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The Logistics Institute-Asia Pacific

Overview of Programme

The Logistics Institute - Asia Pacific (TLIAP) is a collaboration between National University of Singapore (NUS) and Georgia Institute of Technology (Georgia Tech) for research, education and industry outreach in global logistics and supply chain management. TLIAP is modelled after The Supply Chain & Logistics Institute (SCL) at Georgia Tech, which has wide industry recognition as one of the best institutes for education and research in logistics and supply chain management. This collaboration provides expertise which caters to the needs of industries across the world today focusing on global logistics, information technology, industrial engineering and supply chain management. In 2012, TLIAP received another prestigious accolade by being awarded the “Best Education Course Provider” at the Asian Freight & Supply Chain Awards (AFSCA) 2012. This is the tenth consecutive year that TLIAP has received this award since 2003.

Through its strong ties with the Business School, the School of Computing, the Faculty of Engineering and the Faculty of Science at NUS and its excellent relationship with the School of Industrial and Systems Engineering at Georgia Tech, TLIAP is able to develop the Double Masters Programme (DMP) in Supply Chain Management with phenomenal success.

The comprehensive programme in Supply Chain Management has equipped graduates of the DMP with the knowledge and skills to provide expertise and advice to logistics/supply chain companies in Singapore and the Asia Pacific, as well as to multi-national corporations located within Singapore.

For more details on the Institute, please visit our website: http: //www.tliap.nus.edu.sg

Key Contact Information

Title & Name	Designation/Responsibility	Telephone (6772-XXXX)	Email (XXXX@nus.edu.sg)
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Double Masters Programme in Supply Chain Management

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The Double Masters Programme in Supply Chain Management (DMP) is a major step towards developing core competencies in logistics and supply chain management, coupled with research and industrial experience, with a focus on Singapore and the Asia-Pacific region. It leads to two Master of Science Degrees. The programme offers the following graduate degrees by coursework:

- Master of Science in Supply Chain Management by NUS
- Master of Science in Supply Chain Engineering by Georgia Tech

Graduates of the programme will thus be well-equipped with the skill set required for a top professional career in the logistics supply chain industry.

The programme provides advanced studies in modern manufacturing, warehousing and logistics combined with optimisation methodologies, such as deterministic and stochastic optimisation, simulation, data analysis, economic analysis and information technology. The integration of an industry-oriented project (or a research project) during the third semester offers opportunities for students to work with industry and solve real-life problems or to work on an industrial related research topic.

Programme Requirements

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Admission requirements

Students should have a strong foundation in mathematics equivalent to the first two years of an engineering degree, including exposure to courses in linear algebra, calculus, probability, statistics, and the fundamental methodologies of operations research. For admission, students must have obtained the minimum of a second class honours (upper division) degree in one of the following:

1. Engineering,
2. Physical Science, Computer Science or Mathematics,
3. Business Administration,
4. A related technical discipline at undergraduate level.

In addition, students should have taken the Graduate Record Examinations (GRE) not more than five years prior to the submission of the application, and the Test for English as a Foreign Language (TOEFL) not more than two years prior to the submission of the application.

The following applicants are exempted from submitting TOEFL test scores:

- Applicants who attended an English-based North American college/university for at least one full academic year as a full time student on campus; or
- Applicants with four-year undergraduate degrees from National University of Singapore (NUS), Nanyang Technological University (NTU), Singapore Management University (SMU), and Singapore Univirsity of Technology and Design (SUTD).
- Applicants who have completed a four-year degree in an English-medium college/university may be considered for exemption on a case by case basis and subject to the approval of Director (Degree Education) at TLIAP.

Academic Calendar for Double Masters Programme for the 2014 intake:

Semester 1:	Spent at NUS 18 weeks from the start of the semester in August 2014.
Vacation	December 2014
Semester 2:	At Georgia Tech, Atlanta. 17 weeks from the start of the semester in January 2015.
Vacation	Early to mid May 2015
Special Summer Term:	At Georgia Tech, Atlanta mid-May to end June 2015
Semester 3:	Spent at NUS 18 weeks from the start of the semester in August 2015

Leave of Absence

Students may be granted leave for periods of absence from the University. The leave of absence typically falls into the following two categories.

Medical Leave

This will be allowed only if supported by a medical certificate from the University's Student Health Physician, or a medical certificate from any other medical practitioner registered with the Singapore Medical Association, with the endorsement of the Student Health Physician. In line with the national medical policies established by the Ministry of Health, medical certificates issued by practitioners of Traditional Chinese Medicine (TCM) are not accepted.

Study Leave

A student requiring leave other than medical leave should notify, in writing, the Director of Degree Education at TLIAP at least seven days in advance. The Director of Degree Education may accept an application for leave at a shorter notice if there are valid reasons. Students who proceed on leave without giving the required period of notice or without obtaining the express approval for leave from the Director of Degree Education shall be barred from sitting in the examinations. Students who are absent for an extended period without first obtaining the approval for leave will be regarded as being absent without permission and are liable to have their registration status terminated. In addition, students who, for valid reasons, require leave of one semester or more should obtain approval in advance of the semester. A student who applies for leave of absence after the second week of the instructional period during a semester is liable to pay fees for the entire semester. Request for partial payment will not be considered (see Examination Rules and Regulations).

A candidate who is absent in the examination of a module without a valid reason acceptable to the Director of Degree Education will be given Grade F (Fail) for the module which he/she is absent in.

Academic Policies

CAP for Graduation

Minimum CAP = 3.0

Academic warning, dismissal and graduation

For continuation of candidature (a student must obtain satisfactory progress during his/her candidature) i.e.:

An academic warning is issued to a student if, at the end of a semester:

- His/her CAP falls below 3.0 computed from all the modules taken at NUS; or
- His/her GPA falls below 2.7 computed from all the modules taken at GT.

A student is not allowed to repeat a module that he/she has passed for the purpose of improving his/her grade/CAP/GPA. For this purpose, NUS grades of D and above and GT grades of C and above are considered as pass grades.

However, if the student has passed a core module but fails to meet the CAP or GPA requirement for graduation without an alternative, with the approval of the Board of Examiners, he/she may repeat the module, or read a designated equivalent module for the purpose of meeting the CAP or GPA requirement for graduation.

A student may be dismissed and refused re-admission if

- In the first semester of study, his CAP falls below 2.0; or
- He/she has received two consecutive academic warnings.

Students must complete their requirements for their degrees within the maximum period of candidature (i.e, 5 semesters), failing which they will have their candidature terminated.

The above rules on warning and dismissal also apply to a candidate undertaking his/her second semester in Georgia

Tech, and/or a candidate on leave of absence of one semester or longer. If a candidate is given an academic warning prior to his leave, the warning prior to his leave shall count towards dismissal.

For graduation, a student:

- Must not have taken more than 10 modules at NUS/attempts of the modules or its equivalent of 40 MCs during his/her candidature;
- Must complete eight coursework modules (five are core and three are elective, 4 MC each) and undertake a five-month Research Project module (8 MC);
- Passed the following 3 courses at Georgia Tech which are recognized towards the degree of MSc Supply Chain Management in NUS:
    1. ISyE6335 Supply Chain Engineering 1 – Warehousing Operations and Inventory Control
    2. ISyE6336 Supply Chain Engineering 2 – Global Transportation and Distribution
    3. ISyE6337 Supply Chain Engineering 3 – Supply Chain Design;

and

- Satisfied all Georgia Tech requirements for the award of the MSc in Supply Chain Engineering.

Curriculum

In NUS, students have to take one course via distance learning from Georgia Tech, three core modules, and two elective modules during Semester 1. In Semester 3, students will read three modules (two core and one elective) and undertake the Research Project (core module). In Georgia Tech, students have to take five coursework courses and a captstone project (equivalent to two courses).

Semester 1

In Semester 1, students will undertake a total of five modules at NUS, of which three are compulsory core modules and the rest electives. The following is a list of NUS approved elective modules offered by other faculties to DMP candidates. For more information, please refer to the website of The Logistics Institute - Asia Pacific. In addition, students will also undertake ISYE6335 Supply Chain Engineering I via distance learning from Georgia Tech.

CORE MODULES (5)

Students need to take five from the following:

Module Code	Module Title	MCs
IE5004	Engineering Probability and Simulation	4
DSC5211A	Supply Chain Coordination and Risk Management	4
DSC5211B	Analytical tools for Consulting	4
LI5101	Supply Chain Management Thinking and Practice	4
LI5202	Special Topics in Supply Chain Management	4
LI5001	Research Project	8

ELECTIVE MODULES (3)

Students need to take three from the following:

Module Code	Module Title	MCs
IS5123	IT and Supply Chain Management	4
ECA5103	Quantitative and Computing Methods	4
IE5405	Inventory Systems	4
LI5201	Special Topics in Logistics	4
TP5027	Transport & Freight Terminal Management	4
TP5028	Intermodal Transportation Operations	4
BDC5101	Deterministic Operations Research Models	4
DSC4211C	Operations Strategy	4
DSC4211G	Service Design	4
DSC4212	Managerial Decision Analysis	4
DSC5211C	Quantitative Risk Management	4
IE5001	Operations Planning and Control I	4
IE5002	Applied Engineering Statistics	4
IE5107	Material Flow Systems	4
IE5108	Facility Layout and Location	4
IE5202	Applied Forecasting Methods	4
IE5401	Industrial Logistics	4
IE5403	Systems Engineering Case Studies	4

Semester 2

Students will spend Semester 2 at Georgia Tech. They will complete five courses and a capstone project (which is equivalent to two courses). The following is a list of approved courses offered by the Department of Industrial and Systems Engineering at Georgia Tech.. . For more information, please refer to the website of The Logistic Institute-Asia Pacific.

COURSES AT GEORGIA TECH

Course Code	Course Title	
ISyE6335 (via distance learning)	Supply Chain Engineering 1 – Warehousing Operations and Inventory Control	3
ISyE6336	Supply Chain Engineering 2 – Global Transportation and Distribution	3
ISyE6337	Supply Chain Engineering 3 – Supply Chain Design	3
ISyE6338	Supply Chain Strategy	3
ISyE6339	Supply Chain Information Systems	3

ISyE6340	Supply Chain Engineering Seminar	3
ISyE6341	Supply Chain Engineering Capstone Project 1	3
ISyE6342	Supply Chain Engineering Capstone Project 2	3

Semester 3

In Semester 3, students will read three modules (two core and one elective) and undertake the Research Project. :

Module Code	Module Title	MCs
LI5001 (Core)	Research Project	8
1 Core and 1 Elective Module	Student to choose from modules offered	8

Programme Fees and Financial Assistance

Programme Fees

For the 2014 Intake, the programme fee totals S$40,650 and S$44250 (inclusive of 7% GST) respectively for Singaporean and PR or S$61600 for International students eligible for MOE Subsidy, without Service Obligations. This amount covers the tuition and miscellaneous fees imposed by the National University of Singapore (NUS) and Georgia Tech (GT) as well as accommodation and health insurance at GT but excludes accommodation in Singapore, visa application, and text supplies.

Other Expenses

Students will need to set aside an additional S$14,000 for accommodation in Singapore (S$6,000) air-fare (Singapore-Atlanta-Singapore (S$3,500) and miscellaneous (e.g., visa application, text supplies, etc., S$4,500).

For further information, please visit: http://www.tliap.nus.edu.sg/dmp

Bachelor of Engineering (Computer Engineering) Programme

[jointly offered by Faculty of Engineering and School of Computing]

Overview

The Departments of Computer Science and Electrical & Computer Engineering jointly offer a Bachelor of Engineering in Computer Engineering (CEG) programme.

The Computer Engineering programme produces graduates with a solid and balanced foundation in both hardware and software skills required to create computing systems. A uniquely multidisciplinary programme, CEG transcends the traditional boundary of computer science and electrical engineering. The CEG programme has been designed based on the Conceive-Design-Implement-Operate framework that places much emphasis on teamwork and aims to develop mature individuals who can work effectively in teams and communicate professionally. A major thrust of this programme is to train students to be technically competent to design-build-and-operate complex value-added computing systems in a modern team-based engineering environment. Graduates will have the opportunity to consolidate this experience through a unique long-term industrial attachment, and through overseas work and/or learning experience. Graduates will be able to attain significant knowledge and abilities in key technologies for real-time embedded systems, computer networking and wireless communication systems, medical imaging and information systems, intelligent control systems, and many others. In the workplace, computer engineers span a wide range of skills introducing intelligence into every conceivable device -- from the smart phones and MP3 players to massive industrial control systems. They create the electronic systems in a modern car containing dozens of computing systems communicating through a network. They connect the physical world with cyberspace to enhance everything from entertainment to healthcare and the environment.

The educational objectives of the B.Eng. (Computer Engineering) programme is to graduate students who, 5 years after their graduation,

- are technically competent to solve complex problems in computer engineering and can adapt effectively in a fast changing environment
- are able to critically think, analyse and make decisions that give due consideration to global issues in business, ethics, society and the environment
- are able to communicate effectively, act with integrity, and have the inter-personal skills needed to engage in, lead, and nurture diverse teams
- are committed to lifelong learning, resourceful and embrace global challenges and opportunities to make a positive impact in society.

The success of the CEG programme is assessed through the following student learning outcomes:

1. apply knowledge of mathematics, science and engineering to the solution of complex engineering problems
2. design and conduct experiments, analyse, interpret data and synthesise valid conclusions
3. design a system, component, or process, and synthesise solutions to achieve desired needs
4. identify, formulate, research through relevant literature review, and solve engineering problems reaching substantiated conclusions
5. use the techniques, skills, and modern engineering tools necessary for engineering practice with appropriate considerations for public health and safety, cultural, societal, and environmental constraints
6. communicate effectively

7. recognize the need for, and have the ability to engage in life-long learning
8. understand the impact of engineering solutions in a societal context and to be able to respond effectively to the needs for sustainable development
9. function effectively within multi-disciplinary teams and understand the fundamental precepts of effective project management
10. understand professional, ethical and moral responsibility
11. a good understanding of the principles and applications of advanced mathematics, including probability and statistics, differential and integral calculus, and discrete mathematics.

Accreditation of engineering academic programmes is a key foundation for the practice of engineering at the professional level. The B.Eng. (Computer Engineering) programme just undergone a re-accreditation exercise by the Engineering Accreditation Board (EAB) of Singapore last year and is currently accredited for students graduating from the programme up to AY2017/18. Via the accreditation from the EAB, all signatories in the Washington Accord recognise the substantial equivalence of our programmes in satisfying the academic requirements for the practice of engineering at the professional level. This means that our graduates can be accepted for engineering practice in the countries that are part of the Washington Accord. Signatories in the Washington Accord include Canada, USA, UK, Hong Kong, New Zealand, Australia and others.

Degree Requirements

Students in the B.Eng. (Computer Engineering) programme are required to complete a minimum of 160 MCs with a CAP ≥ 2.0 to graduate. In the first stage of the programme, students will receive a broad-based training that seeks to establish a strong foundation in mathematics, information sciences, and computing. In the second stage, students will enrol in core modules that focus on fundamental knowledge in electrical and computer engineering. These core modules provide the essential foundation for a variety of specialised technical areas in CEG. During their senior years of study, students may choose from a wide variety of electives to enable them to specialise in certain fields of CEG. Throughout their programme, they are also expected to broaden their views by reading some general education modules, and breadth modules offered by other Faculties. Students are strongly encouraged to take at least one business module from a prescribed list of business modules. The complete structure of the programme is specified in Table 1.

Table 1: Summary of CEG Modular Requirements and Credits

Modular Requirements	MCs
University Level Requirements	20
General Education Modules (GEM) Group A: GEK1549 Critical Thinking and Writing One from Group B: Humanities and Social Sciences	8 4 4
Singapore Studies (SS) Module	4
Breadth: Modules Outside Student's Faculties*	8
Unrestricted Electives	16
Programme Requirements	124
CG1001 Introduction to Computer Engineering	2
CG1108 Electrical Engineering	4
CG2023 Signals and Systems	4

CG2271	Real-time Operating Systems	4
CG3207	Computer Architecture	4
CS1010	Programming Methodology	4
CS1020	Data Structures and Algorithms I	4
CS1231	Discrete Structures	4
CS2101	Effective Communication for Computing Professionals	4
CS2103	Software Engineering	4
EE2020	Digital Fundamentals	5
EE2021	Devices and Circuits	4
EE2024	Programming for Computer Interfaces	5
EE3204	Computer Communications Networks I	4
EG2401	Engineering Professionalism English[#]	3
HR2002	Human Capital in Organisations	3
MA1505	Mathematics I	4
MA1506	Mathematics II	4
PC1432	Physics IIE	4
ST2334	Probability & Statistics	4
CEG Project Modules:		
CG3002	Embedded Systems Design Project	6
EE3031	Innovation & Enterprise I	4
CG4001	B.Eng. Dissertation (over 2 semesters)	12
CEG Electives:		
Elective Modules from Table 2 to satisfy the breadth and depth requirements of the B.Eng. (CEG) programme.		24
Industrial Attachment		12
Total		160

* Student's faculties refer to both the Faculty of Engineering and School of Computing.

[#] For students who have not passed or have been exempted from the Qualifying English Test at the time of admission to the university.

Students are encouraged to specialise in one of the following concentrations (i.e., Communications & Networking, Embedded Computing, Large-Scale Computing, Intelligent Systems, Interactive Digital Media and System-on-a-Chip Design) by taking the electives in these concentrations. The modules in each concentration are categorised as breadth or depth modules. A breadth module enables students to achieve a broad understanding of concepts in the particular concentration. A depth module is a higher-level module that provides greater depth and coverage in the particular concentration. The list of electives in the various concentrations is given in Table 2.

Table 2: List of Electives in the Various Concentrations

Communications & Networking	
Breadth	CG3204L Computer Networks Laboratory
	EE3131C Communication Systems
Depth	CS4222 Wireless Computing & Sensor Networks
	CS4274 Mobile and Multimedia Networking
	EE4113 Digital Communications & Coding
	EE4114 Optical Communications
	EE4210 Computer Communication Networks II

Embedded Computing	
Breadth	CG3204L Computer Networks Laboratory
	CS2107 Introduction to Information & System Security
	CS3218 Multimodal Processing in Mobile Platforms
	CS3235 Computer Security
Depth	CS4222 Wireless Computing & Sensor Networks
	CS4274 Mobile and Multimedia Networking
	EE4210 Computer Communication Networks II
	EE4214 Real-time Embedded Systems
	EE4218 Embedded Hardware System Design
	EE4415 Integrated Digital Design

Large-Scale Computing	
Breadth	CS2010 Data Structures & Algorithms II
	CS2102 Database Systems
	CS2107 Introduction to Information & System Security
	CS3211 Parallel and Concurrent Programming
	CS3225 Computer Security
Depth	CS3223 Database Systems Implementation
	CS4221 Database Design
	CS4223 Multi-Core Architectures
	CS4224 Parallel & Distributed Database

	CS4345 General-Purpose Computation on GPU
	EE4210 Computer Communication Networks II

Intelligent Systems	
Breadth	CS2010 Data Structures & Algorithms II
	CS3240 Interaction Design
	CS3243 Introduction to Artificial Intelligence
	CS3244 Machine Learning
	EE3206 Introduction to Computer Vision and Image Processing
	EE3331C Feedback Control Systems
Depth	CS4248 Natural Language Processing
	EE4212 Computer Vision
	EE4213 Image Processing
	EE4305 Introduction to Fuzzy/Neural Systems
	EE4306 Distributed Autonomous Robotic Systems
	EE4307 Control Systems Design & Simulation

Interactive Digital Media	
Breadth	CS3240 Interaction Design
	CS3241 Computer Graphics
	CS3242 3D Modelling and Animation
	CS3247 Game Development
	CS3249 User Interface Development
	EE3206 Introduction to Computer Vision and Image Processing
	EE3331C Feedback Control Systems
	EE3701 Digital Media Technologies
Depth	CS4247 Graphics Rendering Techniques
	EE4212 Computer Vision
	EE4213 Image Processing
	ME4245 Robot Kinematics, Dynamics and Control

System-on-a-Chip Design	
Breadth	EE3407 Analog Electronics

	EE3408C Integrated Analog Design
Depth	CS4223 Parallel Computer Architecture
	EE4214 Real-time Embedded Systems
	EE4218 Embedded Hardware System Design
	EE4410A Integrated Circuit Design
	EE4415 Integrated Digital Design
	EE4505 Power Semiconductor Devices & ICs

The rules are as follows. To achieve depth, CEG students need to read a minimum of two depth electives. Students may read breadth electives to achieve exposure to various facets of CEG. All technical electives must add up to at least 16 MCs. These modules may come from any of the concentrations. Students will have to ensure that they have read any prerequisite modules to read the selected depth modules. This may have an impact on the selection of breadth modules.

As an additional note, other modules hosted by CS or ECE may be used to fulfill CEG Technical Elective requirements. Generally, a level 3000 module will count as CEG TE Breadth, while a level 4000 will count as a CEG TE Depth.

Recommended Semester Schedule

The recommended semester schedule for CEG students is presented in Tables 3.

Table 3: Recommended Semester Schedule for CEG students

Modules	MCs	Modules	MCs
Semester 1		Semester 2	
MA1505 Mathematics I	4	MA1506 Mathematics II	4
CS1010 Programming Methodology	4	CG1108 Electrical Engineering	4
CS1231 Discrete Structures	4	CS1020 Data Structures and Algorithms I	4
CG1001 Introduction to Computer Engineering	2	PC1432 Physics IIE	4
* Singapore Studies Module	4	GEK1549 Critical Thinking & Writing	4
		* Singapore Studies Module	4
Sub-total	**18**	**Sub-total**	**20**
Semester 3		Semester 4	
EE2020 Digital Fundamentals	5	EE2024 Programming for Computer Interfaces	5
EE2021 Devices and Circuits	4	G2023 Signals and Systems	4
CS2103T Software Engineering	4	CG2271 Real-Time Operating Systems	4
CS2101 Effective Communication for Computing Professionals	4	ST2334 Probability & Statistics	4
* ULR Breadth	4	* ULR Breadth	4
Sub-total	**21**	**Sub-total**	**21**

Semester 5		Semester 6	
CG3002 Embedded Systems Design Project	6	CP3880/EG3601 Industrial Attachment (6 months)	12
CG3207 Computer Architecture	4	EE3031 Innovation & Enterprise I	4
EE3204 Computer Communications Networks I	4	* UE	4
EG2401 Engineering Professionalism	3		
GEM (Group B)	4		
Sub-total	**21**	**Sub-total**	**20**
Semester 7		Semester 8	
CG4001 B.Eng. Dissertation (over 2 semesters)	4	CG4001 B.Eng. Dissertation (over 2 semesters)	4
HR2002 Human Capital in Organisations	3	Breadth Level Technical Elective	4
Breadth Level Technical Elective	4	Depth Level Technical Elective	4
* UE	4	Depth Level Technical Elective	4
* UE	4	* UE	4
Sub-total	**19**	**Sub-total**	**20**
Total MCs			**160**

* These ULR modules (GE, SS, and ULR Breadth) and UE modules can be read in any semester.

Note 1:
Students can read EE3031 and one UE/ULR/Breadth/Depth Technical Elective in the evening classes during the IA subject to availability.

For the module descriptions of the common modules in this programme, please refer to the Computer Engineering website at http://www.ceg.nus.edu.sg.

Relevant website

For more information, please refer to www.ceg.nus.edu.sg.

Bachelor of Environmental Studies Programme

PDF version Printer-friendly version

[jointly offered by Faculty of Arts & Social Sciences and Faculty of Science, with participation from Faculty of Engineering, Faculty of Law, School of Design & Environment, NUS Business School, Yong Loo Lin School of Medicine, Lee Kuan Yew School of Public Policy and Saw Swee Hock School of Public Health]

Overview of programme

The Bachelor of Environmental Studies (BES) is a 4-year direct Honours degree programme offered jointly by the Faculty of Science and the Faculty of Arts and Social Sciences with participation from Faculty of Engineering, Faculty of Law, School of Design and Environment, NUS Business School, Yong Loo Lin School of Medicine, Lee Kuan Yew School of Public Policy and Saw Swee Hock School of Public Health. NUS recognises that the environmental issues that are presented to the world today are global, complex and interconnected. There is a compelling need for new educational models such as the BES to nurture graduates who can think broadly and deeply so as to effectively address the societal and scientific needs for understanding complex environmental issues. At NUS, we hope to continue to be the preferred choice of top students in Singapore and around the world by always putting ourselves at the forefront of innovative education.

Admission requirements

Students with an aptitude and passion for environmental issues are welcome to apply for direct admission into the Bachelor of Environmental Studies (BES) if they meet the following minimum criteria:

- Good H1 pass or equivalent in Mathematics
- Good H2 pass or equivalent in either Biology or Chemistry

Students who do not meet the above-stated criteria but have a keen interest for the BES may be interviewed for suitability for the programme.

Admission will be on a competitive basis.

Exiting the programme

Environmental Studies is a 4-year programme and the BES with Honours degree will be awarded to candidates who completed 160 MCs and performed well throughout the course, as determined by their cumulative average point (CAP of at least 3.2). Those who do not qualify for an Honours degree will be awarded a BES degree.

Relevant website

Further information on the programme is available at: www.envstudies.nus.edu.sg

Master of Science in Business Analytics

[jointly offered by the School of Computing and School of Business]

The Master of Science (MSc) in Business Analytics (BA) is jointly offered by the School of Computing and Business School. This programme aims to develop students into Business Analytics specialists and professional consultants by imparting both a strong methodological and technical foundation in analytics technology, and knowledge in applying analytics to different domains in various vertical industries.

The programme is designed with the principle of embedding BA education deeply in the university, with the intention to invite domain experts from other faculties in NUS to participate by offering BA-related subjects for multiple industries.

Degree Requirements

Structure of Programme

Students are required to complete five *essential modules* and a one-year professional consulting *capstone project*, as well as to complete at least one module from two *vertical sectors*.

The *essential modules* build a cross-disciplinary foundation for business analytics, enabling students to engage in rigorous inquiry within and beyond assumed disciplinary borders. These modules are:

- BMA5002A – Statistics
- BDC5101 – Deterministic Operations Research
- DCS5101 – Analytics in Managerial Economics
- IS5152 – Decision Making Technologies
- BT5110 – Data Management and Warehousing

Business Analytics Capstone Project

The project investigates, analyzes and provides solutions to real-world business analytic problems. It enables students to become constructive and responsible members of a community and global citizens, with an appreciation of real-world analytics problems, and the skill set required to offer sound solutions. Students are required to attend a series of industry seminars, and classes in developing their project management and communication skills. A major activity in this project is a three-month internship between May and July.

The *vertical sectors* will provide students with a deep understanding of different analytic techniques required for different vertical industry sectors. Importantly, building on the knowledge, concepts and skills imparted from the essential modules, the elective modules from selected verticals will enable students to become BA specialists who can apply relevant BA techniques and tools in specific vertical domains, as well as innovate, devise and refine new BA techniques and tools appropriate to solving complex or emerging BA issues and problems.

The *vertical sectors* offered in this academic year are given below:

- Big-data analytics techniques
- Consumer data analytics
- Financial and risk analytics

Duration of Programme

The duration of the programme is 12 months for full-time candidature.

Workload

It comprises of at least 8 modules (to be completed in two semesters) and the one-year capstone project.

Graduation Requirements

Candidates must achieve a final CAP of 3.0 (average grade of B-) to graduate, otherwise their candidature will be terminated.

Other Administrative Information

Please visit http://msba.nus.edu.sg or direct your enquiries via email to: msba@ nus.edu.sg

University Town College Programme (UTCP)

Overview of Programme

The University Town College Programme (UTCP) is a residential programme offered at College of Alice & Peter Tan and Tembusu College. Designed as a more coherent delivery of general education, the UTCP emphasises multidisciplinary learning and active small-group learning. Students from different disciplines, cultures, and nationalities are put together in each class, which helps them to assimilate and synthesise cross-disciplinary knowledge, facilitating multi-perspectival thinking.

Typically, students are expected to complete a core curriculum of five modules over two years: two modules on Ideas and Exposition, a junior seminar, and two senior seminars.

Through its multidisciplinary curriculum, the UTCP will help students develop effective communications and strong writing skills, critical thinking skills, and intellectual breadth and rigour to tackle the complex, inter-related challenges confronting the world today. A host of informal learning activities, such as talks by distinguished visitors, as well as social and sporting activities, complements the formal curriculum.

Admission Requirements

The UTCP admits incoming freshmen and a small number of undergraduate students across all Faculties/Schools each year. Admission to the UTCP is on a competitive basis. Applicants will be assessed on the following:

- Academic achievements
- Co-curricular experience
- Essay writing
- Interview

Shortlisted applicants will be invited to attend an interview.

Applicants may indicate their preference for College of Alice & Peter Tan or Tembusu College, but the eventual placement may be different.

Programme Requirements

Students admitted as part of the Semester 1 UTCP freshman intake are offered a two-year residency, during which they should complete the UTCP curriculum comprising five modules.

Students admitted as part of the Semester 1 UTCP seniors intake are offered a one-year residency, during which they should read one module with their College.

For most students, the UTCP modules read will fulfil the University Level Requirements, which are essential for graduation. An academic pathway will be tailored for students from non-modular Faculties/Schools such as Medicine, Law, and Dentistry, and those from selected special programmes with curricular restrictions.

Residential College 4 Pilot Programme

The third College in UTown to offer the UTCP, Residential College 4 will be fully operational from AY2015/2016. For AY2014/2015, Residential College 4 invites incoming freshmen and undergraduate students (going on to Year 2 in AY2014/2015) to apply for its residential pilot programme.

Students are expected to participate fully in both the academic and other activities planned across both semesters.

For more information, visit http://rc4.nus.edu.sg/.

Relevant website

For more information on the UTCP, visit http://utown.nus.edu.sg/.

For more information on the Colleges offering the UTCP, visit http://capt.nus.edu.sg/ and http://tembusu.nus.edu.sg/.

6 Double Degree Programmes

Introduction

A Double Degree consists of a combination of two separate degrees from two discipline areas in the same Faculty or in two different Faculties. Except for certain prohibited combinations, as identified by the Faculties, all other combinations of double degree programmes will be allowed. There are specially designed double degrees developed by Faculties, as well as double degree combinations put together by students. In the latter situation, the degree requirements are specified in section 2.2.5 of Part I of the Bulletin.

6.1 Double Honours Degree in Economics and Law

[Bachelor of Social Sciences (Honours) in Economics and Bachelor of Laws (Honours)]

Overview of Programme

The Double Honours Degree in Economics and Law is offered by the Faculty of Arts and Social Sciences and Faculty of Law, leading to both the degrees of B.Soc.Sci. (Hons.) and LL.B. (Hons.).

Economics and Law are, in some areas, complementary disciplines. Increasingly, experts will use methodologies from the two disciplines. Scholars and practitioners of the two fields have been actively examining the places where they meet. For example, most Corporate Law subjects in top law schools now include economic analysis, and economists working on public policy, such as competition policy, require a working knowledge of the supporting legal infrastructure.

Singapore is a regional centre for legal services, and a lot of our international legal work involves commercial, corporate and financial law. This means there is — and will continue to be — a demand for lawyers with a strong background in economics, as well as for economists trained in law. Likely future employers are: some law firms, large commercial banks, and institutions such as the Monetary Authority of Singapore, the Media Development Authority, the Infocomm Development Authority and the Competition Commission of Singapore.

The programme includes the core of our Economics and Law degrees, as well as some other modules to allow students to explore beyond those areas.

Admission Requirements

Students may be admitted to the programme, on a competitive basis, in one of three ways:

- By direct application from Junior College. These students will spend the first two years in the Faculty of Law;
- By application during their second year in the Faculty of Law;
- By application during their first year in the Faculty of Arts and Social Sciences.

Applicants to the double degree programme must meet the admission requirements of both Faculties.

Exiting the Programme

Students must either maintain a CAP of 4.0 for the B.Soc.Sci. (Hons.) or remain in the top half of the Law cohort. Those who fall below in both degrees for two consecutive semesters will be required to leave the programme. Direct entry students will have the choice of degree into which they exit. Later entry students will exit into their home faculty.

Students who do not qualify for the FASS Honours Thesis will graduate with LL.B. (Hons.) and B.A., if all other conditions are met.

Students leaving the programme on their own accord will be advised on how to use modules taken towards their single B.A. or B.Soc.Sci. (Hons.) degree (Economics) or the Law degree.

Relevant website

For more information, please visit: http://www.nus.edu.sg/prog/econlaw

6.2 Double Degree in Communication & New Media and Business

[Bachelor of Social Sciences (Honours) and Bachelor of Business Administration (Honours/non-Honours); Bachelor of Social Sciences (Honours) and Bachelor of Business Administration (Accountancy) (Honours/non-Honours); Bachelor of Arts and Bachelor of Business Administration (Honours/non-Honours); Bachelor of Arts and Bachelor of Business Administration (Accountancy) (Honours/non-Honours)]
The major for the Faculty of Arts and Social Sciences degree is Communications and New Media

Overview of Programme

The DDP in Communication and New Media (CNM) and Business is jointly offered by the Faculty of Arts and Social Sciences (FASS) and the NUS Business School (BIZ).

In today's global environment, the dividing line separating communications and media studies, and business becomes increasingly vague. Graduates from communications and media programmes are often expected to perform tasks that entail business training — e.g., market analysis, marketing campaigns, while business graduates are expected to know how to effectively communicate with a company's public, manage a crisis or chart out technology trends.

Likewise, in today's converging media environment, communication professionals are expected to have a broad range of knowledge and creative skills, from critical thinking and excellent writing to the ability to create publications, websites and other interactive environments.

The programme aims to enrich students' experience and prepare them for this converging field by combining modules from both CNM and NUS Business School.

CNM will be offering modules in three areas, namely new media studies, communication management and interactive media. Students will be exposed to subjects such as political economy, globalisation of media, creation of news content, management of information, structure of the new media industry and how gaming and other forms of interactive media/digital entertainment fit into the greater economic environment of the new media industry. On the business aspect, NUS's Business programme will prepare students for managerial leadership in the global economy. Its broad-based curriculum benefits from the comprehensive academic breadth and intellectual intensity of the University.

Articulate students that embrace technology will find good fit in this CNM and Business double degree programme that promises to nurture an attractive breed of media-savvy business professionals.

Admission Requirements

Students will be admitted to the programme only if they meet the requirements of both the Faculty of Arts and Social Sciences (FASS) and NUS Business School.

Students may be admitted to the programme in one of the following ways:

1. Direct application by students with relevant GCE 'A' Level, Polytechnic or equivalent qualifications; OR
2. Application by students at the end of the first year of study in the FASS or NUS Business School. Students further along in their programme may be admitted on an exceptional basis.

FASS students who plan to enrol in this programme after the first year are encouraged to read two Business modules to enable them to better understand the Business programme. Similarly, Business students who plan to enrol in this programme are encouraged to read two CNM modules. Current students have to apply to the programme through their respective Faculty/School. The application will be forwarded to the partnering School/Faculty if the original Faculty/School approves the application.

The minimum Cumulative Average Point (CAP) requirement for acceptance to the programme is 4.0. The applicant will also need to meet the minimum prevailing admission criteria of both Faculty/School, that is, the applicant must have:

A minimum grade of 'C6' in GCE 'AO' Level Mathematics or GCE 'O' Level Additional Mathematics, or otherwise demonstrated equivalent preparation.

The applicant's non-academic activities may be considered, and the applicant may have to attend an interview.

Exiting the Programme

Students can choose to withdraw, or may be asked to withdraw the programme if they fail to meet requirements. Students who withdraw from the programme are permitted to work instead for a single degree in their original home Faculty/School. Modular Credits completed in the programme will be counted towards the fulfilment of the degree requirements of the home Faculty/School, subject to the normal limits of the Faculty/School curriculum.

A student who does not maintain a CAP of 4.0 in modules contributing to the original degree, and a CAP of 3.5 for the second degree for any two consecutive semesters will be required to withdraw from the DDP by withdrawing from the second degree programme. For details, please refer to http://nus.edu/prog/bizcnm/exit.html

Relevant website

Further information on the programme is available at: http://nus.edu/prog/bizcnm/

6.3 Double Degree in Economics and Business Administration / Business Administration (Accountancy)

[Bachelor of Social Sciences (Honours) and Bachelor of Business Administration (Honours/non-Honours); Bachelor of Social Sciences (Honours) and Bachelor of Business Administration (Accountancy) (Honours/non-Honours); Bachelor of Arts and Bachelor of Business Administration (Honours/non-Honours); Bachelor of Arts and Bachelor of Business Administration (Accountancy) (Honours/non-Honours)]
The major for the Faculty of Arts and Social Sciences degree is Economics

Overview of Programme

The double degree programmes integrate and synergise the strengths of the two disciplines of Economics and Business. Business is multi-disciplinary and imparts the necessary skill set for meeting the challenges of the business world, while Economics, being a science of choice, imparts the skill set for problem-solving. The two are therefore complementary and inextricably interwoven.

Both combinations of economics and business is to nurture business-savvy professionals with an edge in economics.

Admission Requirements

Students will be admitted to the programme only if they meet the requirements of both the Faculty of Arts and Social Sciences (FASS) and NUS Business School.

Students may be admitted to the programme in one of the following ways:

1. Direct application by students with relevant GCE 'A' Level; OR
2. Application by students at the end of the first year of study in the FASS or NUS Business School. Students further along in their programme may be admitted on an exceptional basis.

FASS students who plan to enrol in this programme after the first year are encouraged to read two Business modules to enable them to better understand the Business programme. Similarly, Business students who plan to enrol in this programme are encouraged to read two Economics modules. Current students have to apply to the programme through their respective Faculty/School. The application will be forwarded to the partnering School/Faculty if the original

Faculty/School approves the application.

The minimum Cumulative Average Point (CAP) requirement for acceptance to the programme is 4.0. The applicant will also need to meet the minimum prevailing admission criteria of both Faculty/School, that is, the applicant must have:

A minimum grade of 'C6' in GCE 'AO' Level Mathematics or GCE 'O' Level Additional Mathematics, or otherwise demonstrated equivalent preparation.

The applicant's non-academic activities may be considered, and the applicant may have to attend an interview.

Exiting the Programme

Students can choose to withdraw, or may be asked to withdraw the programme if they fail to meet requirements. Students who withdraw from the programme are permitted to work instead towards the single degree in their original home Faculty/School. Modular Credits completed in the programme will be counted towards the fulfilment of the degree requirements of the home Faculty/School, subject to the normal limits of the Faculty/School curriculum.

A student who does not maintain a CAP of 4.0 in modules contributing to the original degree, and a CAP of 3.5 for the second degree for any two consecutive semesters will be required to withdraw from the DDP by withdrawing from the second degree programme. For details, please refer to http://nus.edu/prog/bizecon/exit.html.

Relevant website

Further information on the programme is available at: http://nus.edu/prog/bizecon/index.html

6.4 Double Degree in Computer Science / Information Systems and Business / Business Administration (Accountancy)

[Bachelor of Computing (Computer Science/Information Systems) (Honours) and Bachelor of Business Administration (Honours/non-Honours); and Bachelor of Computing (Computer Science/Information Systems) (Honours) and Bachelor of Business Administration (Accountancy) (Honours/non-Honours)]

Overview of Programme

The Double Degree in Computer Science /Information Systems and Business Administration/Business Administration (Accountancy) is jointly offered by the NUS School of Computing and NUS Business School. It aims to leverage on the advantage of NUS being a comprehensive university, which enables students to fully develop their potential by pursuing multidisciplinary programmes.

Business Administration and Computer Science/ Information Systems are complementary areas of knowledge which are becoming inextricably interwoven. Our various communications with the IT industry have revealed a strong demand among employers for graduates with both computer science/information systems knowledge and in-depth understanding of business domains.

The Double Degree programme in Computer Science and Business Administration (including Accountancy) meets such a demand through its emphasis on developing both the core computing skills and business skills of students. It will enable students to apply computational considerations to all aspects of business practice, thereby complementing their business skills and introducing a new analytic dimension to the understanding of organisational behaviour, finance and accounting, marketing, economics, and business law, among others.

The Double Degree programme in Information Systems and Business Administration (including Accountancy) meets a similar demand. It will enable students to practise the management and implementation of information systems, enhanced with complementing business skills and knowledge in areas such as organisational behaviour, finance & accounting, marketing, operations management, economics, and business law, among others.

Both combinations of business and computing/ information systems programmes will develop business-savvy IT professionals as well as technology-minded business leaders for the marketplace. The programme is designed so that students may complete it in a reasonable time-frame: four and a half years for B.B.A. /B.Comp. (Hons.) (CS/IS) and five years for Double Honours.

The options offered to students are:

a. B.B.A. (Hons.)/B.Comp. (CS) (Hons.)
b. B.B.A. (Hons.)/B.Comp. (IS) (Hons.)
c. B.B.A. (Acc. Hons.)/B.Comp. (CS) (Hons.)
d. B.B.A. (Acc. Hons.)/B.Comp. (IS) (Hons.)
e. B.Comp. (CS) (Hons.)/B.B.A
f. B.Comp. (IS) (Hons.)/B.B.A.
g. B.Comp. (CS) (Hons.)/B.B.A. (Acc.)
h. B.Comp. (IS) (Hons.)/B.B.A. (Acc.)

Programmes (a) to (d) are double honours degree programmes, while (e) to (h) are single honours degree programmes.

Admission Requirements

Students will be admitted to the DDP only if they meet the requirements of both the NUS School of Computing (SOC) and NUS Business School (BIZ).

Students may be admitted to the DDP in one of the following ways:

1. Direct admissions through the University's admissions exercise.

   Applicants must satisfy one of the following two criteria:
   - GCE 'A' Level applicants: Pass in either GCE 'A' Level or H2 Mathematics
   - Polytechnic applicants: Accredited diploma or Grade 'A2' in GCE 'O' Level Elementary Mathematics or Grade 'B4' in GCE 'O' Level Additional Mathematics

2. Admissions at the completion of first year of B.Comp. (Hons.) in CS or IS or B.B.A. /B.B.A. (Hons.) or B.B.A. (Acc.)/B.B.A. (Acc. Hons) based on CAP criteria.

Exiting the Programme

For students admitted to NUS before AY2011/12: Students in the Double Degree Programme must maintain a CAP of 4.00 or above. Students who do not maintain a CAP of 4.00 in modules contributing to the first degree for two consecutive semesters will be required to withdraw from the DDP by withdrawing from the second degree programme. Upon withdrawal, all the modules which the students have taken to fulfil the requirements of the second degree will be reflected in the transcript and included in the computation of the CAP for the single degree.

For students admitted to NUS with effect from AY2011/12: A student who does not maintain a CAP of 4.0 in modules contributing to the original degree for any two consecutive semesters will be required to withdraw from the DDP by withdrawing from the second degree programme.

A student who does not maintain a CAP of 4.0 in modules contributing to the original degree, and a CAP of 3.5 for the second degree for any two consecutive semesters will be required to withdraw from the DDP by withdrawing from the second degree programme.

Relevant website

Please refer to: http://www.comp.nus.edu.sg/undergraduates/dd_computing_business.html

6.5 Double Degree in Computer Sciences and Mathematics / Applied

Mathematics

[Bachelor of Computing (Computer Science) (Honours) and Bachelor of Science (Mathematics/Applied Mathematics) (Honours/non-Honours)[1]]

Overview of Programme

Targeted at students with good results or special talent in mathematics or computing, this programme seeks to groom them into graduates who will be at ease with tackling multifaceted computational problems in industry such as complex scheduling or taking interactive digital media to the next phase.

This programme celebrates and leverages the synergistic relationship between computer science and mathematics that is apparent in many ways. Emphasising quality over quantity, admission to the programmes will be highly selective in their admission, and students must maintain consistently good results to remain in the programmes.

Students may choose from one of two specialisations: algorithms and computation, and multimedia modelling.

Algorithms and Computation

Graduates with this specialisation will be at the forefront of solving myriad complex computational problems, in both industry and research. They will apply their advanced learning in the principles and practice of computer science to tackle industry needs in complex scheduling, network optimisation, physical simulation, software reliability, etc. Their advanced knowledge in algorithmic design will also enable them to adapt to a wide variety of computing fields. The specialisation covers areas such as: computational complexity, cryptography, algorithmic graph theory and combinatorics, randomness in computing, parallel and distributed computation, machine learning, applications of logic, algorithmic algebra, coding theory, etc.

Multimedia Modelling

Graduates with this specialisation will be in the vanguard of interactive digital media (IDM) technology. They will apply their mathematical logic and learning in networking and multimedia technologies to develop more realistic animation, and better special effects, and generate a more immersive experience in virtual reality that engages the various human senses more fully. Graduates with this specialisation will find their niche in high-end technology companies in the IDM sector, as well as in the field of research. The specialisation covers areas such as Numerical PDE, 3D Differential Geometry, Computational Geometry, Game Development, etc.

Each specialisation comprises advanced modules from both the Department of Mathematics and the Department of Computer Science.[2]

Note 1:
Students in the other Bachelor of Computing programmes, except B.Comp. (Computer Science), may wish to design special Double-degree programme with B.Sc. (Mathematics) or B.Sc. (Applied Mathematics) under the guidance of the Undergraduate Offices of both School of Computing and Faculty of Science.

Note 2:
The list of modules will be updated regularly by the committee overseeing the double-degree programmes.

Modules in “Algorithms and Computation”

Module Code	Module Title	MCs
MA3205	Set Theory	4
MA3218	Applied Algebra	4

MA3219	Computability Theory	4
MA3233	Combinatorics and Graphs II	4
MA3252	Linear and Network Optimisation	4
MA4207	Mathematical Logic	4
MA4235	Topics in Graph Theory	4
MA4254	Discrete Optimisation	4
MA4261	Coding and Cryptography	4
MA4270	Data Modelling and Computation	4
MA5219	Logic and Foundation of Mathematics I	4
MA5220	Logic and Foundation of Mathematics II	4
CS3234	Logic and Formal Systems	4
CS3236	Introduction to Information Theory	4
CS4212	Compiler Design	4
CS4231	Parallel and Distributed Algorithms	4
CS4232	Theory of Computation	4
CS4236	Cryptography Theory and Practice	4
CS5215	Constraint Processing	4
CS5230	Computational Complexity	4
CS5232	Formal Specification and Design Techniques	4
CS5234	Combinatorial and Graph Algorithms	4
CS5236	Advanced Automata Theory	4
CS5237	Computational Geometry and Applications	4
CS5238	Advanced Combinatorial Methods in Bioinformatics	4
CS5330	Randomized Algorithms	4

Modules in “Multimedia Modelling”

Module Code	Module Title	MCs
MA3215	Three-dimensional Differential Geometry	4
MA3220	Ordinary Differential Equations	4
MA3227	Numerical Analysis II	4
MA3229	Introduction to Geometric Modelling	4
MA3236	Nonlinear Programming	4
MA3264	Mathematical Modelling	4
MA4221	Partial Differential Equations	4
MA4230	Matrix Computation	4
MA4255	Numerical Methods in Differential Equations	4
MA4268	Mathematics for Visual Data Processing	4
MA4270	Data Modelling and Computation	4
MA5233	Computational Mathematics	4

MA5242	Wavelets	4
CS3218	Multimodal Processing in Mobile Platforms	4
CS3241	Computer Graphics	4
CS3242	3D Modelling and Animation	4
CS3246	Multimedia Content Analysis and Search	4
CS3247	Game Development	4
CS4242	Social Media Computing	4
CS4243	Computer Vision and Pattern Recognition	4
CS4245	Game Development Project	4
CS4247	Graphics Rendering Techniques	4
CS4248	Natural Language Processing	4
CS4344	Networked and Mobile Gaming	4
CS4347	Sound and Music Computing	4
CS5237	Computational Geometry and Application	4
CS5240	Theoretical Foundations in Multimedia	4
CS5241	Speech Processing	4
CS5246	Text Processing on the Web	4
CS5249	Audio in Multimedia Systems	4
CS5342	Multimedia Computing and Applications	4
CS5343	Advanced Computer Animation	4

Admission Requirements

The double honours degree programme follows a dual-entry system:

1. Direct admission through university admission exercise: http://www.nus.edu.sg/oam

   Applicants must satisfy one of the following two criteria:

   - Grade A in either GCE 'A' Level/H2 Level/IB Higher Level Mathematics or GCE 'A' Level Further Mathematics, and a good grade at GCE 'A' Level/H2 Level/IB Higher Level in either Computing or Physics or Chemistry or Biology or Physical Science.
   - Demonstrated special talents in Mathematics and/or Computing (e.g., Mathematics and/or Informatics Olympiad awards, etc.)

   If the candidate meets criterion 1, no interview will be required.

2. Admissions on the completion of first-year studies in B.Comp. (Hons.) or B.Sc. (Hons.).

Candidates will be assessed on the merits of their first-year results. Interested students should contact the programme administrator on receipt of their results.

Programme Requirements

Students may pursue either a double honours or a single honours programme. Briefly, students pursuing one of the specialisations must obtain at least 32 MCs (for double honours programme) or 28 MCs (for single honours programme) from modules offered under the respective specialisation. Furthermore, students pursuing a double honours programme with specialisation must complete an integrated honours project, which will be jointly supervised by faculty members from the Department of Computer Science and the Department of Mathematics.

B.Comp. (Hons.) – B.Sc. (Hons.) Double Honours Programmes

The double honours programme requires students to take a total of 204 MCs and 208 MCs for B.Comp. (Hons.) — B.Sc. (Hons.) (Math.) and B.Comp. (Hons.) — B.Sc. (Hons.) (Appl.Math.) degrees respectively.

These programmes consist of the following:

a. Bachelor of Computing — Honours in Computer Science (132 MCs)
   B.Comp. students normally take 160 MCs to fulfil the University Level Requirements (ULR), Programme requirements, and Unrestricted Electives. Under this programme, 28 MCs would be waived under double degree rules. The 28 MCs will come from the Unrestricted Electives (20 MCs) and Breadth (8 MCs).

b. Bachelor of Science — Honours in Mathematics (125 MCs)
   B.Sc. students in the four-year B.Sc. degree programme normally take 160 MCs to fulfil the University Level Requirements (ULR), Faculty and Major Requirements, and Unrestricted Electives. Under this programme, 35 MCs would be waived under double degree rules. The 35 MCs will come from the Unrestricted and Breadth Electives.

c. Bachelor of Science — Honours in Applied Mathematics (129 MCs)
   B.Sc. students in the four-year B.Sc. degree programme normally take 160 MCs to fulfil the University Level Requirements (ULR), Faculty and Major Requirements, and Unrestricted Electives. Under this programme, 31 MCs would be waived under double degree rules. The 31 MCs will come from the Unrestricted and Breadth Electives.

The details are set out in Tables A and B respectively.

Table A: B.Comp. (Hons.) – B.Sc. (Hons.) (Mathematics) Double Honours Programmes

Double Honours Degree Requirements	MCs Requirement
(A) University Level Requirement	12 MCs
General Education	8 MCs^
Singapore Studies	4 MCs
(B) B.Comp. Programme Requirements#	88 MCs
Computer Science Foundation and IT Professionalism Modules	36 MCs (+ 8 MCs to be satisfied by common modules)
Computer Science Breadth & Depth Modules	32 MCs (+ 12 MCs to be satisfied by common modules)
Mathematics and Science Modules	20 MCs (+ 12 MCs to be satisfied by common modules)
(C) B.Sc. Programme Requirements	72 MCs
Faculty Requirements Modules*	8 MCs (+ 8 MCs to be satisfied by CS1010 and CS1020)
Mathematics Modules†	64 MCs (+ 32 MCs to be satisfied by common modules)
(D) Common Modules(Tables 1 & 2)	32 MCs
Total	204 MCs

^ At least 4 MCs of Group B GEM have to be read.

* B.Sc (Hons.) Faculty Requirements:
  1. CS1010 Programming Methodology (4MCs)
  2. CS1020 Data Structure and Algorithms (4MCs)
  3. 8MCs from two distinct subject groups excluding ‘Computing Sciences’ and Mathematical & Statistical Sciences’

Please refer to: http://www.comp.nus.edu.sg/undergraduates/dd_cs_math.html for detail.

† Please refer to: http://www.comp.nus.edu.sg/undergraduates/dd_cs_math.html

Table B: B.Comp. (Hons.) – B.Sc. (Hons.) (Applied Mathematics) Double Honours Programmes

Double Honours Degree Requirements	MCs Requirement
(A) University Level Requirement	12 MCs
General Education	8 MCs^
Singapore Studies	4 MCs
(B) B.Comp. Programme Requirements#	88 MCs
Computer Science Foundation and IT Professionalism Modules	36 MCs (+ 8 MCs to be satisfied by common modules)
Computer Science Breadth & Depth Modules	32 MCs (+ 12 MCs to be satisfied by common modules)
Mathematics and Science Modules	20 MCs (+ 12 MCs to be satisfied by common modules)
(C) B.Sc. Programme Requirements	76 MCs
Faculty Requirements Modules*	8 MCs (+ 8 MCs to be satisfied by CS1010 and CS1020)
Mathematics Modules†	68 MCs (+ 32 MCs to be satisfied by common modules)
(D) Common Modules(Tables 1 & 2)	32 MCs
Total	208 MCs

^ At least 4 MCs of Group B GEM have to be read.
* B.Sc. (Hons.) Faculty Requirements:
    1. CS1010 Programming Methodology (4 MCs)
    2. CS1020 Data Structures and Algorithms (4 MCs)
    3. 8 MCs from two distinct subject groups excluding 'Computing Sciences' and 'Mathematical & Statistical Sciences'

Please refer to: http://www.comp.nus.edu.sg/undergraduates/dd_cs_math.html for details.
† Please refer to: http://www.comp.nus.edu.sg/undergraduates/dd_cs_math.html

B.Comp. (Hons.) – B.Sc. Single Honours Programmes

The proposed single honours programmes require students to take a total of 184 MCs.

These programmes consist of the following:

1. Bachelor of Computing — Honours in Computer Science (132 MCs)
   B.Comp. students normally take 160 MCs to fulfil the University Level Requirements (ULR), Programme requirements, and Unrestricted Electives. Under this programme, 28 MCs would be waived under double degree rules. The 28 MCs will come from the Unrestricted Electives (20 MCs) and Breadth (8 MCs).
2. Bachelor of Science — non-Honours in Mathematics (85 MCs)
   B.Sc. students in the three-year B.Sc. degree programme normally take modules of 120 MCs to fulfil University Level Requirements (ULR), Faculty and Major Requirements, and Unrestricted Electives Requirements. Under this programme, 35 MCs will be waived under double degree rules. The 35 MCs will come from Unrestricted and Breadth Electives.
3. Bachelor of Science — non-Honours in Applied Mathematics (89 MCs)
   B.Sc. students in the three-year B.Sc. degree programme normally take modules of 120 MCs to fulfil the University Level Requirements (ULR), Faculty and Major Requirements, and Unrestricted Electives Requirements. Under this programme, 31 MCs will be waived under double degree rules. The 31 MCs will come from Unrestricted and Breadth Electives.

The details are set out in Tables C and D respectively.

Table C: B.Comp. (Hons.) – B.Sc. (Mathematics) Single Honours Programme

Double Honours Degree Requirements	MCs Requirement
(A) University Level Requirement	12 MCs
General Education	8 MCs^
Singapore Studies	4 MCs
(B) B.Comp. Programme Requirements[#]	104 MCs
Computer Science Foundation and IT Professionalism Modules	40 MCs (+ 4 MCs to be satisfied by common modules)
Computer Science Breadth & Depth Modules	44 MCs
Mathematics and Science Modules	20 MCs (+ 12 MCs to be satisfied by common modules)
(C) B.Sc. Programme Requirements	52 MCs
Faculty Requirements Modules*	8 MCs (+ 4 MCs to be satisfied by CS1010)
Mathematics Modules[†]	44 MCs (+ 16 MCs to be satisfied by common modules)
(D) Common Modules[(Tables 1 & 2)]	16 MCs
Total	184 MCs

^ At least 4 MCs of Group B GEM have to be read.
* B.Sc. Faculty Requirements:
    1. CS1010 Programming Methodology (4 MCs)
    2. 8 MCs from two distinct subject groups excluding 'Computing Sciences' and 'Mathematical & Statistical Sciences'
Please refer to: http://www.comp.nus.edu.sg/undergraduates/dd_cs_math.html for details.
† Please refer to: http://www.comp.nus.edu.sg/undergraduates/dd_cs_math.html

Table D: B.Comp. (Hons.) – B.Sc. (Applied Mathematics) Single Honours Programme

Double Honours Degree Requirements	MCs Requirement
(A) University Level Requirement	12 MCs
General Education	8 MCs^
Singapore Studies	4 MCs
(B) Computer Science Requirements[#]	100 MCs
Computer Science Foundation and IT Professionalism Modules	36 MCs (+ 8 MCs to be satisfied by common modules)
Computer Science Breadth & Depth Modules	44 MCs
Mathematics and Science Modules	20 MCs (+ 12 MCs to be satisfied by common modules)
(C) B.Sc. PROGRAMME Requirements	52 MCs
Faculty Requirements Modules*	8 MCs (+ 4 MCs to be satisfied by CS1010)
Mathematics Modules[†]	44 MCs (+ 20 MCs to be satisfied by common modules)
(D) Common Modules[(Tables 1 & 2)]	20 MCs
Total	184 MCs

^ At least 4 MCs of Group B GEM have to be read.
* B.Sc. Faculty Requirements:
    1. CS1010 Programming Methodology (4 MCs)
    2. 8 MCs from two distinct subject groups excluding 'Computing Sciences' and 'Mathematical & Statistical Sciences'

Please refer to: http://www.comp.nus.edu.sg/undergraduates/dd_cs_math.html for details.
† Please refer to: http://www.comp.nus.edu.sg/undergraduates/dd_cs_math.html

Integrated Honours Project

Students pursuing one of the listed specialisations in the double honours degree programme must undertake an integrated honours project in Mathematics and Computer Science. The project will provide the students with the opportunity to explore and integrate their knowledge in the specialised field.

A student pursuing a double honours degree programme without specialisation can choose to undertake:

1. One integrated honours year project or
2. One Computing honours year project and one Mathematics honours year project or
3. One Mathematics honours year project and 12 MCs of Level-4000 'CS' prefixed modules.

To fulfil the graduation requirements of the double degree programme. In the case that integrated honours year project is not chosen, a student can choose to take 12 MCs of common modules from Common Modules Table 2 for double counting purpose.

The integrated honours project will be jointly supervised by faculty members from the Department of Computer Science and the Department of Mathematics, and must contain elements of both computer science and mathematics.

Grading and Degree Requirements

1. Double Honours Programmes

The degree classification for Computing Degree (Honours) will be based on CAP calculated from 132 MCs: 88 MCs B.Comp. Programme Requirements, 32 MCs Common Modules, 8 MCs General Education Modules (GEMs) and 4 MCs Singapore Studies Module.

The degree classification for Science Degree (Honours) majoring in Mathematics will be based on CAP calculated from 125 MCs: 17 MCs Faculty Requirement Modules, 64 MCs Mathematics Modules, 32 MCs Common Modules, 8 MCs General Education Modules (GEMs) and 4 MCs Singapore Studies Module.

The degree classification for Science Degree (Honours) majoring in Applied Mathematics will be based on CAP calculated from 129 MCs: 17 MCs Faculty Requirement Modules, 68 MCs Mathematics Modules, 32 MCs Common Modules, 8 MCs General Education Modules (GEMs) and 4 MCs Singapore Studies Module.

2. B.Comp. (Hons.) – B.Sc. in Mathematics: Single Honours Programme

The degree classification for Computing Degree (Honours) will be based on CAP calculated from 132 MCs: 104 MCs B.Comp. Programme Requirements, 16 MCs Common Modules, 8 MCs General Education Modules (GEMs) and 4 MCs Singapore Studies Module.

The degree classification for Science Degree (non-Honours) majoring in Mathematics will be based on CAP calculated from 85 MCs: 13 MCs Faculty Requirement Modules, 44 MCs Mathematics Modules, 16 MCs Common Modules, 8 MCs General Education Modules (GEMs) and 4 MCs Singapore Studies Module.

3. B.Comp. (Hons.) – B.Sc. in Applied Mathematics: Single Honours Programme

The degree classification for Computing Degree (Honours) will be based on CAP calculated from 132 MCs: 100 MCs B.Comp. Programme Requirements, 20 MCs Common Modules, 8 MCs General Education Modules (GEMs) and 4 MCs Singapore Studies Module.

The degree classification for Science Degree (non-Honours) majoring in Applied Mathematics will be based on CAP calculated from 89 MCs: 13 MCs Faculty Requirement Modules, 44 MCs Mathematics Modules, 20 MCs Common Modules, 8 MCs General Education Modules (GEMs) and 4 MCs Singapore Studies Module.

The list of common modules is given as follows:

Common Modules Table 1

Module Code	Module Title	MCs
CS1231	Discrete Structures	4
MA1101R	Linear Algebra I	4
MA1102R	Calculus	4
ST2131/MA2216	Probability	4
CS3230	Design and Analysis of Algorithms	4
XFC4101/ MA4199	Integrated Honours Project	12
Total		32

Common Modules Table 2

Module Code	Module Title	MCs
CS3234	Logic and Formal Systems	4
CS4232	Theory of Computation	4
CS4235	Computational Geometry	4
CS4236	Cryptography Theory and Practice	4
CS5230	Computational Complexity	4
CS5237	Computational Geometry and Applications	4
CS6209	Topics in Cryptography	4

Exiting the Programme

For students admitted before AY2011/12: Students in the Double Degree Programme in Computer Science and Mathematics/Applied Mathematics must maintain a CAP of 4.00 or above. Students who fail to meet the criteria for two consecutive semesters will not be allowed to remain in the Double Degree Programme, but may continue with either B.Sc. or B.Comp. studies at NUS. Students who leave the programme are permitted to work instead for a single degree in their original home Faculty. Modular Credits completed in the double degree programme will be counted towards the fulfilment of the degree requirements of their single degree, subject to the normal limits of the Faculty curriculum.

For students admitted with effect from AY2011/12 onwards: A student who does not maintain a CAP of 4.0 in modules contributing to the original degree, and a CAP of 3.5 for the second degree for any two consecutive semesters will be required to withdraw from the DDP by withdrawing from the second degree programme.

Relevant website

Please refer to: http://www.comp.nus.edu.sg/undergraduates/dd_cs_math.html

6.6 Double Degree in Engineering and Economics

[Bachelor of Engineering and Bachelor of Social Sciences (Honours) in Economics;
Bachelor of Engineering and Bachelor of Arts in Economics]

Overview of Programme

The Double Degree Programme in Engineering[#] and Economics is a specialised degree programme that combines two disciplines that have significant synergies. The programme is designed to develop the core engineering skills of students so that they would fulfil the requisite professional requirements of their chosen engineering fields. At the same time, the programme will equip a student with necessary knowledge in economics, which will help them succeed in the global marketplace.

This combination of engineering[#] and economics will produce a new breed of engineer-managers for the marketplace.

[#] All Engineering courses except Engineering Science.

Admission Requirements

Students will be admitted to the double degree programme only if they meet the requirements of both the Faculty of Engineering (FoE) and Faculty of Arts and Social Sciences (FASS). A committee comprising staff members from both FASS and FoE will review applications.

Students may be admitted to the programme in one of the following ways:

1. Direct application by students with relevant GCE 'A' Level or equivalent qualifications — Please apply via Office of Admissions website: http://www.nus.edu.sg/oam OR
2. Current students from FoE[#] or FASS programmes — Students are strongly advised to apply by the end of their first year so as to start the double-degree programme at the beginning of their second year. Students must apply through their home faculties. Short-listed applicants may then be interviewed.

Engineering students[#] who plan to enrol after the first year must have read at least two Economics modules in the first year to enable them to better understand the discipline's focus and methodologies. Similarly, FASS students who plan to enrol at that point must have read at least two engineering modules.

The minimum Cumulative Average Point (CAP) requirement for acceptance into the programme is 4.0. The applicant will also need to meet the minimum prevailing admission criteria of both courses.

The applicant's non-academic activities may be considered, and the applicant may have to attend an interview.

[#] All Engineering courses except Engineering Science.

Exiting the Programme

Students can choose to leave the programme, or be asked to leave if they fail to meet and maintain requirements. Students who leave the programme are permitted to work instead for a single degree in their original home Faculty. Modular Credits completed in the double degree programme will be counted towards the fulfilment of the degree requirements of their single degree, subject to the normal limits of the Faculty curriculum.

For students admitted to NUS with effect from AY2011/12 onwards: A student who does not maintain a CAP of 4.0 in modules contributing to the original degree, and a CAP of 3.5 for the second degree for any two consecutive semesters will be required to withdraw from the DDP by withdrawing from the second degree programme. For details, please refer to http://nus.edu/prog/engecon.

Relevant website

Further information on the programme is available at: http://www.nus.edu.sg/prog/engecon

6.7 Double Degree in Engineering and Business Administration / Business Administration (Accountancy)

[Bachelor of Engineering and Bachelor of Business Administration (Honours/Non-honours), Bachelor of Engineering and Bachelor of Business Administration (Accountancy) (Honours/Non-honours)]

Overview of Programme

The double degree programmes in Business Administration and Engineering[#] are special degree programmes that combine two disciplines that have significant synergies. The programmes are designed to develop core engineering skills in students to fulfil the requisite professional requirements of their chosen engineering fields. At the same time, the programme will equip students with the necessary business skills and knowledge in the areas of organisational behaviour, finance and accounting, marketing, economics, and business law, among others, for success in the business world. This combination of engineering and business skills will produce a new breed of business-savvy engineers for the marketplace.

Admission Requirements

Students will be admitted to the double degree programme only if they meet the requirements of both the School of Business and the Faculty of Engineering. A committee comprising staff members from both the Business School and the Faculty of Engineering will review applications.

Students may apply to the programmes in one of the following ways:

1. Direct application by students with relevant GCE 'A' Level or equivalent qualifications — Please apply via Office of Admissions website: http://www.nus.edu.sg/oam
   OR
2. Current students from the School of Business and Faculty of Engineering[#] — Students are strongly advised to apply by the end of their first year so as to start the double degree programme at the beginning of their second year. Students must apply through their home faculties. Short-listed applicants may then be interviewed.

Engineering students who plan to enrol in either of these double degree programmes after the first year are encouraged to read at least one Business module in the first year to enable them to better understand the Business programme. Similarly, Business students who plan to enrol in either of these programmes are also encouraged to read at least one Engineering module in their first year.

The minimum Cumulative Average Point (CAP) requirement for acceptance to either of the double degree programmes is 4.0. The applicant will also need to meet the minimum prevailing admission criteria of both courses*; that is, the applicant generally must have:

1. GCE 'A' Level pass in Chemistry or Physics or equivalent and
2. GCE 'A' Level pass in Mathematics or equivalent

The applicant's non-academic activities may be considered, and the applicant may have to attend an interview. In the event that there is no provision for direct entry into the B.B.A. (Hons.) programme, a successful applicant from the Faculty of Engineering is admitted into the B.B.A. programme in the first instance, and may later be admitted into the B.B.A. (Hons.) programme upon qualification.

[#] All Engineering programmes except Engineering Science
* Minimum admission criteria for Chemical Engineering and Environmental Engineering courses is GCE 'A' Level pass in Chemistry and Mathematics, and GCE 'AO' Level pass in Physics.

The programme offers four choices for students:

1. B.Eng. (Hons.)/B.B.A. (Hons.) - double honours degree programme
2. B.Eng. (Hons.)/B.B.A. – single honours doube degree programme
3. B.Eng. (Hons.)/B.B.A. (Acc. Hons.) – double honours degree programme

4. B.Eng. (Hons.)/B.B.A. (Acc.) – single honours double degree programme

Exiting the Programme

Students can choose to leave the programme, or can be removed from the programme if they fail to meet requirements. Students who choose to leave the double degree programme are permitted to work instead for a single degree in their original home faculty. Modular credits completed in the double degree programme will be counted towards the fulfilment of the degree requirements of the home faculty, subject to the normal limits of the Faculty curriculum.

Students who do not maintain a CAP of 4.0 in modules contributing to the original degree for any two consecutive semesters will be required to withdraw from the second degree programme.

Relevant website

Please refer to: http://www.nus.edu.sg/prog/engbiz for any updates on this programme.

6.8 Double Degree in Materials Sciences & Engineering and Physics

[Bachelor of Engineering in Materials Science & Engineering (Honours) and Bachelor of Science in Physics (Honours/non-Honours)]

Introduction

The double degree programme aims to provide a science-driven, engineering-oriented education to both science and engineering students. Why? Understanding the physics underlying material properties and their technological applications will be vital to the development of future technological innovations in the following relevant industries and research areas:

1. Nanoscience and Nanotechnology;
2. Information and Magnetic Storage;
3. Photonics and Optoelectronics;
4. Biomedical materials and Biotechnology;
5. Semiconductor and Organic Electronics;
6. Quantum Information Technology.

Programme Structure & Curriculum Rationale

The Materials Science and Engineering (MSE) programme is built on the solid foundation of the basic sciences (in the first year) in which Physics is one of the main components. Students from the MSE programme will thus benefit from this double degree programme by being able to delve deeper and broader into the Physics disciplines. Similarly, students with Physics background will benefit immensely from the Engineering applications, design and technological components the MSE programme has to offer (see Tables 1 and 2). A unique feature of this double degree programme is the integrated B.Eng./B.Sc. (Hons.) dissertation/Honours project where students will be jointly supervised by both MSE and Physics staff members and the areas of research will be at the interface of these two disciplines.

The programme structure will allow students to acquire knowledge through understanding the interface between the two major leading fields. Graduates will acquire a comprehensive knowledge of Physics and a thorough insight into the current Engineering practices of new technologies.

The double degree programme will accept students either through the Faculty of Science (Physics track) or the Faculty of Engineering (MSE track).

Science or Engineering students are encouraged to apply for pre-admission into the programme at the beginning of the first semester of Year One in their respective faculties. Selected pre-admitted students are advised to follow the suggested study plan provided (see Tables 3 and 4). They will be confirmed into the double degree programme after satisfactory performance in their first year.

The double degree programme will admit additional suitable students at the beginning of their second year from the Faculties of Science (Physics track) or Engineering (MSE and Common Engineering).

Career Prospects

This double degree programme aims to provide graduates with the flexibility to adapt to any shift in technology and scientific emphasis relevant to first world economies. Students taking this double degree programme can successfully compete for promising employment in industries ranging from semiconductors to infocomm to biotechnology. They can also consider pursuing postgraduate research studies. This double degree is for students who want a MSE B.Eng. Degree and at the same time, are thinking of a career in R&D equipped with a strong Physics training.

Graduation Requirements

To be awarded a B.Eng. in Materials Science and Engineering and B.Sc. in Physics, a student must have:

- Completed a minimum of 180 MCs with a common CAP ≥ 2.00; and
- Passed the modules in accordance with Table 1

To be awarded a B.Eng. in Materials Science and Engineering and B.Sc. (Hons.) in Physics, a student must have:

- Completed a minimum of 200 MCs with a common CAP ≥ 3.20; and
- Passed the modules in accordance with Table 2

Note:
Students who have not achieved a common CAP of 4.0 for any two consecutive semesters will be required to withdraw from the double degree programme.

Table 1: Summary of Requirements for B.Eng. in MSE and B.Sc. in Physics

Modular Requirements	MCs	
University Requirements	20	
4 x General Education Modules	16	
1 x Singapore Studies Module	4	
ES1102 English for Academic Purposes[b]	-	
Faculty Requirements (B.Eng.)	10	
ES1501A Public Persona and Self-presentations OR ES1501B From Kodak to Instragram: How Images Tell Lies	4	
EG2401 Engineering Professionalism	3	
HR2002 Human Capital in Organizations	3	
Faculty Requirements (B.Sc.)	8	
MA1505 Mathematics I[c]	**4**	
CS1010E Programming Methodology[d]	**4**	
Major Requirements		
Level-1000 Essential Modules (B.Eng.)	27	
CM1121 Basic Organic Chemistry OR CM1501 Organic Chemistry For Engineers	4	
EG1108 Electrical Engineering	3	
MA1506 Mathematics II[f]	4	

Level-1000 Essential Modules (B.Sc.)[e]		
PC1141 Physics I	4	
PC1142 Physics II	4	
PC1143 Physics III	4	
PC1144 Physics IV	4	
Level-2000 Essential Modules (B.Eng.)	46	
MLE2101 Introduction to Structure of Materials	4	
MLE2102 Thermodynamics and Phase Diagrams	4	
MLE2103 Phase Transformation and Kinetics	4	
MLE2104 Mechanical Properties of Materials	4	
MLE2105 Electronic Properties of Materials	4	
MLE2106 Metallic Materials and Processing	3	
MLE2107 Ceramic Materials and Processing	3	
2nd Year Materials Laboratory	-	
Level-2000 Essential Modules (B.Sc.)		
PC2130 Quantum Mechanics I	4	
PC2131 Electricity and Magnetism I	4	
PC2132 Classical Mechanics	4	
PC2230 Thermodynamics and Statistical Mechanics	4	
PC2193 Experimental Physics I	4	
Level-3000 Essential Modules (B.Eng.)	26	
MLE3101 Materials Characterisation	4	
MLE3102 Degradation and Failure of Materials	4	
MLE3103 Materials Design and Selection	4	
MLE3104 Polymeric and Composite Materials	3	
MLE3105 Dielectric and Magnetic Materials	3	
3rd Year Materials Laboratory	-	
Level-3000 Essential Modules (B.Sc.)		
PC3130 Quantum Mechanics II	4	
PC3193 Experimental Physics II	4	
Level-3000 Elective Modules (B.Sc.)	4-12	
Choose any **THREE** modules from the following: (All modules are worth 4 MCs unless otherwise stated) PC3231 Electricity and Magnetism II PC3232 Nuclear and Particle Physics PC3233 Atomic and Molecular Physics I PC3235 Solid State Physics I PC3236 Computational Methods in Physics PC3238 Fluid Dynamics PC3241 Solid State Devices PC3242 Physics of Semiconductor Processing PC3243 Photonics PC3246 Nuclear Astrophysics PC3247 Modern Optics PC3251 Nanophysics PC3267 Biophysics II PC3274 Mathematical Methods in Physics II PC3239 Special Problems in Undergraduate Physics II PC3288 UROPS in Physics I PC3289 Advanced UROPS in Physics II	.	
Level-4000 Essential Modules (B.Eng.)	16	

MLE4101 B.Eng. Dissertation (over two semesters)	12	
MLE4102 Design Project	4	
Level-4000 Elective Modules (B.Eng.)	15-16	
Complete at least **15 MCs** (of which at least two modules must be MLE4xxx) from the following group of electives: (All modules are worth 4 MCs unless otherwise stated) Polymeric and Biomedical Materials (four modules from this group are required for the specialisation, together with B.Eng specialised Dissertation) MLE4201 Advanced Materials Characterisation MLE4202 Selected advanced Topics on Polymers MLE4203 Polymeric Biomedical Materials ME4253 Biomaterials Engineering BN4109 Special topics in Bioengineering BN4301 Principles of Tissue Engineering CM4266 Current Topics in Materials Chemistry PC4268 Biophysical Instrumentation and Biomolecular Electronics Nanostructured Materials & Nanotechnology (four modules from this group are required for the specialisation, together with B.Eng specialised Dissertation) MLE4201 Advanced Materials Characterisation MLE4204 Synthesis and Growth of Nanostructures MLE4205 Theory & Modelling of Material Properties MLE4206 Current topics on Nanomaterials MLE4208 Photovoltaic Materials PC4253 Thin film Technology CN4223R Microelectronic Thin Films (3 MCs)		
Other Elective Modules MLE4207 Growth Aspects of Semiconductors MLE4209 Magnetism and Magnetic Materials EE4411 Silicon Processing Technology EE4401 Optoelectronics CN4217R Processing of Microelectronic Materials (3 MCs) CN4203R Polymer Engineering CN5251 Membrane Science and Technology ME4283 Micro-fabrication Process ME4293 Microelectronics Packaging		
Total	188-189	

[b] Students who have not passed or been exempted from the Qualifying English Test at the time of admission to the Faculty have to read ES1000 and/or ES1102. This will be decided by CELC.

[c] Modules are part of essential Level-1000 B.Eng. Mathematics/ Science requirements.
[d] Modules are part B.Eng. faculty requirements.
[e] All PC modules are read in replacement of essential Level-1000 B.Eng. Mathematics/Science requirements of PC1431 and PC1432 (PC1431 overlaps with PC1141 and PC1142; PC1432 overlaps with PC1143 and PC1144).
[f] Modules are part of essential Level-1000 B.Sc. requirements.

Table 2: Summary of Requirements for B.Eng. in MSE and B.Sc. (Hons.) in Physics

Modular Requirements	MCs	
UNIVERSITY REQUIREMENTS	20	
2 x General Education Modules	8	
1 x Singapore Studies Module	4	
2 x Breadth Modules[a]	8	
ES1102 English for Academic Purposes[b]	-	
Unrestricted Elective Modules	4	

Faculty Requirements (B.Eng.)		10	
EG1413	Critical Thinking and Writing	4	
EG2401	Engineering Professionalism	3	
HR2002	Human Capital in Organizations	3	
FACULTY REQUIREMENTS (B.Sc.)		12	
CM1121 CM1501	Basic Organic Chemistry OR Organic Chemistry For Engineers[c]	4	
MA1505	Mathematics I[c]	4	
CS1010E	Programming Methodology[d]	4	
Major Requirements			
Level-1000 Essential Modules (B.Eng.)		23	
EG1108	Electrical Engineering	3	
MA1506	Mathematics II[f]	4	
Level-1000 Essential Modules (B.Sc.)[e]		.	
PC1141	Physics I	4	
PC1142	Physics II	4	
PC1143	Physics III	4	
PC1144	Physics IV	4	
Level-2000 Essential Modules (B.Eng.)		46	
MLE2101	Introduction to Structure of Materials	4	
MLE2102	Thermodynamics and Phase Diagrams	4	
MLE2103	Phase Transformation and Kinetics	4	
MLE2104	Mechanical Properties of Materials	4	
MLE2105	Electronic Properties of Materials	4	
MLE2106	Metallic Materials and Processing	3	
MLE2107	Ceramic Materials and Processing	3	
2nd Year Materials Laboratory		-	
Level-2000 Essential Modules (B.Sc.)		.	
PC2130	Quantum Mechanics I	4	
PC2131	Electricity and Magnetism I	4	
PC2132	Classical Mechanics	4	
PC2230	Thermodynamics and Statistical Mechanics	4	
PC2193	Experimental Physics I	4	
Level-3000 Essential Modules (B.Eng.)		26	
MLE3101	Materials Characterisation	4	
MLE3102	Degradation and Failure of Materials	4	
MLE3103	Materials Design and Selection	4	
MLE3104	Polymeric and Composite Materials	3	
MLE3105	Dielectric and Magnetic Materials	3	
3rd Year Materials Laboratory		-	
Level-3000 Essential Modules (B.Sc.)			
PC3130	Quantum Mechanics II	4	

PC3193 Experimental Physics II	4	
Level-3000 Elective Modules (B.Sc.)	12	
Choose any <u>THREE</u> modules from the following: (All modules are worth 4 MCs unless otherwise stated) PC3231 Electricity and Magnetism II PC3232 Nuclear and Particle Physics PC3233 Atomic and Molecular Physics I PC3235 Solid State Physics I PC3236 Computational Methods in Physics PC3238 Fluid Dynamics PC3241 Solid State Devices PC3242 Physics of Semiconductor Processing PC3243 Photonics PC3246 Nuclear Astrophysics PC3247 Modern Optics PC3251 Nanophysics PC3267 Biophysics II PC3274 Mathematical Methods in Physics II PC3239 Special Problems in Undergraduate Physics II PC3288 UROPS in Physics I PC3289 Advanced UROPS in Physics II		
Level-4000 Essential Modules (B.Eng.)	24	
MLE4102 Design Project	4	
Level-4000 Essential (B.Sc.)		
PC4130 Quantum Mechanics III	4	
Level-4000 Essential (Dissertation)		
MLE4101R Integrated B.Eng./B.Sc. (Hons) Dissertation (over two semesters) OR PC4199R Integrated B.Eng./B.Sc. (Hons) Dissertation (over two semesters)	16	
Level-4000 Elective Modules (B.Eng.)		
Complete at least <u>15 MCs</u> (of which at least two modules must be MLE4xxx) from the following group of electives: (All modules are worth 4 MCs unless otherwise stated) <u>Polymeric and Biomedical Materials</u> (four modules from this group are required for the specialisation, together with B.Eng specialised Dissertation) MLE4201 Advanced Materials Characterisation MLE4202 Selected advanced Topics on Polymers MLE4203 Polymeric Biomedical Materials ME4253 Biomaterials Engineering BN4109 Special topics in Bioengineering BN4301 Principles of Tissue Engineering CM4266 Current Topics in Materials Chemistry PC4268 Biophysical Instrumentation and Biomolecular Electronics	15-16	
<u>Nanostructured Materials & Nanotechnology</u> (four modules from this group are required for the specialisation, together with B.Eng specialised Dissertation) MLE4201 Advanced Materials Characterisation MLE4204 Synthesis and Growth of Nanostructures MLE4205 Theory & Modelling of Material Properties MLE4206 Current topics on Nanomaterials MLE4208 Photovoltaic Materials PC4253 Thin film Technology CN4223R Microelectronic Thin Film	31-32	
<u>Other Elective Modules</u> MLE4207 Growth Aspects of Semiconductors MLE4209 Magnetism and Magnetic Materials EE4401 Optoelectronics EE4411 Silicon Processing Technology CN4217R Processing of Microelectronic Materials CN4203R Polymer Process Engineering CN5251 Membrane Science and Technology ME4283 Micro-fabrication Process ME4293 Microelectronics Packaging	31-32	
	31-32	
Level-4000 Elective Modules (B.Sc.)		

Choose any FOUR modules from the following (All modules are worth 4 MCs unless otherwise stated) PC4232 Cosmology PC4240 Solid State Physics II PC4241 Statistical Mechanics PC4242 Electrodynamics PC4243 Atomic and Molecular Physics II PC4245 Particle Physics PC4246 Quantum Optics PC4248 Relativity PC4253 Thin Film Technology PC4259 Surface Physics			16
PC4262 Remote Sensing PC4267 Biophysics III PC4268 Biophysical Instrumentation and Biomolecular Electronics PC4274 Mathematical Methods in Physics III			
EE4401 Optoelectronics EE4413 Low-dimensional Electronic Devices MLE4201 Advanced Materials Characterisation[g] MLE4204 Synthesis and Growth of Nanostructures[g] MLE4205 Theory and Modelling of Materials Properties[g] Any approved module offered by other Departments	16		
Total	216-217	31-32	

Note [a]:
8 MCs out of a total of 46 MCs from Level-2000 essential modules are used to count towards breadth requirements.
Note [b]:
Students who have not passed or been exempted from the Qualifying English Test at the time of admission to the Faculty have to read ES1000 and/or ES1102. This will be decided by CELC.
Note [c]:
Modules are part of essential Level-1000 B.Eng. Mathematics/Science requirements.
Note [d]:
Modules are part B.Eng. faculty requirements.
Note [e]:
All PC modules are read in replacement of essential Level-1000 B.Eng. Mathematics/Science requirements of PC1431 and PC1432 (PC1431 overlaps with PC1141 and PC1142; PC1432 overlaps with PC1143 and PC1144).
Note [f]:
Modules are part of essential Level-1000 B.Sc. requirements.
Note [g]:
These elective modules are only offered to students reading a double degree in Materials Science & Engineering and in Physics. Only two of them may be counted towards the Physics Level 4000 Elective requirements.

Table 3: Suggested Study Plan for Double Degree in B.Eng. in Materials Science and Engineering and B.Sc. in Physics

SEMESTER 1 (24 MCS)
MA1505 Mathematics I
PC1141 Physics I
PC1142 Physics II
EG1413 Critical Thinking and Writing
SSXXXX Singapore Study Module
ES1102 English for Academic Purposes

SEMESTER 2 (19 MCS)
MA1506 Mathematics II
PC1143 Physics III
PC1144 Physics IV
CS1010E Programming Methodology
EG1108 Electrical Engineering

SEMESTER 3 (24 MCS)
CM1501 Organic Chemistry for Engineers or CM1121 Basic Organic Chemistry

MLE2101 Introduction to Structure of Materials
MLE2102 Thermodynamics and Phase Diagrams
PC2130 Quantum Mechanics I
PC2132 Classical Mechanics
GE General Education Module

SEMESTER 4 (20 MCS)

MLE2103 Phase Transformation and Kinetics
MLE2104 Mechanical Properties of Materials
MLE2105 Electronic Properties of Materials
MLE3101 Materials Characterization
GE General Education Module I

SEMESTER 5 (24 MCS)
MLE2106 Metallic Materials and Processing
MLE2107 Ceramic Materials and Processing
MLE3102 Degradation and Failure of Materials
MLE3103 Materials Design and Selection
MLE3104 Polymeric and Composite Materials
MLE3105 Dielectric and Magnetic Materials

SEMESTER 6 (20 MCS)
PC2131 Electricity and Magnetism I
PC2230 Thermodynamics and Statistical Physics
PC2193 Experimental Physics I
PC3130 Quantum Mechanics II
PC3193 Experimental Physics II

SEMESTER 7 (23 MCS)
MLE4101 BEng Dissertation
MLE4102 Design Project
* MSE Elective I
HR2002 Human Capital in Organizations
GE General Education Module
SEMESTER 8 (23 MCS)
MLE4101 BEng Dissertation
EG2401 Engineering Professionalism
* MSE Elective II
PC3XXX PHY Elective I
GE General Education Module II

SEMESTER 9 (16 MCS)
* MSE Elective III
* MSE Elective IV
PC3XXX PHY Elective II
PC3XXX PHY Elective III

Total MCs =188-189**

* Level-4000 Elective Modules (B.Eng.). At least two modules must be MLE4XXX. The total MCs for these range from 15-16 MCs.
** Thus, the total MCs range from 188-189

Table 4: Suggested Study Plan for Double Degree in B.Eng. in Materials Science and Engineering and B.Sc. (Hons.) in Physics

SEMESTER 1 (28 MCS)
MA1505 Mathematics I
PC1141 Physics I
PC1142 Physics II
EG1413 Critical Thinking and Writing
SSXXXX Singapore Study Module
ES1102 English for Academic Purposes
Unrestricted Elective Module

SEMESTER 2 (19 MCS)
MA1506 Mathematics II
PC1143 Physics III
PC1144 Physics IV
CS1010E Programming Methodology
EG1108 Electrical Engineering

SEMESTER 3 (24 MCS)
CM1501 Organic Chemistry for Engineers or CM1121 Basic Organic Chemistry
MLE2101 Introduction to Structure of Materials
MLE2102 Thermodynamics and Phase Diagrams
PC2130 Quantum Mechanics I
PC2132 Classical Mechanics
GE General Education Module

SEMESTER 4 (20 MCS)
MLE2103 Phase Transformation and Kinetics
MLE2104 Mechanical Properties of Materials
MLE2105 Electronic Properties of Materials
MLE3101 Materials Characterization
GE General Education Module

SEMESTER 5 (24 MCS)
MLE2106 Metallic Materials and Processing
MLE2107 Ceramic Materials and Processing
MLE3102 Degradation and Failure of Materials
MLE3103 Materials Design and Selection
MLE3104 Polymeric and Composite Materials
MLE3105 Dielectric and Magnetic Materials

SEMESTER 6 (20 MCS)
PC2131 Electricity and Magnetism I
PC2230 Thermodynamics and Statistical Physics
PC2193 Experimental Physics I
PC3130 Quantum Mechanics II
PC3193 Experimental Physics II

SEMESTER 7 (23 MCS)
MLE4101R/
PC4199R Integrated B.Eng./B.Sc. (Hons) Dissertation
MLE4102 Design Project
* MSE Elective I
HR2002 Human Capital in Organizations
GE General Education Module

SEMESTER 8 (23 MCS)
MLE4101R/
PC4199R Integrated B.Eng./B.Sc. (Hons) Dissertation

EG2401 Engineering Professionalism
* MSE Elective II
PC3XXX PHY Elective I
PC3XXX PHY Elective II

SEMESTER 9 (20 MCS)
* MSE Elective III
* MSE Elective IV
PC3XXX PHY Elective III
PC4YYY PHY Elective 1
PC4130 Quantum mechanics III

SEMESTER 10 (16 MCS)
PC4YYY PHY Elective 2
PC4YYY PHY Elective 3 (not required if at least two modules from the set {MLE4201, MLE4204, MLE4205} have been read).
PC4YYY PHY Elective 4 (not required if at least one module from the set {MLE4201, MLE4204, MLE4205} has been read).
GE General Education Module

Total MCs = 216-217**

* Level-4000 Elective Modules (B.Eng.). At least two modules must be MLE4XXX. The total MCs for these range from 15-16 MCs.
** Thus, the total MCs range from 216-217.

Relevant website

http://www.physics.nus.edu.sg/student/double_deg_MSEPhysics.html

6.9 Double Degree in Law and Life Sciences

[Bachelor of Laws (Honours) and Bachelor of Science (Honours/non-Honours) in Life Sciences]

Overview of Programme

The intersection between Law and Life Sciences is an expansive one, cutting across many critical and controversial areas including biotechnology, bioethics, environmental regulation, forensic science, and the protection of intellectual property. The Double Degree Programmes (DDPs) in Law and Life Sciences leverage on the strength of the Faculty of Law in the legal dimensions of these issues and depth of technical expertise of NUS Life Sciences, Faculty of Science and Yong Loo Lin School of Medicine. It enables students to discover the broad connections between law and life sciences and acquire a broad expertise to occupy the niche position linking up both disciplines.

There are two Double Degree Programmes in Law and Life Sciences being offered. The first is a 200-MCs Double Honours Double Degree (with Honours in Law and Life Sciences) and the second is a 184-MCs Single Honours Double Degree (with Honours in Law).

Admission Requirements

For the double honours degree programme, there is a dual-entry system:

1. Direct admissions with competitive GCE ‘A’ or H2 Level or equivalent qualifications during University Undergraduate Admissions Exercise;
2. Admissions at the end of completion of second year of LL.B. or first year of B.Sc. (Students in the top 50% of their LL.B. class and Life Sciences Majors will be invited to apply, and to undergo the short-listing round.)

For the single honours degree programme, the same dual-entry system is adopted, with the exception that students after completion of the first year of the B.Sc. will not be able to apply; only direct admissions applicants and applicants who have completed the first year of the LL.B. will be considered for admission.

Exiting the Programme

DDP students can choose to leave the programme, or can be required to leave the programme if they fail to meet continuation requirements.

To remain in the programme, DDP students should remain in the top 50% of students in modules counting toward the LL.B. or maintain a CAP of 4.0 for modules counting towards the B.Sc./B.Sc.(Hons). They will be asked to leave the Double Degree Programme, even if all other requirements are met, if:

1. The student falls below the top 50% of students in modules counting toward the LL.B. for completed Law modules for two consecutive semesters; and
2. CAP falls below 4.0 for completed modules counting toward the Science degree for two consecutive semesters.

Students who choose to leave the Single Honours degree programme are permitted to work for a single degree in Law, and will be considered for credit for their non-Law modules on a case-by-case basis.

Students who choose to leave the Double Honours degree programme are permitted to work for a single degree, or for two separate degrees under the normal university regulations. Students who choose to pursue a single degree in Science will receive MCs for completed Law modules, the grades of which will be converted to the five-point scale and factored into their CAP. The Integrated Modules can count towards elective modules under the Faculty and Major Requirements for this group of students, and other Law modules can contribute towards Breadth and Unrestricted Elective Requirements, subject to the normal limits of the Faculty curriculum. Students who decide to pursue a single degree in Law will be considered for credit for their non-Law modules on a case-by-case basis.

Relevant website

For more information, please visit http://www.nus.edu.sg/prog/lawlifesciences

6.10 Double Degree Programme in Business and Law

[Bachelor of Business Administration (Honours/non-Honours) / Bachelor of Business Administration (Accountancy) (Honours/non-Honours) and Bachelor of Laws (Honours)]

Overview of Programme

The Double Degree Programme in Business Administration/Business Administration (Accountancy) and Law is a prestigious five-year programme offered jointly by the School of Business and the Faculty of Law. The programme is established in line with NUS's aim of attracting the best students from Singapore and around the world, keen on having a quality education and leveraging on interdisciplinary opportunities in a university ranked amongst the world's best.

Built around the core modules of the Business Administration and Law degrees, students who have successfully completed the double degree programme will be awarded a Bachelor of Business Administration with Honours [B.B.A. (Hons)] or a Bachelor of Business Administration (Accountancy) with Honours [B.B.A. (Acc.Hons.)] as well as a Bachelor of Laws (Honours) degree.

Admission Requirements

Students may be admitted to the programme in one of the following ways:

1. Direct application by students with relevant GCE 'A' Level or equivalent qualifications;
2. Admissions at the end of completion of second year of LL.B. or first year of B.B.A. (Students in the top 50% of their LL.B. class and Business Administration class will be invited to apply, and to undergo the short-listing round.)

Applicants to the double degree programme must meet the admission requirements of both Faculties. Information on the admission requirement is available at: http://www.nus.edu.sg/prog/bbalaw/admission.html

Exiting the Programme

Students can choose to leave the programme, or can be required to leave if they fail to meet the continuation requirements. The exemptions from two Business Administration foundation modules namely, BSP1004 Legal Environment of Business and ES2002 Business Communication, will be extended to all exiting students on the condition that they have completed the relevant Law compulsory modules, LC1005 Singapore Legal System and LC1006 Legal Analysis, Writing & Research I respectively. The other special provisions (extra double counting and possible exemption from University Requirements) of the programme will not apply.

Students who choose to leave the double Honours degree programme are permitted to work instead for a single degree, or towards two separate degrees under the normal university regulations. Students who choose to pursue a single degree in Business Administration will receive Modular Credits for completed Law modules, the grades of which will be converted to the five-point scale and factored into their CAP. The common modules can count towards Restricted Elective modules under the programme requirements for this group of students, and other Law modules can contribute towards Breadth and Unrestricted Elective requirements, subject to the normal limits of the Faculty curriculum. Students who decide to pursue a single degree in Law will be considered for credit for their non-Law modules on a case-by-case basis.

Students must either maintain a CAP of 4.0 for the B.B.A (Hons.)/B.B.A. (Acc. Hons.) or remain in the top 50% of the Law cohort. Those who fall below in both degrees for two consecutive semesters will be required to leave the programme. Direct entry students will have the choice of degree into which they exit. Later entry students will exit into their home faculty.

Students who do not qualify for the B.B.A. (Hons.)/B.B.A. (Acc. Hons.) will graduate with a LL.B./B.B.A./B.B.A. (Acc.), if all other conditions are met.

Relevant website

For more information, please visit: http://www.nus.edu.sg/prog/bbalaw/overview.html

6.11 Double Degree in Master of Laws and Master in Public Administration / Public Policy

[Master of Laws and Master in Public Administration/Master in Public Policy]

Overview of Programme

The Faculty of Law and the Lee Kuan Yew School of Public Policy double degree programmes comprising a Master of Laws (LL.M.) and Master in Public Administration (MPA) or Master in Public Policy (MPP) aim to provide students of law and public administration and public policy broad exposure to the issues and challenges that lawyers and leaders of public institutions face.

Admissions Requirements

Applicants must fulfil the admission requirements for both degree programmes in order to gain admission. The requirements are as follows:

LL.M. Degree

- A good Bachelor's degree in Law; and minimum TOEFL score of 100 (Internet Based Test). Candidates with an iBT score of 92-99 may also apply, but may be required to undertake intensive English language training prior to

commencing law studies. Other TOEFL, IELTS of minimum 7 and CET qualifications will be considered, but the iBT is strongly preferred.

MPA/MPP Degrees

- A good NUS honours degree (second class and above) or equivalent (e.g., a four-year Bachelor's degree with at least an average grade of B or equivalent); or
- A good Bachelors degree and successful completion of a placement test; or exceptionally
- Other qualifications and experience subject to approval by the Board of Graduate Studies and
- Good command of the English Language (minimum TOEFL score of 580 or IELTS score of 6.5).

Additional Requirements

MPA Degree – At least five years of work experience
MPP Degree – Preferably some background in Mathematics and Economics

Exiting the Programme

A student's Cumulative Average Point (CAP) should not fall below 2.5 for two consecutive semesters or 3.0 for three consecutive semesters. Any student who fails to maintain the minimum CAP as stipulated would have his/her candidature terminated.

A student who fails a module on a second attempt or fails in more than two modules throughout the course of study will be required to terminate his/her candidature.

Any candidate who does not meet the continuation or graduation requirements for the MPA or MPP degree may be conferred a Graduate Diploma in Public Administration or in Public Policy if the following requirements are met:

1. a minimum CAP of 2.25 for the best 24 MCs at graduate level; and
2. at least 12 of these MCs must be from MPA/MPP core modules or equivalent.

Relevant website

For more information, please visit: http://www.nus.edu.sg/prog/lawspp/llmmppmpa/index.htm

6.12 Double Degree in Master of Business Administration and Master in Public Administration / Public Policy

[Master of Business Administration and Master in Public Administration/Master in Public Policy]

Overview of Programme

The Business School and the Lee Kuan Yew School of Public Policy double degree programmes comprising a Master in Business Administration (MBA) and Master in Public Administration (MPA) or Master in Public Policy (MPP) will enable students to gain knowledge and expertise in both business and government. These students will acquire competencies relevant to industry, government and public sector organizations.

Admissions Requirements

Applicants must fulfil the admission requirements for both degree programmes in order to gain admission. The requirements are as follows:

MBA Degree

- A good undergraduate degree from a reputable academic institution;
- A minimum of two years of full-time post-graduation managerial experience;
- Good Analytical Writing Assessment, Verbal, Quantitative and Total GMAT scores;
- Applicants whose undergraduate degree was not in English are required to submit TOEFL or IELTS scores.

MPA/MPP Degrees

- A good NUS honours degree (second class and above) or equivalent (e.g., a four-year Bachelor's degree with at least an average grade of B or equivalent); or
- A good Bachelors degree and successful completion of a placement test; or exceptionally
- Other qualifications and experience subject to approval by the Board of Graduate Studies and
- Good command of the English Language (minimum TOEFL score of 580 or IELTS score of 6.5).

Additional Requirements

MPA Degree – At least five years of work experience
MPP Degree – Preferably some background in Mathematics and Economics

Exiting the Programme

A student's Cumulative Average Point (CAP) should not fall below 2.5 for two consecutive semesters or 3.0 for three consecutive semesters. Any student who fails to maintain the minimum CAP as stipulated would have his/her candidature terminated.

A student who fails a module on a second attempt or fails in more than two modules throughout the course of study will be required to terminate his/her candidature.

Any candidate who does not meet the continuation or graduation requirements for the MPA or MPP degree may be conferred a Graduate Diploma in Public Administration or in Public Policy if the following requirements are met:

a. a minimum CAP of 2.25 for the best 24 MCs at graduate level; and
b. at least 12 of these MCs must be from MPA/MPP core modules or equivalent.

Relevant website

For more information, please visit:
http://bschool.nus.edu.sg/TheNUSMBA/ProspectiveStudents/DoubleDegreeProgrammes/TheNUSLKY/Background.aspx

7 Concurrent Degree Programmes

7.1 Concurrent Master of Science (Management) Programme

The NUS Master of Science (Management), M.Sc. (Mgt), consisting of 20 management and leadership modules drawn from the B.B.A., M.B.A. & Ph.D. curricula, is only available as a concurrent programme for eligible undergraduates from all NUS faculties and schools. Students may gain this additional master's degree generally with about one extra year of coursework study with no research requirement.

We welcome sensitive, inquisitive and articulate students who are concerned for each other's social, intellectual, and leadership developments to be lifelong co-owners of our collegiate community, hence building a close-knit alumni network of caring and influential leaders.

Students in the concurrent degree programme must meet the stipulated academic requirements for continuation in the programme. With advance planning, students should be able to complete the concurrent degree requirements within five years. Capable M.Sc. (Mgt) students may spend an additional year to obtain the CEMS Master's in International Management (MIM). In 2009, the CEMS MIM was ranked the number one pre-experience master's programme by Financial Times.

Through exposure to business modules, students of this programme will acquire a well-rounded set of skills and be in a position to make meaningful contributions to their workplace.

Interested applicants may apply directly to the MSc (Mgt) programme office. Admitted students enjoy all the rights and privileges of BIZ membership.

Faculty of Engineering

The NUS Business School offers a customised M.Sc. (Mgt) programme for interested undergraduate students from the Faculty of Engineering. The admission criteria for the generic M.Sc. (Mgt) degree also apply to this customised double degree programme. Please visit http://www.eng.nus.edu.sg/ugrad/SP_be_msc.html for details on this customised programme.

School of Business

The M.Sc. (Mgt.) programme is available to undergraduates from all NUS faculties and departments as a concurrent programme. An admitted student completes the M.Sc. (Mgt.) programme as an extension to his/her undergraduate programme, and will be awarded two separate degree scrolls with the same conferment date. Good applicants to the B.B.A. programme may apply for admission to the M.Sc. (Mgt.) programme concurrently. Successful applicants will then be offered admissions to both the B.B.A. and M.Sc. (Mgt.) programmes at the same time. Such students need to perform well in the GMAT and pass an interview before taking graduate modules.

B.B.A. Honours programme students who are admitted into the M.Sc. (Mgt.) programme need to take 32 modular credits (i.e., eight modules) over and above the B.B.A. Honours Programme requirements of 160 modular credits to fulfil the M.Sc. (Mgt.) programme requirements. That is, they need to spend just one more year to complete the master's programme requirements. The M.Sc. (Mgt.) is regarded by some as a mini-analytic M.B.A.

Corresponding modules taken from NUS outside the School of Business, or from exchange partners, may be considered as equivalent, subject to approval by NUS departments and academic exchange offices. No M.Sc. (Mgt.) module taken in NUS can be on the Satisfactory/Unsatisfactory basis.

Please visit http://bba.nus.edu.sg/concurrent_msc_about.html for details on the M.Sc. (Mgt.) programme structure, which consists of Domain Knowledge Requirements (DKR) and M.Sc. (Mgt.) Requirements (MSR) segments.

School of Computing

The NUS Business School offers a customised M.Sc. (Mgt.) programme for interested undergraduate students from the School of Computing. The admission criteria for the generic M.Sc. (Mgt.) programme also applies to this customised double degree programme. To receive both the degrees, the students are required to complete between 192 and 228 MCs depending on the particular degree they are pursuing within the SoC (e.g., students pursuing degrees in E-Commerce and Information Systems have to complete 192 MCs due to the commonality between these disciplines and management; students pursuing Computational Biology degree are required to complete 228 MCs due to the lower commonality between the two disciplines). With advance planning, students (in programmes such as Information Systems and E-Commerce) should be able to complete the double degree requirements within five years.

Relevant websites

For more information, please visit the following websites: http://www.eng.nus.edu.sg/ugrad/SP_be_msc.html, http://bba.nus.edu.sg/concurrent_msc_about.html, and http://www.comp.nus.edu.sg/undergraduates/cdp_bcomp_msc.html.

7.2 Concurrent Programme in Bachelor of Business Administration / Accountancy (Honours) and Master in Public Policy

Overview of Programme

The NUS Bachelor of Business Administration with Honours [B.B.A. (Hons.)] / Bachelor of Business Administration (Accountancy) with Honours [B.B.A. (Acc.Hons.)], and Master in Public Policy (M.P.P.) Concurrent degree programme aims to prepare the next generation of policy leaders to apply business principles to social and environmental issues, as well as to address corporate social responsibility and business ethics concerns.

There is a convergence in the practices of public sector and private sector companies, and in the management of private enterprises and state or public enterprises. Hence, Business and Public Policy, Business and Public Administration, or Business Administration and Public Policy are closely intertwined and correlated. The set of management principles applicable to private enterprises draws parallels in the government sector, particularly in the context and framework of government-linked companies in this dynamic continent.

This concurrent programme by the School of Business, the University Scholars Programme and the Lee Kuan Yew School of Public Policy is ideal for young people in this region who aspire to lead in the public sector and its enterprises. The rigorous academic curriculum is well complemented by the intimate networking among like-spirited future leaders, many nominated by their own governments, from more than 20 countries in this part of the world and beyond.

Admission Requirements

Admission to the Concurrent Degree Programme is highly competitive and selective; applicants should have very good verbal skills, in order to mingle comfortably with generally more mature M.P.P. students who articulate and write well. Shortlisted high-calibre candidates must undergo a rigorous admissions selection process, which includes the following requirements:

1. Outstanding academic results
2. Interview session
3. Written placement test
4. Profiling test

There is a dual-entry system for the Concurrent Degree Programme:

1. Admissions with competitive GCE 'A' Level qualifications or equivalent. (Application through NUS Office of Admissions and online USP Admissions; Eligibility as per B.B.A. programme.)
2. Admissions at the end of the second year of the B.B.A. / B.B.A. (Acc.) programme. (Application through B.B.A. Office when announced in the middle of the second semester; CAP of at least 4.0 out of 5.0).

Exiting the Programme

Students can choose to leave the Concurrent Degree Programme, or can be removed from the Concurrent Degree Programme if they fail to meet continuation requirements.

A student whose academic performance falls under any of the following categories shall be removed from the Concurrent Degree Programme, even if all other requirements are met:

1. CAP falls below 4.0 for completed B.B.A./B.B.A. (Acc.) modules for two consecutive semesters; or
2. CAP falls below 3.0 for completed M.P.P. modules for two consecutive semesters; or
3. CAP falls below 3.5 for completed M.P.P. modules for three consecutive semesters; or
4. Fail any particular M.P.P. module twice; or
5. Fail three or more M.P.P. modules.

Students who leave the Concurrent Degree Programme are permitted to work towards a single degree in B.B.A./B.B.A. (Acc.) or B.B.A. (Hons.)/B.B.A. (Acc. Hons.) (and possibly remain with the USP) if prevailing continuation requirements for the single degree programme are met. They will, however, be advised to withdraw from the USP if prevailing USP continuation requirements are not met. Modular Credits completed in the Concurrent Degree Programme will be counted towards the fulfilment of the prevailing single degree requirements (and possibly the programme requirements of the USP), with all completed M.P.P. modules being included in the computation of the CAP score for the single degree programme.

Relevant website

For more information, please refer to our website: http://bba.nus.edu/dualdegree_bba-mpp-mpa.html.

7.3 Concurrent Programme in Bachelor of Computing (Honours) and Master of Science in Management

Overview of Programme

IT professionals need to rise up to the challenges of managing new IT and market trends such as IT outsourcing and offshoring, IT entrepreneurships, and commercialisations and management of innovative and complex IT products and services. The concurrent programme combining Bachelor of Computing with honours [B.Comp. (Hons.)] from the School of Computing and Masters of Management [M.Sc. (Mgt)] from the School of Business provides a multidisciplinary platform for students to marry strong technical computing skills with the requisite management, communications, and marketing skills to respond effectively to these challenges.

In this programme, students from the School of Computing will take management courses from the School of Business in addition to their usual pursuit of the Bachelor of Computing degree. These management courses consist of 20 management and leadership modules drawn from the Bachelor of Business (B.B.A.), Masters in

Business Administration (M.B.A.) and Doctor of Philosophy (Ph.D.) curricula. Thanks to the broad-based nature of the NUS curriculum structure, such double focuses may be completed within five years. The combined curricula provide an enriching education in the management of both human resources and information technology.

Admission Requirements

Applications are welcome anytime, and undergraduate students are admitted year-round. Details on the application procedure for the concurrent M.Sc. (Mgt) programme can be found at: http://bschool.nus.edu.sg/mscmgt/aboutmsc.htm

Details on direct admission to the concurrent programme in Bachelor in Computing in Information Systems and M.Sc. (Mgt) can be found at: http://www.comp.nus.edu.sg/undergraduates/cdp_bcomp_msc.html

Programme Requirements

The structure for the concurrent M.Sc. (Mgt) programme is as follows:

40 MCs Domain Knowledge Requirements (DKR) segment:
A student must complete the following 10 modules, or 40 MCs, chosen from modules currently offered in the Minor in Management programme:

1. Four Level-1000 modules or their equivalents;
2. Four Level-2000 modules or their equivalents; and
3. Two Level-3000 modules: One module, or its equivalent, from each of two different areas out of those available.

For details on modules listed under the Minor in Management, please refer to: http://bba.nus.edu.sg/majorminor_minor_mgmt.html

40 MCs M.Sc. Requirements (MSR) segment:
A student must complete 40 MCs from the modules below:

1. A maximum of two Level-4000 modules chosen from any offered by the School of Business, or equivalent modules;
2. A minimum of three Level-5000/6000 research-type coursework modules chosen from any offered by the School of Business; and
3. A maximum of five M.B.A.-type modules chosen from any offered by the School of Business, which have not been covered by the student for the DKR segment.

The key features of the programme are listed below:

- School of Computing students use the MCs from breadth requirements and unrestricted electives (UEM) as well as equivalent modules from the B.Comp. (Hons.) programme requirements to meet the 40 MCs Domain Knowledge Requirements (DKR) segment.
- School of Computing students in the B.Comp. (Hons.) (Information Systems) and B.Comp. (Hons.) (E-Commerce) degree programmes are deemed to have satisfied item (1) of the MSR segment as their degree requirements include 16 MCs of Level-4000 modules offered by the Information Systems Department. These modules are business and IT related.
- School of Computing students are allowed to partially meet item (3) of the MSR segment by taking up to two M.B.A.-type equivalent coursework modules offered by the Information Systems Department listed below:
    1. IS5111 Integration of IS and Business
    2. IS5112 Knowledge Systems and Management in Organisations

These two graduate modules cannot be used to satisfy the unrestricted electives requirements of the B.Comp. (Hons.) programme should students discontinue the concurrent programme.

School of Computing students must meet all the other requirements for admission, continuation in the programme and the award of the concurrent programme.

School of Computing students who have completed the M.Sc. (Mgt) programme, as well as their B.Comp. (Hons.) programme will be awarded two degrees depending on their honours classification for their bachelor programme.

Please refer to:
http://www.comp.nus.edu.sg/undergraduates/cdp_bcomp_msc.html for the module requirements, and computation of CAP, for the following concurrent programmes:

1. B.Comp. (Hons.) (Computational Biology) with M.Sc. (Mgt)
2. B.Comp. (Hons.) (Computer Engineering) with M.Sc. (Mgt)
3. B.Comp. (Hons.) (Computer Science) with M.Sc. (Mgt)
4. B.Comp. (Hons.) (E-Commerce) with M.Sc. (Mgt)

Please refer to: http://www.comp.nus.edu.sg/undergraduates/cdp_bcompis_msc_structure.html for the module requirements, and computation of CAP, for the concurrent programme in B.Comp. (Hons.) (Information Systems) with M.Sc. (Mgt).

Grading and Degree Requirements

The M.Sc. (Mgt) degree will be awarded to students who have

- earned at least a Second Class Lower division in the B.Comp. (Hons.) degree; and
- maintained a CAP of 3.5 in the modules counting towards the M.Sc. (Mgt) requirement.

Further Enquiry

Please submit your enquiry to bcomp@comp.nus.edu.sg.

7.4 Concurrent Programme in Bachelor of Laws (Honours) and Master in Public Policy

Overview of Programme

The Lee Kuan Yew School of Public Policy (LKYSPP) and the Faculty of Law have long been preparing their students for the complex world of policy making and public service. LKYSPP helps its students to understand the complex issues that challenge policy makers daily and offers a strong curriculum anchored firmly within an Asian context. The courses and case studies offered in the programmes reflect a wide spectrum of issues which are unique to countries in the Asia Pacific region and complicated by religious, ethnic, historical, and political variables which add to the complexity of governance. The Faculty of Law, on the other hand, offers rigorous training in public law, international law, and governance, and has a long history of placing its graduates in leading positions in government and public service, including Senior Minister and co-ordinating Minister for National Security, Professor S. Jayakumar, the current Chief Justices of Singapore and Malaysia, and the former Secretary General of ASEAN.

The concurrent degree programme in Law (LL.B.) and Public Policy (M.P.P.), launched in Academic Year 2007-2008, combines the strengths of the LKYSPP and the Faculty of Law, offering law students, particularly those interested in a career in public service, a unique opportunity to understand the legal, policy, and practical

dimensions of governance and national, regional, and international policy making.

Admission Requirements

Admission to the concurrent degree programme is highly competitive and selective. Applicants applying with GCE ‘A’ Levels or equivalent qualifications will be required to satisfy the admissions criteria of both the LKYSPP and the Faculty of Law.

Applicants must have an outstanding academic record and undergo the Law admissions test and an interview if they are shortlisted.

For the detailed admissions criteria of the LKYSPP, please refer to
http://www.lkyspp.nus.edu.sg/MPP_Admissions.aspx

Please note that applicants for the LL.B. - M.P.P. concurrent degree need not have a first degree but must satisfy the other listed criteria.

For the admissions criteria of the Faculty of Law, please refer to
http://www.law.nus.edu.sg/admissions/4_yrs_llb_prog.html

There is a dual entry system for the concurrent degree programme:

1. Admissions with competitive GCE ‘A’ Level or equivalent qualifications. Prospective applicants will be invited to apply online through the NUS Office of Admissions.
2. Admissions at the end of completion of the second year of the LL.B. programme. LL.B. students in the top 50% of their class will be invited to apply in the Second Semester of their Second Year, and to undergo an interview if they are shortlisted.

Exiting the Programme

Students can choose to leave the concurrent degree programme, or can be removed from the concurrent degree programme if they fail to meet continuation requirements.

A student whose academic performance falls under any of the following categories shall be removed from the concurrent degree programme, even if all other requirements are met:

- The student falls below the top 50% of students in modules counting toward the LL.B. for completed Law modules for 2 consecutive semesters; or
- CAP falls below 3.0 for completed M.P.P. modules for 2 consecutive semesters; or
- CAP falls below 3.5 for completed M.P.P. modules for 3 consecutive semesters; or
- Fail any particular M.P.P. module twice; or
- Fail 3 or more M.P.P. modules.

In addition, a student who, at the point of entry into the MPP component of the programme, does not stand within the top 55% of his LL.B. cohort will be asked to leave the programme.

Students who leave the concurrent programme are permitted to work toward the LL.B., while adhering to prevailing regulations. Modular Credits completed in the concurrent degree programme will be counted towards the fulfillment of the degree requirements for LL.B., subject to the normal limits of the curriculum.

Relevant website

For more information, please visit http://www.nus.edu.sg/prog/mpplaw/

8 Joint Degree Programmes / Concurrent Degree Programmes / Double Degree Programmes with Overseas Universities

8.1 Bachelor of Science (Honours) from National University of Singapore (NUS) and Bachelor of Philosophy (Honours) from Australian National University (ANU)

Overview of Programme

The University Scholars Programme (USP) and the Faculty of Science (FOS) offer a four-year Joint Degree Programme (JDP) resulting in a Bachelor of Science (Honours) from NUS and a Bachelor of Philosophy (Honours) from ANU, which can be taken in three fields of study: Chemistry, Physics and Mathematics. It is only offered to FOS students in USP.

A rigorous and challenging programme, the JDP is designed for students who have a strong interest in and aptitude for graduate research work. Students are expected to acquire a strong foundation in critical analysis and depth in the principles of each subject. They will be closely involved in undergraduate research with at least 25% of their graduation requirements based on independent research.

If your institution of primary enrolment is NUS, you will spend the first three semesters here at NUS, followed by three semesters at ANU in Canberra before returning for your final two semesters.

Upon successful completion of the JDP's requirements, students graduate with a degree of Bachelor of Science (Honours) with the field of study recorded. The degree carries the crests of both universities and certifies the completion of Joint Degree Programme for Bachelor of Philosophy (Honours) from ANU and Bachelor of Science (Honours) from NUS.

Admission Requirements

The JDP is restricted to eight to ten students from each institution annually.

The JDP is only offered to the Faculty of Science students in USP. Application opens in September/October and those who have indicated their interest in the programme (during February-April) will be notified. Applicants will be required to attend an interview. Successful applicants will be admitted provisionally into the JDP.

Final selection of JDP students will be made at the end of their third semester of study, based on academic performance in the first three semesters of study (CAP of at least 4.2).

Programme Requirements

Programme Structure

The course of study in each major is indicated in the tables below. There is significant flexibility and a JDP student can design his or her programme of study in consultation with an assigned Academic Mentor, with approval from the relevant Field Coordinator.

Chemistry course for NUS students	
	16 modules including: 7* modules in Chemistry; 3 Special Programme in Science (SPS) modules and 6 University Scholars Programme (USP) modules • For Students matriculated in 2011 or before: 6 First Tier modules including 'Writing and Critical Thinking' and 2 modules from the Humanities and Social Sciences domain • For Students matriculated in 2012 or after: 3 Compulsory Foundation Modules and 3 Inquiry modules, two of which must come from the Humanities and Social Sciences domain

Semesters 1-3 (NUS)	or 8* modules in Chemistry; 2 Special Programme in Science (SPS) modules and 6 University Scholars Programme (USP) • For Students matriculated in 2011 or before: 6 First Tier modules including 'Writing and Critical Thinking' and 2 modules from the Humanities and Social Sciences domain • For Students matriculated in 2012 or after: 3 Compulsory Foundation Modules and 3 Inquiry modules, two of which must come from the Humanities and Social Sciences domain * this includes MA1421 or any non-bridging MA module [Total: 64 Modular Credits]
Semesters 4-6 (ANU)	Completion of 12 6-unit courses including: A minimum of 6 courses in Chemistry and Advanced Studies 1, 2 and 3. [Total: 72 units]
Semesters 7-8 (NUS)	Honours in Chemistry. Completion of 10 modules, including: A minimum of 9 Chemistry modules of which 6 should be project work [Total: 40 Modular Credits]

Mathematics course for NUS students	
Semesters 1-3 (NUS)	Completion of 15 modules including: A minimum of 6 in Mathematics, 3 Special Programme in Science (SPS) modules and 6 University Scholars Programme (USP) modules • For Students matriculated in 2011 or before: 6 First Tier modules including 'Writing and Critical Thinking' and 2 modules from the Humanities and Social Sciences domain • For Students matriculated in 2012 or after: 3 Compulsory Foundation Modules and 3 Inquiry modules, two of which must come from the Humanities and Social Sciences domain or A minimum of 7 in Mathematics, 2 Special Programme in Science (SPS) modules and 6 University Scholars Programme (USP) modules • For Students matriculated in 2011 or before: 6 First Tier modules including 'Writing and Critical Thinking' and 2 modules from the Humanities and Social Sciences domain • For Students matriculated in 2012 or after: 3 Compulsory Foundation Modules and 3 Inquiry modules, two of which must come from the Humanities and Social Sciences domain [Total: 60 Modular Credits]
Semesters 4-6 (ANU)	Completion of 12 6-unit courses, including: A minimum of 6 courses in Mathematics and Advanced Studies Courses 1, 2 and 3 [Total: 72 units]
Semesters 7-8 (NUS)	Honours in Mathematics. Completion of 10 modules, including: A minimum of 9 Mathematics modules [Total: 40 Modular Credits]

Physics course for NUS students	
	Completion of 15 modules comprising: PC1431 Physics 1E, PC1432 Physics 2E,

Semesters 1-3 (NUS)	PC2130 Quantum Mechanics 1, PC2131 Electricity and Magnetism 1, PC2193 Experimental Physics 1, MA1101R Linear Algebra and MA1505 Mathematics 1, 2 Special Programme in Science (SPS) modules and 6 University Scholars Programme (USP) modules • For Students matriculated in 2011 or before: 6 First Tier modules including 'Writing and Critical Thinking' and 2 modules from the Humanities and Social Sciences domain • For Students matriculated in 2012 or after: 3 Compulsory Foundation Modules and 3 Inquiry modules, two of which must come from the Humanities and Social Sciences domain [Total: 60 Modular Credits]
Semesters 4-6 (ANU)	Completion of 12 6-unit courses, including: A minimum of 7 courses in Physics and Advanced Studies Courses 1, 2 and 3 [Total: 72 units]
Semesters 7-8 (NUS)	Honours in physics. Completion of 10 modules, including: A minimum of 9 Physics modules [Total: 40 Modular Credits]

The Honours in Chemistry will be largely (approximately 60%) project work although there will be a coursework component. Honours in Mathematics or Physics will comprise project work (between 40% and 50%) and coursework. Joint Honours project work between NUS and ANU are encouraged in the JDP.

Grading and Degree Requirements

The JDP requires completion of at least 100 Modular Credits at NUS and 72 units at ANU. Students are expected to maintain a CAP of at least 4.2 at NUS and an average mark of 80 at the ANU. Students who fail to meet the expected CAP or average mark for more than two consecutive semesters will be required to leave the JDP, with borderline cases referred for decision to the JDP Committee.

USP students must also fulfill one Singapore Studies (SS) requirement.

Exiting the Programme

Students can choose to leave the Programme, or be asked to leave if they fail to meet and maintain requirements. Students who choose to leave the JDP are permitted to work instead for a single degree in their primary institution of enrolment and faculty. Modular Credits completed during the duration of the JDP are counted towards the fulfilment of requirements degree at their home faculty, subject to the normal limits of the faculty curriculum.

Relevant website

Please refer to http://www.usp.nus.edu.sg/curriculum/joint-deg/anu-fos/index.html for any updates on this JDP.

8.2 Bachelor of Arts (Honours) from National University of Singapore (NUS) and Bachelor of Philosophy (Honours) from Australian National University (ANU)

Overview of Programme

The University Scholars Programme (USP) and the Faculty of Arts and Social Sciences (FASS) offer a four-year Joint Degree Programme (JDP) between Bachelor of Arts (Honours) from NUS and Bachelor of Philosophy (Honours) from ANU, which can be taken in four fields of study: English Literature, History, Philosophy and Political Science. It is only offered to FASS students in USP.

The joint degree programme places a strong emphasis on independent, disciplinary enquiry, which will prepare students for possible future research,. In addition, it will provide a greater range of offerings than either university could alone. Students will enjoy the benefit of complementary modules and faculty from the two universities.

If your institution of primary enrolment is NUS, you will spend the first three semesters here at NUS, followed by three semesters at ANU in Canberra before returning for your final two semesters.

Upon successful completion of the JDP's requirements, students graduate with a degree of Bachelor of Arts (Honours) with the field of study recorded. The degree carries the crests of both universities and certifies the completion of Joint Degree Programme for Bachelor of Philosophy (Honours) from ANU and Bachelor of Arts (Honours) from NUS.

Admission Requirements

The JDP is restricted to six students from each institution annually.
The JDP is only offered to the Faculty of Arts and Social Sciences students in USP. Application opens in September/October and those who have indicated their interest in the programme (during February-April) will be notified. Applicants will be required to attend an interview. Successful applicants will be admitted provisionally into the JDP.

Final selection of JDP students will be made at the end of their third semester of study, based on academic performance in the first three semesters of study (CAP of at least 4.2).

Programme Requirements

Programme Structure

The curriculum structure is based upon an amalgamation of the broad-based NUS FASS/USP curriculum and the enquiry-intensive ANU Ph.B. curriculum. It follows that of the existing ANU/FOS joint B.Sc. (Hons.)/Ph.B. (Hons.). The distribution of modules is as follows:

	Major	USP	Electives	Faculty Requirements	Second Major
		NUS Modular Credits			
NUS	102	24	22	12	0
ANU	97	16	15	0	32
		ANU Credits			
NUS	122.4	28.8	26.4	14.4	0
ANU	116.4	19.2	18	0	38.4

The NUS 102 MCs Major is made up of 52 to 55 MCs of taught modules, 15 MCs Honours Thesis ('**HT**'), 12 to 15 MCs Independent Study Modules ('**ISM**'), and 20 MCs ANU Advanced Studies courses. 47-50 MCs come from either ISM, HT, or ANU Advanced Studies courses.

The ANU 97 MCs Major is made up of 30 MCs of taught modules, 40 MCs of Honours modules, a 12 MCs of ISM and 15 MCs of Advanced Studies courses. 80% of the Honours year is based on a thesis. Thus 32 MCs of thesis, plus 15 MCs of Advanced Studies courses, plus 12 MCs of ISM, mean that 59 MCs (or 60%) of the Major concentrates on independent enquiry.

NUS students must fulfill the following requirements:

- The USP modules count towards the 8 MCs of electives outside of the FASS, and 8 MCs of General Education Modules. These satisfy 16 MCs of the University Level Requirements ('**ULR**').
- NUS students must also complete 12 MCs of FASS faculty exposure requirements, that is, one exposure module (4 MCs) each from the Faculty's three divisions: Asian Studies, Humanities and Social Sciences. The requirement ensures that students have a broad, working knowledge of disciplines close to their own. (ANU students are exempted from the ULR and faculty exposure requirements, because of their need to complete a second major.)
- NUS rules for each Major about numbers of Level-2000 and Level-3000 (or equivalent) modules also apply.
- Of the Major modules for NUS students, at least 40 MCs (48 units) must be at Level-4000 (or equivalent).
- All NUS students must complete an HT, which will earn the usual number of MC for an HT in that Major.

The Vice Dean (Undergraduate), upon advice from the JDP Committee and with the agreement of the relevant department, can approve variations to the above pattern where appropriate.

Study Plans

The table below shows typical ways in which students can meet the requirements of the JDP. The distributions of Major and elective modules between the two universities may, of course, vary from student to student. In other words, a student may elect (for instance) to do a larger proportion than shown below of his/her Major at NUS or ANU.

Typical Study Plan for NUS students

NUS Students	
At NUS	
Sem 1-3 Sem 7-8	40 to 37 MCs (5 to 7 modules, including HT) in the Major 12 to 15 MCs (3 modules) independent study in the Major 24 MCs (6 modules) USP 12 MCs (3 modules) FASS requirements 12 MCs (3 modules) unrestricted electives
Total	100 MCs (120 units)
At ANU	
Sem 4-6	36 units (30 MCs; 6 courses) in the Major 24 units (20 MCs; 4 courses) Advanced Studies courses in the Major 12 units (10 MCs; 2 courses) unrestricted electives
Total	72 units (60 MCs)

Detailed Study Plan for NUS students (This is only an illustrated example)

NUS Students				
		Semester 1	**Semester 2**	**Semester 3**
Semesters 1-3	NUS	USP module USP module faculty exposure elective major module	USP module USP module faculty exposure elective major module	USP module USP module faculty exposure elective ISM
Semesters 4-6	ANU	advanced studies course major course major course elective	advanced studies course major course major course elective	advanced studies course advanced studies course major course major course

Semesters 7-8	NUS	Elective Honours Thesis ISM 3 or 4 major modules ISM	

Additional Requirements for English (English Literature)

- For NUS students, the English Literature modules must include either EN1101 or EN2101, one of EN2111, EN2112 or EN2113, and 4 modules from amongst EN322x and EN422x, of which 2 must be British Literature before 1800 (or approved ANU equivalents).

Complementary areas for NUS students at ANU include: Old English Lit, Scottish Lit, Australian Lit and Film.
Complementary areas for ANU students at NUS include: Singapore-Malaysia theatre, South Asian Lit, Diasporic Lit, Critical Theory.

Additional Requirements for History

- For NUS students, the History modules must include HY1101E and HY4101 (or approved ANU equivalents).

Additional Requirements for Philosophy

- For NUS students, the Philosophy modules must include PH1101 and PH2110.

NUS offerings in Indian and Chinese philosophy will complement the courses at ANU.

Additional Requirements for Drama (Theatre Studies)
Additional Requirements for Political Science
For NUS students, the Political Science modules must include:

1. PS1101E
2. PS3257 (or approved ANU equivalent: POL3025)
3. a minimum of ONE * from the following (Singapore Politics):
    a. PS2249 (CP)
    b. PS2244 (GPP)
    c. PS3249 (IR)
4. * The above may be used to fulfil requirement (d).
5. a minimum of ONE from each of the following subfields:
    a. Comparative Politics (CP)
    b. International Relations (IR)
    c. Political Theory (PT)
    d. Governance and Public Policy (GPP)

Note:

Content equivalence of courses (modules) within the Major shall be decided by the relevant department at NUS or the Major convenor at ANU, as it would be for a regular Student Exchange Programme. Each department (or convenor) must communicate such decisions to the JDP Committee.

Grading and Degree Requirements

The JDP requires completion of the following requirements:

- No more than 40 MCs (48 units) from courses offered at Level-1000 (or equivalent);
- A minimum of 80 MCs (96 units) from courses offered at Level-2000/Level-3000 at ANU or Level-2000-4000 at NUS;

Students are expected to maintain a CAP of at least 4.2 at NUS and an average mark of 80 at ANU. Students who fail to meet the expected CAP or average mark for more than two consecutive semesters will be required to leave the JDP, with

borderline cases referred for decision to the JDP Committee.

Students in the Scholars Programme must also fulfill one Singapore Studies (SS) requirement during his/her duration in the JDP.

Exiting the Programme

Students can choose to leave the JDP, or be asked to leave if they fail to meet and maintain requirements. Students who choose to leave the JDP are permitted to work instead for a single degree in their original home institution and faculty. Modular Credits completed during the duration of the JDP will be counted towards the fulfilment of the degree requirements of their degree at the home faculty, subject to the normal limits of the faculty curriculum.

Relevant website

Please refer to http://www.usp.nus.edu.sg/curriculum/joint_-degree/anu-fass/index.html for any updates on this JDP.

8.3 Joint Bachelor of Music from National University of Singapore and Peabody Institute of The John Hopkins University

Overview of Programme

The joint B.Mus. degree provides a best-practice Bachelor's level music education that aims to provide undergraduate music students from both YSTCM and the Peabody Institute with learning and performance experience in a global context.

The joint degree is a continuation of the agreement between the two institutions first established in 2001.

Of the total of eight semesters of undergraduate study, the proposal stipulates that students spend five semesters in their home institution and three semesters in the partner (or "host") institution. The programme will encourage those students where the joint B.Mus. degree will provide additional value to their undergraduate education by expanding the possibility for a broader instructional base not available at a single institution.

Admission Requirements

It is anticipated that the annual intake of students into the joint-B.Mus.-degree programme will be approximately three to five (3-5) students from each institution. Entering students to each institution are encouraged to declare their interest and intention in applying for the joint degree programme at the commencement of their studies. Each institution will conduct its own auditions and interviews for proposed candidates, in accordance with the standard regulations for B.Mus. entry. In particular, potential students will need to be able to articulate why the joint-degree programme will have meaning for their music educational and performance contexts. The Joint-Degree Committee must approve all potential candidates, and both institutions have the right to accept or reject candidates put forward by the Committee.

The selection process into the joint degree programme will be highly competitive, with all potential candidates interviewed and evaluated at the completion of their first year of study. Candidates will be required to demonstrate:

- Strong English language comprehension skills (both oral and written);
- Excellent first-year CAP results (generally minimum 4.1), with a proper balance of high results in both academic and practical modules;
- A strong motivation and desire to study music performance and/or composition within an international context.

A test may be administered at the time of application to assist in determining a candidate's suitability for the joint-degree programme. Final selection will be determined by the Joint-Degree Committee and the individual student's major study teacher at their home institution.

Programme Requirements

A student's period of candidature will commence at the beginning of an academic year in his/her home institution. Students at YSTCM and The Peabody Institute will normally be expected to earn their B.Mus. degree after four (4) years, or eight (8) semesters, of full-time study. Extensions of the joint-B.Mus.-degree programme are only possible for extenuating circumstances, and must be approved by both institutions. Matters related to any interruptions of study will be handled by the home institution, subject to the approval of the Joint-Degree Committee.

The joint-B.Mus.-degree programme stipulates that students spend five semesters in their home institution and three semesters in the host institution. Traditionally the study format will be as follows:

- Students will follow the standard requirements for their home institution during their first year of enrolment.
- Normally, students will then undertake study at the host institution in Semester 1 of their second year of study, and return to the home institution for Semester 2 of their second year.
- Students will then return to the host institution for their entire third year of study (both Semesters 1 and 2), and complete their study with the entire fourth year at the home institution.
- This format provides the opportunity for students to explore the joint-degree option in their second year of enrolment to evaluate the value-added benefits of overseas study.
- If at the end of Semester 1 of their second year students decide that they do not wish to continue in the joint-degree programme, they will have the option to return to the traditional programme of study at their home institution, with the "semester away" credited as an exchange semester.

As with the traditional B.Mus. programme at each institution, each student will have a major study instructor responsible for one-to-one training on their primary instrument, voice or composition, and will be supervised by at least one major-study instructor at each institution.

Candidates will follow the rules and regulations of both the host and home institutions relating to student conduct during their periods of candidature at each location, unless the Joint-Degree Committee has granted prior approval of alternative arrangements.

Students who complete the joint B.Mus. degree successfully will be awarded a joint degree scroll: Bachelor of Music. Students will have their degree conferred jointly by the home and host institutions, but will have their degree presented in the home institution. Students awarded the joint B.Mus. degree are entitled to become members of the alumni associations of both institutions.

Coursework Requirements and List of Undergraduate Modules

The module mapping for each student will be conducted on an individual basis, with a general comparative outline as follows:

PEABODY		YSTCM
55 / 134 [65.7 / 164]	MAJOR AREA - lessons, juries, recitals - ensembles	80 / 164
45 / 134 [53.7 / 164]	SUPPORTIVE COURSES IN MUSIC - Mus Concepts & Materials (20) - History (8) - Prof Dev (8) - Comm about Mus (4) - Conducting (2) + - Advanced theory electives (4) - Advanced history electives (6)	42 / 164 [w/ directed electives: 52/164]
28 / 134 [33.4 / 164]	GENERAL STUDIES - Singapore Studies (4) - Humanities/GEMS (16) + - 12 further MCs in general studies	20 / 164 [w / directed electives: 32 / 164]

6 / 134 [7.3 / 164]	ELECTIVES	22 / 164 [w / re-direction: 0/164]

Appendix A includes a generic outline mapping the module structure in the joint-degree programme at both the Peabody Conservatory and YSCTM.

Grading and Degree Requirements

Assessment of student progress shall be conducted in accordance with the academic regulations of the home institution or host institution at which the student is currently resident, unless the Joint-Degree Committee has granted prior approval with alternative arrangements. Each institution will be responsible for the assessment of students enrolled in its course. Responsibility for monitoring student progress lies with the institution at which the student is currently resident, which will submit a report each semester to the Joint-Degree Committee for oversight. The awarding of the joint BMus degree to a student will be approved by the respective authorities of both institutions.

With the exception of the Major Study lesson and the Junior Recital / Departmental Examination modules, all other modules read at the host university will be granted credit transfer without grades at the home institution. The Major Study and Junior Recital / Departmental Examination modules will be assigned a transferable letter grade, in consultation with the Joint-Degree Committee, and will additionally be assessed utilising the traditional written evaluation of performance in the major study modules.

Of the 164 equivalent module credits in the YSTCM (home) and Peabody (host) institutions, students who complete the joint degree programme will be granted credit transfer of 45 equivalent MCs, and 119 equivalent MCs as graded modules.

The transferable letter grade for the Major Study and Junior Recital / Departmental Examination modules will be evaluated as follows:

Peabody Grade	YSTCM (CAP)
A	5.0
A-	4.5
B+	4.0
B	3.5
B-	3.0
C+	2.5
C	2.0
D+	1.5
D	1.0
F	0.0

Exiting the Programme

Continuation will be based upon the normal criteria and regulations of the institution where the student is currently resident. Oversight will be undertaken by the Joint-Degree Committee. YSTCM students are expected to maintain a minimum CAP of 4.0 during their enrolment in the joint-degree programme. Any student falling below this CAP at any time during their enrolment is subject to review by the Joint-Degree Committee.

Withdrawal will follow the home institution's normal processes. If a student withdraws from the joint BMus degree, the home institution will notify the host institution.

Cases for termination must be agreed upon by the Joint-Degree Committee, as well as the home and host institutions.

Joint Degree: Yong Siew Toh Conservatory as Home Institution

Course	Name	Category	Semester	MC	
MUA1107	Ensemble	Major	1.1	4	
MUA1161	Lesson	Major	1.1	5	
MUH1115	Communicating about Music	Music Academics	1.1	2	
MUT1121	Musical Concepts and Materials I	Music Academics	1.1	6	
MUA1108	Ensemble	Major	1.2	4	
MUA1162	Lesson	Major	1.2	6	
MUH1116	Communicating about Music	Music Academics	1.2	2	
MUT1122	Musical Concepts and Materials II	Music Academics	1.2	6	
MUL2101	Critical Thinking for Musicians	General Studies	2.1	4	
MUA2107	Ensemble	Major	2.1	4	
MUA2161	Lesson	Major	2.1	5	
MUT2117	Musical Concepts and Materials III	Music Academics	2.1	4	**∑ = 23 Semester at Peabody**
MUH2115	Music and Context: Before 1800	Music Academics	2.1	4	
MUA1163	Introduction to Professional Studies	Music Academics	2.1	2	
MUL2102	Patrons of the Arts	General Studies	2.2	4	
MUA2108	Ensemble	Major	2.2	4	
MUA2162	Lesson	Major	2.2	6	These are the MC credits to be replaced with credits in courses at Peabody
MUT2118	Musical Concepts and Materials IV	Music Academics	2.2	4	
MUH2116	Music and Context: After 1800	Music Academics	2.2	4	
xxxxxxx	Electives	Electives	3.1	3	
MUL320x	Science and Technology as Artistic Innovators / Art of Ritual and Recreation	General Studies	3.1	4	
MUA3107	Ensemble	Major	3.1	4	
MUA3161	Lesson	Major	3.1	5	
MUA3105	Conducting	Music Academics	3.1	2	
xxxxxxx	Electives	Electives	3.2	3	**∑ = 40 Year at Peabody**
SSxxxx	GEM Electives	General Studies	3.2	4	
MUA3108	Ensemble	Major	3.2	4	
MUA3162	Junior Recital	Major	3.2	8	

MUAxxxx	Applied Studies Elective	Music Academics	3.x	3	
SSxxxxx	GEM Electives	General Studies	4.1	4	
SSxxxx	GEM Electives	General Studies	4.1	4	
MUA4107	Ensemble	Major	4.1	2	
MUA4161	Lesson	Major	4.1	5	
SSxxxx	Singapore Studies	General Studies	4.1	4	
SSxxxx	GEM Electives	General Studies	4.2	4	
MUA4108	Ensemble	Major	4.2	2	
MUA4132	Senior Recital	Major	4.2	12	
MUAxxxx	Applied Studies Elective	Music Academics	4.2	3	
				160	

Joint Degree: Peabody as Home Institution

Course	Name	Category	Semester	Credits	
PY.206.115	Humanities Seminar	General Studies	1.1	4	
PY.100.100	Major Lesson	Major	1.1	4	
PY.910.xxx	Large Ensemble	Major	1.1	2	
PY.710.123	Ear-training I	Music Academics	1.1	2	
PY.710.155	Keyboard Studies I	Music Academics	1.1	2	
PY.710.1xx	Music Theory 1-2	Music Academics	1.1	3	
PY.206.xxx	Humanities	General Studies	1.2	3	
PY.100.100	Major Lesson	Major	1.2	4	
PY.910.xxx	Large Ensemble	Major	1.2	2	
PY.xxx.109	Departmental Examination	Major	1.2	1	
PY.710.124	Ear-training I	Music Academics	1.2	2	
PY.710.156	Keyboard Studies I	Music Academics	1.2	2	
PY.710.1xx	Music Theory 3-4	Music Academics	1.2	3	
PY.206.xxx	Humanities	General Studies	2.1	3	**∑ =16 Semester at YSTCM**
PY.100.100	Major Lesson	Major	2.1	4	
PY.910.xxx	Large Ensemble	Major	2.1	2	
PY.710.223	Ear-training I	Music Academics	2.1	2	
PY.710.255	Keyboard Studies I	Music Academics	2.1	2	
PY.710.2xx	Music Theory 1-2	Music Academics	2.1	3	
PY.206.xxx	Humanities	General Studies	2.2	3	
PY.100.100	Major Lesson	Major	2.2	4	
PY.910.xxx	Large Ensemble	Major	2.2	2	

PY.xxx.209	Departmental Examination	Major	2.2	1	These are the credits to be replaced with credits in modules at YSTCM
PY.710.224	Ear-training I	Music Academics	2.2	2	
PY.710.256	Keyboard Studies I	Music Academics	2.2	2	
PY.710.2xx	Music Theory 3.4	Music Academics	2.2	3	
PY.206.xxx	Humanities	General Studies	3.1	3	∑ = 26 **Year at YSTCM**
PY.100.100	Major Lesson	Major	3.1	4	
PY.910.xxx	Large Ensemble	Major	3.1	2	
PY.610.xxx	Musicology	Music Academics	3.1	2	
PY.710.311	Music Theory 5	Music Academics	3.1	3	
PY.206.xxx	Humanities	General Studies	3.2	3	
PY.100.100	Major Lesson	Major	3.2	4	
PY.910.xxx	Large Ensemble	Major	3.2	2	
PY.xxx.309	Departmental Examination	Major	3.2	1	
PY.610.xxx	Musicology	Music Academics	3.2	2	
PY.xxx.xxx	General Elective	Elective	4.1	3	
PY.206.xxx	Humanities	General Studies	4.1	6	
PY.100.100	Major Lesson	Major	4.1	4	
PY.910.xxx	Large Ensemble	Major	4.1	2	
PY.950.531	Small Ensemble	Major	4.1	1	
PY.330.331	Basic Conducting	Music Academics	4.1	1	
PY.610.xxx	Musicology	Music Academics	4.1	2	
PY.xxx.xxx	General Elective	Elective	4.2	3	
PY.206.xxx	Humanities	General Studies	4.2	3	
PY.100.100	Major Lesson	Major	4.2	4	
PY.190.495	Recital	Major	4.2	2	
PY.910.xxx	Large Ensemble	Major	4.2	2	
PY.950.531	Small Ensemble	Major	4.2	1	
PY.610.xxx	Musicology	Music Academics	4.2	2	
PY.710.xxx	Music Theory Elective	Music Academics	4.2	3	
				132	

8.4 Joint Bachelor of Arts (Honours) from NUS and Bachelor of Social Sciences (Honours) in Actuarial Studies and Economics from Australian National University

For details please refer to section A3.3.4.1 of Part II of this bulletin or alternatively, please visit the following link: http://www.fas.nus.edu.sg/ecs/undergraduate/anu_nus.html

8.5 Joint Bachelor of Arts (Honours) from National University of Singapore and Bachelor of Arts (Honours) from University of North Carolina - Chapel Hill

For details please refer to section A3.3.4.3 of Part II of this bulletin or alternatively, please visit the following link: http://www.fas.nus.edu.sg/intl/JointDegree/JointBA-NorthCarolina.html

8.6 Joint Bachelor of Science (Honours) in Life Sciences from NUS and Bachelor of Science in Biology from The University of North Carolina - Chapel Hill

Overview of Programme

This joint degree programme combines the Bachelor of Science (Honours) in Life Sciences offered by the Faculty of Science, NUS, and Bachelor of Science in Biology offered by the College of Arts and Sciences, the University of North Carolina at Chapel Hill (UNC-CH), and is designed to be completed in four years, to be taught in NUS and UNC-CH. It brings together the strengths of both universities' undergraduate curricula, integrates overseas experience into the undergraduate studies, and awards a jointly validated Bachelor of Science degree qualification. NUS students will complete the requirements for an Honours class while UNC-CH students will have the option to pursue (or not to pursue) the Honours class.

Admission Requirements

Students in NUS Faculty of Science with a primary major in Life Sciences may apply to enter this programme at the end of their first year of B.Sc. (Hons.) candidature. All applicants will undergo a selection process and an interview to assess their academic performance, and aptitude and suitability for the programme, as well as other relevant criteria.

The application period and procedure will be announced every academic year.

Exiting the Programme

NUS students in this programme must maintain a CAP of 4.00 or above (out of 5.00) for the Bachelor of Science degree. A student whose CAP falls below 4.00 for two consecutive semesters will be required to leave the programme, resulting in a termination to the JDP candidature. The student may then resume and complete the default B.Sc. (Hons.) degree in NUS.

NUS students in this programme can also choose to withdraw and continue with the default B.Sc. degree study.

The withdrawal and termination processes will follow the prevailing practices of the home university. Students who withdraw or are terminated from the programme would only transfer the credits but not grades of the modules read at the partner university.

Relevant website

For more information, please visit http://www.lifesciences.nus.edu.sg

8.7 Concurrent Programme in Bachelor of Computing (Computer Science) from NUS and Master of Entertainment Technology from Carnegie Mellon University

Overview of Programme

This is a fast-track programme that allows talented and passionate students to obtain the Bachelor of Computing (B.Comp.) in Computer Science degree from NUS and a Master of Entertainment Technology (M.E.T.) degree from Carnegie Mellon University (CMU) within five years.

Successful applicants will spend three-and-a-half years in NUS to complete the bachelor degree and the next one-and-a-half years at campuses of the Entertainment Technology Centre (ETC-Global) located in the United States, Australia and

Korea to complete the M.E.T. degree. If the degrees were pursued separately, the B.Comp. programme takes four years to complete, and the M.E.T. two years.

Students who meet selection criteria may also gain full scholarship support from the Infocomm Authority of Singapore (IDA) under its National Infocomm Scholarship (NIS) scheme.

Students will also build up a portfolio of work as the programme emphasises project work, which is much valued in the interactive digital industry. Alumni of the ETC are known to be much sought after by the digital media industry, as well as museum and theme park companies.

Partner University: ETC of CMU

ETC of CMU is a leading institution in the world for training in interactive digital media installations and technology. Trainees undergo a rigorous project-based curriculum where they work in teams in highly creative environments. ETC currently has its headquarters in Pittsburgh, USA, and other operational campuses in Adelaide, Australia/Seoul, Korea/L.A., USA. Trainees are encouraged to travel to interesting sites all over the world, and work with first-hand perspective on projects. Adventurous projects often lead to start-up companies or starting points for Ph.D. research in renowned universities.

Admission Requirements

Selection criteria

Students will be admitted directly to the Concurrent Programme during their application to undergraduate admission to NUS via: http://www.nus.edu.sg/oam/. These students will be selected on the basis of their GCE ‘A’ Level grades or equivalent, and their interest profiles in creative projects and activities. An interview will be conducted to assess the potential and suitability of students for this concurrent programme.

Computing students who are not granted direct entry into this concurrent programme but are accepted into the School as part of the general Bachelor in Computing cohort may apply to the programme after their first year of studies. The call for applications will be announced to all existing students at an appropriate time. These students must demonstrate strong academic ability (gaining a CAP of 4.0 and above) and creative talent in their first year of studies with the School. They must also meet all criteria of the Concurrent Programme for B.Comp. Admission of these students is subject to the size constraint of the Concurrent Programme.

Subject Prerequisites

GCE ‘A’ Level Pass in Mathematics and either GCE ‘A’ Level Pass in Computing or GCE ‘A’ Level Pass in Physics or GCE ‘A’ Level Pass in Chemistry.

Applicants must first make an online application with the NUS Office of Admissions at:
http://www.nus.edu.sg/oam/apply/cata/

After the online application is made, the following documents must be submitted to the School:

1. Academic Performance documents: Copy of GCE ‘A’ Level consolidated results;
2. Curriculum Vitae: concise, tabular, less than four pages;
3. Statement of intent: an essay on why you are suitable for the concurrent programme;
4. Portfolio: academic and personal projects submitted in non-returnable CD form; highlighting the important aspects of each demo item.

Instructions for submission of supporting documents:

- Please do not submit original certificates or official documents; send the photocopies instead.
- Please write your name and application number on all documents.
- Please enclose an English translation for any supporting document that is not in English.
- Please write your application number and ‘M.E.T.’ on the top left-hand corner of the envelope.

- Please send the documents to:

  The Administrator (B.Comp.-M.E.T.)
  School of Computing
  National University of Singapore
  Computing 1, #03-68
  13 Computing Drive
  Singapore 117417

Programme Requirement

The programme structure comprises the modules and requirements of both the B.Comp. in Computer Science (CS) programme, and the M.E.T. programme. The details are listed at http://www.comp.nus.edu.sg/undergraduates/cdp_carnegie_CS.html

Grading and Degree Requirements

Students in this concurrent programme must maintain a CAP of 4.00 or above out of 5.00 and/or demonstrate strong creative talents.

Exiting the Programme

Students who fail to meet the criteria will not be allowed to remain in the Concurrent Programme, but may continue with their B.Comp. studies at NUS.

Further Enquiry

Please direct all queries to socug@comp.nus.edu.sg with the subject clearly marked: “Concurrent Programme in Interactive Digital Media with CMU-ETC”.

Relevant website

Please refer to: http://www.comp.nus.edu.sg/undergraduates/cdp_carnegie_CS.html.

8.8 Concurrent Programme in Bachelor of Laws / Graduate Bachelor of Laws (Honours) from NUS and Master of Laws from New York University School of Law

The LL.B./Graduate LL.B. - LL.M. programme allows current NUS law students in the four-year LL.B. programme and three-year Graduate LL.B. programme to seek early admission to the Master of Laws (LL.M.) programme at NYU School of Law. The four-year LL.B. programme will commence the LL.M. in their fourth year of studies and the three-year Graduate LL.B. programme will commence the LL.M. in their sixth semester of studies. Upon completion of the LL.M. requirements, students will receive the NUS LL.B. and the NYU LL.M.

For more information, please refer to http://law.nus.edu.sg/student_matters/llb_prog/nyu_nus_llb_llm.html.

8.9 Bachelor of Laws / Graduate Bachelor of Laws (Honours) from NUS and Juris Doctor from New York University School of Law

Launched in 2008, this double degree programme will allow NUS law students in the four-year LL.B. programme to spend their fourth year, plus one additional year, at NYU School of Law and receive the J.D. degree. The J.D. is a first degree in law in the United States and is read as a graduate degree. Students in the three-year Graduate LL.B. Programme at NUS will be able to spend their third year, plus one additional year, at NYU and receive the J.D. degree.

For more information, please visit: http://www.law.nus.edu.sg/student_matters/llb_prog/nyu_nus_llb_jd.html

8.10 Bachelor of Laws (Honours) from NUS and Master of Laws from Boston University School of Law

The LL.B.-LL.M programme allows NUS law students in the four-year LL.B. programme to complete three years at NUS law, then go to Boston to read LL.M. in American Law for one year, on a fee waiver basis. Upon successful completion of the LL.M. at Boston, NUS law students will graduate with an LL.B. from NUS, and an LL.M. in American Law from Boston.

For more information, please visit: http://law.nus.edu.sg/student_matters/llb_prog/boston_nus_llb_llm.html

8.11 Bachelor of Arts (Honours) / Bachelor of Science (Honours) from NUS and Bachelor of Arts in International Liberal Studies from Waseda University

Overview of Programme

The University Scholars Programme (USP) offers a five-year Double Degree Programme (DDP) between Bachelor of Arts (Honours)/ Bachelor of Science (Honours) of NUS and Bachelor's degree of Waseda University. It is only offered to Faculty of Arts and Social Sciences and Faculty of Science students in USP.

The DDP provides opportunities for up to five students from NUS' USP and Waseda University's School of International Liberal Studies (SILS) to study at the partner institution in each year that the DDP is run.

Waseda is one of the best universities in Japan and is regarded as one of Japan's top two private universities. SILS is a small select college within Waseda that has a wealth of student opportunities. SILS itself has a strong emphasis on internships and other activities (such as community and volunteer work) that will take the students outside the university. The underlying philosophy at SILS includes a global outlook emphasising intercultural understanding.

NUS students who successfully complete the DDP will be issued with a Bachelor of Arts (Honours) or a Bachelor of Science (Honours) from NUS and a Bachelor's degree from Waseda University. Waseda students who successfully complete the DDP will be issued with a Bachelor of Arts or a Bachelor of Science from NUS and a Bachelor's degree from their home institution.

Admission Requirements

Application opens in the first quarter of each calendar year, for students in their first year of study. The DDP is only offered to Faculty of Arts and Social Sciences and Faculty of Science students in USP. Students who are interested to apply to this DDP are expected to submit a study plan detailing the fulfilment of the relevant graduation requirements.

Programme Requirements

Programme Structure

The DDP requires NUS students to take a total of 200 MCs. For NUS students, 120 MCs will be earned at NUS and 80 MCs will be earned at Waseda towards a Bachelor's (Honours) degree from NUS and a Bachelor's degree from Waseda. Waseda University offers a four-year degree programme without an Honours structure.

To be awarded an NUS degree, both NUS and Waseda students have to satisfy minimum requirements for the grades received in NUS modules and the credits (but not grades) earned from Waseda modules.

NUS students on this DDP will spend two years at Waseda, during their third and fifth year of study. An NUS student must satisfy the equivalent of 160 MCs to graduate with a NUS Bachelor's (Honours) degree. Of the total 160 MCs, 120 MCs will be read in NUS in Year One, Year Two, and Year Four, and 40 MCs will be double-counted Waseda credits earned in Year Three. The distribution of these credits is indicated in the below table. The 40 MCs earned at Waseda in Year Five will not be used to satisfy the NUS degree requirements.

The major and faculty requirements for each major, as listed in the NUS Bulletin, will be satisfied through the 120 MCs read in NUS along with some modules read in Year Three at Waseda that are mapped back to major and faculty requirements at NUS. Only a maximum of 12 MCs can be mapped back to major requirements at NUS. Programme approval will be required prior to the student taking such modules at Waseda.

The grading and classification of the Bachelor's (Honours) degree at NUS will be based upon the 120 MCs earned at NUS and credit (not grade) transfer for the 40 MCs earned in Waseda in Year Three.

NUS students are required to take 16 MCs of Intensive Japanese, 8 MCs during Year Three and 8 MCs during Year Five.

	Year 1	Year 2	Year 3	Year 4	Year 5
Total credits at NUS	40	40	0	40	0
Total credits at Waseda	0	0	40	0	40
Faculty requirements			0 to 8		
Major requirements			12 to 4		
Singapore Studies			0		
Breadth			4		
General Education			0		
Unrestricted electives (including 8 MCs USP)			16		
Japanese Language			8 (Intensive Japanese I)		8 (Intensive Japanese II)

Grading and Degree Requirements

The DDP requires completion of 200 MCs, with 120 MCs from NUS and 80 MCs from Waseda. Students selected for the DDP are required to maintain a CAP of at least 4.0 for modules taken in NUS to stay in the programme. Those who fail to maintain a CAP of 4.0 over two semesters will be required to withdraw from the DDP.

Exiting the Programme

Students can choose to leave the programme, or be asked to leave if they fail to meet and maintain requirements. Students who choose to leave the programme are permitted to work instead for a single degree in their primary institution of enrolment and faculty. Modular Credits completed during the duration of the DDP are counted towards the fulfilment of their degree requirements at the home faculty, subject to the normal limits of the faculty curriculum.

Relevant website

Please refer to http://www.usp.nus.edu.sg/curriculum/cultural-immersion/waseda/index.html for any updates on this DDP.

8.12 Bachelor/Master of Engineering or Science or Computing from NUS and Diplome d'Ingenieur from French Grande Ecole (the equivalent of Masters in France)

For details please refer to section C3.3.4 (for School of Computing), section F3.5.4.4 (for Faculty of Engineering) and section K3.6.7 (for Faculty of Science) of Part II of this bulletin, or alternatively, please visit the following link: http://www.fddp.nus.edu.sg

8.13 Concurrent Programme in Bachelor of Computing (Computer Science) from NUS and Scientiae Magister in Computer Science from Brown University

Overview of Programme

This is a fast–track programme that allows deserving students to obtain the Bachelor of Computing (Computer Science) degree from NUS and a Scientiae Magister in Computer Science from Brown University within five years. It offers an opportunity for students to integrate professional development with a rich international experience.

The programme commenced in August 2011, with an expected intake of five to ten students annually.

Partner University: Department of Computer Science of Brown University

The Department of Computer Science, Brown University has an excellent reputation for innovative education and research, and for the tight interaction of theory and practice of Computer Science. It offers one of the leading computer science programme in the US, as ranked by US's National Research Council.

Admission Requirement

Direct Admissions

Students may enter the concurrent degree programme at any point during their undergraduate study at NUS although it is preferred that they declare their interest upon matriculation at NUS.

Candidates applying for admission to NUS can also apply for direct admission to this programme. They will be chosen on the basis of their A-level or diploma grades (or equivalent), their interest profile in computer science, and a personal interview designed to judge their potential and suitability for the programme.

During their course of study at NUS, students in the programme must maintain a high level of performance as judged by a joint committee. Students who do not meet this standard will be moved to the standard Bachelor of Computing in Computer Science at NUS. Admission to the Master's degree component of the programme, granted by the Graduate School at Brown University, will be based on the student's academic performance, GRE examination scores and recommendations of the joint committee.

In-Progress Admissions

Students who have not opted for direct admission, but are admitted to SoC-NUS, may also declare their interest at NUS matriculation. Selection criteria for these students will be similar to those for direct admission.

Existing Bachelor of Computing in Computer Science students who have demonstrated strong academic abilities may be allowed to enter the programme at any stage of their study at NUS. These students are required to meet all the requirements of the programme.

Programme Requirement

The programme structure comprises the modules and requirements of both the B.Comp. in Computer Science, and the Scientiae Magister in Computer Science programmes.

1. **B.Comp. (CS) Programme Requirement**

The details of B.Comp. (CS) requirements (including the two special programmes in Computer Science) can be found at: http://www.comp.nus.edu.sg/undergraduates.

2. **Scientiae Magister in Computer Science Degree Structure**

The programme requirements consist of a basic component and an advanced component:

Basic component (six courses):

1. Two must be CS courses that form a coherent major,
2. One must be a CS course that complements the major., and
3. Three additional courses must be in CS or related areas

Here, “coherent” refers to a pair of intimately related courses (e.g., a sequence, or same subject matter) whereas “complementary” indicates a less strong relatedness, but still a meaningful pairings. Such relations are dynamic and sanctioned by the department: the current version is clearly spelled out in the table Sample Curricula for the Sc.M. degree (from the Master's programme website).

Please visit: http://www.comp.nus.edu.sg/undergraduates/samplecurriculum_ScM.pdf for a sample.

Finally, of these courses, at least two must be at the level-200(advanced graduate) offered by the Department of Computer Science, other than reading and research.

Advanced component (two courses):

A student must choose one of the following three options:

1. A research thesis (typically, involving two semesters of reading and research) directed by an advisor.
2. A project, involving either a software implementation (typically, involving two semesters of reading and research under an advisor).
3. Two additional 200-level courses in CS or related areas.

Grading and Degree Requirements

Continuation Criteria

Students in this concurrent programme must maintain a CAP of 4.00 or above (out of 5.00) for their B.Comp. requirements.

Award of Degree

Students must fully satisfy the concurrent B.Comp. in Computer Science and the Scientiae Magister in Computer Science degree requirements before they are simultaneously conferred both degrees. Under no circumstances would a student be conferred the Brown degree before both degree requirements are fully satisfied.

Exiting the Programme

A student whose CAP falls below 4.00 for two consecutive semesters in NUS will not be allowed to remain in the concurrent programme, but may continue with his B.Comp. study at NUS.

Tuition Fees at Brown University

Students will pay Brown tuition fees during the time they undertake instruction at Brown in partial fulfillment of the requirements of the concurrent degree. They will also provide their medical insurance coverage.

Applicants pursuing this concurrent programme are encouraged to take up the National Infocomm Scholarship which is offered by the Infocomm Development Authority of Singapore.

Further Enquiry

Please direct all queries to socug@comp.nus.edu.sg with the subject clearly marked: "Concurrent Programme in Computer Science with Brown University".

Relevant website

Please refer to: http://www.comp.nus.edu.sg/undergraduates/cdp_cs_brown.html.

8.14 Concurrent Programme in Bachelor of Computing (Computational Biology) of NUS and Scientiae Magister in Computer Science - Computational Biology track of Brown University

Overview of Programme

This is a fast–track programme that allows deserving students to obtain the Bachelor of Computing (Computational Biology) degree from NUS and a Scientiae Magister in Computer Science – Computational Biology track from Brown University within five years. The programme aims to educate Computer-Scientists/ Computational-Biologists in the foundations and the technology of Bioinformatics in its broadest connotation. Brown University has an excellent reputation for innovative education and research, and for the tight interaction of theory and practice. Graduates involved in the programme will play a major role in developing biotechnology industries and know-how, spanning therapeutics, diagnostics, translational medicine, and fundamental research.

The programme will accept an intake of five to ten students annually.

Partner University: Department of Computer Science of Brown University

The Department of Computer Science, at Brown University has an excellent reputation for innovative education and research, and for the tight interaction of theory and practice. A decade ago, it established an undergraduate degree in Computational Biology, presumed to be one of the first such degrees in the world. Recently, the CS Department has been the driving force in the establishment of the Center for Computational Molecular Biology (CCMB), an interdisciplinary academic unit spanning several departments (including Computer Science), which are central to this emerging area. The mission of the CCMB is to establish Brown as a leader in research and in the training of computational biologists.

Admission Requirements

Direct Admissions

Students may enter the concurrent degree programme at any point during their undergraduate study at NUS although it is preferred that they declare their interest upon matriculation at NUS.

Candidates applying for admission to NUS can also apply for direct admission to this programme. They will be chosen on the basis of their ‘A’-level grades (or equivalent), their interest profile in bioinformatics/ computational biology, and a personal interview designed to judge their potential and suitability for the programme.

During their course of study at NUS, students in the programme must maintain a high level of performance as judged by a joint oversight committee. Students who do not meet this standard will be moved to the standard Bachelor of Computing in Computational Biology programme at NUS. Admission to the Master's degree component of the programme, granted by the Graduate School at Brown University, will be based on the student's academic performance, GRE examination scores and recommendations of the joint oversight committee.

In-Progress Admissions

Students who have not opted for direct admission, but are admitted to SoC-NUS, may also declare their interest at NUS matriculation. Selection criteria for these students will be similar to those for direct admission.

Existing Bachelor of Computing in Computational Biology students who have demonstrated strong academic abilities may be allowed to enter the programme at any stage of their study at NUS (subject to size constraints). These students are required to meet all the requirements of the programme.

Programme Requirements

The programme structure comprises the modules and requirements of both the B.Comp. in Computational Biology, and the

Scientiae Magister in Computer Science programmes.

A. Programme Structure of the Concurrent Programme in Computational Biology

Table 1 : Bachelor of Computing in Computational Biology Degree Structure

Modules		MCs	Subtotals
UNIVERSITY LEVEL REQUIREMENTS			20
PROGRAMME REQUIREMENTS			120
Common Essentials			
CS1010	Programming Methodology[1]	4	
CS1020	Data Structures and Algorithms I[2]	4	
CS2010	Data Structures and Algorithms II[2]	4	
CS2100	Computer Organisation	4	
CS2102	Database Systems	4	
CS2103T	Software Engineering[3]	4	
CS2105	Introduction to Computer Networks	4	
Major Requirements			
Level-1000 CS and LS major requirements			
CS1231	Discrete Structures	4	
LSM1101	Biochemistry and Biomolecules	4	
LSM1102	Molecular Genetics	4	
MA1101R	Linear Algebra I	4	
MA1102R	Calculus	4	
Level-2000 requirements	CS and LS major		
CS2220	Introduction to Computational Biology	4	
CS2101	Effective Communication for Computing Professionals	4	
LSM2101A LSM2102A LSM2103	Metabolism and Regulation or Molecular Biology or Cell Biology	4	
LSM2201A or LSM2202A	Experimental Biochemistry Experimental Molecular and Cell Biology	4	
ST2334	Probability and Statistics[4]	4	
Level-3000 requirements	CS and LS major		
CS3230	Design & Analysis of Algorithms	4	
CS3225 MA3259	Combinatorial Methods in Bioinformatics or Mathematical Methods in Genomics	4	
LSM3231	Protein Structure and Function	4	
Level-3000 Electives[5]; Choose any three from the following:			
CS3103	Computer Networks and Protocols[6]		
CS3225 or	Combinatorial Methods in Bioinformatics		

MA3259	Mathematical Methods in Genomics	12	
CS3240	Interaction Design		
CS3241	Computer Graphics		
CS3243	Introduction to Artificial Intelligence		
CS3244	Machine Learning		
Level-4000 CS and LS major requirements			
CS4220	Knowledge Discovery Methods in Bioinformatics	4	
LSM4241	Functional Genomics	4	
Industrial Experience Training[7] Sufficient number of modules from CB Elective Course List[8]		20	**20**
UNRESTRICTED ELECTIVES[9]			20
Grand Total			160

Note 1:
CS1010 can be replaced by CS1101S Programming Methodology.

Note 2:
CS1020 (4 MCs) and CS2010 (4 MCs) can be replaced by CS2020 Data Structures and Algorithms Accelerated (6 MCs). The remaining 2 MCs will be added to the Unrestricted Electives Requirements.

Note 3:
Students taking CS2103T Software Engineering must take CS2101 Effective Communication for Computing Professionals in the same semester. Students who are taking IEM1201x or IEM2201xmodule on grade basis in place of CS2101 will take CS2103 instead.

Note 4:
Students should choose ST2131 (Probability) and ST2132 (Mathematical Statistics) in place of ST2334 (Probability and Statistics) if they plan to pursue higher level statistics modules.

Note 5:
With the special permission from the UROP coordinator and Computational Biology Programme Coordinator, CP3208/CP3209 Undergraduate Research in Computing I/II can be used to replace two of the Level-3000 Computational Biology electives if the project is on Computational Biology.

Note 6:
Students who take CS3103 (Computer Networks and Protocols) must also take CS3103L (Computer Networks Laboratory).

Note 7:
Please refer to Section 3.2.6 for the details on Industrial Experience Training for students in the Department of Computer Science. Students doing this concurrent degree may opt to replace Industry Experience Training by CP4101 B.Comp. Dissertation.

Note 8:
The Computational Biology (CB) Elective Course List may be revised from time to time to include new Computational Biology electives that are introduced and approved by the Department of Computer Science.

Note 9:
Students are required to read CM1121 Basic Organic Chemistry, and PC1432 Physics IIE towards Unrestricted Electives.

B. Scientiae Magister in Computer Science – Computational Biology track (ScM-CS Compbio) Degree Structure

The course requirements consist of two components (comprising eight Brown courses):

I. Basic component (six courses):

1. Two level-100 or higher courses in Computational Genomics,
2. Two level-100 or higher courses in another area in Bioinformatics/Computational Biology, and
3. Two additional level-100 or higher courses, one of which requires "significant programming", and the other, under normal circumstances, is a rotation in a Life Sciences laboratory.

Of these courses, at least two must be at the level-200 (advanced graduate) offered by the Department of Computer Science, other than reading and research.

II. Advanced component (two courses):

A student must choose one of the following three options:

1. A research thesis (typically, involving two semesters of reading and research) in a CCMB-approved area directed by a CCMB advisor.
2. A project, involving either software implementation or laboratory work (typically, involving two semesters of reading and research under a CCMB advisor).
3. Two additional level-200 courses, selected in consultation with the assigned academic advisor to balance Computer-Science/Computational-Biology expertise.

Finally, students are expected to participate in the seminar programme organised by the CCMB, both as audience and as occasional speakers.

C. List of Brown modules that can be double counted towards B.Comp. Requirements

ScM-CS Compbio modules can be taken in replacement of either Level-3000 or Level-4000 B.Comp. in Computational Biology modules. Only a maximum of three ScM-CS Compbio modules can be used for double counting towards both degrees.

ScM-CSCompbio modules		In replacement of B.Comp. in Comp.Bio. modules	
CSCI1680	Computer Network	CS3103	Computer Networks and Protocols
CSCI1810 CSCI1950-L CSCI1950-Z	Computational Molecular Biology or Algorithmic Foundations of Computational Biology or Computational Methods for Biology	CS3225 MA3259	Combinatorial Methods in Bioinformatics or Mathematical Methods in Genomics
CSCI1230	Intro to Computer Graphics	CS3241	Computer Graphics
CSCI1410	Intro to AI	CS3243	Introduction to Artificial Intelligence
CSCI1950F	Intro to Machine Learning	CS3244	Machine Learning
CSCI1380	Distributed Computer Systems	CS4231	Parallel and Distributed Algorithms
CSCI1950-J	Introduction to Computational Geometry	CS4235 CS5237	Computational Geometry or Computational Geometry and Applications
CSCI1430	Introduction to Computer Vision	CS4243	Computer Vision and Pattern Recognition
CSCI1460(CS146)	Introduction to Computational Linguistics	CS4248	Natural Language Processing
CSCI2500-A (CS250)	Advanced Algorithms	CS5206	Foundation in Algorithms

Grading and Degree Requirements

Continuation Criteria

Students in this concurrent programme must maintain a CAP of 4.00 or above (out of 5.00) for their B.Comp. requirements.

Award of Degree

Students must fully satisfy the concurrent B.Comp. in Computational Biology and the Scientiae Magister in Computer Science degree requirements before they are simultaneously conferred both degrees. Under no circumstances would a student be conferred the Brown degree before both degree requirements are fully satisfied.

Exiting the Programme

A student whose CAP falls below 4.00 for two consecutive semesters in NUS will not be allowed to remain in the concurrent programme, but may continue with his B.Comp. study at NUS.

Tuition Fees at Brown University

Students will pay Brown tuition fees during the time they undertake instruction at Brown in partial fulfillment of the requirements of the concurrent degree. They will also provide their medical insurance coverage.

Admissions by B.Sc.(Computational Biology) students

Faculty of Science Computational Biology students are also eligible to apply for admission to this concurrent degree programme at any time during their study if they meet the following criteria[7]:

- A CAP of at least 4.00;
- Must have read the following Computer Science related modules on top of the B.Sc. (Computational Biology) degree requirements – CS2100 Computer Organisation, CS2102 Database Systems and CS3230 Design and Analysis of Algorithms.

Note 7:
Admission application will be considered by the Joint Committee of this concurrent programme. The Joint Committee reserves the right to adjust the special admission criteria to ensure the readiness of students in admitting to the Scientiae Magister in Computer Science – Computational Biology track.

Further Enquiry

For School of Computing students, please direct your queries to bcomp@comp.nus.edu.sg with the subject clearly marked: “Concurrent Programme in Computational Biology with Brown University”.

For Faculty of Science students, please send your queries to Computational Biology Programme mailbox at compbio@nus.edu.sg.

Relevant website

Please refer to: http://www.comp.nus.edu.sg/undergraduates/cdp_brown.html

8.15 Concurrent Programme in Bachelor of Computing (Electronic Commerce) from NUS and Master of Science (Engineering and Technology Innovation Management) of Carnegie Mellon University

Overview of Programme

This fast–track 4.5-year programme allows students to graduate with a Master degree in Engineering and Technology Innovation Management (thereafter called MS (E&TIM)) from Carnegie Mellon University (CMU) and a Bachelor degree in Electronic Commerce (hereafter called B.Comp. (EC)) from NUS. Students get a global education within 3.5 years at NUS

and 1 year at Carnegie Mellon University. To apply for this programme, students must apply for Computing (Electronic Commerce), offered by the School of Computing, NUS. They can apply for direct admission to this programme. They will be chosen on the basis of their A-level grades (or equivalent), their interest profile in electronic commerce studies, and a personal interview designed to judge their potential and suitability for the programme.

Students will complete 144 modular credits (equivalent to 36 modules) of the B.Comp. (EC) programme before they proceed to complete MS (E&TIM) at CMU. Sixteen modular credits (equivalent to 4 modules) will be counted against the modules in MS (E&TIM). Students who have successfully completed the stipulated four modules in the MS (E&TIM) programme will be awarded B.Comp. (EC) from NUS. At the end of the MS (E&TIM) programme, the students will be conferred the second degree – MS (E&TIM) from CMU. The intake to this B.Comp. (EC) – MS (E&TIM) concurrent programme will be limited by agreement between CMU and NUS.

Partner University: College of Engineering, Carnegie Mellon University

The Carnegie Mellon University's College of Engineering ranks among the leaders in the world for engineering research and education. It offers a five-year joint bachelor's and master's degree in all five of the traditional majors, in addition to an accelerated master's programme in Engineering & Technology Innovation Management.

Admission Requirements

The admission and progress criteria comply with the requirements established by both CMU and NUS. A joint steering committee comprising at least one faculty representative from each of the two universities will oversee the programme. Students may enter the concurrent degree programme at any point during their undergraduate study at NUS although it is preferred that they declare their interest at the NUS matriculation.

Direct admission

Local applicants with A-level certificate or its equivalent can apply for direct admission to this programme when they submit their undergraduate admission applications to NUS via http://www.nus.edu.sg/oam/. **Applicants must select the 'Computing (Information Systems Courses)' course before they can view the Concurrent Programme among the available choices.** They will be chosen on the basis of their A-level grades (or equivalent) or polytechnic diploma grades, their interest profile in electronic commerce studies, and a personal interview designed to judge their potential and suitability for the programme.

During their course of study at NUS, students in the programme must maintain a high level of performance (CAP 4.20 and above) as judged by a joint steering committee. Students who do not meet this standard will be moved to the standard B.Comp. (EC) programme at NUS. Admission to the Master's degree component of the programme, granted by the College of Engineering at CMU, will be based on the student's academic performance, and recommendations of the joint steering committee. Students will apply to CMU for admission to the MS (E&TIM) degree component of the Programme during the May-August period immediately preceding the CMU Spring semester in which the student is expected to commence the MS (E&TIM) degree component of the Programme at CMU

In-progress admission

Students who have not opted for direct admission, but are admitted to SoC's Computing (Information Systems courses) at NUS, may also declare their interest at the NUS matriculation. Selection criteria for these students will be similar to those for direct admission.

Electronic Commerce students who are not granted direct entry into this Concurrent Programme but are accepted into the Department of Information Systems, may apply to the programme after their first year of studies. The call for applications will be announced to all existing students at an appropriate time. These students must demonstrate strong academic ability (gaining a CAP of 4.20 and above) and meet all criteria of the Concurrent Programme for B.Comp. (EC). Admission of these students is subject to size constraints of the Concurrent Programme.

Existing B.Comp. (EC) students who have demonstrated strong academic abilities may be allowed to enter the programme at any stage of their study at NUS (subject to size constraints). These students are required to meet all the requirements

of the programme. Admission to the Master's degree component of the programme, granted by the College of Engineering at CMU, will be based on the student's academic performance, and recommendations of a joint selection committee. Students will apply to CMU for admission to the MS (E&TIM) degree component of the Programme during the May-August period immediately preceding the CMU Spring semester in which the student is expected to commence the MS (E&TIM) degree component of the Programme at CMU.

Programme Requirements

This concurrent programme combines the Bachelor in Computing (Electronic Commerce) offered by the School of Computing, NUS, and MS in Engineering & Technology Innovation Management offered by the College of Engineering, Carnegie Mellon University, USA.

B.Comp.(Electronic Commerce) Programme

Table 2 gives the degree structure of the Bachelor of Computing in Electronic Commerce programme.

Table 2: Summary of degree requirements for B.Comp. (EC)

Modules	MCs	Sub totals
UNIVERSITY LEVEL REQUIREMENTS		**20**
PROGRAMME REQUIREMENTS		**120**
Core Modules	***60***	
CS1010J Programming Methodology	4	
CS1020 Data Structures and Algorithms I	4	
IS1103 Computing and Society	4	
IS1105 Strategic IT Applications	4	
IS1112 E-Business Essentials	4	
IS2101 Business and Technical Communication	4	
IS2150 E-Business Design and Implementation	4	
CS3240 Interaction Design	4	
IS3230 Principles of Information Security	4	
IS3150 Digital and New Media Marketing	4	
IS4150 Mobile and Ubiquitous Commerce	4	
IS4102 E-Business Capstone Project	8	
IS4260 E-Commerce Business Models	4	
ST1131 Introduction to Statistics	4	
Programme Electives (PE)	**48**	
Students are required to choose 2 out of the 4 modules in this list: CS4880 Digital Entrepreneurship IS3220 Service Science IS3240 Economics of E-Business IS3241 Enterprise Social Systems	8 (All modules are 4 MCs).	
Students are required to choose 3 modules from this list of School of Business modules: ACC1002X Financial Accounting ACC2002 Managerial Accounting BSP1004X Legal Environment of Business BSP1005X Managerial Economics DSC2006 Operations Management DSC3201 Supply Chain Management FIN2004 Finance MNO1001X Management and Organisation	12 (All modules are 4 MCs).	

	MKT1003X	Principles of Marketing		
	MKT2412	Global Marketing		
	TR2201	Entrepreneurial Marketing		
	TR2202	Technological Innovation		
	TR3001	New Product Development		
Programme Electives **Option 1:** Choose 7 modules from the Programme Elective List below to make up 28 MCs. 3 of the 7 modules must be at level-4000. **Option 2:** Choose CP4101 and 4 modules from Programme Elective List below to make up 28 MCs.			28 (All modules are 4 MCs, except CP4101 (12 MCs)).	
	CP4101	B.Comp. Dissertation		
	CS3235	Computer Security		
	IS3221	Enterprise Resource Planning Systems		
	IS3222	IT and Customer Relationship Management		
	IS3223	IT and Supply Chain Management		
	IS3242	Software Quality Management		
	IS3243	Technology Strategy and Management		
	IS3250	Health Informatics		
	IS3260	Gamification for Organisations and Individuals		
IS3261	Mobile Apps Development for Enterprise			
	IS4224	Service Systems		
	IS4225	Strategic IS Planning		
	IS4226	IT Outsourcing and Offshoring Management		
	IS4227	Enterprise Service Oriented Architecture		
	IS4228	Information Technologies in Financial Services		
	IS4231	Information Security Management		
	IS4232	Topics in Information Security Management		
	IS4233	Legal Aspects of Information Technology		
	IS4234	Control and Audit of Information Systems		
	IS4240	Business Intelligence Systems		
	IS4241	Social Media Network Analysis		
	IS4243	Information Systems Consulting		
	IS4250	Healthcare Analytics		
	IS4010	Industry Internship Programme[#]	12	
UNRESTRICTED ELECTIVES				20
Grand Total				160

Note:

#: Students can choose to take on any current 12 MCs or more internship-related programmes within the School of Computing (e.g., CP3880 Advanced Technology Attachment Programme (ATAP)) and/or within NUS (e.g., Innovative Local Enterprise Achiever Development (iLEAD) and NUS Overseas College (NOC)) will be recognized as having fulfilled IS4010 Industry Internship Programme.

MS (E&TIM) Programme at Carnegie Mellon University

The Engineering and Technology Innovation Management MS programme builds upon the technical strengths of engineers and scientists by providing frameworks to lead, foster and manage technical innovation. This unique, cross-cutting approach allows students to develop capabilities for leading innovation while growing and leveraging their own areas of technical expertise.

E&TIM is a one-year interdisciplinary MS programme offered by Carnegie Mellon's distinguished College of Engineering, one of the top ten engineering schools in the country. It is coordinated by the Department of Engineering and Public Policy with collaboration from other schools, including the Heinz School of Public Policy and Management, the Department of Social & Decision Sciences (in the College of Humanities & Social Sciences) and the Tepper School of Business.

The one-year programme runs from January to December and includes a summer internship. The details of the Masters programme can be found at: http://www.cit.cmu.edu/etim/Structure.htm.

Grading and Degree Requirement

Students are required to complete 144 modular credits (equivalent to 36 modules) of the B.Comp. (EC) programme before they can register for the MS (Engineering and Technology Innovation Management) from Carnegie Mellon University. Students need to complete at least one internship before going to CMU. This can be done latest by the May vacation period in their third year of B.Comp. (EC) programme. Exception may be allowed on a case-by-case basis if students have other prior working experience.

Students who have satisfied the core requirements of the MS (E&TIM) programme namely, Managerial and Engineering Economics, The Strategy and Management of Technological Innovation, Product/Process Project Course, and the Innovation Management in Practice Seminar will be considered as having successfully completed the 4 remaining modules required for the B.Comp. (EC) programme. These modules correspond to IS3240 Economics of E-Business, IS3243 Technology Strategy and Management, and two programme electives of the B.Comp. (EC) programme respectively.

Continuation Criteria

Students in this concurrent programme must maintain a CAP of 4.20 or above (out of 5.00) for their B.Comp. requirements.

Award of Degree

Students who satisfy the concurrent B.Comp. (Electronic Commerce) – MS (Engineering and Technology Innovation Management) degree requirements will be conferred both degrees.

Exiting the Programme

A student whose CAP falls below 4.20 for two consecutive semesters in NUS will not be allowed to remain in the concurrent programme, but may continue with his/her B.Comp. (EC) study at NUS.

Students who have completed the four core modules from the MS (E&TIM) programme but did not succeed in completing the entire programme will only be awarded the B.Comp. (EC) degree and not the MS (E&TIM) degree.

Tuition Fees at Carnegie Mellon University

Students will pay Carnegie Mellon University tuition fees during the time they undertake instruction at CMU in partial fulfillment of the requirements of the concurrent degree. They will also provide their own medical insurance coverage.

Further Enquiry

Please direct all queries to comqww@nus.edu.sg with the subject clearly marked: "Concurrent Programme in Electronic Commerce with College of Engineering, Carnegie Mellon University (CDP-EC-CMU)".

Relevant Website

Please refer to: http://www.comp.nus.edu.sg/undergraduates/cdp_ec_CMU.html

8.16 Concurrent Programme in Bachelor of Computing (Information Systems) from NUS and Master of Philosophy in Management from Cambridge University

Overview of Programme

This fast–track 4-year programme allows students to graduate with a Master's degree in Management (thereafter called MPhil (M)) from Cambridge University and a Bachelor degree in Information Systems (hereafter called B.Comp. (IS)) from NUS. Students get a global education with 3 years at NUS and 1 year at Cambridge University. To apply for this

programme, students must apply for Computing (Information Systems), offered by School of Computing, NUS. They can apply for direct admission to this programme. They will be chosen on the basis of their A-level grades (or equivalent), their interest profile in information systems studies, and a personal interview designed to judge their potential and suitability for the programme.

Students will complete 144 modular credits (equivalent to 36 modules) of the B.Comp. (IS) programme before they proceed to complete MPhil (M) at Cambridge University. Sixteen modular credits (equivalent to 4 modules) will be counted against the modules in MPhil (M). Students who have successfully completed the stipulated four modules in the MPhil (M) programme will be awarded B.Comp. (IS) from NUS. At the end of the MPhil (M) programme, the students will be conferred the second degree – MPhil (M) from Cambridge University. The intake to this B.Comp. (IS) – Mphil (M) concurrent programme will be limited by agreement between Cambridge and NUS.

Partner University: Judge Business School, University of Cambridge

The Judge Business School, University of Cambridge is one of the top business schools in Europe, offering a variety of teaching programmes including the Cambridge M.B.A, Ph.D., M.Phil. and undergraduate degrees together with a suite of Executive Education.

Admission Requirements

The admission and progress criteria comply with requirements established by both Cambridge and NUS. A joint steering committee comprising at least one faculty representative from each of the two universities will oversee the programme. Students may enter the concurrent degree programme at any point during their undergraduate study at NUS although it is preferred that they declare their interest at NUS matriculation.

Direct admissions

Local applicants with an A-level certificate or its equivalent can apply for direct admission to this programme when they submit their undergraduate admission applications to NUS via http://www.nus.edu.sg/oam/. Applicants must select the ‘Computing (Information Systems Courses)' course before they can view the Concurrent Programme among the available choices. They will be chosen on the basis of their A-level grades (or equivalent), their interest profile in information systems studies, and a personal interview designed to judge their potential and suitability for the programme.

During their course of study at NUS, students in the programme must maintain a high level of performance (CAP 4.50 and above) as judged by a joint steering committee. Students who do not meet this standard will be moved to the standard B.Comp. (IS) programme at NUS. Admission to the Master's degree component of the programme, granted by the Judge Business School at Cambridge University, will be based on the student's academic performance, and recommendations of the joint steering committee.

In-Progress admissions

Students who have not opted for direct admission, but are admitted to the SoC Information Systems course at NUS, may also declare their interest upon matriculation at NUS. Selection criteria for these students will be similar to those for direct admission.

Information Systems students who are not granted direct entry into this concurrent programme but are accepted into the Department of Information Systems, may apply to the programme after their first year of studies. The call for applications will be announced to all existing students at an appropriate time. These students must demonstrate strong academic ability (gaining a CAP of 4.50 and above) and meet all criteria of the Concurrent Programme for B.Comp (IS). Admission of these students is subject to size constraint of the Concurrent Programme.

Existing B.Comp.(IS) students who have demonstrated strong academic abilities may be allowed to enter the programme at any stage of their study at NUS (subject to size constraints). These students are required to meet all the requirements of the programme.

Programme Requirements

This concurrent programme combines the Bachelor in Computing (Information Systems) offered by the School of Computing, NUS, and M.Phil. in Management offered by the Judge Business School, Cambridge University, U.K. The Cambridge University's M.Phil. in Management is a taught Masters' programme which offers new and recent non-business/management graduates a thorough grounding in management. Students admitted to this programme will normally have a First Class Honours degree or its equivalent.

B.Comp.(Information Systems) Programme

Table 3 gives the degree structure of the Bachelor of Computing in Information Systems programme.

Table 3: Summary of degree requirements for B.Comp. (Information Systems)

Modules	MCs	Sub totals
UNIVERSITY LEVEL REQUIREMENTS		20
PROGRAMME REQUIREMENTS		120
Core Modules		
CS1010 Programming Methodology	4	
CS1020 Data Structures and Algorithms I	4	
CS1231 Discrete Structures	4	
IS1103 Computing and Society	4	
IS1105 Strategic IT Applications	4	
IS2101 Business and Technical Communication	4	
ACC1002X Financial Accounting	4	
CS2100 Computer Organisation	4	
CS2102 Database Systems	4	
CS2105 Introduction to Computer Networks	4	
IS2102 Requirements Analysis and Design	4	
IS2103 Enterprise Systems Development Concepts	4	
IS2104 Software Team Dynamics	4	
IS3101 Management of Information Systems	4	
IS3102 Enterprise Systems Development Project	8	
IS4100 IT Project Management	4	
MA1301 Introductory Mathematics[9]	4	
MA1521 Calculus for Computing or MA1312 Calculus with Applications[10]	4	
ST2334 Probability and Statistics	4	
Programme Electives (PE)	28	
Option 1: Choose 7 modules to make up 28 MCs from the list of Programme Electives below. 3 of the 7 modules must be at level-4000. **Option 2:** Choose CP4101 and 4 modules to make up 28 MCs from the list of Programme Electives below. CP4101 B.Comp. Dissertation **Programme Electives** CS2106 Introduction to Operating Systems		

CS3235 Introduction to Computer Security CS3240 Interaction Design IS3220 Service Science IS3221 Enterprise Resource Planning Systems IS3222 IT and Customer Relationship Management IS3223 IT and Supply Chain Management IS3230 Principles of Information Security IS3240 Economics of E-Business IS3241 Enterprise Social Systems IS3242 Software Quality Management IS3243 Technology Strategy and Management IS3250 Health Informatics IS3260 Gamification for Organisations and Individuals IS3261 Mobile Apps Development for Enterprise CS4880 Digital Entrepreneurship IS4202 Global Virtual Project IS4203 IT Adoption and Change Management IS4240 Business Intelligence Systems IS4224 Service Systems IS4225 Strategic IS Planning IS4226 IT Outsourcing and Offshoring Management IS4227 Enterprise Service-Oriented Architecture IS4228 Information Technologies in Financial Services IS4231 Information Security Management IS4232 Topics in Information Security Management IS4233 Legal Aspects of Information Technology IS4234 Control and Audit of Information Systems IS4241 Social Media Network Analysis IS4243 Information Systems Consulting IS4250 Healthcare Analytics Specialisations To be awarded the Information Security Specialisation, students have to complete six modules from the following list of modules: CS3235 Computer Security IS3230 Principles of Information Security IS3242 Software Quality Management IS3261 Mobile Apps Development for Enterprise IS4231 Information Security Management IS4232 Topics in Information Security Management IS4233 Legal Aspects of Information Technology IS4234 Control and Audit of Information Systems To be awarded the Services Science, Management and Engineering Specialisation, students have to satisfy the following: Compulsory modules: IS3220 Service Science IS4224 Service Systems Choose four from the following list of modules: IS3221 Enterprise Resource Planning Systems IS3222 IT and Customer Relationship Management IS3223 IT and Supply Chain Management IS4225 Strategic IS Planning IS4226 IT Outsourcing and Offshoring Management IS4227 Enterprise Service-Oriented Architecture	All modules are 4 MCs modulesexcept CP4101 (12 MCs).	
IS4010 Industry Internship Programme[11]	12	
UNRESTRICTEDELECTIVES[12]		20
Grand Total		160

Note 9:
MA1301 is waived for students with A-level Mathematics. The 4 MCs gained from the waiver are added to the MCs for Unrestricted Electives but need to be graded.

Note 10:
MA1521 to be chosen if student wants to keep the option of switching to the Computer Science stream.

Note 11:
Students can choose to take on any current 12 MCs or more internship-related programmes within the School of Computing (e.g., CP3880 Advanced Technology Attachment Programme (ATAP)) and/or within NUS (e.g., Innovative Local Enterprise Achiever Development (iLEAD) and NUS Overseas College (NOC)) will be recognized as having fulfilled IS4010 Industry Internship Programme.

Note 12:
Students will be encouraged to use their unrestricted electives to take industrial-related modules, such as CP3200 Internship and CP3201 Industry Seminar. They will also be encouraged to use their unrestricted electives to take modules that will build up their business domain knowledge. Having a strong knowledge of a business domain will provide EC graduates a favorable advantage in employment opportunity in the industry.

M.Phil. (M) Programme at Cambridge University

The M.Phil. (M) programme requires 11 modules over 3 terms (Michaelmas, Lent and Easter) from October to June.

Students will be required to complete all the 11 modules in the M.Phil. (M) programme from Cambridge University.

The list of modules for the M.Phil. (M) programme is given at: http://www.comp.nus.edu.sg/undergraduates/cdp_jbs.html

Overall Programme

The student cohort will be managed by a joint steering committee to be set up between SoC-NUS and JBS-Cambridge.

Grading and Degree Requirement

Students are required to complete 144 modular credits (equivalent to 36 modules) of the B.Comp. (IS) programme before they can register for the M.Phil. (M) from Cambridge University.

Students who have completed four core modules from the M.Phil. (M) programme namely, Quantitative Techniques for Management, Finance and Accounting, Strategic Management, and Organisational Analysis, will be considered as having successfully completed the 4 remaining modules required for the B.Comp. (IS) programme. These modules correspond to IS4240 Business Intelligence Systems, accounting module, IS4225 Strategic IS Planning, and IS4100 IT Project Management of the B.Comp. (IS) programme respectively.

Continuation Criteria

Students in this concurrent programme must maintain a CAP of 4.50 or above (out of 5.00) for their B.Comp. requirements.

Award of Degree

Students who satisfy the concurrent B.Comp. (IS) – M.Phil. (M) degree requirements will be conferred both degrees.

Exiting the Programme

A student whose CAP falls below 4.50 for two consecutive semesters in NUS will not be allowed to remain in the concurrent programme, but may continue with his/her B.Comp. (IS) study at NUS.

Students who have completed the four core modules from the M.Phil. (M) programme but did not succeed in completing the entire programme will only be awarded the B.Comp. (IS) degree and not the. M.Phil. (M) degree.

Tuition Fees at Cambridge University

Students will pay Cambridge tuition fees during the time they undertake instruction at Cambridge in partial fulfillment of the requirements of the concurrent degree. They will also provide their own medical insurance coverage.

Further Enquiry

Please direct all queries to socug@comp.nus.edu.sg with the subject clearly marked: "Concurrent Programme in Information Systems with Judge Business School, University of Cambridge (CDP-JBS)".

Relevant website

Please refer to: http://www.comp.nus.edu.sg/undergraduates/cdp_cambridge.html.

8.17 Concurrent Programme in Bachelor of Science (Honours) in Life Sciences from NUS and Master of Research in Molecular Biophysics from King's College London

Overview of Programme

The concurrent degree programme in NUS B.Sc. (Hons.) in Life Sciences and KCL M.Res. in Molecular Biophysics is designed as a 4-year programme, focusing on the increasingly important and exciting field of biophysical sciences. This is a joint effort harnessing the synergy between two institutions in the field of Biophysics, specifically the complementary strength and expertise of the prestigious Randall Division of Cell & Molecular Biophysics in KCL, and the Research Centre of Excellence (RCE) in Mechanobiology and Centre for BioImaging Sciences, both in NUS.

Students in this programme will complete the B.Sc. (Hons.) degree in Life Sciences major curriculum during the first three years in NUS, followed by a year of M.Res. study in KCL. They will be given the opportunity, during the B.Sc. (Hons.) years, to spend two summer semesters overseas in KCL to read the Undergraduate Research Opportunities Programme in Science (UROPS) projects. During the M.Res. study in KCL, students will experience in-depth practical experience in the form of a biophysics research project, complemented by M.Res. coursework modules in molecular biophysics and biology. Completion of these M.Res coursework modules and an additional requirement required by the Faculty of Science, NUS, will earn Modular Credits (MCs) towards the fulfillment of the NUS B.Sc. (Hons) in Life Sciences degree graduation requirements.

Admission Requirements

Students in the NUS Faculty of Science with primary major in Life Sciences may apply to enter this programme at the end of their first year of B.Sc. (Hons.) candidature. All applicants will undergo a selection process and an interview to assess their academic achievements, interest profile in biophysical sciences, and potential and suitability for the programme, as well as other relevant criteria.

The application period and procedure will be announced to Year 1 Life Sciences Major students every academic year.

Exiting the Programme

The continuation requirements are as follow:

While student is in NUS

NUS students in this concurrent degree programme must maintain a Cumulative Average Point (CAP) of 4.00 or above (out of 5.00) for their B.Sc. (Hons.) degree requirements. A student whose CAP falls below 4.00 for two consecutive semesters in NUS will not be allowed to remain in this programme, but may go on to complete the B.Sc. degree in Life Sciences at NUS.

NUS students in this programme can also choose to withdraw and continue with the B.Sc. degree study in NUS.

While student is in KCL

Students must meet the minimum continuation requirements as stipulated by KCL for the M.Res. degree. A student who does not meet the requirements will have to withdraw from the programme.

If the student fails the research project at KCL but passes all the coursework modules, he/she will be awarded the B.Sc. (Hons.) degree from NUS. Otherwise the student will have to complete the unfulfilled components of graduation requirements for the NUS B.Sc. (Hons.) degree.

The withdrawal and termination processes will follow that of the host university.

Relevant website

For more information, please visit http://www.lifesciences.nus.edu.sg/cdpkclbiophysics.html

8.18 Concurrent Programmes in Bachelor of Science in Chemistry / Life Sciences of NUS and Master of Science in Forensic Science / Analytical Toxicology of King's College London

Overview of Programme

The concurrent degree programmes in National University of Singapore (NUS) Bachelor of Science (Honours) in Chemistry/Life Sciences and King's College London (KCL) Master of Science in Forensic Science/Analytical Toxicology aim to provide professional training in forensic studies and meet the niche demand for forensic scientists and relevant expertise from the governmental organisations and statutory boards such as Singapore Police Force and Health Sciences Authority. Students will be exposed to technology and methodologies at the forefront of forensic research and development taught by forensic practitioners and field experts, and will also be granted placement opportunities in laboratories with the Forensic Science Service and Metropolitan Police Forensic Services, UK. These programmes seek to prepare graduates for potential careers in analytical and supervisory roles within government and private institutions.

Students in these programmes will complete most of the modular credits required for the B.Sc. (Hons.) degree in Chemistry/Life Sciences major and other components of graduation during the four years in NUS, followed by a year of M.Sc. study in KCL. They will be given the opportunities, during the B.Sc. (Hons.) years, to spend a summer semester overseas in KCL to conduct Undergraduate Research Opportunities Programme in Science (UROPS) projects. During the M.Sc. study in KCL, students will go through four coursework modules and immerse in in-depth practical experience in the form of a Master level research project. Credits from two of the four M.Sc. coursework modules will be double-counted towards the fulfillment of the NUS B.Sc. (Hons) in Chemistry/Life Sciences degree graduation requirements.

Admission Requirements

Students in NUS Faculty of Science with a primary major in Life Sciences or Chemistry may apply to enter this programme at the end of their first year of B.Sc. (Hons.) candidature. All applicants will undergo a selection process and an interview to assess their academic achievements, interest profile in forensic studies, and potential and suitability for the programme, as well as other relevant criteria.

The application period and procedure will be announced every academic year.

Exiting the Programme

The continuation requirements are as follow:

While student is in NUS

NUS students in this concurrent degree programme must maintain a Cumulative Average Point (CAP) of 4.00 or above (out of 5.00) for their B.Sc. (Hons.) degree requirements. A student whose CAP falls below 4.00 for two consecutive semesters in NUS will not be allowed to remain in this programme, but may go on to complete the B.Sc. degree in Chemistry/Life Sciences at NUS.

NUS students in this programme can also choose to withdraw and continue with the B.Sc. degree study in NUS.

While student is in KCL

Students must meet the minimum continuation requirements as stipulated by KCL for the M.Sc. degree. A student who does not meet the requirements will have to withdraw from the programme.

The withdrawal and termination processes will follow that of the host university.

Relevant website

For more information, please visit http://www.lifesciences.nus.edu.sg/cdpkclfsat.html (for Life Sciences Major)
http://www.chemistry.nus.edu.sg/education/undergrads/PrimaryMajor/cdp.htm (for Chemistry Major)