutical industries.

You will be equipped to address complex pharmaceutical problems through integrated knowledge of pharmaceutical chemistry, biology, formulation science, technology and regulatory sciences.

There are wide-ranging experiential learning opportunities that enhance your readiness for the real world, such as industry internships, research attachments and overseas exchange programmes.

For information on the department's Minor in Pharmaceutical Science, please refer to "Admissions Information".

M.SC. IN (PHARMACEUTICAL SCIENCE AND TECHNOLOGY) BY COURSEWORK

This part-time programme is designed for those who are already working in, or aspiring to enter the pharmaceutical industry.

You will acquire in-depth knowledge and practical skills for the formulation and process manufacturing of chemical and biological drugs into various dosage forms, and gain understanding of regulatory and quality compliance in the process of drug development and manufacturing.

M.SC./PH.D. BY RESEARCH

This programme is suitable for those with a good basic degree in science, engineering or health-related disciplines who wish to enhance competencies in independent research in a specialised area relevant to pharmaceutical sciences.

PHARM.D. (DOCTOR OF PHARMACY) BY COURSEWORK AND CLINICAL CLERKSHIP

This two-year full-time programme (also available part-time), comprising both active learning and clerkship components, equips pharmacists with additional clinical knowledge, as well as clinical skills and attitudes to deliver quality and safe medication therapies to patients in collaboration with other health professionals.

It builds on the undergraduate programme foundations and focuses on pharmacotherapy topics in greater depth.

This programme contributes to the development of Specialist Clinical Pharmacists in Singapore.

DEPARTMENT OF PHYSICS

Undergraduate Programmes

B.SC. (HONS) AND B.SC. IN PHYSICS

You will learn theoretical and experimental skills for solving complex problems, by studying Classical and Quantum Mechanics; Electromagnetism; Thermodynamics; Atomic and Nuclear Physics; Nanophysics; and Relativity.

Honours students can either pursue a general Honours degree or one of these specialisations:

- **Astrophysics:** This focuses on celestial physics and cosmology, and is suitable for aspiring physics teachers.
- **Nanophysics:** This focuses on the scientific principles behind the technological and industrial developments of nanoscale materials with advanced functionalities.
- **Quantum Technologies:** This focuses on the foundations of quantum mechanics and its applications to sensing, communication, computation and cryptography.

For information on the department's Second Major and Minor courses, please refer to "Admissions Information".

Graduate Programmes

M.SC. BY COURSEWORK

This programme leads to an M.Sc. degree in either physics or applied physics, enabling educators and professionals to further upgrade their professional skills and qualifications.

Applied physics focuses on advanced training in areas such as semiconductor manufacturing, photonics and biophysics. It is suitable for physics graduates and professionals who wish to upgrade their professional skills and qualifications, or to switch to the high technology industry.

M.SC./PH.D. BY RESEARCH

Possible research areas include: Acoustics and Computer Simulations; Astrophysics; Atomic Physics; Condensed Matter Physics; High Energy Physics; Infrared Spectroscopy; Ionics; Ion Beam Applications; Laser Optics; Materials Science; Optics; Quantum Technologies; Solid-State X-Ray Fluorescence; Superconductors; and Surface Physics.

Possible Careers

Computer architecture designer
Data scientist
Educator
Engineer
Geophysicist
Industrial design planner
Instrumentation specialist
Materials scientist
Medical and radiation physicist
Medical technologist
Meteorologist
Renewable energy expert
Researcher
Science journalist
Solar energy physicist
Structural engineer

Examples of Industries/Sectors

Defence
Education
Energy
Engineering
Environment and climate
Financial services
Government agencies
Healthcare
Infocommunication technologies
Materials
Microelectronics
Physical sciences
Research and development
Scientific consultation
Semiconductors
Service industries



Department of Pharmacy

National University of Singapore
Blk S4A, Level 3, 18 Science Drive 4
Singapore 117543

(65) 6516 2648
phabox2@nus.edu.sg
www.pharmacy.nus.edu.sg



Department of Physics

National University of Singapore
Blk S12, Level 2, 2 Science Drive 3
Singapore 117551

(65) 6516 2619
physngwl@nus.edu.sg
www.physics.nus.edu.sg

DEPARTMENT OF STATISTICS AND APPLIED PROBABILITY

Possible Careers

Actuary
Biostatistician
Business analyst
Consumer intelligence analyst
Consumer risk analyst
Data scientist
Educator
Financial analyst
Pharmaceutical engineer
Pricing analyst
Quality assurance officer
Researcher
Statistician

Examples of Industries/Sectors

Biomedical sciences
Chemicals
Consumer businesses
Education
Electronics
Financial services
Government agencies
Healthcare
Infocommunication technologies
Insurance
Manufacturing
Pharmaceuticals
Research and development
Telecommunications
Transportation

Undergraduate Programmes

B.SC. (HONS) AND B.SC. IN STATISTICS

You will learn about the scientific application of mathematical principles to the collection, analysis and presentation of data, to gain insights which enable data-drive decisions.

Honours students can either pursue a general Honours degree or one of these specialisations:

- **Data Science:** This covers computing concepts and skills, enabling you to manage the collection, storage and analysis of large amounts of data in virtually every field.
- **Finance and Business Statistics:** This covers the application of statistics to the areas of investment and financial analysis, insurance, marketing research and management.

B.SC. (HONS) IN DATA SCIENCE AND ANALYTICS

This four-year direct Honours programme is designed with sufficient technical depth to equip graduates with the ability to develop novel analytical tools for new scientific applications and industry problems. It is jointly offered by the Department of Statistics and Applied Probability and the Department of Mathematics, in conjunction with the Department of Computer Science in the School of Computing (see page 13).

For information on the department's Second Major and Minor courses, please refer to "Admissions Information".

Graduate Programmes

M.SC. IN STATISTICS BY COURSEWORK

This is designed for students from statistics, mathematics or related fields.

You will acquire practical skills to solve real-world industry problems, and knowledge of statistical principles and methods required in the application of statistics.

NEW! M.SC. IN DATA SCIENCE AND MACHINE LEARNING BY COURSEWORK

This one-year full-time programme will help to meet the growing demand for Big Data professionals by transforming graduates with Bachelor degrees in quantitative science (e.g. mathematics, applied mathematics, statistics and physics) into practitioners. The M.Sc. in Data Science and Machine Learning is offered jointly by the Department of Mathematics, the Department of Statistics and Applied Probability, and the Department of Computer Science in the School of Computing, with support from the Faculty of Engineering, and the Saw Swee Hock School of Public Health (see pages 3, 9).

M.SC. IN STATISTICS BY RESEARCH

You will acquire advanced knowledge of theoretical and applied statistics.

Possible research areas include: Biostatistics; Computational Statistics; Financial Statistics; High Dimensional Data Analysis; and Probability Theory and Applications.

PH.D. IN STATISTICS BY RESEARCH

You will acquire skills to produce high-quality statistical research, for careers in research and development, and academia.

Possible research areas include: Bayesian Inference; Biostatistics; Functional Data Analysis; High Dimensional Data Analysis; and Probability Theory and Applications.

DATA SCIENCE AND ANALYTICS PROGRAMME

Undergraduate Programme

The **B.Sc. (Hons) in Data Science and Analytics** is a four-year direct Honours programme which equips you with the ability to develop novel analytical tools to address data-driven problems in businesses and new scientific applications. This programme is jointly offered by the Department of Statistics and Applied Probability and the Department of Mathematics, in conjunction with the Department of Computer Science in the School of Computing (see pages 9, 12).

In this interdisciplinary programme, you will read modules in mathematics, statistics and computer science, and be exposed to the interplay among these three key areas in the practice of data science.

In Years 3 and 4, you will delve in-depth into analytics methods such as artificial intelligence; computation and optimisation; computer algorithms; database and data processing; data mining and machine learning; and high dimensional statistics; as well as applications of analytics to various domains.

Programme highlights

Capstone module: The industry-driven module enables you to work on research and projects that are related to real-life data and workplace challenges.

NUS Co-Operative Education Programme: You may gain extensive workplace experience by spending 18 months (five consecutive semesters and terms) with reputable employers.

This programme will enhance your employability upon graduation for careers in diverse industries and businesses that require insights from Big Data which will enable them to be smarter, more productive and more competitive.

SECOND MAJOR IN DATA ANALYTICS

This programme enables you to apply computing and statistical methods to analyse and model complex data in your respective domains.

For information on the department's Second Major in Data Analytics, please refer to "Admissions Information".

Possible Careers

Actuary
Artificial intelligence specialist
Big Data analyst
Biostatistician
Business analytics specialist
Consumer insights analyst
Data analytics specialist
Data scientist
Educator
Machine learning scientist
Statistician

Examples of Industries/Sectors

Biomedical sciences
Consumer businesses
Education
Financial services
Government agencies
Healthcare
Infocommunication technologies
Insurance
Manufacturing
Pharmaceuticals
Research and development
Safety and security
Telecommunications
Transportation



Department of Statistics and Applied Probability

National University of Singapore
Blk S16, Level 7, 6 Science Drive 2
Singapore 117546

(65) 6516 8050
melissa.thong@nus.edu.sg
www.stat.nus.edu.sg



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www.stat.nus.edu.sg

COMPUTATIONAL BIOLOGY PROGRAMME

Possible Careers

Bioinformatician
Clinical bioinformatics data scientist
Computational microbiologist
Computational modeller
Computational scientist
Gaming specialist
Project scientist
Researcher
Software developer
Technology analyst

Examples of Industries/Sectors

Biotechnology
Government agencies
Healthcare
Infocommunication technologies
Pharmaceuticals
Research and development
Scientific services

Undergraduate Programme

The **B.Sc. (Hons) in Computational Biology** is a four-year multidisciplinary programme focusing on computer-based analysis of biological problems, the fastest growing area of the life sciences.

The programme is suitable for students with keen interest in mathematics, computing and life sciences.

It also provides excellent research opportunities and mentorship. You are often mentored by two professors from different faculties.

In Years 1 and 2, you will learn about the foundations of university-level life sciences, mathematics and statistics, and computer science; how to develop, apply and interpret algorithms to biology; and how to reason analytically about biological problems.

In Years 3 and 4, you can focus on your interests, culminating with a two-semester final year research project.

Key specialisation topics

- Big Data analysis of next-generation DNA and RNA sequencing
- Modelling of biological systems
 - Computational genomics
 - Computational neuroscience
 - Computer-aided drug design
- Theoretical foundations and analysis of genes/proteins
- Biological and pharmaceutical databases

You will acquire broadly applicable skills in modern biological sciences, mathematical and statistical analysis, as well as computer science.

ENVIRONMENTAL STUDIES PROGRAMME

Undergraduate Programme

The **Bachelor of Environmental Studies** is a four-year direct Honours degree programme jointly hosted by the Faculty of Science and the Faculty of Arts and Social Sciences, with participation from the Faculty of Engineering, Faculty of Law, School of Design and Environment, NUS Business School and the Saw Swee Hock School of Public Health.

It adopts an interdisciplinary approach in addressing complex, modern environmental issues such as climate change, land use, water usage, alternative energy and the building of liveable high-density cities.

The programme includes a two-year broad-based curriculum where you read core modules in biology, chemistry, economics, geography, law, management, mathematics, policy, public health and statistics.

You can specialise in either Environmental Biology or Environmental Geography:

Environmental Biology: This includes modules in Behavioural Biology; Biodiversity; Evolution; Field Studies; Freshwater and Terrestrial Ecology; Marine Biology; and Physiology.

Environmental Geography: This includes modules in Climate; Economics; Environmental Management; Geography; Geographical Information Systems; Geosciences; Modelling; and Sustainability.

Three capstone modules

ENV3101 and ENV3102: Environmental Challenges: Asian Case Studies: These two interconnected modules include an extended field trip to one of the countries in the Asia region in ENV3102, where you can experience first-hand the issues you studied in ENV3101.

ENV4101: Environmental Management in Singapore: This is a townhall style series where you can discuss a range of professional topics with environmental experts. These roundtable discussions provide an opportunity to learn about the ins and outs of these fields.

Programme highlights

Specially designed integrated modules emphasise small-group discussions, case studies, fireside chats and guest lectures with environmental luminaries, policy-makers and government officials.

You can participate in undergraduate research, as well as internships with environmental agencies, natural resource management agencies and environmental research centres/institutes, which provide you practical exposure at the workplace.

You will undertake real-world and real-time field studies to understand selected environmental challenges facing Asia.

Possible Careers

Conservation biologist
Ecologist
Educator
Environmental consultant
Environmental health officer
Environmental impact assessor
Environmental quality specialist
Environmental sustainability specialist
Environmental technologist
Forest conservationist
Park manager
Public policy analyst
Researcher
Wildlife biologist

Examples of Industries/Sectors

Ecotourism
Education
Environmental consultancy
Environmental management
Environmental planning
Government agencies
Natural resource management
Research and development
Sustainable development



Faculty of Science Dean's Office
(Undergraduate Programmes)

National University of Singapore
Blk S16, Level 2, 6 Science Drive 2
Singapore 117546

(65) 6516 8471
compbio@nus.edu.sg
www.science.nus.edu.sg/compbio



Department of Biological Sciences
(Undergraduate Programmes)

National University of Singapore
Blk S3, Level 5, 16 Science Drive 4
Singapore 117558

(65) 6601 2300
envhelp@nus.edu.sg
www.envstudies.nus.edu.sg

SPECIAL PROGRAMMES

The Faculty of Science offers a range of special programmes for students to enrich and enhance their learning, while catering to their diverse interests.

Joint Degree Programme with The Australian National University (ANU) Bachelor of Philosophy (Hons)

This four-year programme combines the Bachelor of Philosophy (Hons) degree of ANU with NUS' B.Sc. (Hons) degree.

It is offered to NUS Science students in the University Scholars Programme (USP) who are majoring in Chemistry, Mathematics and Physics, and is suitable if you have an interest in, and aptitude for graduate research work.

Up to six students are accepted into the programme annually.

You will spend three semesters at NUS, followed by three semesters at ANU, before returning to NUS to complete the Honours year.

You will acquire a strong foundation in critical analysis and in-depth perspectives into the principles of each subject, while actively undertaking independent undergraduate research work.

Applications open in September/October each year. Successful students are provisionally admitted to the programme based on academic performance and other relevant qualifications. Official admission into the programme is at the end of the third semester of study.

Joint Degree Programme with The University of North Carolina at Chapel Hill (UNC-CH) B.Sc. in Biology

This four-year programme, offered in collaboration between the Faculty of Science and the College of Arts and Sciences, UNC-CH, leads to a B.Sc. (Hons) in Life Sciences from NUS and a B.Sc. in Biology from UNC-CH.

It offers students from both institutions a unique learning experience encompassing advanced life sciences modules, undergraduate research and exposure to UNC-CH's liberal arts education.

You will generally spend Semesters 1 to 4 in NUS, Semesters 5 and 6 in UNC-CH and Semesters 7 and 8 in NUS.

Upon graduation, you will receive a degree jointly validated by NUS and UNC-CH.

Joint Degree Programme with University of Dundee (UoD) B.Sc (Hons) in Biological Sciences/Biomedical Sciences

This programme is jointly offered by NUS' B.Sc. (Hons) in Life Sciences and UoD's B.Sc. (Hons) in Biological Sciences/Biomedical Sciences, and equips you with drug discovery and design expertise.

The first of its kind joint Honours programme enables NUS Life Sciences students to complete a full-year research project at UoD in drug discovery and design.

Upon graduation, you will receive a degree jointly validated by NUS and UoD (see page 6).

Joint Minor Programme in Environmental Biology or Environmental Chemistry with University of Toronto (U of T)

You can read advanced courses for one semester in U of T, renowned for its environmental sciences. In the Environmental Biology focus, you will gain understanding of how environmental changes impact the ecology and biodiversity. In the Environmental Chemistry focus, you will develop insights on how chemical processes due to natural and human causes influence environmental elements such as soil, air and water.

For more information, please visit www.science.nus.edu.sg/education/undergraduate/ug-programmes/sap-outgoing. You can also email your enquiries to scisap@nus.edu.sg.

SPECIAL PROGRAMMES

NUS-Grandes Écoles French Double Degree Programme (FDDP)

The Grandes Écoles are a cluster of world-renowned institutions of higher scientific learning with a history of over 200 years, known for educating France's technical and management elites. NUS has set up Double Degree Programmes with six premier French Grandes Écoles:

- Centrale Supélec (CS)
- École Polytechnique (X)
- École Nationale Supérieure des Mines de Paris (Mines ParisTech)
- École Nationale Supérieure de Techniques Avancées (ENSTA)
- École Nationale Supérieure des Télécommunications (Telecom ParisTech)
- École Nationale des Ponts et Chaussées (Ponts ParisTech)

Students are selected in the first year from amongst top engineering, science and computing applicants.

Grandes Écoles place strong emphasis on mathematics and physics curricula in the first year.

You will undergo French language preparation, spend your third and fourth year in a French institution, and return to NUS for your M.Sc. programme.

Upon graduation, you will receive three degrees - a B.Sc. (Hons) degree, an M.Sc. degree from NUS and a Diplôme d'Ingenieur (the equivalent of Masters in France) from a French Grande École.

For more information on FDDP, please visit www.science.nus.edu.sg/undergraduate-studies/ugsap/ugsap-out/fddp. You can also email your enquiries to askscience@nus.edu.sg.

Special Programme in Science (SPS)

SPS is designed for students with a passion in science, technology and research. The programme trains you to better understand and address modern multidisciplinary scientific challenges.

SPS is organised around an Integrated Science Curriculum comprising four custom-designed thematic modules (integrating biology, chemistry, mathematics and physics) and two research-oriented modules.

You can participate in an established student mentorship scheme, where you can develop and hone your teamwork and leadership skills. You will do this in a tightly knit, multidisciplinary community of staff and students with a common goal of scientific excellence.

You will acquire scientific, computational and communication skills essential for today's workforce, as well as creative and critical thinking through novel pedagogy.

Admission is by interview. We look for a passion in science and the willingness to learn new things out of your comfort zone.

For more information on SPS, please visit <http://sps.nus.edu.sg>. You can also email your enquiries to enquire@sps.nus.edu.sg.

Special Programme in Mathematics (SPM)

SPM is specially designed for a select group of students who have a strong passion and aptitude for the mathematical sciences.

It comprises a number of specially designed modules ("S-modules") in foundational mathematics, which are taught in greater depth and sophistication than their regular versions.

Under the close mentorship of faculty members, you will participate in two semesters of undergraduate seminars in the form of topic modules.

You can participate in undergraduate research programmes locally and overseas, as well as graduate programmes at the Department of Mathematics.

For more information on SPM, please visit <http://ww1.math.nus.edu.sg/undergraduates.aspx?f=UP-SPM>.

SPECIAL PROGRAMMES

University Scholars Programme (USP)

This multi- and interdisciplinary academic programme shapes independent, adaptable thinkers and doers through its transformative learning environment, innovative curriculum and diverse global opportunities.

The programme admits students from seven Faculties/Schools - Arts and Social Sciences; Business; Computing; Design and Environment; Engineering; Science; and Law.

You will be challenged to build upon, or go beyond your majors, by thinking critically and approaching topics from different disciplinary perspectives. This enables you to make connections across disciplines and challenge conventional ways of thinking.

You will attend seminar-style classes, and do 30% of your academic work in USP and 70% in your home Faculty/School where you read your majors.

You will flourish in different ways through an enriching residential experience in an organic, self-driven environment that encourages exchange, peer learning and collaboration. This is achieved by living at the USP residential college – Cinnamon College – at University Town, for two or more years.

You will organise or take part in USP International Programmes, which challenge you on issues outside your fields of interest and enhance your global perspectives.

USP admission opens every year with NUS' general admissions and shortlisted applicants will be interviewed. A second USP admission exercise is also considered for Faculty of Science freshmen in the 2nd semester of study.

USP is not a scholarship disbursement programme. You may, however, apply for NUS scholarships or be recipients of other scholarships. There are also financial aid initiatives and scholarships in USP to help you defray the cost of studying and living on campus.

Upon successful completion of USP requirements and an Honours programme, you will graduate with an Honours degree from your Faculty/School and receive a certificate of recognition as a University Scholar.

For more information on USP and application timelines, please visit www.usp.nus.edu.sg. You can also email your enquiries to usp@nus.edu.sg.

Undergraduate Research Opportunities Programme in Science (UROPS)

This programme provides you a unique opportunity to work with our faculty members to experience the challenges and benefits of undertaking an independent research project.

You will get to work at the frontiers of scientific research and closely engage established scientists in their fields.

You will enhance your knowledge in the latest developments in science and technology, and acquire communication and presentation skills.

You can take a UROPS project during regular semesters or special terms (May to July).

For more information on UROPS, please visit www.science.nus.edu.sg/undergraduate-studies/ugenh/urops-main. You can also email your enquiries to scienhance@nus.edu.sg.

Internships

There are multiple opportunities during your candidature to take up internships at renowned local and international organisations, through the Undergraduate Professional Internship Programme (UPIP) and Final Year Internship (FYI).

These programmes are an important part of experiential learning, which reinforces and enhances classroom learning. You will get to:

- **Broaden your perspective:** You will gain knowledge of companies and careers relevant to the industry sector of the internship provider. Internships prepare you to become workforce-ready upon graduation.
- **Translate scientific principles:** You will become adept in applying classroom learning to practical assignments at the workplace and address real-world problems.
- **Develop your network:** You can establish personal and professional networks before graduation.

Upon successful completion of the internship, you will also be awarded modular credits that count towards your graduation requirement.

For more information on internships, please visit www.science.nus.edu.sg/industry/internships. You can also email your enquiries to sciupip@nus.edu.sg.

STUDY ABROAD PROGRAMMES

Study abroad programmes with over 300 overseas partner universities open the door to a global learning experience. You will gain exposure to different cultures and academic environments. Ranging from a few weeks to two years, these programmes allow you to study abroad as part of your undergraduate studies in NUS while paying only home university fees. Courses taken as part of study abroad programmes could earn you modular credits towards fulfilling graduation requirements.

Student Exchange Programmes

Going on exchange allows you to take modules not taught in NUS.

You will spend one semester or two at an overseas partner university.

We have collaborations with over 300 reputable partner universities. These include: University College Cork; Radboud University; University of Toronto; Colgate University; Cornell University; The University of North Carolina at Chapel Hill; La Trobe University; Chang Gung University; Nagoya University; and many more.

Summer Programmes

Summer programmes allow you to take NUS modules in an overseas setting.

Spanning three to eight weeks, these programmes are ideal should you prefer to gain overseas learning experience outside regular semesters.

Some partner universities offering summer programmes include: University of Toronto; The University of North Carolina at Chapel Hill; and Hokkaido University.

Places offered by our partner universities are reserved for NUS Science students only.

Overseas Summer Research Programmes

Students spend eight to 12 weeks in the laboratories of our partner universities or in overseas research institutes.

Students from all disciplines can enrol in these programmes.

Some partner universities and research institutes include: University of Cambridge; The University of North Carolina at Chapel Hill; University of Alberta; University of Toronto;

University Autónoma de Madrid; King Abdullah University of Science and Technology; Shanghai Jiao Tong University; and Chang Gung University.

NUS Overseas Colleges (NOC) Programme

Under the NUS Overseas Colleges (NOC) programme, selected students will get to work at leading entrepreneurial hotspots across the globe - Beijing, Israel, New York, Southeast Asia, Shanghai, Shenzhen, Silicon Valley, Singapore, Stockholm and Toronto - while taking classes at our renowned partner universities like Stanford University, Tsinghua University and KTH Royal Institute of Technology.

Our programmes run between three months to a year. You will gain firsthand insights into the operations of innovative startups and experience the challenges faced by the founders of these companies.

For more information on our study abroad programmes, please visit www.science.nus.edu.sg/education/undergraduate/ug-programmes/sap-outgoing. You can also email your enquiries to scisap@nus.edu.sg.

ADMISSIONS INFORMATION

Admission Requirements for Students with GCE 'A' Level (H1/H2) Qualifications or Equivalent

For admission to the Faculty of Science (FoS), you must have good GCE 'A' Level (H2) passes or equivalent in at least two of these Science subjects: Biology, Chemistry, Computing, Physics and Mathematics/Further Mathematics.

Students admitted to FoS will choose their major in July if they meet the prerequisites for that major. If you intend to pursue major courses like Data Science and Analytics, Environmental Studies, Food Science and Technology, or Pharmaceutical Science or Pharmacy, you can apply for any of them via the online application form.

Primary Majors Leading to an Honours Degree	Prerequisites for Students Offering H2 Curriculum or Equivalent
<ul style="list-style-type: none"> • Chemistry • Chemistry Specialisation in Materials Chemistry Specialisation in Medicinal Chemistry Specialisation in Environment and Energy 	Good H2 pass (or equivalent) in Chemistry and at least a good 'O' Level pass (or equivalent) in Mathematics
<ul style="list-style-type: none"> • Computational Biology^{a#} 	Good H2 passes (or equivalent) in Mathematics/Further Mathematics, and either Biology or Chemistry <i>Students without H2 passes (or equivalent) in either Biology or Chemistry should have at least an 'O' Level (or equivalent) pass in it [subject to departmental approval].</i>
<ul style="list-style-type: none"> • Data Science and Analytics[#] 	Very good H2 pass (or equivalent) in Mathematics/Further Mathematics, and a good H2 pass (or equivalent) in Biology or Chemistry or Physics or Computing
<ul style="list-style-type: none"> • Food Science and Technology 	Good H2 pass (or equivalent) in Chemistry and a good H2 pass (or equivalent) in Biology or Physics or Computing or Mathematics/Further Mathematics <i>Students without H2 pass (or equivalent) in Biology are required to read the bridging module in Biology (i.e. LSM1301) in Semester 1 to fulfil the prerequisites for the relevant Level 1000 Life Sciences module in the syllabus.</i>

Primary Majors Leading to an Honours Degree	Prerequisites for Students Offering H2 Curriculum or Equivalent
<ul style="list-style-type: none"> • Life Sciences • Life Sciences Specialisation in Biomedical Science Specialisation in Environmental Biology Specialisation in Molecular and Cell Biology 	Two good H2 passes (or equivalent) in Biology or Chemistry or Mathematics/Further Mathematics or Physics <i>Students without H2 pass (or equivalent) in Biology or Chemistry may read the relevant bridging modules as entry requirements.</i>
<ul style="list-style-type: none"> • Mathematics • Applied Mathematics • Applied Mathematics Specialisation in Mathematical Modelling and Data Analytics Specialisation in Operations Research and Financial Mathematics • Quantitative Finance[*] 	Good H2 pass (or equivalent) in Mathematics/Further Mathematics <i>Subject to departmental approval (applicable to Quantitative Finance only).</i>
<ul style="list-style-type: none"> • Pharmaceutical Science[#] 	Very good H2 pass (or equivalent) in Chemistry and a very good H2 pass (or equivalent) in Biology or Physics or Mathematics/Further Mathematics
<ul style="list-style-type: none"> • Pharmacy[#] <i>(Professional programme where application is by direct admission only)</i> 	Very good H2 passes (or equivalent) in Chemistry and either Biology, Mathematics/Further Mathematics or Physics
<ul style="list-style-type: none"> • Physics • Physics Specialisation in Astrophysics Specialisation in Nanophysics Specialisation in Quantum Technologies 	Good H2 passes (or equivalent) in Physics and Mathematics/Further Mathematics
<ul style="list-style-type: none"> • Statistics • Statistics Specialisation in Data Science Specialisation in Finance and Business Statistics 	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Interdisciplinary Degree Programme	Prerequisites for Students Offering H2 Curriculum or Equivalent
<ul style="list-style-type: none"> • Environmental Studies Programme[#] Specialisation in Environmental Biology 	Good H1 pass (or equivalent) in Mathematics and a good H2 pass (or equivalent) in Biology or Chemistry

NOTE

a) * Admission to FoS does not automatically qualify you to choose these majors as there will be additional departmental selection due to limited places.

b) # These are strict four-year programmes. Students in other majors can graduate with a Bachelor of Science (B.Sc.) degree after three years.

c) Specialisations are awarded only with a B.Sc. (Hons) degree.

Courses Beyond Primary Major

FoS offers a flexible curriculum, allowing you to enrich and broaden your educational experience. You can choose other courses and programmes beyond your primary major course. You may do a double degree (two degrees with two full majors), choose a double major (one primary and one second major) and/or minor programmes within and outside the Faculty.

Within the Faculty of Science

Second Majors (Optional)	Prerequisites for Students Offering H2 Curriculum or Equivalent
• Chemistry	Good H2 pass (or equivalent) in Chemistry
• Data Analytics	Very good H2 pass (or equivalent) in Mathematics/Further Mathematics
• Life Sciences	Two good H2 passes (or equivalent) in Biology or Chemistry or Mathematics/Further Mathematics or Physics
• Mathematics • Statistics	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
• Physics	Good H2 pass (or equivalent) in Physics

Minors (Optional)	Prerequisites for Students Offering H2 Curriculum or Equivalent
• Analytical Chemistry	Good H2 pass (or equivalent) in Chemistry
• Biophysics	Good H2 passes (or equivalent) in Physics, Chemistry and/or Biology
• Forensic Science*	Good pass in the gateway module LSM 1306 Forensic Science
• Life Sciences	Good H2 pass (or equivalent) in Biology
• Mathematics • Financial Mathematics • Statistics	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
• Nanoscience	Good H2 pass (or equivalent) in Chemistry or Physics

Minors (Optional)	Prerequisites for Students Offering H2 Curriculum or Equivalent
• Pharmaceutical Science*	Good H2 pass (or equivalent) in Chemistry or Biology
• Physics	Good H2 pass (or equivalent) in Physics
• Geosciences <i>Co-hosted by FoS and Faculty of Arts and Social Sciences (FASS)</i>	Nil

Joint Minors (Optional)	Prerequisites for Students Offering H2 Curriculum or Equivalent
• Aquatic Ecology*	Open to students from all disciplines, except those who are reading the Bachelor of Environmental Studies programme from Academic Year 2016/2017 and onwards. An interview is required.
• Engineering Materials*	Good H2 pass (or equivalent) in Chemistry or Physics
• Environmental Biology*	Good H2 passes (or equivalent) in Biology and Mathematics/Further Mathematics
• Environmental Chemistry*	Good H2 passes (or equivalent) in Physics and Mathematics/Further Mathematics
• Medical Physics*	Open to students from Faculty of Science and Faculty of Engineering (FoE) with good H2 passes (or equivalent) in Physics and Biology

NOTE

* Application is subject to departmental approval.

You can apply directly to the following double major programme within FoS via the online admission application form.

FoS Primary Major	Second Major (From FoS)	Admission Requirements*
Chemistry	Food Science	Good H2 pass (or equivalent) in Chemistry and a good H2 pass (or equivalent) in Biology or Physics or Computing or Mathematics/Further Mathematics

NOTE

* Applicants satisfying the admission requirements will subject to selection criteria before being admitted into the programme.

Outside the Faculty of Science

You can apply directly to the following double major programmes via the online admission application form.

FoS Primary Major	Second Major (From Other Faculties/Schools)	Admission Requirements*
Applied Mathematics	Economics (FASS)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Mathematics	Economics (FASS)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Statistics	Economics (FASS)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Life Sciences	Psychology (FASS)	Two good H2 passes (or equivalent) in Biology or Chemistry or Mathematics/Further Mathematics or Physics
Applied Mathematics	Computer Science (SoC)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Mathematics	Computer Science (SoC)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Statistics	Computer Science (SoC)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Applied Mathematics	Information Security (SoC)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Mathematics	Information Security (SoC)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Statistics	Information Security (SoC)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Applied Mathematics	Business Analytics (SoC)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Mathematics	Business Analytics (SoC)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Statistics	Business Analytics (SoC)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Applied Mathematics	Management (Biz)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Mathematics	Management (Biz)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Statistics	Management (Biz)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Life Sciences	Management (Biz)	Two good H2 passes (or equivalent) in Biology or Chemistry or Mathematics/Further Mathematics or Physics

Major with Minor Programmes

Students can apply directly to the following major with minor programmes via the online admission application form.

FoS Primary Major	Minor (From Other Faculties/Schools)	Admission Requirements*
Applied Mathematics	Information Security (SoC)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Computational Biology	Information Security (SoC)	Good H2 passes (or equivalent) in Mathematics/Further Mathematics and either Biology or Chemistry
Quantitative Finance	Information Security (SoC)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Statistics	Information Security (SoC)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Life Sciences	Public Health (SSHSPH)	Two good H2 passes (or equivalent) in Biology or Chemistry or Mathematics/Further Mathematics or Physics
Mathematics	Entrepreneurship (Biz)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Applied Mathematics	Entrepreneurship (Biz)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Statistics	Entrepreneurship (Biz)	Good H2 pass (or equivalent) in Mathematics/Further Mathematics
Data Science and Analytics	Entrepreneurship (Biz)	Very good H2 pass (or equivalent) in Mathematics/Further Mathematics and a good H2 pass (or equivalent) in Biology or Chemistry or Physics or Computing
Life Sciences	Entrepreneurship (Biz)	Two good H2 passes (or equivalent) in Biology or Chemistry or Mathematics/Further Mathematics or Physics
Food Science and Technology	Entrepreneurship (Biz)	Good H2 pass (or equivalent) in Chemistry and a good H2 pass (or equivalent) in Biology or Physics or Computing or Mathematics/Further Mathematics

NOTE

*Applicants satisfying the admission requirements will be subjected to selection criteria before being admitted into the programme.

LEGEND

Biz: NUS Business School; FASS: Faculty of Arts and Social Sciences; FoE: Faculty of Engineering; FoS: Faculty of Science; SoC: School of Computing; SSHSPH: Saw Swee Hock School of Public Health

After admission to FoS, you can also self-design your own Major/Second Major or Double Degree combinations as shown below.

Examples of Possible Double Major Combinations

- Chemistry and Geography
- Chemistry and Management
- Chemistry and Political Science
- Life Sciences and English Language
- Life Sciences and Sociology
- Mathematics and Chinese Studies
- Quantitative Finance and Economics

Examples of Possible Double Degree Combinations

- Chemistry and Business Administration
- Life Sciences and Business Administration
- Life Sciences and Computer Science
- Life Sciences and Economics
- Mathematics/Applied Mathematics and Business Administration
- Mathematics/Applied Mathematics and Computer Science
- Mathematics/Applied Mathematics and Economics
- Physics and Materials Science and Engineering
- Physics and Mechanical Engineering
- Quantitative Finance and Business Administration
- Quantitative Finance and Economics
- Statistics and Business Administration

For more information on self-designed programmes, please visit NUS' Registrar's Office website at <http://www.nus.edu.sg/registrar/academic-information-policies/undergraduate-students/special-programmes/double-major-programmes>. You can also email your enquiries to askscience@nus.edu.sg.

Admission Requirements for Polytechnic Diploma Holders

Local polytechnic applicants (regardless of nationality) will be considered for admission if their diplomas are accredited to our Environmental Studies, Pharmaceutical Science, Pharmacy or Science courses.

Nanyang Polytechnic	NUS Major Courses
Biologics and Process Technology	Science (Chemistry)
Biomedical Engineering	Science (Physics)
Chemical and Green Technology	Environmental Studies Science (Chemistry)
Chemical and Pharmaceutical Technology	Science (Chemistry)
Digital and Precision Engineering	Science (Physics)
Electronic Systems <i>(Previously named as Electronics, Computer and Communication Engineering)</i>	Science (Physics)
Engineering with Business <i>(For 2017 polytechnic graduates onwards)</i>	Science (Physics)

Nanyang Polytechnic

Nanyang Polytechnic	NUS Major Courses
Food Science and Nutrition <i>(Previously named as Food Science)</i>	Science (Chemistry) Science (Food Science and Technology) Science (Life Sciences)
Manufacturing Engineering	Science (Physics)
Mechatronics Engineering	Science (Physics)
Medicinal Chemistry	Science (Chemistry) Science (Life Sciences) Science (Pharmaceutical Science) Science (Pharmacy)
Molecular Biotechnology	Science (Chemistry) Science (Life Sciences) Science (Pharmaceutical Science) Science (Pharmacy)
Molecular Biotechnology <i>(Pharmaceutical and Clinical Trial track)</i>	Science (Life Sciences) Science (Pharmaceutical Science) Science (Pharmacy)
Molecular Biotechnology <i>(R&D/Bioenterprise/Manufacturing track)</i>	Science (Life Sciences) Science (Pharmaceutical Science) Science (Pharmacy)
Nanotechnology and Materials Science	Science (Chemistry) Science (Physics)
Nursing (three-year programme)	Science (Life Sciences)
Pharmaceutical Sciences	Science (Chemistry) Science (Life Sciences) Science (Pharmaceutical Science) Science (Pharmacy)

Ngee Ann Polytechnic

Ngee Ann Polytechnic	NUS Major Courses
Aerospace Technology/Aerospace Technology <i>(With minor in Business Management)</i>	Science (Physics)
Biomedical Engineering/Biomedical Engineering <i>(With minor in Business Management)</i>	Science (Computational Biology) Science (Life Sciences) Science (Physics)

Ngee Ann Polytechnic

NUS Major Courses

Biomedical Laboratory Technology/Biotechnology	Science (Chemistry) Science (Life Sciences) Science (Pharmaceutical Science) Science (Pharmacy)
Biomedical Science <i>(For 2015 polytechnic graduates onwards)</i> • Specialisation: Clinical Laboratory Technology • Specialisation: Biomedical Research • Specialisation: Medicinal Chemistry (renamed)	Science (Chemistry) Science (Life Sciences) Science (Pharmaceutical Science) Science (Pharmacy)
Biomedical Science <i>(For 2014 polytechnic graduates or earlier)</i> / Biomedical Science <i>(Medical Laboratory Technology option)</i>	Environmental Studies Science (Chemistry) Science (Life Sciences) Science (Pharmaceutical Science) Science (Pharmacy)
Chemical Engineering	Science (Chemistry)
Chemical and Biomolecular Engineering	Science (Chemistry)
Electrical Engineering/Electrical Engineering <i>(With minor in Business Management)</i>	Science (Physics)
Engineering Science	Science (Physics)
Environmental and Water Technology	Environmental Studies
Landscape Design and Horticulture <i>(Previously named as Horticulture and Landscape Management)</i>	Science (Life Sciences)
Molecular Biotechnology	Environmental Studies Science (Chemistry) Science (Life Sciences) Science (Pharmaceutical Science) Science (Pharmacy)
Optometry	Science (Life Sciences)
Pharmacy Science	Science (Chemistry) <i>[For 2013 polytechnic graduates and earlier, and for 2017 polytechnic graduates onwards]</i> Science (Life Sciences) Science (Pharmaceutical Science) Science (Pharmacy)
Veterinary Bioscience	Environmental Studies Science (Life Sciences)

Republic Polytechnic

NUS Major Courses

Aerospace Engineering	Science (Physics)
Biomedical Electronics	Science (Computational Biology)
Biomedical Science	Environmental Studies Science (Chemistry) <i>[For 2013 polytechnic graduates and earlier]</i> Science (Life Sciences) Science (Pharmaceutical Science) Science (Pharmacy)
Biotechnology	Environmental Studies Science (Chemistry) <i>[For 2013 polytechnic graduates and earlier]</i> Science (Life Sciences) Science (Pharmaceutical Science) Science (Pharmacy)
Environmental Sciences	Environmental Studies Science (Chemistry) Science (Life Sciences)
Marine Science and Aquaculture <i>(For 2017 polytechnic graduates onwards)</i>	Environmental Studies Science (Life Sciences)
Materials Science	Science (Chemistry) Science (Physics)
Pharmaceutical Sciences	Environmental Studies Science (Chemistry) <i>[For 2013 polytechnic graduates and earlier]</i> Science (Life Sciences) Science (Pharmaceutical Science) Science (Pharmacy)

Singapore Polytechnic

NUS Major Courses

Aeronautical Engineering	Science (Physics)
Applied Chemistry <i>(For 2018 polytechnic graduates onwards)</i> Option: Industrial Chemistry Option: Pharmaceutical Science Option: Medicinal Chemistry Research <i>[Merger between Diploma in Applied Chemistry with Pharmaceutical Science and Diploma in Applied Chemistry with Materials Science]</i>	Science (Chemistry) Science (Pharmaceutical Science) Science (Pharmacy)

Singapore Polytechnic	NUS Major Courses
Applied Chemistry <i>(For 2018 polytechnic graduates onwards)</i> Option: Materials Science <i>[Merger between Diploma in Applied Chemistry with Pharmaceutical Science and Diploma in Applied Chemistry with Materials Science]</i>	Science (Chemistry)
Bioengineering Biomedical Science	Science (Chemistry) Science (Life Sciences) Science (Physics) Science (Pharmaceutical Science) Science (Pharmacy)
Biotechnology <i>(Medical Technology option)</i>	Science (Life Sciences) Science (Pharmaceutical Science) Science (Pharmacy)
Biotechnology	Environmental Studies Science (Chemistry) Science (Computational Biology) <i>[For 2017 polytechnic graduates onwards]</i> Science (Life Sciences) Science (Pharmaceutical Science) Science (Pharmacy)
Chemical Engineering	Science (Chemistry) Science (Food Science and Technology) <i>[For 2017 polytechnic graduates onwards]</i>
Environmental Management and Water Technology	Environmental Studies
Food Science and Technology <i>(Previously named as Chemical Process Technology [Food Technology])</i>	Science (Chemistry) Science (Food Science and Technology) Science (Pharmaceutical Science) Science (Pharmacy)
Materials Engineering	Science (Chemistry)
Materials Science <i>(Previously named as Chemical Process Technology [Polymer Option])</i>	Science (Chemistry)

Singapore Polytechnic	NUS Major Courses
Mechanical Engineering <i>(For 2017 polytechnic graduates onwards)</i>	Science (Physics)
Medical Technology	Science (Life Sciences) Science (Pharmaceutical Science) Science (Pharmacy)
Nutrition, Health and Wellness	Science (Food Science and Technology) Science (Life Sciences)
Optometry	Science (Life Sciences)
Perfumery and Cosmetic Science <i>(Previously named as Chemical Process Technology [Industrial Chemistry])</i>	Science (Chemistry) Science (Pharmaceutical Science) Science (Pharmacy)
Process Engineering	Science (Chemistry)

Temasek Polytechnic	NUS Major Courses
Applied Food Science and Nutrition	Science (Chemistry) <i>[For 2017 polytechnic graduates onwards]</i> Science (Food Science and Technology) Science (Pharmaceutical Science) Science (Pharmacy)
Biomedical Engineering <i>(For 2015 polytechnic graduates onwards [Previously named as Biomedical Informatics and Engineering])</i>	Science (Computational Biology) Science (Life Sciences) Science (Physics)
Biomedical Informatics and Engineering	Science (Computational Biology) Science (Life Sciences)
Biomedical Science	Environmental Studies Science (Chemistry) Science (Life Sciences) Science (Pharmaceutical Science) Science (Pharmacy)
Biotechnology	Environmental Studies Science (Chemistry) Science (Computational Biology) <i>[For 2017 polytechnic graduates onwards]</i> Science (Life Sciences) Science (Pharmaceutical Science) Science (Pharmacy)

Chemical Engineering	Science (Chemistry)
Mechatronics <i>(For 2017 graduates onwards)</i>	Science (Physics)
Pharmaceutical Science	Science (Chemistry) Science (Food Science and Technology) Science (Life Sciences) Science (Pharmaceutical Science) Science (Pharmacy)
Veterinary Technology	Environmental Studies Science (Food Science and Technology) <i>(For 2017 polytechnic graduates onwards)</i> Science (Life Sciences)

ADVANCED PLACEMENT CREDITS (APCs)

APCs are given to diploma holders of approved programmes from the five polytechnics in Singapore. Such students admitted to a four-year degree programme may be granted APCs in relevant modules for up to a maximum of 40 modular credits (MCs), as follows:

Auto-granted MCs

(i) 20 MCs from Unrestricted Elective Modules

Performance-based MCs

(ii) Up to 20 MCs from programme requirements may be granted based on performance in advanced placement tests and/or interviews set by the department offering the module.

Please visit NUS' Office of Admissions website for more details:

<http://www.nus.edu.sg/oam/apply-to-nus/polytechnic-diploma-from-singapore/admissions-requirements>



Faculty of Science

DEAN'S OFFICE

Faculty of Science
Block S16
Level 2, 6 Science Drive 2
Singapore 117546

Tel: (65) 6516 8471

Fax: (65) 6777 4279

www.science.nus.edu.sg