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Nanyang Technological University (NTU Singapore) is the fastest-rising university in the world’s top 50. Ranked 39th globally and No. 1 among the world’s young, elite universities, NTU is a vibrant hub for learning and a hotbed for research at the confluence of the most important disciplines. As the President of this university, I can tell you this is an exciting place to be in.

With a wide range of disciplines offered - engineering, business, science, humanities, arts and social sciences, and now medicine - students can customise what knowledge they want to gain in fresh and exciting ways. NTU’s engineering college is the 6th most cited in the world with a research output among the top six universities globally, and we have one of the best business schools in Asia. Our medical school, set up jointly with Imperial College London, one of the world’s best universities, welcomed its first cohort in 2013.

To excel in the fast-changing global workplace, one needs to be versatile, creative, socially competent and comfortable with different cultures. NTU nurtures these qualities through a flexible, broad-based curriculum, coupled with an enriching campus life, leadership opportunities and exposure to international environments. Students learn in a 21st century IT-enabled environment that promotes critical thinking and communication skills. In addition, the Margaret Lien Centre for Professional Success nurtures in students a sound grounding in the right values to succeed in the workplace and grooms students for career success right from day one.

We are pleased that 9 out of 10 students find a job within six months of their final exams, with many receiving multiple job offers, both locally and overseas. Each graduating class has enjoyed high employment, with fresh graduates being offered jobs while on internships and getting multiple job offers. Some even go on to become entrepreneurs and create jobs for others.

It is no surprise then that more and more top students are choosing NTU for their undergraduate education. Just last year, we saw an 83% increase in top A-Level students enrolling compared to 2011.

A number of our undergraduate and graduate programmes are conducted with top overseas universities including Imperial College London and University of California, Berkeley. With our target to have 8 in 10 students go overseas at least once during the course of their studies, we ensure you are ready to work as part of multicultural teams.

NTU is also the partner of choice of global industry leaders for institutions such as BMW, Thales, Rolls-Royce, and Lockheed Martin, all of whom have chosen to set up joint laboratories with NTU. Many of these connections provide students with exposure to the industry and enhance their employability in economically strategic sectors.
It is no surprise then that more top students are choosing NTU for their undergraduate education. Compared with two years ago, NTU has seen a 60% increase in top A-Level students enrolling last year.

In recent years, we have attracted the best of the internationally-acclaimed scientists. At NTU you will be inspired and mentored by the leading lights of science and technology. The University has established strengths in areas of global importance such as sustainability, healthcare, new media, innovation and East-West research. Many of our professors and researchers have helped to put Singapore on the world map through their cutting-edge work in these interdisciplinary spheres.

NTU’s 200-hectare garden campus is the largest university campus in Singapore and has been named one of the world’s top 15 most beautiful campuses. With a vibrant and cosmopolitan campus, here you can meet and mingle with students and professors from about 100 countries. We recently welcomed the first batch of students to the two new Pioneer and Crescent Halls, which are home to 1,250 students. Within a green oasis of tree-lined boardwalks, sky terraces and a natural pond, students will experience new ways of living, learning and leisure.

Also new on campus is the learning hub which will be a new hive of student activities and learning. It has 56 smart classrooms, a lecture theatre, library, and student pods for group discussions, club or society meetings and so on. Upcoming recreational facilities include a lifestyle hub with new food and retail outlets as well as more spaces to mingle.

With the Experimental Medicine and Clinical Sciences buildings set to open soon at our Novena Campus, we foresee greater collaboration between students, faculty and clinicians in fields of life sciences and medicine.

I warmly invite you to come and share in these exciting times, and to seize opportunities to make a difference while you are here. Whether as a student leader initiating change, a budding entrepreneur with an out-of-the-box innovation, or a driver of a social enterprise that brings hope to those in need, the sky’s the limit. See you soon!

Prof Bertil Andersson
President
Nanyang Technological University
INTRODUCTION

About Nanyang Technological University

A young and research-intensive autonomous university, Nanyang Technological University (NTU) has more than 33,000 undergraduate and postgraduate students in the colleges of Engineering, Business, Science, and Humanities, Arts, & Social Sciences. It also has an Interdisciplinary Graduate School and a medical school, Lee Kong Chian School of Medicine, set up jointly with Imperial College London.
NTU is also home to four world-class autonomous institutes – the National Institute of Education (NIE), S Rajaratnam School of International Studies (RSIS), Earth Observatory of Singapore (EOS), and Singapore Centre on Environmental Life Sciences Engineering (SCSELE) – and various leading research centres such as the Nanyang Environment & Water Research Institute (NEWRI), Energy Research Institute @ NTU (ERI@N) and the Institute of Asian Consumer Insight.

A fast-growing university with an international outlook, NTU is putting its global stamp on Five Peaks of Excellence: Sustainability, Healthcare, New Media, The Best of the East and West, and Innovation.

Besides the main Yunnan Garden campus, NTU also has a satellite campus in Singapore’s science and tech hub, one-north, and a third campus in Novena, Singapore’s medical district.

Achievements
The university’s international standing has risen rapidly in recent years and it has been consistently ranked within the top 1% of universities globally. In 2014, NTU leapt to 39th place in the Quacquarelli Symonds (QS) ranking of the world’s top 100 universities – up 35 notches in four consecutive years. NTU is the fastest-rising university in the world’s Top 50 and recognised at the world’s top young elite university.

In October 2014, NTU climbed 15 places to be ranked 61st worldwide in Times Higher Education’s World University Rankings. NTU is also ranked 1st in industry income and innovation. The citation impact data for Asia from Thomson Reuters showed how NTU has risen and shot ahead over the last 10 years, coming in number one in Asia for research citation impact.

When it comes to engineering education and research, NTU’s College of Engineering is consistently ranked among the top in the world. In the US News & World Report’s global ranking of engineering schools (October 2014), NTU’s College of Engineering was placed 5th among all engineering institutions in the world and 2nd in Asia. In the Essential Science Indicators 2014, NTU’s engineering research output was among the top six globally and the 6th most-cited worldwide. NTU’s Engineering & Technology also climbed five positions to No. 9 in the world and 2nd in Asia, in the QS 2014/15 World University Rankings. In the Academic Ranking of World Universities 2014 produced by Shanghai Jiao Tong University, NTU Engineering was ranked 12th globally and 1st in Asia.

The Nanyang Business School (College of Business) is the leading business school in Singapore and takes its place among the top business schools in Asia. The Nanyang MBA programme has been consistently ranked among the top 100 MBA programmes in the world by The Economist since 2004, and is ranked ahead of other Singapore business schools. The Nanyang MBA is also consistently ranked in the top 35 in the Financial Times (FT) Global MBA rankings. The Nanyang Business School is one of only three in Asia to be awarded both the EQUIS (European Quality Improvement System) and AACSB (Association to Advance Collegiate Schools of Business) accreditations - international hallmarks of quality. NTU’s accounting research has been ranked 1st in Asia and 7th in the world by Brigham Young University. NTU is also the best globally in auditing research. Its actuarial science programme is the first in Singapore to be accredited by the Institute and Faculty of Actuaries, the world’s oldest actuarial professional body.

Our College of Science, known for its award-winning faculty and world class laboratories, runs Singapore’s only direct honours bachelor’s degree programmes in the biological, physical and mathematical sciences.

Our College of Humanities, Arts & Social Sciences is home to a top journalism and media school in Asia, a fast-growing humanities and social sciences school with distinctive niches of excellence and Singapore’s first professional art school offering degree courses in art, design and interactive digital media.

NTU is also the first university in Asia to receive the maximum five stars under the QS Stars evaluation system. Other universities with the same five-star rating include University of Cambridge, Stanford University and Massachusetts Institute of Technology.

Vision and Mission
A great global university founded on science and technology, nurturing creative and entrepreneurial leaders through a broad education in diverse disciplines.

University Governance
The NTU Board of Trustees sets the broad strategic directions of NTU and oversees its affairs and business. The President of the University is its Chief Executive Officer.
**Academic Council**
The Academic Council, comprising all tenure-track faculty and some categories of non-tenure track academic staff of the University, provides input on academic matters through the Senate and its committees, as well as the Advisory Board. The President of NTU chairs the Academic Council.

**Senate**
The Senate is formed by 50 tenured Academic Council members elected from the various Colleges, Lee Kong Chian School of Medicine, NIE and RSIS. The President, the Provost and Chief Planning Officer/Registrar are ex-officio members. The Senate acts on behalf of the Academic Council as its elected representative body. Its key responsibility is to consider recommendations from Academic Council committees on relevant matters. The Senate, in turn, elects a Senate Steering Committee from among its members to facilitate its work. President, Provost, and Chief Planning Officer/Registrar are ex-officio members of this Committee. The Steering Committee’s key role is to identify subjects for study and discussion by the Senate, i.e. it sets the agenda for Senate meetings. Other committees of the Senate include the Committee on Committees, which is responsible for setting up committees as required from time to time, and the Committee of Tellers, which ensures that Senate and Advisory Board elections are conducted in an open and fair manner.

**Advisory Board**
The Advisory Board comprises nine tenured, full professors elected from among Academic Council members. It provides advice on matters that the President or the Provost may refer to it. Such matters may include faculty appointments, promotions and tenure review, as well as the creation of new academic programmes.

1. All faculty members who are tenured and those who are eligible for nomination or re-nomination to be tenured.
2. These include Nanyang Business School faculty on Practice Track as well as senior lecturers and lecturers on contract of at least 3 years.

**Colleges, Schools and Administrative Departments**
Under a four-college structure of 12 schools as listed below, NTU provides comprehensive programmes of various disciplines to more than 33,500 undergraduates and graduate students.

NTU also has one autonomous school, Lee Kong Chian School of Medicine, and four autonomous entities, namely the National Institute of Education, S. Rajaratnam School of International Studies, the Earth Observatory of Singapore, and the Singapore Centre on Environmental Life Sciences Engineering, which are leading authorities in their respective fields of education, strategic studies and security research, hazards-related earth sciences, and water and environmental sustainability.

**College of Business (Nanyang Business School)**
The Nanyang Business School (NBS) is a leading business school committed to nurturing leaders for a sustainable world through academically rigorous curricula that are relevant to business practice.

NBS is one of Asia’s largest business schools, offering a comprehensive array of undergraduate and graduate programmes in accountancy and business. Drawing on a 50-year heritage of educating the region’s business leaders, NBS provides an outstanding learning environment with state-of-the-art facilities and world-class research centres.

NBS is the first business school in Singapore, and the third in Asia, to be accredited by both the European Quality Improvement System and Association of Advance Collegiate Schools of Business (AACSB). It is one of only ten business schools outside of the United States to be accredited by the AACSB in Accounting. Both these accreditations are the most recognised quality assurance standards for accounting and business education.

We have also been conferred full EQUIS accreditation since 2004. The EQUIS quality assurance scheme is a leading international system of quality assessment, improvement, and accreditation of higher education institutions in management and business administration. EQUIS – accredited business schools possess. This is an attestation of our attainment of a) high international standards of quality for mission, governance, student and programme quality, faculty and research, corporate and international connections and management of resources; b) a significant level of internationalization and c) a strong corporate orientation in programmes, activities and processes.

The Nanyang MBA programme has been consistently ranked among the best in the Asia-Pacific. The full-time programme was ranked 38th in The Financial Times’ latest global MBA rankings, and is placed 66th worldwide in The Economist’s top 100 MBA list, the best showing by a Singapore business school.

To leverage the strengths of world-class institutions, NBS has established many strategic partnerships and collaborations with the business schools of many internationally renowned universities. These include the Massachusetts Institute of Technology (MIT); Carnegie Mellon University; University of California, Berkeley; University of Illinois at Urbana-Champaign; Waseda University; and the Shanghai Jiao Tong University.

**College of Engineering**
The College of Engineering (CoE) was established to catalyse synergy and best practices among six engineering Schools by promoting collaboration and sharing of resources within and outside of the constituent Schools and the University. With exciting new knowledge and innovations developed through collaborations across disciplines, the College actively pursues strategic alliances with reputable peer institutions and industries locally and internationally to achieve excellence in education and research.

As a research-intensive and industry-focused college, CoE offers an unparalleled experiential learning with its undergraduate programmes that are designed to provide a complete education and diverse opportunities for students to explore their varied interests and talents. Through an integrated and interdisciplinary educational approach, our broad-based and flexible curricula are infused with research exposure, professional engineering...
experience, personal development opportunities and global dimensions. Apart from a strong grounding in engineering fundamentals, students are also broadly educated in arts, humanities, business and sciences, and trained in critical soft skills.

Towards fostering industry relevance, the College works closely with business sectors and government agencies to expand choices and scholarships in learning, and to enhance graduates’ employability. With a host of interdisciplinary programmes and specialisations offered by the six engineering Schools, the College is committed to training graduates to be creative, well-rounded engineering leaders, mobile among a variety of careers and disciplines locally and globally.

According to the QS World University Rankings by Subject 2014, all six engineering Schools are ranked among the top 25 universities in the world.

**Mission**

To nurture creative and entrepreneurial leaders through broad-based, research-infused engineering education and to advance knowledge and create innovative and sustainable solutions for the benefit of industry and society.

**Vision**

A great global engineering college for education, research and innovation.

The six engineering Schools in the College are:

- **School of Chemical and Biomedical Engineering**
  The School, comprising the Division of Chemical and Biomolecular Engineering and the Division of Bioengineering, aims to train a new generation of engineers through a rigorous curriculum that integrates engineering principles with the fundamentals of life and chemical sciences.

  Academic Programmes Offered by the School include:
  - Bachelor of Engineering (Chemical and Biomolecular Engineering)
  - Bachelor of Engineering (Bioengineering)
  - Bachelor of Engineering (Chemical & Biomolecular Engineering) with Minor in Business
  - Bachelor of Engineering (Bioengineering) with Minor in Business
  - Double Degree in Chemical & Biomolecular Engineering and Economics
  - Double Degree in Bioengineering and Economics
  - Master of Science (Biomedical Engineering)
  - Master of Engineering (Chemical and Biomolecular Engineering)
  - Master of Engineering (Bioengineering)
  - Doctor of Philosophy (Chemical and Biomolecular Engineering)
  - Doctor of Philosophy (Bioengineering)

  **Goals and Missions**
  The School aims to provide educational training and experiences that facilitate students to:
  - Gain a thorough understanding of the fundamentals of life and chemical sciences.
  - Deftly solve challenging problems in chemical and biomedical engineering and related areas while understanding the implications of such solutions on the society.
  - Develop good communication and management skills through team work in the execution of experimental and design projects.

- **School of Civil and Environmental Engineering**
  The School of Civil and Environmental Engineering (CEE) was one of the initial three engineering schools when the University started out as NTU back in 1982. It was then called the School of Civil and Structural Engineering (CSE). In 2002, it was renamed School of Civil and Environmental Engineering due to increasing emphasis on the environment and the significant strength the school had gained in this area. Thereafter, the Bachelor of Environmental Engineering programme was introduced in 2003. In 2004, in addition to the existing Civil Engineering and Environmental Engineering programmes, a new undergraduate programme in Maritime Studies was launched.

  **Vision**
  A leading school for sustainable built environment

  **Mission**
  To nurture students to be responsible leaders capable of realising their maximum potential in their profession and community. To provide a collegiate environment for faculty to excel in education and research for sustainable development. To advance knowledge for the practice of civil and environmental engineering and maritime professions.

We train and educate professional civil and environmental engineers, and advance the state of knowledge in important civil and environmental engineering fields. The Civil Engineering curriculum equips its students with the professional knowledge and skills needed to excel in a challenging career as a civil engineer, while the Environmental Engineering curriculum imparts knowledge, skills and capabilities in a wide variety of environmental engineering topics to further research and knowledge building and maintaining sustainable living environments. The Maritime Studies curriculum equips its students with the necessary expertise in shipping, business and management, and maritime science and technology to meet the new challenges in the maritime industry, as well as working towards establishing Singapore as a centre of excellence for shipping business, research and development.

State-of-the-art facilities in both hardware and software are incorporated to provide a professionally-oriented education and a highly advanced environment for research, development and collaborations with the industry and overseas universities. We have well-equipped laboratories with highly developed facilities to support teaching and intensive research, namely:
- Information-Technology Support & Computing
- Environment laboratory
- Geotechnics, Transport and Geospatial laboratory
The School is staffed by an international faculty of academics who are strong in teaching as well as research and professional experiences. Besides teaching the undergraduate and graduate courses, they are active in research collaboration with industrial organisations, offering engineering consultancy, conferences, seminars and short courses for the benefit of the industry.

The School provides a number of practice-oriented courses to prepare the students for their challenging careers. The courses are designed to provide the requisite breadth and depth so that the students are able to pursue a career in planning, design and construction of civil, environmental, maritime projects and systems, as well as in research and development. Lectures and tutorials complemented by laboratory sessions, design projects, practical training, industrial visits and seminars will equip the students with the principles and practical aspects of their areas of studies. Upon graduation, they are able to be involved in various engineering and maritime activities.

**CEE Research Focus and Strength**

**Environmental and Water Resources Engineering**

Research theme: Sustainable exploitation and management of the environment, through cutting edge research in a broad spectrum of environment and water related areas, with the main focus on upstream R&D and development of novel technologies for both national and regional needs.

Areas of research include:
- Integrated Urban Storm-water Management
- Sediment Transport and Coastal Management
- Waste Minimization, Recycling & Resources Recovery
- Membrane Technology
- Biotechnology in Wastewater Treatment
- Environmental Chemistry
- Air Quality

**Infrastructure Systems and Maritime Studies**

Research theme: Development of sustainable infrastructures focusing on the development of underground space, urban infrastructure and transport systems, and maritime

Areas of research include:
- Transport Modeling and Traffic Management
- Risk and Project Finance for Infrastructure Projects
- Information Technology on Construction Management
- Land Reclamation
- Underground Space Development
- Tropical Soils Engineering
- Maritime Logistics and Port Economics

**Structures and Mechanics**

Research theme: Address and mitigate problems caused by natural and man-made disasters, urbanization, and depletion of natural resources, through the building of resilient and protective urban infrastructures in our built environment.

Areas of research include:
- Computational Mechanics
- Dynamics and Seismic Engineering
- Protective Technology
- Fire and Building Engineering
- Offshore Engineering
- Structural Health Monitoring and Damage Prognosis
- Structural Steel and Concrete
- Sustainable Construction Materials

**School of Computer Engineering**

This 25-year-old school is the pioneer school for Computer Engineering and Computer Science Engineering Programmes in Singapore. The School has produced top earning graduates in NTU for the last 4 consecutive years, based on Singapore’s Ministry of Education’s (MOE) Graduate Employment Survey (GES). The SCE programmes combine a distinctive blend of theory and practice with critical hands-on-experience, and project-based learning. Communication and professional skills are enhanced through carefully selected industrial internships which complement the Programme, ensuring our students are ready to meet the goals and challenges of a global workforce. In addition, overseas exchanges under our Global Immersion Programme with international prestigious universities are encouraged. Our graduates are found in widely diverse fields - with a number of graduates seeking overseas as well as entrepreneurial career options.

**Mission**

The School strives to achieve teaching excellence, world-class research and leadership development in the rich, diverse, challenging yet fulfilling fields of computer engineering and computer science.

**Vision**

The School’s vision is to achieve teaching excellence and to prepare its graduates for lifelong learning, equipped with excellent leadership skills that lead to the fostering of an innovative and entrepreneurial community. The School endeavours to provide pathways in specialisations that are in line with current industry requirements and to steer cutting-edge research in collaboration with industry and eminent international institutions. The School is well-prepared to train and provide qualified engineers to meet the requirements of the various related Industries ranging from Game Development, Digital Media and Animation, Interactive Entertainment, Robotics, Software Design, Data Mining and Database Management, Embedded Systems, Web Services, Cyber & IT Security, Enterprise Network Management, R&D Engineering, IT Management Consultancy and Solutions, Financial and Banking Services, Telecommunications, Education and Training, Business Process Outsourcing Management and more!

**Goals**

SCE aims to develop human resources to their fullest potential that will enable them to achieve lifelong personal and
professional development goals and to exercise leadership as well as make lasting contributions in their respective disciplines. To cater to the diverse backgrounds and learning abilities of the students, the School intends to promote self-learning through structured programmes that are in line with current industry requirements. To steer this further, we will continue to collaborate on cutting-edge research with industry and eminent international institutions. We also hope to magnify our positive impact in serving national and global needs by enhancing mutually beneficial linkages.

**School of Electrical and Electronic Engineering**

The School of Electrical and Electronic Engineering is one of the three founding Schools with which Nanyang Technological Institute (now Nanyang Technological University) commenced its undergraduate programmes in engineering, soon after it was set up in August 1981. The first batch of students to obtain the degree graduated in 1985.

The School has a faculty of close to 160 full-time professors with higher degrees from world renowned universities. They have wide and varied backgrounds and strong research and professional expertise. Apart from teaching undergraduate and postgraduate programmes, faculty members are active in research and development with a broad range of collaborations with renowned overseas universities, research institutes and multinational companies. The School also offers advanced short courses for working engineers to keep them updated on the latest developments in the rapidly evolving areas of electrical and electronic engineering.

**Vision**

An engineering school of high global repute in Electrical, Electronic and Information Sciences and Technology.

**Mission Statements**

The mission of the School of Electrical & Electronic Engineering is:

1. To nurture creative and entrepreneurial leaders with broad-based and interdisciplinary education.
2. To lead pioneering research and innovation, and translate them into solutions for a sustainable future.
3. To enhance the profession, and contribute to the economic advancement of the nation and the enrichment of humanity.

**School of Materials Science and Engineering**

The School of Materials Science and Engineering has undergone substantial transformation over the years, since 1991 when the first materials engineering degree programme was initiated in Singapore by NTU. Now the school stands as one of the world’s largest materials engineering institutions, comprising of almost 1000 undergraduates and more than 300 research students.

Our undergraduate and graduate programmes are designed to equip students with the latest scientific and technological skills sets much needed by the industry, with the focus on providing an integrated science-driven and application-oriented engineering education in advanced materials for cutting-edge technologies.

Students and faculty members often attest to the school’s vibrant environment for teaching, research and innovation, with good infrastructure, state-of-the-art facilities and interactive training, facilities and training.

With a stellar track record in developing breakthrough technologies, the School has come a long way, and is now recognized as a hub of excellence in its niche areas of research and innovation, such as Biomaterials and Biomedical Devices, Computational Materials Science, Defence Materials, Functional Materials and Composites, Materials for Sustainability and Nanoelectronics, Nanomaterials and Multiferroics.

In the recently released 2014 QS World Rankings by Subject, the school is ranked 8th, naming us as one of the top institute in the world for Materials Science and Engineering.

**Mission**

The mission of the School of Materials Science and Engineering (MSE) is to:

- Educate and Inspire globally connected and inter-disciplinarily trained Material Scientists and Engineers beyond the decade.
- Create intellectual value, inspire need-based research and translate Science and Technology to the marketplace.

**Vision**

Our vision is to be the leading Materials Science and Engineering institution worldwide.

**Core Values**

Our core values help the School achieve excellence in teaching, research and contribution to industry and the community. These values include:

- Quality and innovative teaching
- People-centered services
- Academic excellence
- Strategic and impactful research
- Industrial relevance
- Community development

Academic Programmes offered by the School include:

- Bachelor of Engineering (Materials Engineering)
- Bachelor of Engineering (Materials Engineering) With Minor in Business
- Bachelor of Engineering (Materials Engineering) With a Second Major in Business
- Double Degree in Materials Engineering and Economics
- Master of Engineering (Materials Engineering)
- Doctor of Philosophy (Materials Engineering)

**School of Mechanical and Aerospace Engineering**

**Vision**

A global leader in education and research in Mechanical and Aerospace Engineering, preferred by students, industry and the community.

**Mission**

- To provide world-class education and conduct cutting-edge research to achieve international eminence.
- To nurture leaders and professionals to serve society with integrity and excellence.
Background
Mechanical and aerospace engineers design and produce systems that extend our physical abilities and enhance our quality of life. These systems include every mode of transportation; robots and intelligent systems for new age manufacturing; biomedical sensors, actuators and other life-saving systems; micro-electromechanical systems; information storage systems; microprocessor driven consumer products and environmentally responsible energy systems. With phenomenal advances in computing power, nanotechnology, aerospace and the life sciences, the design of systems and their effective realisation have been rapidly transformed. This necessitates a pool of versatile and highly skilled engineers that can match the industry’s need for critical skills in manufacturing, aviation, design, biomedical and informatics applications and in other strategic sectors.

The School of Mechanical and Aerospace Engineering (MAE) aims to train and develop individuals with a broad engineering foundation as well as bespoke knowledge and skills in some relevant leading edge technologies. By providing a stimulating environment in which diverse ideas and talents are exchanged and harnessed, the School seeks to create innovative, cross-disciplinary mechanical and aerospace engineering graduates who can function effectively as professionals in high demand in the 21st century.

The student-oriented focus of the School offers students more flexibility and choices in their course of study. Some students may choose to further their interests and aptitudes in design or mechatronics by opting for an in depth specialisation in either of these streams from the start of their second year. Within each of these streams, students study the core mechanical engineering courses, together with courses in their specific area of specialisation.

The School of Mechanical and Aerospace Engineering keeps abreast of advanced technological developments in industry and in research. These are a few, but not limited, fields that it focuses mainly on Aerospace Engineering, Engineering Mechanics, Manufacturing Engineering, Mechatronics & Design, Systems & Engineering Management and Thermal & Fluids Engineering.

College of Humanities, Arts, & Social Sciences
The College offers a wide selection of major disciplines across three distinct schools: the School of Art, Design and Media (ADM), Singapore’s premier professional art school that offers degree programmes in Art, Design and Interactive Digital Media; the Wee Kim Wee School of Communication and Information (WKWSCI), Asia’s top school in Mass Communications; and the School of Humanities and Social Sciences (HSS), an energetic school dedicated to the study of human progress, human condition, its social aspects, and in all, an enlightened understanding of the individual and society.

The College seeks to offer well-balanced programmes that foster a culture of excellence and creativity through the breadth and depth of syllabus. Rooted in the belief of cross-discipline mastery, students can take minors or second majors beyond their primary disciplines, across the three schools, from ADM – a Minor and Second Major in Art History; from WKWSCI – a Minor in Information and New Media or Minor in Communication Studies; from HSS – a whole host of minors in the humanities and social sciences.

Higher education should not only equip students with a valuable skill set necessary for their prospective career, it should also extend their understanding of ways in which societies function and path them on a journey of self-discovery. Along the way, students will gain new perspectives and develop interests and meet friends they will cherish for life. The College aims to foster in students a spirited intellectual curiosity, openness, independence and integrity. The College provides challenging curricular and co-curricular options, and an environment that is conducive for learning, reflection, interaction and community involvement.

Whether students are majoring in Economics, Digital Filmmaking or Journalism, pursuing an education in the College of Humanities, Arts, and Social Sciences will enable them to question assumptions, articulate informed judgment and make innovative contributions to diverse professions and industries.

The College achieves excellence in education through:
– cultivating the highest standards of education;
– promoting interdisciplinary learning; and
– producing graduates with creative and innovative talent to meet the challenges of the 21st century

School of Art, Design and Media
The Bachelor of Fine Arts (BFA) in Art, Design and Media is a four-year degree programme for undergraduates interested in a major in Art, Design and Media within specialisation in six disciplines at NTU.
– Digital Animation
– Digital Filmmaking
– Photography and Digital Imaging
– Interactive Media
– Product Design
– Visual Communication

This degree combines a rigorous foundation in traditional art and design studio disciplines and innovative developments in new media. Delivery is through a balanced combination of studio practice and scholarship in cultural and historical studies. While the degree retains the canonical core elements of an art and design programme, it also reflects a breadth of interests that is relevant both regionally and globally and embraces many of the key areas that comprise contemporary art, design and media studies.

The first two semesters constitute the foundation year, where students learn the fundamentals of visual creation including: drawing, design in two and three dimensions, time based design, visual storytelling and a survey of art history. Specialisation begins in the second year, and continues throughout the programme. In addition to the studio-based courses, students are required to complete critical theory, history and philosophy modules.

Honours are awarded on completion of the fourth year to those students who have performed at a high level of excellence.

Besides the BFA, the School of Art, Design and Media (ADM) offers a Minor in Art History for ADM students and a Second Major in Art History.
• **School of Humanities and Social Sciences**

**Vision**
To be a leading intellectual centre of humanities and social sciences in Asia, making valuable contributions to the advancement of knowledge and human life.

**Mission**
To fulfil the ideals of teaching and scholarship in the humanities and social sciences, enabling graduates and researchers to confront the challenges of the 21st century world.

Established in 2004, the School of Humanities and Social Sciences (HSS) is a dynamic and fast-growing school with distinctive interdisciplinary research strengths in Literary and Cultural Studies; Environment & Sustainability; Global Asia; Humanities; Science & Society (HSS@HSS); and New Frontiers in Neuroscience. Home to more than 220 faculty and staff members, and over 2,700 undergraduate and 300 graduate students, HSS offers undergraduate and postgraduate Chinese, Economics, English Literature, History, Linguistics & Multilingual Studies, Philosophy, Public Policy & Global Affairs, Psychology, and Sociology. In addition, HSS offers two coursework programmes - Master of Arts in Contemporary China, and Master of Science in Applied Economics.

HSS provides a student-centred education that enables students to not only obtain specialised knowledge in their majors, but also develop interdisciplinary thinking capacities. Students have the flexibility to design their curriculum according to their interests and strengths. NTU offers more than 30 undergraduate minor programmes, including a range of dynamic HSS minor programmes such as Creative Writing, Environmental and Urban Studies, and Translation. Outstanding students can choose to take a second major in any of these disciplines: Communication Studies, Art History, Business (for Economics students only), Biological Sciences (for Psychology students only), or any of the nine major disciplines within HSS.

Students who aspire to be novelists, screenwriters or playwrights can look forward to learning from our Writers-in-Residence. Collaborating with the National Arts Council, we run two national creative writing programmes – Chinese and English – hosting local and international writers with creative excellence. While working on their literary projects, these writers mentor students in creative writing, imparting their expertise on style, structure, characterisation, and the publishing process.

Our HSS Professional Attachment Programme exposes students to the working world through internships and attachments, endowing them with a competitive edge in the job market after graduation. Students also have the opportunity to connect with people from diverse culture through the various NTU overseas exchange programmes.

• **Wee Kim Wee School of Communication and Information**

**Vision**
To be the premier school of communication and information in Asia with international eminence.

**Mission**
To educate and nurture communication and information professionals and academics, to advance knowledge, and to serve society.

**Background**
The Wee Kim Wee School of Communication and Information (WKWSCI) was founded in 1992 and has already acquired the status as one of Asia’s premier communication schools. It is well-recognized for its strengths in teaching and research, its close ties with the media and information industries, and for its success rate in placing students in communication professions upon graduation.

WKWSCI has five divisions offering a wide range of communication courses both at the undergraduate and graduate levels. The divisions are: Journalism and Publishing, Broadcast and Cinema Studies, Public and Promotional Communication, Information Studies, and Communication Research.

Students in WKWSCI receive a balance of theoretical knowledge and practical training in their broad-based curriculum. The School has invested in state of the art equipment and technology for the teaching of its courses, The School also houses the Newsplex which is akin to a futuristic newsroom to train budding journalists.

**Objectives**
The School's four graduate degree programmes by coursework are collectively multi-disciplinary in nature and aimed to provide graduates with relevant work experience with advanced professional education in the areas of information studies, knowledge management, information systems and mass communication. In addition, the School offers research degrees such as Doctor of Philosophy, Master of Communication Studies and Master of Applied Science.

**Unique Features of the School**
1. Multidisciplinary undergraduate curriculum featuring five academic concentrations - Journalism; Broadcast and Cinema Studies; Communication Policy and Research; Advertising; and Public Relations. There is also an interdisciplinary concentration that allows students to tailor the curriculum of their choice to meet their own specific needs. At the same time, the curriculum encourages students to take general education modules, work on real-life and lab-based practicum, portfolio seminars, workshops, and many more.

2. Students can take up academic minors in all schools. Some popular options are Arts, Design & Media, Drama & Performance, Economics, English Literature, History, Chinese Language & Culture, Business, Education Studies, Music, Environmental Management, Sociology, and Psychology among others.

3. Students are encouraged to apply for the Overseas Exchange Programme. Successful students can spend up to six months at top communication schools in leading universities in America, Australia, China and India and Europe.
4. The School offers a required professional internship of 24 weeks where students gain first-hand industry training and experience under the supervision of professors and industry practitioners.

5. WKWSCI prepares students for comprehensive hands-on learning through campus media and various special projects, including Nanyang Spectrum - a 30 minute weekly TV news magazine; Radio Fusion – simulated radio broadcast weekly on Internet; Nanyang Chronicle – student-produced campus newspaper; Going Overseas for Advanced Reporting (GO-FAR); Film Festivals, and ConnexSCIons – student produced alumni newsletter.

College of Science
The NTU Science education arouses the student’s spirit of inquiry; instills respect for evidence, objectivity and reasoning; cultivates critical analytical thinking; and develops problem-solving abilities. At the College of Science, such highly valued skills are imparted through a combination of theory, experiments and practical applications – features characteristic of all our innovative Bachelor of Science degree programmes. Opportunities abound for our students in industrial internship, attachments to research labs, and overseas study.

Our flexible curricula in Biology, Chemistry, Physics, Mathematics, and Earth Systems Science prepare students to tackle multidisciplinary problems in sustainability, energy, environment, economics, and health that constitute major challenges for the future of mankind.

Students have the choice of programmes in these disciplines, with optional concentrations in current topics such as Green Chemistry and Nanotechnology. They can also choose from several multidisciplinary programmes such as Biological Sciences with a second major in Psychology, Chemistry and Biological Chemistry with a second major in Food Science and Technology, Physics with a second major in Mathematical Sciences, the combined major in Mathematics and Economics, and the double degree programme in Biomedical Sciences and Chinese Medicine.

• School of Biological Sciences
Mission
To achieve excellence in teaching, research, development and service to the community in the field of Life Sciences so as to attain improvement in human health.

Overview
The School of Biological Sciences was established in July 2001 to produce graduates in biological and biomedical sciences to meet the demand for a skilled workforce relevant for the biomedical manufacturing and research industries, and health care services. The School is housed in a 30,000 m² building containing 60 research laboratories, core instrumentation rooms and an adjoining two-storey animal holding facility. The building also contains state-of-the-art classrooms, computer suites and teaching laboratories equipped with high-speed wireless internet access providing world-class educational support for undergraduate and graduate students alike. The School offers rigorous undergraduate programmes that are taught by an international team of experienced academics and eminent researchers.

Undergraduates will experience a challenging and engaging learning environment that promotes innovation, critical and creative thinking. The B.Sc. (Honours) programme incorporates elective courses that allow specialization in areas of biological sciences that match students’ interests. The School also offers the only double degree programme in Singapore that integrates biomedical sciences and Chinese medicine.

Graduates from this programme will have attained in-depth knowledge and skill-sets necessary for practising Chinese medicine and related biomedical research.

• School of Physical and Mathematical Sciences
Mission
Our mission is twofold: in teaching, to impart the habit and mode of thinking in science and mathematics using the most effective pedagogical methods; in research, to contribute to the scholarship of discovery, integration, application and teaching.

Vision
Our vision is to build a renowned school with strong faculty, innovative curricula, promising students, strong links with industry and supportive alumni.

Overview
The new building of NTU’s School of Physical & Mathematical Sciences (SPMS) was opened officially by Dr Ng Eng Hen, Minister for Education and Second Minister for Defence, Singapore, on 21 July 2009.

The new SPMS complex is an indication of the University’s commitment to excellence in education and research. The SPMS complex provides an environment conducive for intellectual pursuits which help to attract and retain the very best global talent: faculty, researchers and students. The cluster of three interconnected buildings, totalling 38,000 square meters, house the Divisions of Chemistry & Biological Chemistry, Mathematical Sciences, and Physics & Applied Physics. The design of the buildings is in line with our philosophy of advancing multidisciplinary collaborations while promoting excellence in our core areas.

The Chemistry & Biological Chemistry building is modelled after the new Oxford Chemistry building, reputed to have the best safety features by industry standards in the western world. The building is well-equipped for interdisciplinary research with emphasis on synthesis, molecular design, catalysis, biological chemistry, interfacial science and new materials. The building houses cutting edge equipment including state-of-the-art nuclear magnetic resonance instruments and mass spectrometers.
A special feature of the Mathematical Sciences building is the well-placed interactive meeting spaces that are known to provide the best environment for learning and research by facilitating faculty-faculty, faculty-student, and student-student discussion on mathematics and statistics problems. Unlike traditional mathematics departments, we have incorporated modern laboratories and computing facilities to do cutting-edge teaching and research on modern multidisciplinary application areas in bioinformatics, biocomputing, finance, digital media, etc.

The Physics and Applied Physics building has many laboratories for the training of a new breed of graduates with strong fundamental understanding of science and the ability of putting together the technology built on scientific principles. The building and faculty members provide an environment for learning the core principles of physics, as well as for students to acquire mechanical, electronic, software, engineering and design skills, laboratory teamwork, and resource management for success in large-scale projects.

As of 2011, the SPMS building is revamped with interactive tutorial rooms, better known as smart-classrooms, which accommodate information technology and allow students to better partake in group discussions. They are built under the recommendation of NTU’s Blue Ribbon Commission (BRC), to promote better and more effective learning.

Established in 2005, SPMS provides students with excellent preparation for further studies and fulfilling careers, through its innovative and relevant B.Sc. (Hons) programmes in Chemistry & Biological Chemistry, Mathematical Sciences, Mathematics & Economics and Physics & Applied Physics. It also offers M.Sc. and Ph.D. programmes in chemistry, mathematical sciences, physics and earth sciences.

A number of graduates from our undergraduate programmes have gone to graduate studies and research at top institutions around the world including Berkeley, Harvard, Stanford, Technical University of Munich, and London School of Economics. Their achievements bear testimony to the high quality of education that NTU and SPMS have given them.

In August 2010, the SPMS welcomes the addition of the Division of Earth Sciences into this family. This new division also admits its pioneer batch of PhD students in the same month and will offer a new undergraduate programme in August 2014.

The School’s primary clinical partner is the National Healthcare Group, a leader in public healthcare recognized for the quality of its medical expertise, facilities and teaching. The School, named after local philanthropist Tan Sri Dato Lee Kong Chian, aims to be a future model for innovative medical education. Its first doctors will graduate in 2018 with a Bachelor of Medicine and Bachelor of Surgery (MBBS), awarded jointly by NTU and Imperial, and become doctors who will enhance Singapore’s healthcare in the decades to come.

From 2015 onwards, incoming students will be taught in LKCMedicine’s purpose-designed new building on NTU Yunnan Garden Campus. The seven-storey Experimental Medicine Building, to be completed by mid-2015, will be equipped with a state-of-the-art Learning Studio for Team-Based Learning (TBL) lessons as well as a seminar room, research laboratories and collaboration spaces.

This will be followed by the Clinical Sciences Building, to be ready in 2016 at the School’s Novena Campus. In addition to research facilities, the 20-storey building will be the main student hub with a range of recreational and learning. These include a Learning Studio, alcove-clusters for team-based anatomy teaching and a bespoke clinical skills training centre. Situated at the heart of the upcoming HealthCity Novena and next door to Tan Tock Seng Hospital, the building will be the main teaching and learning venue.

For more information about our School, please visit: www.lkcmedicine.ntu.edu.sg

• **Interdisciplinary Graduate School (IGS)**

New knowledge is always found at the crossroads between disciplines. And embarking on a PhD at the Interdisciplinary Graduate School (IGS) within NTU in interdisciplinary research could put you on route to a breakthrough discovery. IGS which was newly launched on June 25, 2012 by NTU President, Professor Bertil Andersson, offers prestigious scholarships for outstanding graduate students. In tandem with the Peaks of Research Excellence identified by Nanyang Technological University (NTU) and a series of increasingly complex global challenges, which require multi-disciplinary knowledge of science and engineering to address, IGS will focus on the first three peaks: Sustainable Earth, New Media and Future Healthcare.

IGS continues to see healthy growth in intakes. Currently, IGS has a cohort of 270 graduate students – almost ten times its initial size of 25 graduate students. Notably, it also took enrolled inaugural batch of 13 graduate students for the Future Healthcare research programme in August 2013.

Research projects are offered and are carried out by any of the following centres across the 3 thematic research programmes:

**Sustainable Earth**

• Earth Observatory of Singapore (EOS)
• Energy Research Institute @ NTU (ERI@N)
• Institute of Catastrophe Risk Management (ICRM)
The unique features of an IGS PhD student comprise cross disciplinary learning and research approaches in a research-intensive university. Moreover, students get the first hand accessible opportunity to work with top researchers from every school who are at the core of NTU. The graduate students will work with engineering and business professors, physicists, biologists, chemists, economists, doctors, psychologists, and experts in arts design and media. This research approach resonates well with the school’s mission. Solutions to global challenges, particularly in environmental sustainability, new media and future healthcare, will be sought. IGS will work closely with leading players in government, business and the industry.

One of NTU’s joint PhD programmes come under the purview of IGS. This partnership is with Germany’s Technical University of Munich (TUM) in the areas of future healthcare and energy research respectively. Successful candidates will be conferred degrees jointly awarded by NTU and the partner university, and spend half of their candidature in each institution. This research methodology incorporates well with the school’s mission. In addition, it aims to facilitate the application of its research to critical challenges, particularly in environmental sustainability, new media and future healthcare.

In August 2011, NTU Industrial Postgraduate Programme was initiated with the support of Singapore’s Economic Development Board to offer industry-relevant exposure to PhD students. To date, there are 48 postgraduates across 20 industry partners, namely Rolls Royce, Lloyd’s Register Global Technology Centre, Novartis Institute for Tropical Diseases Pte Ltd, GLOBALFOUNDRIES Singapore Pte Ltd.

Gradually, IGS will progress towards working with leading players in government, business and the industry.

IGS Website: http://igs.ntu.edu.sg

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**Sustainable Earth**
- Earth Observatory of Singapore (EOS)
- Energy Research Institute @ NTU (ERI@N)
- Institute of Catastrophe Risk Management (ICRM)
- Nanyang Environment and Water Research Institute (NEWRI)
- Singapore Centre On Environmental Life Sciences Engineering (SCELSE)

**New Media**
- Centre of Social Media Innovation For Communities (COSMIC)
- Institute for New Media (IMI)
- Active Living for the Elderly (LILY)
- Multi-Platform Game Innovation Centre (MAGIC)
- Rapid-Rich Object Search Lab (ROSE)

**Future Healthcare**
- Nanyang Institute of Technology in Health & Medicine (NITHM)

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Gradually, IGS will progress towards working with leading players in government, business and the industry.

**Autonomous Institute**
- Earth Observatory of Singapore
- National Institute of Education
- S. Rajaratnam School of International Studies
- Singapore Centre on Environmental Life Sciences Engineering

**Other Institutes and Centres**
- Institute on Asian Consumer Insight
- Confucius Institute
- Cornell-Nanyang Institute of Hospitality Management
- Energy Research Institute @ NTU
- Institute of Advanced Studies
- Institute for Media Innovation
- Institute for Sports Research
- Nanyang Environment and Water Research Institute
- Nanyang Technopreneurship Center
- Nanyang Centre for Public Administration
- Singapore Centre for Chinese Language
- Nanyang Institute of Technology in Health and Medicine
- SAF-NTU Academy

**Administrative Departments**
The colleges are supported by administrative departments which provide quality service to the university’s stakeholders and to the wider community.

The following is a list of all our administrative and support offices:
- President’s Office
- Alumni Affairs Office
- Centre for Continuing Education
- Centre for IT Services
- China Affairs Office
- CN Yang Scholars Programme Office
- Corporate Communications Office
- Development Office
- Nanyang Executive Centre
- Legal and Secretariat Office
- Nanyang Innovation and Enterprise Office
- NTU Events Office
- NTU Shared Services
- Office of Development & Facilities Management
- Office of Finance
- Office of International Affairs
- Office of Health and Safety
- Office of Housing & Auxiliary Services
- Office of Human Resources
- Student & Academic Services Department
- Research Support Office
- Undergraduate Research Experience on CAmpus (URECA)
Academic Programmes
(http://www.ntu.edu.sg/Students/Undergraduate/AcademicServices/AcademicProgrammes/Pages/default.aspx)
The undergraduate programmes offered in AY 2014-15 are as follows:

**Single Degree Programmes (Full Time)**

<table>
<thead>
<tr>
<th>Programme</th>
<th>Degree Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accountancy</td>
<td>Bachelor of Accountancy</td>
</tr>
<tr>
<td>Aerospace Engineering</td>
<td>Bachelor of Engineering (Aerospace Engineering)</td>
</tr>
<tr>
<td>Art, Design and Media</td>
<td>Bachelor of Fine Arts in Digital Animation</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Fine Arts in Digital Filmmaking</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Fine Arts in Photography and Digital Imaging</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Fine Arts in Interactive Media</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Fine Arts in Product Design</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Fine Arts in Visual Communication</td>
</tr>
<tr>
<td>Arts (Education)</td>
<td>Bachelor of Arts (Education)</td>
</tr>
<tr>
<td>Bioengineering</td>
<td>Bachelor of Engineering (Bioengineering)</td>
</tr>
<tr>
<td>Programme</td>
<td>Degree Title</td>
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<tr>
<td>-----------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Biological Sciences</td>
<td>Bachelor of Science in Biological Sciences</td>
</tr>
<tr>
<td>Business</td>
<td>Bachelor of Business</td>
</tr>
<tr>
<td>Chemical and Biomolecular Engineering</td>
<td>Bachelor of Engineering (Chemical and Biomolecular Engineering)</td>
</tr>
<tr>
<td>Chemistry and Biological Chemistry</td>
<td>Bachelor of Science in Chemistry and Biological Chemistry</td>
</tr>
<tr>
<td>Chinese</td>
<td>Bachelor of Arts in Chinese</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>Bachelor of Engineering (Civil)</td>
</tr>
<tr>
<td>Communication Studies</td>
<td>Bachelor of Communication Studies</td>
</tr>
<tr>
<td>Computer Engineering</td>
<td>Bachelor of Engineering (Computer Engineering)</td>
</tr>
<tr>
<td>Computer Science</td>
<td>Bachelor of Engineering (Computer Science)</td>
</tr>
<tr>
<td>Economics</td>
<td>Bachelor of Arts in Economics</td>
</tr>
<tr>
<td>Electrical and Electronic Engineering</td>
<td>Bachelor of Engineering (Electrical and Electronic Engineering)</td>
</tr>
<tr>
<td>English</td>
<td>Bachelor of Arts in English</td>
</tr>
<tr>
<td>Environmental Earth Systems Science</td>
<td>Bachelor of Science in Environmental Earth Systems Science</td>
</tr>
<tr>
<td>Environmental Engineering</td>
<td>Bachelor of Engineering (Environmental Engineering)</td>
</tr>
<tr>
<td>History</td>
<td>Bachelor of Arts in History</td>
</tr>
<tr>
<td>Information Engineering and Media</td>
<td>Bachelor of Engineering (Information Engineering and Media)</td>
</tr>
<tr>
<td>Linguistics and Multilingual Studies</td>
<td>Bachelor of Arts in Linguistics and Multilingual Studies</td>
</tr>
<tr>
<td>Maritime Studies</td>
<td>Bachelor of Science (Maritime Studies)</td>
</tr>
<tr>
<td>Materials Engineering</td>
<td>Bachelor of Engineering (Materials Engineering)</td>
</tr>
<tr>
<td>Mathematical Sciences</td>
<td>Bachelor of Science in Mathematical Sciences</td>
</tr>
<tr>
<td>Mathematics and Economics</td>
<td>Bachelor of Science in Mathematics and Economics</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>Bachelor of Engineering (Mechanical Engineering)</td>
</tr>
<tr>
<td>Medicine</td>
<td>Bachelor of Medicine and Bachelor of Surgery</td>
</tr>
<tr>
<td>Philosophy</td>
<td>Bachelor of Arts in Philosophy</td>
</tr>
<tr>
<td>Physics and Applied Physics</td>
<td>Bachelor of Science in Applied Physics</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Science in Physics</td>
</tr>
<tr>
<td>Philosophy</td>
<td>Bachelor of Arts in Philosophy</td>
</tr>
<tr>
<td>Public Policy and Global Affairs</td>
<td>Bachelor of Arts in Public Policy and Global Affairs</td>
</tr>
<tr>
<td>Science (Education)</td>
<td>Bachelor of Science (Education)</td>
</tr>
<tr>
<td>Sociology</td>
<td>Bachelor of Arts in Sociology</td>
</tr>
<tr>
<td>Sport Science and Management</td>
<td>Bachelor of Science (Sport Science and Management)</td>
</tr>
</tbody>
</table>

**Single Degree Programmes (Part-Time)**

<table>
<thead>
<tr>
<th>Programme</th>
<th>Degree Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical and Electronic Engineering</td>
<td>Bachelor of Engineering (Electrical and Electronic Engineering)</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>Bachelor of Engineering (Mechanical Engineering)</td>
</tr>
</tbody>
</table>

**Double Degree Programmes (Full-Time)**

Students in the double degree programmes (DDP) are awarded with a degree certificate for each of the two programmes. Under the DDP, some courses may be counted towards the requirements of both degrees, thus allowing a student to complete two degrees in a shorter period than it would take to complete them separately.

<table>
<thead>
<tr>
<th>Programme</th>
<th>Degree Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accountancy and Business</td>
<td>Bachelor of Accountancy</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Business</td>
</tr>
<tr>
<td>Biomedical Sciences and Chinese Medicine</td>
<td>Bachelor of Science in Biomedical Sciences</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Medicine (Chinese Medicine)*</td>
</tr>
<tr>
<td>Business and Computing</td>
<td>Bachelor of Business</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Engineering (Computer Science)</td>
</tr>
<tr>
<td>Business and Computer Engineering</td>
<td>Bachelor of Business</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Engineering (Computer Engineering)</td>
</tr>
<tr>
<td>Engineering* and Economics</td>
<td>Bachelor of Engineering*</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Arts in Economics</td>
</tr>
</tbody>
</table>

* The degree is awarded by the Beijing University of Chinese Medicine
+ The Bachelor of Engineering degree awarded will be in the specific Engineering programme
Integrated Programmes (Full-Time)

Students in the integrated programmes are awarded with two degrees - a Bachelor degree and a Masters degree.

<table>
<thead>
<tr>
<th>Programme</th>
<th>Degree Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Sciences</td>
<td>Bachelor of Science in Biological Sciences</td>
</tr>
<tr>
<td></td>
<td>Master of Science (Research)</td>
</tr>
<tr>
<td>Computer Engineering</td>
<td>Bachelor of Engineering (Computer Engineering)</td>
</tr>
<tr>
<td></td>
<td>Master of Science (Computer Science)*</td>
</tr>
<tr>
<td>Computer Science</td>
<td>Bachelor of Engineering (Computer Science)</td>
</tr>
<tr>
<td></td>
<td>Master of Science (Computer Science)*</td>
</tr>
<tr>
<td>Electrical and Electronic Engineering</td>
<td>Bachelor of Engineering (Electrical and Electronic Engineering)</td>
</tr>
<tr>
<td></td>
<td>Master of Science (Electrical and Computer Engineering)*</td>
</tr>
<tr>
<td>Engineering*</td>
<td>Bachelor of Engineering*</td>
</tr>
<tr>
<td></td>
<td>Masters of Science*</td>
</tr>
<tr>
<td>Renaissance Engineering Programme</td>
<td>Bachelor of Engineering Science*</td>
</tr>
<tr>
<td></td>
<td>Master of Science in Technology Management</td>
</tr>
</tbody>
</table>

* The Master of Science degrees are awarded by the Georgia Institute of Technology
* The Bachelor of Engineering Science degree awarded will be in the Specific Engineering discipline
# The Bachelor of Engineering and the Master of Science degrees awarded will be in the specific discipline

Degree Programmes and Requirements

College of Business (Nanyang Business School)

Undergraduate Study

(A) Bachelor of Accountancy programme

The Bachelor of Accountancy programme offered by the Nanyang Business School (NBS) is the most established and well-regarded Accountancy programme in Singapore and the region. We have a long tradition of training professional accountants for leadership roles as partners in accounting firms, chief financial officers of major corporations and managing directors of public and private companies. The majority of the top accountants in Singapore have been trained by us in the last 50 years.

The three-year direct honour Bachelor of Accountancy (B.Acc.) programme is recognised as a professional accounting qualification in Singapore by the Institute of Certified Public Accountants of Singapore and the Accounting and Corporate Regulatory Authority. It is accredited by international professional accounting bodies such as CPA Australia, the Institute of Chartered Accountants in Australia (ICAA), the Institute of Chartered Accountants in England and Wales (ICAEW), the Chartered Institute of Management Accountants (CIMA) and AACSB International (AACSB). We are among only ten schools in the world, outside of the US, to have the AACSB accreditation in Accounting.

Partnering with top US accounting programme at the University of Illinois at Urbana-Champaign, we embarked on Project Discovery more than ten years ago, to radically transform the way that Accounting is taught. There is a greater focus on risk assessment, corporate governance and ethics, and integration of disciplines such as economics, finance, strategy, psychology and systems thinking into the understanding of Accounting. Active learning methods based on real-world cases and projects are emphasised to develop students’ critical thinking and communication skills.

With top Accounting professors teaching in the programme, up-to-date curriculum and pedagogical changes, coupled with the renowned rigour and high standards of our programme, we ensure that our students have the best Accountancy education available in this part of the world, and that our graduates are well prepared to meet the challenges of the new and global economy.

Curriculum structure

The curriculum for the B.Acc. programme comprises Business and core Accounting courses, a professional attachment and breadth courses which include General Education Requirements and unrestricted electives.

Business Courses

B.Acc. students are required to complete nine Business courses within the three-year direct honours programme.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC1101</td>
<td>Accounting I</td>
</tr>
<tr>
<td>AC1102</td>
<td>Accounting II</td>
</tr>
<tr>
<td>AB1201</td>
<td>Financial Management</td>
</tr>
<tr>
<td>AB1202</td>
<td>Statistical and Quantitative Methods</td>
</tr>
<tr>
<td>AB1301</td>
<td>Business Law</td>
</tr>
<tr>
<td>AB1501</td>
<td>Marketing</td>
</tr>
<tr>
<td>AB1401</td>
<td>Information Technology</td>
</tr>
<tr>
<td>AB1601</td>
<td>Organisational Behavior and Design</td>
</tr>
<tr>
<td>AB3601</td>
<td>Strategic Management</td>
</tr>
</tbody>
</table>

In addition to these nine business courses, students who have not passed or are not exempted from the Qualifying English Test for admission to the programme are required to read HW0001 English Proficiency.
Core Accounting Courses
Students are required to read nine core Accounting courses across their second and third years of study.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC2101</td>
<td>Accounting Recognition and Measurement</td>
</tr>
<tr>
<td>AC2102</td>
<td>Accounting for Decision-Making and Control</td>
</tr>
<tr>
<td>AC2103</td>
<td>Risk Management, Control and Ethics</td>
</tr>
<tr>
<td>AC2301</td>
<td>Principles of Taxation</td>
</tr>
<tr>
<td>AC2302</td>
<td>Company Law</td>
</tr>
<tr>
<td>AC2401</td>
<td>Accounting Information Systems</td>
</tr>
<tr>
<td>AC3101</td>
<td>Assurance and Auditing</td>
</tr>
<tr>
<td>AC3102</td>
<td>Risk-Reporting and Analysis</td>
</tr>
<tr>
<td>AC3103</td>
<td>Accounting Analysis and Equity Valuation</td>
</tr>
</tbody>
</table>

Unrestricted Electives (UE)
The programme’s flexibility also allows students to pursue a variety of options for an enriching learning experience, thus ensuring that they are endowed with a wide set of skills and knowledge to meet the demands of the new economy.

Unrestricted electives available to NBS students under the broadening component include:

(I) Broad-based education options
Being a large comprehensive University, students enjoy many options for interdisciplinary learning and exposure. The flexibility of a well-designed curriculum which balances the in-depth disciplinary training in the respective fields of profession with broadening study enables students to pursue a variety of options outside their area of specialisation.

Under the broad-based and flexible framework of the Accountancy undergraduate programme, students can also obtain a minor under the University Minor Programme offered by other schools in areas such as Communications, Psychology, Entrepreneurship, Sports Management, etc. In addition, students may also choose to read electives offered by other schools from foreign languages, sciences, technology, communications, and humanities to arts, design, media and sports.

(II) Broad-based education options
Recognising the increasing importance of international exposure and the value of cross-cultural links and exchanges in today’s global economy, NBS students are encouraged to pursue a semester of study or work at one of NTU’s overseas partner universities under the GEM - Explorer. Short term abroad opportunities GEM - Discoverer programme are also available.

(III) Second specialisation programme
The Second Specialisation programme offers students who are academically able the choice of obtaining a second specialisation in an area outside of their first specialisation to broaden their skill sets and knowledge, making them more attractive to employers.

Students in the Second Specialisation Programme (SSP) read the SSP courses in place of Unrestricted Electives (UEs) in the degree programme requirements.

Second specialisations may be pursued in these areas:
- Banking and Finance
- Business Law
- Economics
- Human Resource Consulting
- Information Technology
- Marketing

Professional Attachment
NBS students pursue a professional attachment lasting eight or ten weeks at the ends of their second year of study. This attachment is carefully crafted to be relevant and enriching, allowing our students to acquire first-hand practical experience and sharpen their skill in the industry. In addition to providing practical real-life work experience for our students to balance their academic training, NBS students also get to interact and network with professionals in the working environment, setting up valuable contacts necessary to give them the edge in the working world. The attachment often serves as an excellent opportunity for employers to assess our students and their quality, prior to making a permanent job offer to them, even before graduation.

General Education Requirements
Apart from the Business and Core courses and the professional attachment mentioned above, NBS students need to fulfill the following General Education Requirements (GER) to complete their programme:

(I) GER - Core

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB0901</td>
<td>Principles of Economics: A Singapore Perspective</td>
</tr>
<tr>
<td>AB0601</td>
<td>Communication Management Fundamentals</td>
</tr>
<tr>
<td>AB0602</td>
<td>Communication Management Strategies</td>
</tr>
</tbody>
</table>

In addition to the above three courses, students will also take a course each in Ethics & Academic Integrity, Sustainability and Enterprise & Innovation.

(II) GER - Prescribed Electives (PE)
Students are required to take a prescribed elective course from each of the following areas:
- Liberal Arts (LA)
- Science, Technology and Society (STS)
- Business and Management (BM) – corporate sustainability

These courses offer breadth of study, enabling NBS students to understand and appreciate the broader issues and trends in areas of study outside their main disciplines.

(III) Second specialisation programme
The Second Specialisation programme offers students who are academically able the choice of obtaining a second specialisation in an area outside of their first specialisation to broaden their skill sets and knowledge, making them more attractive to employers.

Students in the Second Specialisation Programme (SSP) read the SSP courses in place of Unrestricted Electives (UEs) in the degree programme requirements.

Second specialisations may be pursued in these areas:
- Banking and Finance
- Business Law
- Economics
- Human Resource Consulting
- Information Technology
- Marketing
Curriculum Structure

Banking and Finance
(To complete four from a menu of courses) Four courses to be chosen from the following:

- BF2207 International Finance
- BF2206 Wealth Management
- BF3202 Fixed Income Securities
- BF3204 Financial Modeling
- BF2210 Bank Risk Management
- BF3201 Corporate Finance and Strategy
- BF3203 Equity Securities
- BF3207 Alternative Investments

Business Law
(To take four courses comprising one compulsory core course and three prescribed electives)

One compulsory core course

- BL9311 Law of Commercial Transactions

Three prescribed electives to be chosen from the following:

- BL9302 Management of Intellectual Property and New Media
- BL9313 Corporate Finance Law
- BL9304 Negotiation and Dispute Resolution
- BL9305 Advanced Taxation
- BH3301 Employment Law

Economics
Course requirements for a second major in Economics:
(To complete 11 courses comprising five compulsory core courses and six prescribed electives)

Five compulsory core courses

- A90001 Principles of Economics
- HE1005 Introduction to Probability and Statistical Inference
- HE2001 Intermediate Microeconomics
- HE2002 Intermediate Macroeconomics
- HE4010 Singapore Economy in a Globalized World

Choose SIX Prescribed Electives (20 AUs) of which TWO have to be HE4XXX

- HE2004 Introductory Econometrics
- HE2005 Principles of Econometrics
- HE2006 International Monetary Economics
- HE2007 Money and Banking
- HE2008 Public Finance
- HE2009 Industrial Organisation
- HE2010 Development Economics

- HE2011 Labour Economics & Labour Relations
- HE2012 Economic Thought
- HE2013 International Trade
- HE2015 Macroeconomic Issues and Policies in Contemporary China
- HE2020 Survey Methods and Sampling Technique
- HE3001 Mathematical Economics
- HE3002 Game Theory & Applications to Social Sciences
- HE3003 The Chinese Economy
- HE3004 Health Economics
- HE3005 Environmental Economics
- HE3006 Urban and Transport Economics
- HE3007 Financial Economics
- HE3009 Population Economics
- HE3010 Energy Economics
- HE3011 Cost-Benefit Analysis
- HE3012 Political Economy of East Asia
- HE3013 Urban Economics
- HE3014 Economics of Corporate Finance
- HE3015 Political Economy
- HE3016 Principles of Mathematics Finance
- HE3020 Applied Econometrics
- HE3021 Intermediate Econometrics
- HE3022 Econometric Modelling & Forecasting
- HE3023 Econometric Analysis of Financial Data
- HE4001 Advanced Microeconomics
- HE4002 Advanced Macroeconomics
- HE4003 Advanced International Finance
- HE4004 Behavioural Economics
- HE4005 Growth Theory and Empircs
- HE4010 Singapore Economy in a Globalized World
- HE4011 Current Topics in Economics
- HE4012 Advanced Financial Economics
- HE4013 Experimental Economics
- HE4014 Information Economics
- HE4015 Personnel Economics
- HE4016 Quantitative Economics
- HE4017 Monetary Economics
- HE4020 Econometric Time Series Analysis
- HE4021 Advanced Econometrics

Human Resource Consulting
(To complete four courses comprising one compulsory core and three electives)

One Compulsory core course

- BH2601 Strategic Human Resource and Consulting
Three Prescribed electives to be chosen from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BH2602</td>
<td>Total Rewards Management</td>
</tr>
<tr>
<td>BH2603</td>
<td>Talent Sourcing &amp; Acquisition</td>
</tr>
<tr>
<td>BH2604</td>
<td>Managing &amp; Consulting through Research</td>
</tr>
<tr>
<td>BH3601</td>
<td>Talent Development &amp; Management</td>
</tr>
<tr>
<td>BH3602</td>
<td>HR Technologies, Metrics &amp; Performance</td>
</tr>
<tr>
<td>BH3603</td>
<td>Cultural Intelligence at Work</td>
</tr>
<tr>
<td>BH3301</td>
<td>Employment Law</td>
</tr>
</tbody>
</table>

**Information Technology**

(To complete four courses comprising one compulsory core course and three prescribed electives)

One compulsory core course

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC2402</td>
<td>Data Management and Business Intelligence</td>
</tr>
</tbody>
</table>

Three prescribed electives to be chosen from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC2401</td>
<td>Analysis &amp; Management of IT Projects</td>
</tr>
<tr>
<td>BC2403</td>
<td>Project and Vendor Management</td>
</tr>
<tr>
<td>BC2404</td>
<td>Financial Analytic and Reporting</td>
</tr>
<tr>
<td>BC2405</td>
<td>Decision Tools for Managers</td>
</tr>
<tr>
<td>BC3401</td>
<td>Enterprise Computing</td>
</tr>
<tr>
<td>BC3402</td>
<td>Information Systems in Financial Services</td>
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</tbody>
</table>

**Marketing**

(To complete four compulsory courses as follows)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>BM2501</td>
<td>Market Behaviour</td>
</tr>
<tr>
<td>BM2502</td>
<td>Market Intelligence</td>
</tr>
<tr>
<td>BM2503</td>
<td>Market Relationships</td>
</tr>
<tr>
<td>BM3502</td>
<td>Global Business Strategy</td>
</tr>
</tbody>
</table>

**Actuarial Science** - The first of its kind in Asia since 1991, this specialisation is globally recognised with full accreditation from the Institute & Faculty of Actuaries, UK.

**Banking and Finance** - We are a Chartered Financial Analyst (CFA) Programme Partner and we offer the largest range of cutting-edge courses. Our students achieve a high degree of success in the Chartered Financial Analyst certification.

**Human Resource Consulting** - The only Human Resource Consulting specialisation in the Asia-Pacific region that prepares graduates to focus strategically on building and sustaining people as a critical source of competitive advantage.

**Information Technology** - With a state-of-the-art curriculum that combines rigorous IT competency with business domain knowledge, this unique programme produces IT-savvy professionals who are much sought after by businesses in Singapore and abroad.

**Marketing** - This highly interactive programme offers a curriculum with a strong global and Asian perspective, a practical orientation and creativity. Our highly-rated students go on to find jobs in virtually every industry.

**Tourism and Hospitality Management** - Designed in collaboration with the Singapore Tourism Board and major industry players in response to strong industry demand, this specialisation focuses on the high growth areas of business travel and events, attractions and integrated resorts management.

**Curriculum Structure**

The curriculum for the B.Bus. programme comprises foundational and advanced Business courses, a professional attachment and breadth courses which include General Education Requirements and unrestricted electives.

**Business Courses**

B.Bus. students are required to complete nine Business courses within the three-year direct honours programme.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AD1101</td>
<td>Financial Accounting</td>
</tr>
<tr>
<td>AD2101</td>
<td>Management Accounting</td>
</tr>
<tr>
<td>AB1201</td>
<td>Financial Management</td>
</tr>
<tr>
<td>AB1202</td>
<td>Statistical and Quantitative Methods</td>
</tr>
<tr>
<td>AB1301</td>
<td>Business Law</td>
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<tr>
<td>AB1401</td>
<td>Information Technology</td>
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<td>AB1601</td>
<td>Organisational Behavior and Design</td>
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<tr>
<td>AB3601</td>
<td>Strategic Management</td>
</tr>
</tbody>
</table>

In addition to these nine business courses, students who have not passed or are not exempted from the Qualifying English Test for admission to the programme are required to read HW0001 English Proficiency.
Business Enhancement Courses
In addition, all Business students are to take three business enhancement courses as follows:
Two compulsory courses:

BE1401 Business Operations and Processes
BE2601 Principles of Management

The balance one core course can be chosen from the following menu:

BE2501 International Business Environment
BE3201 Entrepreneurial Finance
AC2302 Company Law
BL9301 Law of Commercial Transactions
BL9303 Corporate Finance Law

Specialisation Courses
Actuarial Science
Seven courses compulsory core courses

BA2201 Actuarial Economics
BA2202 Mathematics of Finance
BA2203 Statistical Modelling
BA2204 Models
BA3201 Life Contingencies and Demography
BA3202 Actuarial Statistics
BA3203 Actuarial Aspects of Asset Valuation

The following courses are available as Unrestricted Electives for Actuarial Science students:

BA2205 Actuarial Computing
BA2206 Principles of Risk & Insurance
BA3204 Actuarial Management
BA3205 Property & Casualty Insurance
BA3206 Insurer Operations & Financial Analysis

Banking and Finance
To take seven courses comprising four compulsory core courses and three specialisation prescribed electives.
Four compulsory core courses

BF2101 Financial Statement Analysis
BF2201 Investments
BF2207 International Finance
BF3201 Corporate Finance and Strategy

Three specialisation prescribed electives to be chosen from the following:

BF2206 Wealth Management
BF2209 Derivative Securities
BF2210 Bank Risk Management
BF3202 Fixed Income Management
BF3203 Equity Securities
BF3204 Financial Modelling
BF3207 Alternative Investments
BC3402 Technology Management in Financial Markets
AC2301 Principles of Taxation
BL9313 Corporate Finance Law

Human Resource Consulting
To take six courses chosen from the following:

BH2601 Strategic Human Resource and Consulting
BH2602 Total Rewards Management
BH2603 Talent Sourcing & Acquisition
BH2604 Management & Consulting through Research
BH3301 Talent Development & Management
BH3601 Performance Management & HR Metrics
BH3602 Cultural Intelligence at Work
BH3603 Employment Law

Note: In view of the pre-requisites for the various HRC courses, HRC majors are strongly encouraged to read BH2601 Strategic Human Resource and Consulting in Year 2, Semester 1.

Information Technology
To take six courses comprising two compulsory core courses and four specialisation prescribed electives
Two compulsory core courses

BC2401 Management and Analysis of IT Projects
BC2402 Data Management and Business Intelligence

Four specialisation prescribed electives to be chosen from the following:

BC2403 Project and Vendor Management
BC2404 Financial Analytics and Reporting
BC2405 Decision Tools for Managers
BC3401 Enterprise Computing
BC3402 Management in Financial Services
BC3403 Enterprises Technologies in Digital Marketing
BC3404 Business Analytics

Marketing
To take six courses comprising four compulsory core courses and two specialisation prescribed electives.
Four compulsory core courses
Two specialisation prescribed electives to be chosen from the following:

- BE2511 International Business Environment
- BM2504 Integrated Marketing Communications
- BM2505 Marketing Channels
- BM3501 Marketing Strategy
- BM3503 Retail Management
- BM3504 Sales Management
- BM3505 Services Marketing
- BM3506 Strategic Brand Management
- BT2501 Tourism & Hospitality Management
- BT3502 Tourism & Technology

Unrestricted Electives (UE)

The programme’s flexibility also allows students to pursue a variety of options for an enriching learning experience, thus ensuring that they are endowed with a wide set of skills and knowledge to meet the demands of the new economy.

Unrestricted electives available to NBS students under the broadening component include:

(I) Broad-based education options

Being a large comprehensive University, students enjoy many options for interdisciplinary learning and exposure. The flexibility of a well-designed curriculum which balances the in-depth disciplinary training in the respective fields of profession with broadening study enables students to pursue a variety of options outside their area of specialisation.

Under the broad-based and flexible framework of the Business undergraduate programme, students can also obtain a minor under the University Minor Programme offered by other schools in areas such as Communications, Psychology, Entrepreneurship, Sports Management, etc.

In addition, students may also choose to read electives offered by other schools from foreign languages, sciences, technology, communications, and humanities to arts, design, media and sports.

(II) Overseas exchange experience

Recognising the increasing importance of international exposure and the value of cross-cultural links and exchanges in today’s global economy, NBS students are encouraged to pursue a semester of study or work at one of NTU’s overseas partner universities under the GEM – Explorer. Short term study abroad opportunities, GEM – Discoverer programme, are also available.

(III) Second specialisation programme

The Second Specialisation programme offers students who are academically able the choice of obtaining a second specialisation in an area outside of their first specialisation to broaden their skill sets and knowledge, making them more attractive to employers.

Students in the Second Specialisation Programme (SSP) read the SSP courses in place of Unrestricted Electives (UEs) in the degree programme requirements.
Second specialisations may be pursued in these areas:
- Banking and Finance
- Business Law
- Economics
- Human Resource Consulting
- Information Technology
- Marketing

Curriculum structure

Banking and Finance
(To complete four from a menu of courses)
Four courses to be chosen from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BF2207</td>
<td>International Finance</td>
</tr>
<tr>
<td>BF2206</td>
<td>Wealth Management</td>
</tr>
<tr>
<td>BF3202</td>
<td>Fixed Income Securities</td>
</tr>
<tr>
<td>BF3204</td>
<td>Financial Modeling</td>
</tr>
<tr>
<td>BF2210</td>
<td>Bank Risk Management</td>
</tr>
<tr>
<td>BF3201</td>
<td>Corporate Finance and Strategy</td>
</tr>
<tr>
<td>BF3203</td>
<td>Equity Securities</td>
</tr>
<tr>
<td>BF3207</td>
<td>Alternative Investments</td>
</tr>
</tbody>
</table>

Business Law
(To take four courses comprising two compulsory core courses and two prescribed electives)
Two compulsory core courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BL9311</td>
<td>Law of Commercial Transactions</td>
</tr>
<tr>
<td>AC2312</td>
<td>Company Law</td>
</tr>
</tbody>
</table>

Two prescribed electives to be chosen from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC2301</td>
<td>Principles of Taxation</td>
</tr>
<tr>
<td>BL9302</td>
<td>Management of Intellectual Property and New Media</td>
</tr>
<tr>
<td>BL9313</td>
<td>Corporate Finance Law</td>
</tr>
<tr>
<td>BL9304</td>
<td>Negotiation and Dispute Resolution</td>
</tr>
<tr>
<td>BL9305</td>
<td>Advanced Taxation</td>
</tr>
<tr>
<td>BH3301</td>
<td>Employment Law</td>
</tr>
</tbody>
</table>

Economics
Course requirements for a second major in Economics:
(To complete 11 courses comprising five compulsory core courses and six prescribed electives)
Five compulsory core courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB0901</td>
<td>Principles of Economics</td>
</tr>
<tr>
<td>HE1005</td>
<td>Introduction to Probability and Statistical Inference</td>
</tr>
<tr>
<td>HE2001</td>
<td>Intermediate Microeconomics</td>
</tr>
<tr>
<td>HE2002</td>
<td>Intermediate Macroeconomics</td>
</tr>
<tr>
<td>HE4010</td>
<td>Singapore Economy in a Globalized World</td>
</tr>
</tbody>
</table>

Five compulsory Prescribed electives - Choose four from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>HE2004</td>
<td>Introductory Econometrics</td>
</tr>
<tr>
<td>HE2005</td>
<td>Principles of Econometrics</td>
</tr>
<tr>
<td>HE2006</td>
<td>International Monetary Economics</td>
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<td>HE2007</td>
<td>Money and Banking</td>
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<td>HE2008</td>
<td>Public Finance</td>
</tr>
<tr>
<td>HE2009</td>
<td>Industrial Organisation</td>
</tr>
<tr>
<td>HE2010</td>
<td>Development Economics</td>
</tr>
<tr>
<td>HE2011</td>
<td>Labour Economics &amp; Labour Relations</td>
</tr>
<tr>
<td>HE2012</td>
<td>Economic Thought</td>
</tr>
<tr>
<td>HE2013</td>
<td>International Trade</td>
</tr>
<tr>
<td>HE2015</td>
<td>Macroeconomic Issues and Policies in Contemporary China</td>
</tr>
<tr>
<td>HE2020</td>
<td>Survey Methods and Sampling Technique</td>
</tr>
<tr>
<td>HE3001</td>
<td>Mathematical Economics</td>
</tr>
<tr>
<td>HE3002</td>
<td>Game Theory &amp; Applications to Social Sciences</td>
</tr>
<tr>
<td>HE3003</td>
<td>The Chinese Economy</td>
</tr>
<tr>
<td>HE3004</td>
<td>Health Economics</td>
</tr>
<tr>
<td>HE3005</td>
<td>Environmental Economics</td>
</tr>
<tr>
<td>HE3006</td>
<td>Urban and Transport Economics</td>
</tr>
<tr>
<td>HE3007</td>
<td>Financial Economics</td>
</tr>
<tr>
<td>HE3009</td>
<td>Population Economics</td>
</tr>
<tr>
<td>HE3010</td>
<td>Energy Economics</td>
</tr>
<tr>
<td>HE3011</td>
<td>Cost-Benefit Analysis</td>
</tr>
<tr>
<td>HE3012</td>
<td>Political Economy of East Asia</td>
</tr>
<tr>
<td>HE3013</td>
<td>Urban Economics</td>
</tr>
<tr>
<td>HE3014</td>
<td>Economics of Corporate Finance</td>
</tr>
<tr>
<td>HE3015</td>
<td>Political Economy</td>
</tr>
<tr>
<td>HE3016</td>
<td>Principles of Mathematics Finance</td>
</tr>
<tr>
<td>HE3020</td>
<td>Applied Econometrics</td>
</tr>
<tr>
<td>HE3021</td>
<td>Intermediate Econometrics</td>
</tr>
<tr>
<td>HE3022</td>
<td>Econometric Modelling &amp; Forecasting</td>
</tr>
<tr>
<td>HE3023</td>
<td>Econometric Analysis of Financial Data</td>
</tr>
<tr>
<td>HE4001</td>
<td>Advanced Microeconomics</td>
</tr>
<tr>
<td>HE4002</td>
<td>Advanced Macroeconomics</td>
</tr>
<tr>
<td>HE4003</td>
<td>Advanced International Finance</td>
</tr>
<tr>
<td>HE4004</td>
<td>Behavioural Economics</td>
</tr>
<tr>
<td>HE4005</td>
<td>Growth Theory and Empirics</td>
</tr>
<tr>
<td>HE4010</td>
<td>Singapore Economy in a Globalized World</td>
</tr>
<tr>
<td>HE4011</td>
<td>Current Topics in Economics</td>
</tr>
<tr>
<td>HE4012</td>
<td>Advanced Financial Economics</td>
</tr>
<tr>
<td>HE4013</td>
<td>Experimental Economics</td>
</tr>
</tbody>
</table>
**Human Resource Consulting**

*(To complete four courses comprising one compulsory core & three electives)*

One compulsory core course

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BH2601</td>
<td>Strategic Human Resource and Consulting</td>
</tr>
</tbody>
</table>

Three prescribed electives to be chosen from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BH2602</td>
<td>Total Rewards Management</td>
</tr>
<tr>
<td>BH2603</td>
<td>Talent Sourcing &amp; Acquisition</td>
</tr>
<tr>
<td>BH2604</td>
<td>Managing &amp; Consulting through Research</td>
</tr>
<tr>
<td>BH3301</td>
<td>Employment Law</td>
</tr>
<tr>
<td>BH3601</td>
<td>Talent Development &amp; Management</td>
</tr>
<tr>
<td>BH3602</td>
<td>Performance Management &amp; HR Metrics</td>
</tr>
<tr>
<td>BH3603</td>
<td>Cultural Intelligence at Work</td>
</tr>
</tbody>
</table>

**Information Technology**

*(To complete four courses comprising two compulsory core courses and two prescribed electives)*

Two compulsory core courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC2401</td>
<td>Management and Analysis of IT Projects</td>
</tr>
<tr>
<td>BC2402</td>
<td>Data Management and Business Intelligence</td>
</tr>
</tbody>
</table>

Two prescribed electives to be chosen from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC2404</td>
<td>Financial Analytic and Reporting</td>
</tr>
<tr>
<td>BC2405</td>
<td>Decision Tools for Managers</td>
</tr>
<tr>
<td>BC3401</td>
<td>Enterprise Computing</td>
</tr>
<tr>
<td>BC3402</td>
<td>Technology Management in Financial Services</td>
</tr>
</tbody>
</table>

**Marketing**

*(To complete four compulsory courses)*

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BM2501</td>
<td>Market Behaviour</td>
</tr>
<tr>
<td>BM2502</td>
<td>Market Intelligence</td>
</tr>
<tr>
<td>BM2503</td>
<td>Market Relationships</td>
</tr>
<tr>
<td>BM3502</td>
<td>Global Business Strategy</td>
</tr>
</tbody>
</table>

**Accounting Core Courses**

Nine Accounting core courses are read by students across the second, third and fourth year of study.

**Business Enhancement Courses**

Students are to take three business enhancement courses, as follows:

Two compulsory courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE1401</td>
<td>Business Operations and Processes</td>
</tr>
<tr>
<td>BE2601</td>
<td>Principles of Management</td>
</tr>
</tbody>
</table>

The balance one core course can be chosen from the following menu:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE2501</td>
<td>International Business Environment</td>
</tr>
<tr>
<td>BE3201</td>
<td>Entrepreneurial Finance</td>
</tr>
<tr>
<td>AC2302</td>
<td>Company Law</td>
</tr>
<tr>
<td>BL9301</td>
<td>Law of Commercial Transactions</td>
</tr>
<tr>
<td>BL9303</td>
<td>Corporate Finance Law</td>
</tr>
</tbody>
</table>

**Business Specialisation Courses**

A wide range of specialisations are available to best match students’ diverse aptitudes and interests. Double Degree students will have the opportunity to specialise in one of the following six business specialisations at the end of their first year of study by choice and academic merit:

**Actuarial Science** – The first of its kind in Asia since 1991, this specialisation is globally recognised with accreditation from the Institute of Actuaries, UK.

**Banking and Finance** – Offers the largest range of cutting-edge courses. Our students achieve a high degree of success in the Chartered Financial Analyst certification.

**Human Resource Consulting** – The only Human Resource Consulting specialisation in the Asia-Pacific region that prepares graduates to focus strategically on building and sustaining people as a critical source of competitive advantage.
Information Technology – With a state-of-the-art curriculum that combines rigorous IT competency with business domain knowledge, this unique programme produces IT-savvy professionals who are much sought after by businesses in Singapore and abroad.

Marketing – This highly interactive programme offers a curriculum with a strong global and Asian perspective, a practical orientation and an emphasis on thinking skills, imagination and creativity. Our highly-rated students go on to find jobs in virtually every industry.

Tourism and Hospitality Management – Designed in collaboration with the Singapore Tourism Board and major industry players in response to strong industry demand, this major focuses on the high growth areas of business travel and events, attractions and integrated resorts management.

Details of the specialisation courses are as follows:

**Specialisation Courses**

**Actuarial Science**
To take seven courses comprising five compulsory core courses and two specialisation prescribed electives.

Seven courses compulsory core courses

- **BA2201** Actuarial Economics
- **BA2202** Mathematics of Finance
- **BA2203** Statistical Modelling
- **BA2204** Models
- **BA3201** Life Contingencies and Demography
- **BA3202** Actuarial Statistics
- **BA3203** Actuarial Aspects of Asset Valuation

The following courses are available as Unrestricted Electives for Actuarial Science students:

- **BA2205** Actuarial Computing
- **BA2206** Principles of Risk & Insurance
- **BA3204** Actuarial Management
- **BA3205** Property & Casualty Insurance
- **BA3206** Insurer Operations & Financial Analysis

**Banking and Finance**
To take seven courses comprising four compulsory core courses and three specialisation prescribed electives.

Four compulsory core courses

- **BF2201** Investments
- **BF2207** International Finance
- **BF3201** Corporate Finance and Strategy

Four specialisation prescribed electives to be chosen from the following:

- **BF2206** Wealth Management
- **BF2209** Derivative Securities

**Information Technology**
To take six courses comprising two compulsory core courses and four specialisation prescribed electives.

Two compulsory core courses

- **BF2210** Bank Risk Management
- **BF3202** Fixed Income Securities
- **BF3203** Equity Securities
- **BF3204** Financial Modelling
- **BF3207** Alternative Investments
- **BC3402** Technology Management in Financial Markets
- **AC2301** Principles of Taxation
- **BL9313** Corporate Finance Law

**Human Resource Consulting**
To take six courses from the following:

- **BH2601** Strategic Human Resource and Consulting

Five specialisation prescribed electives to be chosen from the following:

- **BH2602** Total Rewards Management
- **BH2603** Talent Sourcing & Acquisition
- **BH2604** Management & Consulting through Research
- **BH3301** Employment Law
- **BH3601** Talent Development & Management
- **BH3602** Performance Management & HR Metrics
- **BH3603** Cultural Intelligence at Work

Note: In view of the pre-requisites for the various HRC courses, HRC majors are strongly encouraged to read **BH2601 Strategic Human Resource and Consulting** in Year 2, Semester 1.

**Marketing**
To take six courses comprising four compulsory core courses and two specialisation prescribed electives.

Four specialisation prescribed electives to be chosen from the following:

- **BC2401** Management and Analysis of IT Projects
- **BC2402** Data Management and Business Intelligence
- **BC2403** Project and Vendor Management
- **BC2404** Financial Analytics and Reporting
- **BC2405** Decision Tools for Managers
- **BC3401** Enterprise Computing
- **BC3402** Technology Management in Financial Services
- **BC3403** Technologies in Digital Marketing
- **BC3404** Business Analytics

**Tourism and Hospitality Management**
To take six courses comprising four compulsory core courses and three specialisation prescribed electives.

Four compulsory core courses

- **BC2401** Management and Analysis of IT Projects
- **BC2402** Data Management and Business Intelligence
- **BC2403** Project and Vendor Management
- **BC2404** Financial Analytics and Reporting
- **BC2405** Decision Tools for Managers
- **BC3401** Enterprise Computing
- **BC3402** Technology Management in Financial Services
- **BC3403** Technologies in Digital Marketing
- **BC3404** Business Analytics

**Banking and Finance**
To take seven courses comprising four compulsory core courses and three specialisation prescribed electives.

Four compulsory core courses

- **BF2201** Investments
- **BF2207** International Finance
- **BF3201** Corporate Finance and Strategy

Four specialisation prescribed electives to be chosen from the following:

- **BF2206** Wealth Management
- **BF2209** Derivative Securities

**Information Technology**
To take six courses comprising two compulsory core courses and four specialisation prescribed electives.

Two compulsory core courses

- **BF2210** Bank Risk Management
- **BF3202** Fixed Income Securities
- **BF3203** Equity Securities
- **BF3204** Financial Modelling
- **BF3207** Alternative Investments
- **BC3402** Technology Management in Financial Markets
- **AC2301** Principles of Taxation
- **BL9313** Corporate Finance Law

**Human Resource Consulting**
To take six courses from the following:

- **BH2601** Strategic Human Resource and Consulting

Five specialisation prescribed electives to be chosen from the following:

- **BH2602** Total Rewards Management
- **BH2603** Talent Sourcing & Acquisition
- **BH2604** Management & Consulting through Research
- **BH3301** Employment Law
- **BH3601** Talent Development & Management
- **BH3602** Performance Management & HR Metrics
- **BH3603** Cultural Intelligence at Work

Note: In view of the pre-requisites for the various HRC courses, HRC majors are strongly encouraged to read **BH2601 Strategic Human Resource and Consulting** in Year 2, Semester 1.
Two specialisation prescribed electives to be chosen from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE2511</td>
<td>International Business Environment</td>
</tr>
<tr>
<td>BM2504</td>
<td>Integrated Marketing Communications</td>
</tr>
<tr>
<td>BM2505</td>
<td>Marketing Channels</td>
</tr>
<tr>
<td>BM3501</td>
<td>Marketing Strategy</td>
</tr>
<tr>
<td>BM3503</td>
<td>Retail Management</td>
</tr>
<tr>
<td>BM3504</td>
<td>Sales Management</td>
</tr>
<tr>
<td>BM3505</td>
<td>Services Marketing</td>
</tr>
<tr>
<td>BM3506</td>
<td>Strategic Brand Management</td>
</tr>
<tr>
<td>BT2501</td>
<td>Tourism &amp; Hospitality Management</td>
</tr>
<tr>
<td>BT3502</td>
<td>Tourism &amp; Technology</td>
</tr>
</tbody>
</table>

Tourism and Hospitality Management

Six compulsory core courses

- BT2402: Service Operations Management for Tourism & Hospitality
- BT2504: Corporate Social Responsibility in Tourism & Hospitality
- BT2501: Tourism and Hospitality Management
- BT2502: Tourism & Hospitality Facility Management & Design
- BT2503: Revenue Management
- BM3505: Services Marketing

Professional Attachment

NBS students pursue a professional attachment lasting eight or ten weeks at the end of their second year of study. This attachment is carefully crafted to be relevant and enriching, allowing our students to acquire first-hand practical experience and sharpen their skills in the industry. In addition to providing practical real-life work experience for our students to balance their academic training, NBS students also get to interact and network with professionals in the working environment, setting up valuable contacts necessary to give them the edge in the working world. The attachment often serves as an excellent opportunity for employers to assess our students and their quality, prior to making a permanent job offer to them, even before graduation.

General Education Requirements

Apart from the Business and Core courses and the professional attachment mentioned above, NBS students need to fulfill General Education Requirements (GER) to complete their programme:

(I) GER Core

- AB0601: Communication Management Fundamentals
- AB0602: Communication Management Strategies
- AB0901: Principles of Economics: A Singapore Perspective*

* In addition to the above three courses, students will also take a course each in Ethics & Academic Integrity, Sustainability and Enterprise & Innovation.

(II) GER – Prescribed Electives (PE)

Students are required to take one prescribed elective course from each of the following areas:

- Liberal Arts (LA)
- Science, Technology and Society (STS)
- Business and Management (BM) – corporate sustainability

These courses offer breadth of study, enabling NBS students to understand and appreciate the broader issues and trends in areas of study outside their main disciplines.

Unrestricted Electives (UE)

The programme’s flexibility also allows students to pursue a variety of options for an enriching learning experience, thus ensuring that they are endowed with a wide set of skills and knowledge to meet the demands of the new economy.

Unrestricted electives available under the broadening component include:

(I) Broad-based education options

Being a large comprehensive University, students enjoy many options for interdisciplinary learning and exposure. The flexibility of a well-designed curriculum which balances the in-depth disciplinary training in the respective fields of profession with broadening study enables students to pursue a variety of options outside their area of specialisation.

Under the broad-based and flexible framework of the double degree undergraduate programme, students can also obtain a minor under the University Minor Programme offered by other schools in areas such as Communications, Psychology, Entrepreneurship, Sports Management, etc.

In addition, students may also choose to read electives offered by other schools from foreign languages, sciences, technology, communications, and humanities to arts, design, media and sports.

(II) Overseas exchange experience

Recognising the increasing importance of international exposure and the value of cross-cultural links and exchanges in today’s global economy, NBS students are encouraged to pursue a semester of study or work at one of NTU’s overseas partner universities under the GEM – Explorer. Short term study abroad opportunities, GEM – Discoverer programm, are also available.

Description of Courses

For visitors and prospective students: Please visit our website at http://www.nbs.ntu.edu.sg PROSPECTIVE/UNDERGRAD/Pages/Home.aspx for more information.
College of Engineering

Undergraduate Study

The College of Engineering offers the following undergraduate programmes:

- Bachelor of Engineering programmes in one of the following majors:
  - Aerospace Engineering
  - Bioengineering
  - Chemical and Biomolecular Engineering
  - Civil Engineering
  - Computer Engineering
  - Computer Science
  - Electrical and Electronic Engineering
  - Environmental Engineering
  - Information Engineering and Media
  - Materials Engineering
  - Mechanical Engineering
  - Engineering with Business Minor

  (Applicable to all single Engineering degree programmes listed above)

- Bachelor of Science programme
  - Maritime Studies

- Double Major programme
  - Chemical and Biomolecular Engineering with a Second Major in Food Science and Technology
  - Engineering (in a specific engineering major) with a Second Major in Business
  - Maritime Studies with a Second Major in Business

- Double Degree programmes
  - Computer Engineering and Business
  - Computer Science and Business
  - Engineering (in a specific engineering major) and Economics

- NTU-Georgia Tech Integrated programmes
  - B.Eng and MS (Computer Engineering)
  - B.Eng and MS (Computer Science)
  - B.Eng and MS (Electrical and Computer Engineering)

Description of Courses

Please visit the College of Engineering website at http://coe.ntu.edu.sg/CurrentStudents/Undergraduate/Programmes/Pages/default.aspx for more information on our courses.

School of Chemical and Biomedical Engineering

Bachelor of Engineering (Chemical and Biomolecular Engineering)

The programme amalgamates principles of chemical engineering and life sciences (biology, biochemistry and genetics) to facilitate the development of safe, profitable and environmental-friendly processes for the synthesis and manufacture of products from chemical / biological raw materials.

Curriculum structure of B.Eng. (CBE)

The total number of AUs required in the B.Eng. (CBE) programme to qualify for graduation is 138 AUs. Students are to fulfill the specified AU requirement in the B.Eng. (CBE) programme, according to the broad groups of courses in the curriculum structure indicated below:

(a) General Education Requirement (GER)

The first group of courses is collectively called the “GER” and consists of 42 AUs for adequate grounding in broad cross-disciplinary areas beyond the Engineering Majors. Students are to fulfill the GER in the following manner:

(i) Core Courses (12 AUs)
  - Communication (2 AUs)
  - Technical Communication (2 AUs)
  - Professional Communication (2 AUs)
  - Environmental Sustainability (3 AUs)
  - Engineers and Society (3 AUs)

(ii) Prescribed Electives (15 AUs)
  - GER Prescribed Electives are classified under four areas of interests. Students are to satisfy their choices of courses according to specified AUs per area as follow:
    a) Arts, Humanities and Social Sciences (3 AUs)
    b) Management and Business (3 AUs)
    c) Science, Technology and Society (3 AUs)
    d) Liberal Studies (3 AUs)
    e) Any areas of the above (3 AUs)

(iii) Unrestricted Electives (15 AUs)

Students are to elect 15 AUs of Unrestricted Electives from the wide selection of courses available in the University. This includes courses in Minor programmes, technical electives related to Engineering Majors (including CBE prescribed electives), and any other courses offered by other Majors.

(b) Engineering Major's Requirement

Students are required to take 87 AUs of CBE core courses and 9 AUs of CBE Prescribed Electives from the current three specialisation areas (namely Pharmaceutical Engineering, Biotechnology and Therapeutic Engineering, and Nanotechnology and Green Processing). A student can elect to be classified under a specialisation area if he/ she takes three CBE Prescribed Electives (9 AUs) under a particular specialisation area. It is not necessary to have a specialisation area to meet graduation requirements.

Bachelor of Engineering (Bioengineering)

The programme trains students in the blended field of modern biology with engineering advances information technology, electronics, communications and materials to develop new engineering approaches and tools for biomedical applications.

Curriculum structure of B.Eng. (BIE)

The total number of AUs required in the B.Eng. (BIE) programme to qualify for graduation is 138 AUs. Students are to fulfill the specified
AU requirement in the B.Eng. (BIE) programme, according to the broad groups of courses in the curriculum structure indicated below:

(a) General Education Requirement (GER)

The first group of courses is collectively called the “GER” and consists of 42 AUs for adequate grounding in broad cross-disciplinary areas beyond the Engineering Majors. Students are to fulfill the GER in the following manner:

(i) Core Courses (12 AUs)
- Communication (2 AUs)
- Technical Communication (2 AUs)
- Professional Communication (2 AUs)
- Environmental Sustainability (3 AUs)
- Engineers and Society (3 AUs)

(ii) Prescribed Electives (15 AUs)
GER Prescribed Electives are classified under four areas of interests. Students are to satisfy their choices of courses according to specified AUs per area as follow:
- a) Arts, Humanities and Social Sciences (3 AUs)
- b) Management and Business (3 AUs)
- c) Science, Technology and Society (3 AUs)
- d) Liberal Studies (3 AUs)
- e) Any areas of the above (3 AUs)

(iii) Unrestricted Electives (15 AUs)
Students are to elect 15 AUs of Unrestricted Electives from the wide selection of courses available in the University. This includes courses in Minor programmes, technical electives related to Engineering Majors (including BIE prescribed electives), and any other courses offered by other Majors.

(b) Engineering Major’s Requirement

Students are required to take 87 AUs of BIE core courses and 9 AUs of BIE Prescribed Electives from the current two specialisation areas (namely Bioinstrumental and Bioelectronics, and Biomaterials and Tissue Engineering).

Description of Courses

Please visit our website at http://www.scbe.ntu.edu.sg/current_students/Undergraduate/Programme_Requirements/Pages/default.aspx for more information on our Courses.

School of Civil and Environmental Engineering

The undergraduate programmes offered by CEE include:
- Bachelor of Engineering in Civil Engineering
- Bachelor of Engineering in Civil Engineering with a Second Major in Business
- Bachelor of Engineering in Environmental Engineering
- Bachelor of Engineering in Environmental Engineering with a Second Major in Business
- Bachelor of Science in Maritime Studies
- Bachelor of Science in Maritime Studies with a Second Major in Business
- Double Degree in Bachelor of Engineering (Civil Engineering) and Bachelor of Arts (Economics)
- Double Degree in Bachelor of Engineering (Environmental Engineering) and Bachelor of Arts (Economics)

Degree Programmes and Requirements

**Bachelor of Engineering in Civil Engineering**

<table>
<thead>
<tr>
<th>Year 1 Semester 1 &amp; 2</th>
<th>Course code and title</th>
<th>AUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>MH1810 Mathematics 1</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>FE1008 Computing</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>PH1011 Physics</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>FE1073 Introduction to Engineering &amp; Practices</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>GC0001 Introduction to Sustainability: Multidisciplinary Approaches and Solutions</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>HW0188 Engineering Communication I</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>GER - Elective (LA)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>MH1811 Mathematics 2</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>CV1011 Mechanics of Materials</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>CV1012 Fluid Mechanics</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>CV1013 Civil Engineering Materials</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>CV1711 Civil Engineering Drawing</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>CV0001 Civil Engineering and Sustainable Built Environment</td>
<td>compulsory GER-PE STS</td>
<td>3</td>
</tr>
<tr>
<td>MLC0001</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Total AUs</td>
<td></td>
<td>34</td>
</tr>
</tbody>
</table>

GER: General Education Requirement
- GER Elective – LA (Liberal Arts)
- GER Elective - STS (Science, Technology and Society)

Students with only GCE ‘O’ level Physics qualification are required to take PH1012 Physics A (4AUs)

Students who have not passed or are not exempted from the Qualifying English Test are required to take HW0001 English Proficiency (0AUs)

**Year 2 Semester 1**

<table>
<thead>
<tr>
<th>Course code and title</th>
<th>AUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV2011 Structural Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>CV2013 Engineering Geology &amp; Soil Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>CV2015 Hydraulics</td>
<td>3</td>
</tr>
<tr>
<td>MH2814 Probability &amp; Statistics</td>
<td>3</td>
</tr>
<tr>
<td>CV2711 Civil Engineering Laboratory A</td>
<td>1</td>
</tr>
<tr>
<td>HW0288 Engineering Communication II</td>
<td>2</td>
</tr>
<tr>
<td>Ethics and Academics Integrity</td>
<td>1</td>
</tr>
<tr>
<td>Total AUs</td>
<td>16</td>
</tr>
</tbody>
</table>

**Year 2 Semester 2**

<table>
<thead>
<tr>
<th>Course code and title</th>
<th>AUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV2012 Structural Analysis II</td>
<td>3</td>
</tr>
<tr>
<td>CV2014 Geotechnical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CV2016 Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>CV2019 Matrix Algebra &amp; Computational Methods</td>
<td>3</td>
</tr>
<tr>
<td>CV2712 Civil Engineering Laboratory B</td>
<td>1</td>
</tr>
<tr>
<td>GER (Free Elective)</td>
<td>3</td>
</tr>
<tr>
<td>Total AUs</td>
<td>16</td>
</tr>
</tbody>
</table>

GER: General Education Requirement
- (Free Elective)
### Bachelor of Engineering in Environmental Engineering

#### Year 1 Semester 1 & 2

<table>
<thead>
<tr>
<th>Course code and title</th>
<th>AUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>MH1810 Mathematics 1</td>
<td>3</td>
</tr>
<tr>
<td>FE1008 Computing</td>
<td>3</td>
</tr>
<tr>
<td>PH1011 Physics</td>
<td>3</td>
</tr>
<tr>
<td>FE1073 Introduction to Engineering &amp; Practices</td>
<td>1</td>
</tr>
<tr>
<td>GC0001 Introduction to Sustainability: Multidisciplinary Approaches and Solutions</td>
<td>1</td>
</tr>
<tr>
<td>HW0188 Engineering Communication I</td>
<td>2</td>
</tr>
<tr>
<td>GER - Elective (LA)</td>
<td>3</td>
</tr>
<tr>
<td>MH1811 Mathematics 2</td>
<td>3</td>
</tr>
<tr>
<td>CV1012 Fluid Mechanics</td>
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<td>CV1711 Civil Engineering Drawing</td>
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<td>EN1001 Environmental Chemistry</td>
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**GER: General Education Requirement**

**GER Elective – LA (Liberal Arts)**

**GER Elective - STS (Science, Technology and Society)**

Students with only GCE ‘O’ level Physics qualification are required to take PH1012 Physics A (4AUs)

Students who have not passed or are not exempted from the Qualifying English Test are required to take HW0001 English Proficiency (0AUs)

### Year 2 Semester 1

<table>
<thead>
<tr>
<th>Course code and title</th>
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<tbody>
<tr>
<td>CV1011 Mechanics of Materials</td>
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<td>MH2814 Probability &amp; Statistics</td>
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<td>EN2001 Environmental Issues in a Changing World</td>
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<td>EN2002 Environmental Biology and Microbiology</td>
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<td>CV2019 Matrix Algebra &amp; Computational Methods</td>
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<td>EN2003 Water Supply Engineering</td>
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**Year 3 Semester 1**

**Course code and title**

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**GER: General Education Requirement (Free Elective)**

**Year 3 Semester 2**

**Course code and title**

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**GER: General Education Requirement (Free Elective)**

**Year 3 Special Semester**

**Course code and title**

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**Year 4 Semester 1**

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<td>EN4911 Final Year Project</td>
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**GER: General Education Requirement**

**Year 4 Semester 2**

**Course code and title**

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**Grand Total (Year 1 to Year 4)**

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**Bachelor of Science in Maritime Studies**

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<td>MT1002 Introduction to Maritime Industry</td>
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<td>MT1003 Trade Practice and Incoterms</td>
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<td>GO0001 Introduction to Sustainability: Multidisciplinary Approaches and Solutions</td>
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Students who have not passed or are not exempted from the Qualifying English Test are required to take HW0001 English Proficiency (0 AUs)

**Year 1 Semester 2**

**Course code and title**

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<td>MT0001 Shipping and Environment</td>
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<td>MT1004 Introduction to Meteorology and Oceanography</td>
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**GER: General Education Requirement (Free Elective)**

**Year 2 Semester 1**

**Course code and title**

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<td>MT2002 Shipping Economics</td>
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**GER: General Education Requirement**

**Year 2 Semester 2**

**Course code and title**

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GER: General Education Requirement (Free Elective)
GER Elective - can be taken from any category of STS, BM, LA

### Year 3 Semester 1

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<td>MT3003 Organisation of a Ship Owning Entity</td>
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<td>MT3004 Shipping Management</td>
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### Year 3 Semester 2

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<td>MT3006 Ship Chartering</td>
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<td>MT0002 Professionals in Society</td>
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### Year 3 Special Semester

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### Year 4 Semester 1

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<td>MT4004 Research Project</td>
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### Year 4 Semester 2

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**Grand Total (Year 1 to Year 4)**: 130

GER: General Education Requirement (Free Elective)
GER Elective – BM (Business & Management)

### Double Degree in Civil Engineering and Economics

#### Year 1 Semester 1 & 2

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<td>PH1011 Physics</td>
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<td>FE1073 Introduction to Engineering &amp; Practices</td>
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<td>HE1001 Microeconomics Principles</td>
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<td>HE1002 Microeconomics Principles</td>
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<td>HW0188 Engineering Communication I</td>
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### Year 2 Semester 1

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### Year 2 Semester 2

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Year 3 Semester 1

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Year 3 Semester 2

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Year 3 Special Semester

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Year 4 Semester 1

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<td>CV4011 Project Planning &amp; Management</td>
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Year 4 Semester 2

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Year 5 Semester 1

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Year 5 Semester 2

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**Grand Total (Year 1 to Year 5)**: 175

Double Degree in Environmental Engineering and Economics

Year 1 Semester 1 & 2

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GER: General Education Requirement
GER Elective - STS (Science, Technology and Society)
Students with only GCE ‘O’ level Physics qualification are required to take PH1012 Physics A (4AUs)
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<td>CV2015 Hydraulics</td>
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### Bachelor of Engineering in Civil Engineering with Business Major

### Year 1 Semester 1 & 2
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</table>
Students with only GCE ‘O’ level Physics qualification are required to take PH1012 Physics A (4AUs).

Students who have not passed or are not exempted from the Qualifying English Test are required to take HW0001 English Proficiency (0AUs).

<table>
<thead>
<tr>
<th>Year 2 Semester 1</th>
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GER: General Education Requirement
GER Elective – STS (Science, Technology and Society)

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GER: General Education Requirement
GER Elective – LA (Liberal Arts)

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Grand Total (Year 1 to Year 4): 153
### Bachelor of Engineering in Environmental Engineering with Business Major

#### Year 1 Semester 1 & 2

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#### Year 2 Semester 2

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<td>EN2003 Water Supply Engineering</td>
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</tr>
<tr>
<td>EN2712 Environmental Engineering Laboratory B</td>
<td>1</td>
</tr>
<tr>
<td>AB1601 Organisational Behaviour and Design</td>
<td>3</td>
</tr>
<tr>
<td>HW0288 Engineering Communication II</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total AUs</strong></td>
<td>18</td>
</tr>
</tbody>
</table>

GER: General Education Requirement  
GER Elective – LA (Liberal Arts)

#### Year 3 Semester 1

<table>
<thead>
<tr>
<th>Course code and title</th>
<th>AUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV2013 Engineering Geology &amp; Soil Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>EN3001 Solid &amp; Hazardous Waste Management</td>
<td>3</td>
</tr>
<tr>
<td>EN3002 Wastewater Engineering</td>
<td>3</td>
</tr>
<tr>
<td>EN3003 Environmental Transport Processes</td>
<td>3</td>
</tr>
<tr>
<td>Enterprise and Innovation</td>
<td>1</td>
</tr>
<tr>
<td>AB1301 Business Law</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total AUs</strong></td>
<td>16</td>
</tr>
</tbody>
</table>

#### Year 3 Semester 2

<table>
<thead>
<tr>
<th>Course code and title</th>
<th>AUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN3004 Air Pollution Control Engineering</td>
<td>3</td>
</tr>
<tr>
<td>EN3005 Structural Design</td>
<td>3</td>
</tr>
<tr>
<td>AB0901 Principles of Economics</td>
<td>3</td>
</tr>
<tr>
<td>GER - Elective (LA)</td>
<td>3</td>
</tr>
<tr>
<td>MLC0002</td>
<td>1</td>
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<tr>
<td><strong>Total AUs</strong></td>
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</tr>
</tbody>
</table>

#### Year 3 Special Semester

<table>
<thead>
<tr>
<th>Course code and title</th>
<th>AUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN3912 Industrial Orientation</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total AUs</strong></td>
<td>4</td>
</tr>
</tbody>
</table>

#### Year 4 Semester 1

<table>
<thead>
<tr>
<th>Course code and title</th>
<th>AUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV0002 Engineers &amp; Society</td>
<td>3</td>
</tr>
<tr>
<td>CV4011 Project Planning &amp; Management</td>
<td>3</td>
</tr>
<tr>
<td>EN4711 Seminars &amp; Site Visits</td>
<td>1</td>
</tr>
<tr>
<td>EN4911 Final Year Project</td>
<td>4</td>
</tr>
<tr>
<td>EN4XXX Specialisation Course / Core Elective</td>
<td>3</td>
</tr>
<tr>
<td>Track Course 1</td>
<td>4</td>
</tr>
<tr>
<td>Track Course 2</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total AUs</strong></td>
<td>22</td>
</tr>
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</table>
### Bachelor of Science in Maritime Studies with Business Major

#### Year 1 Semester 1

<table>
<thead>
<tr>
<th>Course code and title</th>
<th>AUs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AB1601 Organisation Behaviour and Design</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>AB1201 Financial Management</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MT1001 Mathematics I for Maritime Studies</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MT1002 Introduction to Maritime Industry</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>MT1003 Trade Practice and Incoterms</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GC0001 Introduction to Sustainability:</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Multidisciplinary Approaches and Solutions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HW0188 Engineering Communication I</td>
<td>2</td>
<td></td>
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</tbody>
</table>

**Total AUs**: 17

#### Year 1 Semester 2

<table>
<thead>
<tr>
<th>Course code and title</th>
<th>AUs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AD1101 Financial Accounting</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>AB0901 Principles of Economics</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>AB1501 Marketing</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MT0001 Shipping and Environment</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MT1004 Introduction to Meteorology and Oceanography</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MLC0001</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>GER - Elective (LA)</td>
<td>3</td>
<td></td>
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</tbody>
</table>

**Total AUs**: 20

#### Year 2 Semester 1

<table>
<thead>
<tr>
<th>Course code and title</th>
<th>AUs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AD2101 Management Accounting</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>AB1301 Business Law</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>AB1401 Information Technology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MT2814 Probability &amp; Statistics</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MT2002 Shipping Economics</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MT2003 Maritime Technology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Ethics and Academics Integrity</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Total AUs**: 20

#### Year 2 Semester 2

<table>
<thead>
<tr>
<th>Course code and title</th>
<th>AUs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AC2302 Company Law</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>MT2004 Mathematics II for Maritime Studies</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MT2005 Port Economics</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MT2006 Regulatory Framework of Shipping</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>HW0288 Engineering Communication II</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GER - Elective</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Total AUs**: 17

#### Year 3 Semester 1

<table>
<thead>
<tr>
<th>Course code and title</th>
<th>AUs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MT3001 Maritime Law</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MT3002 Introduction to Marine Insurance</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MT3003 Organisation of a Ship Owning Entity</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MT3004 Shipping Management</td>
<td>3</td>
<td></td>
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</tbody>
</table>

**GER (Free Elective)**: 3

**Total AUs**: 15

#### Year 3 Semester 2

<table>
<thead>
<tr>
<th>Course code and title</th>
<th>AUs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BE1401 Business Operations and Processes</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>MT3005 Quality Management in Shipping</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MT3006 Ship Chartering</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MT0002 Professionals in Society</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Enterprise and Innovation</td>
<td>1</td>
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<tr>
<td>MLC0002</td>
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</tbody>
</table>

**Total AUs**: 15

#### Year 3 Special Semester

<table>
<thead>
<tr>
<th>Course code and title</th>
<th>AUs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MT3007 Industrial Immersion</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

**Total AUs**: 4

#### Year 4 Semester 1

<table>
<thead>
<tr>
<th>Course code and title</th>
<th>AUs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BE2501 International Business Environment</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>MT4001 Shipping Logistics</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MT4002 Essentials of Project Management</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MT4003 Maritime Strategy</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MT4004 Research Project</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>MT400X Specialisation Course / Core Elective</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Total AUs**: 20

---

**Students who have not passed or are not exempted from the Qualifying English Test are required to take HW0001English Proficiency (0AUs)**

**GER**: General Education Requirement

**GER - Elective**: can be taken from any category of STS, BM, LA
## Year 4 Semester 2

<table>
<thead>
<tr>
<th>Course code and title</th>
<th>AUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>BH3603 Cultural Intelligence at Work</td>
<td>4</td>
</tr>
<tr>
<td>MT4004 Research Project</td>
<td>4</td>
</tr>
<tr>
<td>MT4XXX Specialisation Course / Core Elective</td>
<td>3</td>
</tr>
<tr>
<td>MT4XXX Specialisation Course / Core Elective</td>
<td>3</td>
</tr>
<tr>
<td>GER: Elective</td>
<td>3</td>
</tr>
<tr>
<td>GER (Free Elective)</td>
<td>3</td>
</tr>
<tr>
<td>Total AUs</td>
<td>20</td>
</tr>
</tbody>
</table>

Grand Total (Year 1 to Year 4) 148

---

**GER:** General Education Requirement  
(Free Elective)  
GER - Elective: can be taken from any category of STS,BM,LA

### List of Core Electives (Specialisation Course) of Degree of Bachelor in Civil Engineering (B.Eng.)

#### Year 4: Core Electives  
(not every course will be offered at any one time)

<table>
<thead>
<tr>
<th>Course code and title</th>
<th>AUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV4101 Structural Analysis III</td>
<td>3</td>
</tr>
<tr>
<td>CV4102 Advanced Steel Design</td>
<td>3</td>
</tr>
<tr>
<td>CV4103 Offshore Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CV4104 Bridge Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CV4105 Prestressed Concrete</td>
<td>3</td>
</tr>
<tr>
<td>CV4106 Construction Law &amp; Dispute Resolution</td>
<td>3</td>
</tr>
<tr>
<td>CV4107 Engineering Economics and Finance</td>
<td>3</td>
</tr>
<tr>
<td>CV4108 IT in Engineering Construction</td>
<td>3</td>
</tr>
<tr>
<td>CV4109 Advanced Foundation Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CV4110 Excavation &amp; Retaining Wall</td>
<td>3</td>
</tr>
<tr>
<td>CV4111 Ground Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CV4112 Traffic Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CV4113 Highway Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CV4114 Airport Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CV4115 Applied Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>CV4116 Coastal Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CV4117 Urban Stormwater Management</td>
<td>3</td>
</tr>
<tr>
<td>EN2003 Water Supply Engineering</td>
<td>3</td>
</tr>
<tr>
<td>EN3001 Solid &amp; Hazardous Waste Management</td>
<td>3</td>
</tr>
<tr>
<td>EN3002 Wastewater Engineering</td>
<td>3</td>
</tr>
<tr>
<td>EN3004 Air Pollution Control Engineering</td>
<td>3</td>
</tr>
<tr>
<td>EN4101 Surface Water Quality</td>
<td>3</td>
</tr>
<tr>
<td>EN4104 Environmental Hydraulics</td>
<td>3</td>
</tr>
</tbody>
</table>

### List of Core Electives (Specialisation Course) of Degree of Bachelor in Environmental Engineering (B.Eng.)

#### Year 4: Core Electives  
(not every course will be offered at any one time)

<table>
<thead>
<tr>
<th>Course code and title</th>
<th>AUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV3016 Construction Technology &amp; Processes</td>
<td>3</td>
</tr>
<tr>
<td>CV4107 Engineering Economics and Finance</td>
<td>3</td>
</tr>
<tr>
<td>CV4115 Applied Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>CV4116 Coastal Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CV4117 Urban Stormwater Management</td>
<td>3</td>
</tr>
<tr>
<td>EN4101 Surface Water Quality</td>
<td>3</td>
</tr>
<tr>
<td>EN4102 Membrane Water Reclamation Technology</td>
<td>3</td>
</tr>
<tr>
<td>EN4103 Biotechnology in Environmental Engineering</td>
<td>3</td>
</tr>
<tr>
<td>EN4104 Environmental Hydraulics</td>
<td>3</td>
</tr>
<tr>
<td>EN4105 Integrated Environmental Management</td>
<td>3</td>
</tr>
<tr>
<td>EN4106 Geo-Environmental Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

### List of Core Electives (Specialisation Course) of Degree of Bachelor in Science (Maritime Studies) (B.Sc.)

#### Year 4: Core Electives  
(not every course will be offered at any one time)

<table>
<thead>
<tr>
<th>Course code and title</th>
<th>AUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT4101 Intermodal Transportation</td>
<td>3</td>
</tr>
<tr>
<td>MT4102 Distribution and Warehousing</td>
<td>3</td>
</tr>
<tr>
<td>MT4103 Port Planning and Operations</td>
<td>3</td>
</tr>
<tr>
<td>MT4104 Information Technology Management</td>
<td>3</td>
</tr>
</tbody>
</table>

### Description of Courses

Please visit our website at [http://www.cee.ntu.edu.sg/CurrentStudents/undergraduatesstudents/Pages/Home.aspx](http://www.cee.ntu.edu.sg/CurrentStudents/undergraduatesstudents/Pages/Home.aspx) for the information on Description of Courses.
School of Computer Engineering

Undergraduate study
1. Bachelor of Engineering (Computer Engineering)
2. Bachelor of Engineering (Computer Science)
3. Bachelor of Engineering (Computer Engineering/Computer Science) and Bachelor of Business (Information Technology) [Double degree programme with NBS]
4. Bachelor of Engineering (Computer Engineering/Computer Science) and Bachelor of Arts (Economics) [Double degree programme with HSS]
5. Integrated Bachelor of Engineering (Computer Engineering/Computer Science) awarded by NTU and Master of Science (Computer Science) awarded by Georgia Institute of Technology [NTu-Georgia Tech Integrated Programme]

Curriculum Structure of the B.Eng. (Computer Engineering) and B.Eng. (Computer Science)

- Four-year, full-time B.Eng degree
- 3.5-year accelerated programme (by invitation)

Curriculum Structure of the double degree programme in B.Eng. (Computer Engineering/Computer Science) and B.Bus. (Information Technology) Business

- The double degree programme may be completed in four years and consists of a hybrid curriculum merging Business and Computer Engineering or Computer Science Courses.
- A holistic approach is presented with specialised electives, and a Final Year Project in Year 4.

By choosing a combination of prescribed elective courses in the fourth year, students may achieve specialisation in areas such as:
Curriculum Structure of the double degree honours programme in: B.Eng. (Computer Engineering/Computer Science) and B.A (Economics)

The double degree honours programme can be completed in five years.

- First Class Honours
- Second Class Upper Honours
- Second Class Lower Honours
- Third Class Honours
- Pass

Integrated programme curriculum structure

At Georgia Institute of Technology, USA

- The diversity and flexibility of the curriculum allow students to have a comprehensive all-rounded education with a global perspective.

Description of Courses

Please visit our website at [http://sce.ntu.edu.sg](http://sce.ntu.edu.sg) for detailed information on our curricula and description of our courses.
School of Electrical and Electronic Engineering

1. Bachelor of Engineering (Electrical and Electronic Engineering)

To achieve our vision of becoming a great global university founded on science and technology and in light of the global conditions faced by Singapore in the twenty-first century, the new curriculum for Year 1 intake will obtain the desired attributes of NTU graduates in the areas that include but not limited to global exposure, broad literacy in the sciences and the arts, intellectual curiosity, research, creativity and innovation, entrepreneurship, and awareness of socio-economic and environmental issues.

The core courses consist of Mathematics, Sciences, Computing, Fundamental and Specialised Engineering courses, Industrial Orientation and Final Year Project. The Core Electives include all engineering design and technical electives in the third and final year. The GER Core courses include Communication Skills courses, Environmental Sustainability and Singapore Studies, whilst GER Electives include courses in the area of Liberal Arts, Science, Technology and Society, and Business and Management.

The new curriculum structure with the distributions of AUs for different categories of courses is outlined below:

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of AUs</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>77</td>
<td>96</td>
</tr>
<tr>
<td>Core Elective</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>GER Core</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>GER Elective</td>
<td>15</td>
<td>27</td>
</tr>
<tr>
<td>Unrestricted Elective</td>
<td>15</td>
<td>11.0</td>
</tr>
<tr>
<td>Total</td>
<td>138</td>
<td>100.00</td>
</tr>
</tbody>
</table>

The reduced number of AUs from previous 154 to 138, would mean a slightly lower workload per semester for students who will have more time to spend on elective courses such as URECA, UROP, language electives, etc., or be involved in cultural activities to broaden and deepen their university experiences.

To give a clearer picture of the significant features introduced to the curriculum structure, major changes were made to each year of study as follows:

First year
The first year curriculum covers fundamentals in the physical sciences, such as Mathematics, Physics, and Computing, to provide a strong foundation for specialisation in the years to follow. A new course called “An Introduction to Engineering and Practices” has been introduced to provide an opportunity for all engineering students in the first semester to have a better understanding of the different engineering disciplines so that they can make an informed choice before they are streamed to their respective engineering programmes from second semester onwards.

Second year
In the second year, further courses on Engineering Mathematics are included to strengthen the foundation for more advanced study in electrical and electronic engineering. Other core fundamental electrical and electronic engineering courses such as Circuit Analysis, Semiconductor Fundamentals, Electronics, Data Structures and Algorithms, and Signals and Systems are introduced to provide a broad background for all areas of electrical and electronic engineering. In addition, students undertake two courses of laboratory experiments and a new structured course named Introduction to EEE Design and Project to provide the necessary grounding in the practical skills required of engineers.

Third year
In the third year, basic principles which underpin a broad spectrum of technologies encompassed by the area of electrical and electronic engineering are taught. These include core courses on Engineering Electromagnetics, and Microprocessors. In addition, students will select two electives from a list of more specialised courses in preparation for more in-depth specialisation in their final year.
The reduced number of AUs from previous 154 to 138, would mean a slightly lower workload per semester for students who will have more time to spend on elective courses such as URECA, UROP, language electives, etc., or be involved in cultural activities to broaden and deepen their university experiences.

To give a clearer picture of the significant features introduced to the curriculum structure, major changes were made to each year of study as follows:

**Final year**

In the final year, students are given the flexibility to select their prescribed elective courses under three broad groups, namely Electrical and System Engineering, Electronic Engineering and Infocommunication Engineering. They may select any two design elective courses and three technical elective courses from their respective groups.

However, students who prefer a more in-depth study can select the courses from one of 8 areas of specialisation, namely Biomedical Electronics, Communication Engineering, Computer Engineering, Intelligent Systems and Control Engineering, Digital Media Processing, Integrated Circuits Design, Microelectronics, and Power and Clean Energy.

In addition to the elective technical courses, all students are required to take compulsory courses such as Engineering Communication, and Engineers and Society.

**EEE Curriculum**

### Year 1
- Physics Foundation for Electrical and Electronic Engineering
- Introduction to Materials for Electronics
- EEE Laboratory 1
- Mathematics 1
- Mathematics 2
- Computing
- Physics *
- An Introduction to Engineering and Practices
- Engineering Communication I

*Students without GCE ‘A’ level Physics are required to read PH1012 Physics A, instead of PH1011 Physics.

### Year 2
- Circuit Analysis
- Analog Electronics
- Semiconductor Fundamentals
- Digital Electronics
- Engineering Mathematics I
- Engineering Mathematics II
- Data Structures and Algorithms
- Signal and Systems
- Introduction to EEE Design and Project
- An Introduction to Engineering and Practices
- Engineering Communication I

### Year 3
- Engineering Electromagnetics
- Microprocessors
- Industrial Orientation *
- Design and Innovation Project
- Engineering Communication II

* Besides the 10-week Industrial Orientation (IO), engineering students may opt for the 20-week Industrial Attachment.

Students will be required to read 2 pre-specialised Major Prescribed Elective Courses from the following list:
- Electrical Devices and Machines
- Modelling and Control
- Communication Principles
- Semiconductor Devices and Processing
- Digital Signal Processing
- Power Systems and Protection
- Computer Communications
- Introduction to Photonics
- Integrated Electronics

### Year 4
- Engineers and Society
- Final Year Project

In addition, students will be required to read two (2) design elective courses, and three (3) technical elective courses within one of the three option groups.

**Electrical and Systems Engineering Option Group**

### Design Elective Courses
- Control Engineering Design
- Intelligent System Design
- Power Engineering Design
- Design of Clean Energy Systems
- Biomedical Control System Design
- Design of Medical Information Processing Systems

### Technical Elective Courses
- Software Engineering
- Process Control Systems
- Computer Vision
- Robotics and Automation
- Digital Control Systems
- Computational Intelligence
- Power System Analysis and Control
- Power Electronics and Drives
- Modern Distribution Systems with Renewable Resources
- Biophotonics
- Physiological Systems Analysis
- Biomedical Instrumentation

**Electronic Engineering Option Group**

### Design Elective Courses
- Mixed-Signal IC Design
- Radio Frequency Integrated System Design
- Digital Design with HDL
- CMOS Process and Device Simulation by Technology CAD
- Device Parameter Extraction and Layout Implementation
Technical Elective Courses

- Software Engineering
- VLSI Systems
- Advanced Analog Circuits
- Radio Frequency Circuits
- Analysis & Design of Integrated Circuits
- Microfabrication Engineering
- VLSI Technology
- Microelectronic Devices
- Flat Panel Display Technologies
- IC Reliability and Failure Analysis
- Laser Engineering and Applications
- Biophotonics

Infocommunication Engineering Option Group

Design Elective Courses

- Cellular Communication System Design
- Microwave Circuit and System Design
- Optical Communication System Design
- DSP System Design
- Web Application Design
- Enterprise Network Design

Final Year Specialisation Courses

Students who wish to pursue a more in-depth specialization within the 3 broad option groups may select the relevant design and technical electives courses from 8 areas of specialization under the respective option group.

<table>
<thead>
<tr>
<th>Specialisation</th>
<th>Recommended elective courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical and Systems Engineering</td>
<td>EE4207, EE4208, EE4265, EE4266, EE4268, EE4273, EE4285</td>
</tr>
<tr>
<td>Intelligent Systems &amp; Control Engineering</td>
<td>EE4503, EE4504, EE4530, EE4532, EE4534, EE4265, EE4273, EE4285, EE4001</td>
</tr>
<tr>
<td>Power &amp; Clean Energy</td>
<td>EE4901, EE4902, EE4903, EE4904, EE4265, EE4266, EE4840</td>
</tr>
<tr>
<td>Biomedical Electronics</td>
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<tr>
<td>Electronic Engineering</td>
<td></td>
</tr>
<tr>
<td>Integrated Circuit Design</td>
<td>EE4303, EE4304, EE4305, EE4340, EE4341, EE4343, EE4344, EE4694</td>
</tr>
<tr>
<td>Microelectronics</td>
<td>EE4613, EE4614, EE4645, EE4646, EE4647, EE4648, EE4694, EE4838, EE4840</td>
</tr>
<tr>
<td>Infocommunication Engineering</td>
<td></td>
</tr>
<tr>
<td>Communication Engineering</td>
<td>EE4105, EE4109, EE4110, EE4151, EE4152, EE4153, EE4188, EE4190</td>
</tr>
<tr>
<td>Computer Engineering</td>
<td>EE4001, EE4717, EE4718, EE4756, EE4758, EE4761, EE4455, EE4483, EE4490, EE4791</td>
</tr>
<tr>
<td>Digital Media Processing</td>
<td>EE4001, EE4413, EE4105, EE4455, EE4475, EE4476, EE4478, EE4483, EE4490</td>
</tr>
</tbody>
</table>
1. Bachelor of Engineering (Electrical and Electronic Engineering) - Part-Time

The part-time B.Eng. Programme in Electrical and Electronic Engineering (EEE) was launched in 1996 on a self-financed basis to provide a platform for polytechnic graduates to further their studies and obtain degrees on a part-time basis while remaining in their respective jobs. The programme is offered only to applicants who have already obtained a Diploma in Electrical/ Electronic Engineering or an equivalent qualification from one of the polytechnics in Singapore, and are in full-time employment in a technical job.

Intake has been kept at around 150 every year. An invitation for applications is advertised in several newspapers in December each year, with a briefing for prospective students 3 weeks before the closing date at the end of January. Detailed information on the programme is available at http://www.eee.ntu.edu.sg/ProspectiveStudents/BEngPartTime/. All part-time students undergo an orientation programme similar to that conducted for full-time students before they begin their first semester of study.

The curriculum of the part-time B.Eng. Programme has been revised from time to time in line with the curriculum of the full-time B.Eng. programme. Part-time students follow the curriculum prepared for full-time direct-entry students (Diploma holders) closely, except that part-time students gain the exemption for the inter-semester project module and industrial attachment in Years 2 and 3, respectively, as well as an exemption for 2 AUs of Unrestricted Electives in Years 4 or 5. Part-time students also enjoy the benefit of a broad-based education. Two courses in mathematics and science are included in the first year to better prepare students for subsequent years of study. To balance their workload, they are exempted for the same number of AUs of Unrestricted Electives. Today, part-time students in Years 4 and 5 enjoy as many options as full-time students, as long as the number of students for each course is about 10.

Part-time students sit for the same examination as their full-time counterparts and after successful completion of the programme requirements, receive the same B.Eng. degree in Electrical and Electronic Engineering, which is wholly recognized by reputable professional institutions such as The Institution of Engineering and Technology of the United Kingdom (IET), Engineering Accreditation Board, Singapore (EAB), Professional Engineers Board, Singapore (PEB) and The Institution of Engineers, Singapore (IES). The year 2001 saw the graduation of the first batch of part-time B.Eng. students - 73 students graduated, with many receiving good honours. This pattern has varied slightly from year to year. Since its inception, the part-time B.Eng. programme has been a testimony to NTU's success in maximizing its output using existing facilities.

Singapore citizens (SC) and Singapore Permanent Residents (SPR) enjoy MOE Tuition Fee Subsidy, with the Government meeting 55% of the cost for SCs and 20% for SPRs.

2. Bachelor of Engineering (Electrical and Electronic Engineering) with Minor in Business

Students enrolled in this programme follow the Electrical and Electronic Engineering curriculum, with the additional 5 business courses (totalling 15 AUs), in fulfilment of requirements for the Minor in Business.

The Business Minor programme prepares students for life-long learning in various financial, management and business skills and tools in their professional careers. This is especially important in a rapidly changing knowledge-based economy. In addition, it prepares students who may enrol in postgraduate business programmes in the future.

3. Bachelor of Engineering (Information Engineering and Media)

The Bachelor of Engineering in Information Engineering and Media (B.Eng. (IEM)) is a new multi-disciplinary and inter-disciplinary degree programme designed for those who aspire to a career in the fields of Infocommunications (Infocomm) and Digital Media. The programme is hosted by the School of Electrical and Electronic Engineering, and jointly offered with the School of Art, Design and Media, the School of Computer Engineering, and the Wee Kim Wee School of Communication and Information.

The programme aims:
- To train professional Infocomm engineers with strong technical skills to meet the demand for Infocomm manpower.
- To train engineers with an exposure to the artistic and creative processes and equip them with an understanding of the needs of the growing media industry.
- To provide graduates with a solid foundation in mathematics, information sciences and soft-skills for diverse careers and life-long learning.
- To develop graduates with a good understanding of their roles in society and a strong sense of ethical and professional responsibilities.

This programme is mainly technical and is rigorously grounded in core information and communication engineering principles, with 60% of curriculum covering courses programming, computer hardware/software, communications and networking, and digital audio/image/video processing. This part of the programme prepares graduates for jobs in the IT, computer and communications industries.

In addition, the programme provides a good exposure to the artistic and creative aspects of the media industry with about 20% of the curriculum devoted to courses such as digital art and design, animation and game design, and radio/TV/movie production. This part of the programme equips graduates with basic knowledge and understanding of media design and production in line with industrial needs.

The graduates will be able to work with media designers in content creation, production and delivery. They will be in a unique position to better understand the needs of the content creators and to develop new technologies and tools which will help the media industry achieve higher productivity and elevate it to the next level of excellence. Besides specialized training, the programme will provide a holistic undergraduate education with 20% of the curriculum being devoted to broadening courses in arts, humanities and social sciences, science and technology, business and communication skills. This is to enrich the learning
experience of students and to equip them with comprehensive and broad-based knowledge that would be needed upon their graduation in today’s fast changing world.

For more information, please visit http://www.eee.ntu.edu.sg/Programmes/ProspectiveStudents/UG/IEM/Pages/Home.aspx or email to iemonline@ntu.edu.sg.

**EEE Curriculum**

**Year 1**
- Mathematics 1
- Mathematics 2
- Physics
- Computing
- Digital Electronics
- Analog Electronics
- Data Structures and Algorithms
- Object-Oriented Programming
- Basic Media Writing (GER-Core)
- Thinking and Communicating Visually I
- Environmental Sustainability (GER-Core)
- Course I by Margaret Lien Centre for Professional Success (GER-Core)

**Year 2**
- Engineering Mathematics I
- Engineering Mathematics II
- Software Engineering
- Computer Communications
- Microprocessors
- Signals and Systems
- Introduction to Design and Project
- Visual Literacy and Communication (GER-Core)
- Thinking and Communicating Visually II
- General Education Requirement (Liberal Arts)
- Ethics and Academic Integrity (GER-Core)

**Year 3**
- Digital Signal Processing
- Communication Principles
- Information Security
- Design and Innovation Project
- Industrial Attachment/Industrial Orientation
- Thinking and Communicating Visually III
- Engineering Communication II (GER-Core)
- Enterprise & Innovation (GER-Core)
- General Education Requirement (Business & Management)
- General Education Requirement (Science, Technology & Society)
- Free Elective 1
- Free Elective 2
- Free Elective 3
- Free Elective 4

**Year 4**
- Final Year Project
- Design Elective 1
- Technical Elective 1
- Technical Elective 2
- Technical Elective 3
- Design Elective 2 / Technical Elective 4
- Engineers and Society
- General Education Requirement (Liberal Arts/Business & Management/Science, Technology & Society)
- Course II by Margaret Lien Centre for Professional Success (GER-Core)
- Free Elective 5

**Note:** Students taking Industrial Attachment will read 4 free electives not less than 11 AUs.

**Design Electives**
- Web Application Design
- Enterprise Network Design
- Cellular Communication System Design
- DSP System Design

**Technical Electives**
- Computer Architecture
- Database Systems
- Computer Networking
- Multimedia Systems
- Digital Communications
- Telecommunication Systems
- Wireless Communications
- Embedded Systems
- Audio Signal Processing
- Image Processing
- Digital Video Processing
- Artificial Intelligence & Data Mining
- Audio Radio Production
- Single-Camera Production
- Web Design & Technology
- Interface Design
- Interactive I
- Augmented and Virtual Reality
- Media Management & Processing
- Computer Vision
- 3D Modeling & Animation
- Simulation and Modeling

**4. Bachelor of Engineering (Information Engineering and Media) with Minor in Business**

Students enrolled in this programme follow the Information Engineering and Media curriculum, with the additional 5 business courses (totalling 15 AUs), in fulfilment of requirements for the Minor in Business.

The Business Minor Programme prepares students for life-long learning in various financial, management and business skills and tools in their professional careers. This is especially important in a rapidly changing knowledge-based economy. In addition, it prepares students who may enrol in postgraduate business programmes in the future.
5. Bachelor of Engineering (Electrical and Electronic Engineering) and Bachelor of Arts (Honours) in Economics

Bachelor of Engineering (Information Engineering and Media) and Bachelor of Arts (Honours) in Economics

The double-degree programme in Engineering and Economics aims to produce engineers who are knowledgeable and competent in both engineering and economics. The multi-disciplinary approach will inject relevant soft skills, which are essential to the professional development of an engineer for the 21st Century. Jointly offered by the School of Electrical and Electronic Engineering and the School of Humanities and Social Sciences, this double-degree programme provides students with strong foundation in the fundamentals of Engineering principles and knowledge of Economics, wide choice of Engineering and Economics electives, and vigorous training in problem solving, verbal and written communication skills. Students enrolled in this programme can earn two degrees in 5 to 5½ years.

6. Bachelor of Engineering (Electrical and Electronic Engineering) with a Second Major in Business

Bachelor of Engineering (Information Engineering and Media) with a Second Major in Business

The Bachelor of Engineering with a Second Major in Business programme is a collaboration between NTU’s two foremost colleges, the College of Engineering (CoE) and the Nanyang Business School (NBS). The new double major programme aims to equip qualified students with both engineering and business knowledge and competencies to succeed in the contemporary global marketplace. Students can choose from 11 Engineering majors and 4 Business tracks in Accounting, Finance, Marketing and Operations Management, according to their interests and strengths. Trained in both Engineering and Business over the normal programme duration of 4 years, graduates of the programme will acquire decidedly distinct competitive advantage and market value over their peers, and enjoy better career mobility across all sectors of the job market with access to a greater breadth of career options and opportunities.

7. NTU-Georgia Tech Integrated Bachelor of Engineering (EEE) and Master of Science (ECE) Programme

The NTU-Georgia Tech Integrated Bachelor’s and Master’s programme is tailor-made for aspiring students who wish to pursue a career in the Infocommunication industry. Students enrolled in this programme can earn two degrees in four years instead of the usual five to five-and-a-half years. Students will spend three to four years in NTU’s School of Electrical and Electronic Engineering, majoring in Information and Communications, and the next one to one-and-a-half years in Georgia Tech’s School of Electrical and Computer Engineering, specializing in Computer Engineering and Telecommunications.

Students admitted into the integrated programmes are eligible to apply for the prestigious Infocomm Development Authority (IDA)’s National Infocomm Scholarship. The National Infocomm Scholarship is sponsored by Infocomm and end-user companies such as IBM, Microsoft, Oracle, DBS, SingTel and StarHub. The scholars can look forward to internships with their sponsoring company, and will have the opportunity to work in the company when they graduate.

For more information, please refer to www.eee.ntu.edu.sg/ProspectiveStudents/NTUGT/Pages/Home.aspx or send an email to ipeeehelp@ntu.edu.sg.

Special Programme

Design and Innovation Project

The Design and Innovation Project (DIP) is a practical training course for all full-time third-year EEE/IEM students. The course is designed to exercise creativity, stimulate innovation and cultivate techropreneur capabilities. It focuses on an in-depth project covering the design, prototyping, testing and documentation of innovative electronic, electronic or IT products. The course requires each student to undertake a project and work in groups under the supervision of academic staff. It culminates in a project competition. Through proposing team-based projects, students are actively involved in this course.

UROP

UROP has been offered in EEE since 1997 to encourage more undergraduates to consider R&D as a career choice.

In EEE, UROP is administered as an unrestricted elective course, carrying 3 AUs. Students are expected to conduct an independent in-depth study of a particular topic under the supervision of an academic staff.

Undergraduate Research Experience on Campus

The Undergraduate Research Experience on Campus (URECA) aims to cultivate a research culture amongst the most able undergraduates at NTU.

URECA is available to undergraduates (second and third years in four-year Bachelor’s degree programmes and second years in three-year Bachelor’s degree programmes) who have excelled in their academic examinations.

This ‘select’ group of undergraduates are eligible for either stipend, without academic units or with academic units and if they choose to undertake URECA, they will be known as NTU President Research Scholars (NTU PRS). NTU PRSs are required to undertake a research project for a minimum of 160 hours over a 10-month in an academic year. Invitations are sent to eligible students in August.

For more details, please visit the URECA website at http://www.ntu.edu.sg/ureca/Pages/default.aspx.

Description of Courses

Please visit the EEE website at http://www.eee.ntu.edu.sg/Programmes/CurrentStudents/undergraduate/undergraduatefull-time/Pages/CourseInformation.aspx for information on course description.
School of Materials Science Engineering  
Undergraduate study

Bachelor of Engineering (Materials Engineering) 
Programme features:  
- 4-year full time B.Eng degree (Direct Honours)  
- Accelerated Bachelor’s Programme (ABP) where students who perform extremely well can obtain their degree with Honours in 3.5 years (7 semesters)  
- Excellent training in individual and team project work  
- Comprehensive hands-on training through formal laboratory work  
- Professional Internship  
- Superbly equipped laboratories  
- Specializations in selected areas in the final year

Bachelor of Engineering (Materials Engineering) & Bachelor of Engineering (Materials Engineering) with Business Minor

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<thead>
<tr>
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<th>Number/ Duration AU</th>
<th>AU</th>
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<td>GER Core</td>
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<td>GER-PE - BM</td>
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<tr>
<td>GER-PE - LA</td>
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<td>GER-PE - STS</td>
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<td>8</td>
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<td><strong>Total</strong></td>
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</table>

Curriculum Structure for: 
Bachelor of Engineering in Materials Engineering (Hons)  
Bachelor of Engineering in Materials Engineering (Hons) and minor in Business

<table>
<thead>
<tr>
<th></th>
<th>Number/ Duration AU</th>
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<tr>
<td>Core Courses</td>
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<td>Major Prescribed Electives</td>
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<td>12</td>
</tr>
<tr>
<td>Professional Internship</td>
<td>22 weeks</td>
<td>8</td>
</tr>
<tr>
<td>Final Year Project</td>
<td>2 semesters</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<td>176</td>
</tr>
</tbody>
</table>

Double Degree in Bachelor of Engineering (Materials Engineering) and Bachelor of Arts (Economics)

- First Class Honours  
- Second Class (Upper) Honours  
- Second Class (Lower) Honours  
- Third Class Honours  
- Pass

Curriculum Structure for: 
Double Degree in Bachelor of Engineering (Materials Engineering) and Bachelor of Arts (Economics)

<table>
<thead>
<tr>
<th></th>
<th>Number/ Duration AU</th>
<th>AU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Courses</td>
<td>33</td>
<td>97</td>
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<tr>
<td>Major Prescribed Electives</td>
<td>16</td>
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<tr>
<td>GER (CORE)</td>
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<td>12</td>
</tr>
<tr>
<td>Professional Internship</td>
<td>22 weeks</td>
<td>8</td>
</tr>
<tr>
<td>Final Year Project</td>
<td>2 semesters</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>176</td>
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</tbody>
</table>

Curriculum Structure for: 
Bachelor of Engineering (B.Eng.Hons) Degree  
Bachelor of Arts (B.A.Hons) Degree

- First Class Honours  
- Second Class (Upper) Honours  
- Second Class (Lower) Honours  
- Third Class Honours  
- Pass

Description of Courses
Please visit our website at http://www.mse.ntu.edu.sg/Programmes/Undergraduates/CurrentStudent/AcademicMatters/Pages/CourseSummary.aspx for the information on Description of Courses.
Bachelor of Engineering (Materials Engineering) with a Second Major in Business

<table>
<thead>
<tr>
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<th>Number/Duration</th>
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<tr>
<td>Core Courses</td>
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<tr>
<td>Major Prescribed Electives</td>
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<td>GER Core</td>
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<td>Professional Internship</td>
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<td>8</td>
</tr>
<tr>
<td>Final Year Project</td>
<td>2 semesters</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
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</table>

CNYang Scholars Programme (Materials Engineering)

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<th></th>
<th>Number/Duration</th>
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</thead>
<tbody>
<tr>
<td>Core Courses</td>
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<td>Major Prescribed Electives</td>
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<td>GER-PE – BM</td>
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<tr>
<td>Professional Internship</td>
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<tr>
<td><strong>Total</strong></td>
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<td>141</td>
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</table>

Undergraduate Research Opportunity Program

The Undergraduate Research Opportunity Programme (UROP) aims to encourage more undergraduates to consider R&D as a career choice. UROP is administered as a general elective subject with 3 Academic Units. Students are expected to conduct an independent study of a particular topic under the supervision of a faculty. This programme is runs in flexible time and is in sync with the timing of the main academic learning programme.

Objective:
1. To expose undergraduates to the challenges and excitement of research.
2. To provide research opportunity for students who wish to consider R&D as one of their career options.

UROP students will get the opportunity to experience research and perform some of the following tasks:
1. Search, review and analyze research literature;
2. Collect, classify and analyze experimental data;
3. Conduct theoretical and computational analysis; computer modelling and software development

School of Mechanical and Aerospace Engineering

Undergraduate study

Aerospace Engineering

Aerospace Engineering is the application of advanced science and engineering principles to the design, assembly, manufacturing and optimisation of flight vehicles and their propulsion systems. These vehicles include a variety of aircraft and spacecraft. It is often called aeronautical engineering when referring solely to aircraft and astronautical engineering when referring to spacecraft. Aerospace engineering encompasses both.

The division has its vision set on placing MAE’s Aerospace Engineering at the forefront of aerospace engineering education, research and outreach programmes in Asia and the Asia-Pacific region. The BEng (Aerospace Engineering) degree programme has successfully obtained full accreditation from the Engineering Accreditation Board (EAB) in 2011. The Aerospace Engineering degree programme has also received regional recognition at the Frost & Sullivan Asia Pacific Aerospace & Defense Awards where NTU was singled out as the “2009 Aerospace Academic Institution of the year” in recognition for its outstanding role in nurturing the best Aerospace engineers for the future and providing them with skills to meet the industry’s high standards.

Students undergo rigorous training that includes courses that address the appropriate core competencies in flight sciences and integrated system view of aircraft design, manufacturing, assembly, maintenance, and safety. Our staff also adopt a holistic approach when it comes to teaching through the introduction of problem-based learning, as well as the provision of industrial mentors to give our students the vital practical link to the growing aviation industry. The programme has strong backing from the aviation industry and defense organisations as evident by their provision of scholarships and contribution to collaborative research funds.

In research, the division has identified four Knowledge Domains (KDs) in Aerodynamics, Flight Mechanics and Control, Aerospace Structures and Propulsion. Our academic staff’s expertise cover these domains and more. The Main Aircraft Laboratory houses facilities to support teaching and research; these include the four KD based laboratories, a fighter jet, helicopters, a flight simulator, water and wind tunnels.

Engineering Mechanics

The Engineering Mechanics division is dedicated to excellence in teaching and research. It ensures that its work strategically supports the mission of the School and University. The Division comprises faculty members whose expertise lie broadly in the four domains, namely solid mechanics; dynamics, vibration and acoustics; numerical methods; and micro mechanics and systems.

The division provides fundamental and specialised courses essential for the analysis and design of mechanical systems and components. The courses include mechanics of materials; mechanics of structures; kinematics and dynamics of machinery; design of machine components; engineering design; finite element methods for engineering applications; noise and
vibration; mechanics of aerospace materials; aerospace structures; marine and offshore structural integrity, etc. The division also offers postgraduate courses in the areas of advanced mechanics of materials; failure analysis; experimental mechanics; micromechanics; biomaterials and biomechanics; electronic packaging; mechanics of micro-systems and MEMS.

Faculty members in the division are highly active in research through both fundamental and strategic research programmes. Current research interests are broadly scoped and grouped into four knowledge domains, namely: solid mechanics, dynamics, vibration and acoustics, numerical methods and micro mechanics and systems. The research activities are funded by various government agencies and industry partners. Modern laboratories are in place to support research as well as teaching. The division attracts high calibre research students both locally and internationally, and has strategic collaborations with renowned universities and institutions.

**Manufacturing Engineering**
Manufacturing translates ideas, concepts and design into tangible products and services that meet the needs of society. Manufacturing engineering is multi-disciplinary in nature involving the science and engineering of materials, processes, inspection and measurement, process design and computational modeling, to name a few. Besides technology, modern manufacturing deals with the economic and organisational impact of product and process design, as well as marketing, production, distribution, product service support and sustainable manufacturing.

The teaching and research in the division covers the processing and applications of metals, polymers, ceramics, composites and semiconductor and bio-materials, ultraprecision engineering and micro/nano fabrication, surface engineering, advanced measurement and inspection, joining and assembly and tribology.

Contrary to popular belief, manufacturing in Singapore has not waned but rather morphed into high end manufacturing. For example, April 2011 figures from EDB shows that the precision engineering industry alone employs 22 percent of the total manufacturing workforce in Singapore. The division continues to help local industries maintain a competitive edge and leadership position by researching Next Generation Manufacturing technologies such as advanced materials and materials processing, multiscale modeling, advanced 3D additive manufacturing, concurrent engineering, green design and manufacturing, precision engineering, and advanced manufacturing and re-manufacturing processes.

**Mechatronics and Design**
The core competencies of the Division are in mechatronics, sensing & system Identification, actuation & control, and computer visualisation. The focus is on the synergistic integration of mechanical engineering with electronics, intelligent computer control and design which is vital in the realisation of innovative products and systems. The division aims to train and nurture engineers and researchers who can conceptualise and design innovative products and systems in support of Singapore’s new economy.

In teaching, the division is responsible for the core curricula of the undergraduate Mechatronics Specialisation stream, and hosts the Smart Product Design Master of Science programme. The division endeavours to match the core competence of academic staff to the content knowledge and expected learning outcomes of courses. It strives to support the School’s initiative in maximising students’ potential.

Faculty members undertake research in biomedical robotics and biomechatronics; robotic rehabilitation technology; unmanned mobile robots; underwater robotic vehicles; modular re-configurable robots; artificial intelligence; innovative product design; informatics, medical and bio- Informatics; and virtual reality.

Staff members have been awarded research funds from the industry, the University and research agencies such as A*STAR. They are active in transferring the outcomes of their research to industry. Internationally, Staff members are recognised for their contributions to research and they continue to forge strategic alliances with colleagues from renowned overseas universities and research institutes.

**Systems and Engineering Management**
The division deals with systems engineering, human factors engineering, operations research, quality, reliability and design studies. Faculty members typically specialise in one of these knowledge areas. This diversity gives much strength in dealing with complex design problems, where a systems approach is necessary to:
1) obtain systems overview,
2) specify design goals,
3) conceptualise the problem
4) specify methods for systems analysis,
5) design of the system or artifact, and
6) manage and maintain the system.

There are large and complex design problems – such as designing a power distribution system or a large seaport in Singapore. There are also smaller problems such as designing a process control display that is useful and informative for process controllers. The interest in design permeates the teaching and research at both undergraduate and graduate levels.

Undergraduate and graduate levels courses are offered in engineering management, logistics, operations research, smart product design, computer integrated manufacturing and human factors engineering.

There are many Ph.D. students with research interests in a variety of topics, including: modelling of intelligent manufacturing systems and supply chain management, human errors in medical practice, manufacturing optimization, and strategic studies in manufacturing. Faculty members continue to receive external research grants as well as government research funding in areas such as additive manufacturing, human factors engineering, manufacturing optimization and logistics, networks reverse engineering, cognitive engineering, affective design and tissue engineering.
Thermal and Fluids Engineering

Rapid advances in technologies in the last decade have brought forth new challenges in thermal sciences and fluid mechanics. For instance, thermal management of electronic packaging is critical as we approach the sub-micron and even nano-scale levels. The realms of bioengineering and nanotechnology have opened up a myriad of opportunities for engineers working in the thermal and fluids engineering. Increasingly, we find that existing knowledge is insufficient to deal with such complex systems.

Faculty members in the Thermal and Fluids Engineering division have responded to these challenges by undertaking research projects in the areas of computational modelling of the physiological systems, DNA modelling, biomedical engineering, transport phenomena in micro-channels and micro-fluidics, thermal management of advanced electronic packages, fuel cells, hydrogen production, green buildings and gas separation technology.

The division is involved in teaching the fundamentals of thermodynamics, fluid mechanics and heat transfer. The expertise within the division is manifested in final year options that are offered, namely, aeronautical engineering and energy and the environment. In addition, faculty members within the division are also involved in teaching several postgraduate courses offered by the school. Teaching and research in the division are supported by several well-equipped laboratories providing all the essential facilities.

For more information, please visit our website at www.mae.ntu.edu.sg

<table>
<thead>
<tr>
<th>CORE</th>
<th>GER-</th>
<th>Core</th>
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<td>12</td>
<td>9</td>
<td>15</td>
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<td>Year 2 (Direct Entry)</td>
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<td>12</td>
<td>9</td>
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<th>CORE</th>
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<td>12</td>
<td>12</td>
<td>9</td>
<td>15</td>
<td>136</td>
</tr>
</tbody>
</table>

Programmes

Undergraduate programmes offered at MAE:

- **Degree in Mechanical Engineering or Aerospace Engineering**
  
  For current students: www.mae.ntu.edu.sg/CurrentStudents/Undergraduate(FullTime)
  
  For prospective students: www.mae.ntu.edu.sg/ProspectiveStudents/Undergraduate(Full-Time)

- **Double Degree in Engineering (Mechanical / Aerospace) and Economics**
  
  For current students: www.mae.ntu.edu.sg/CurrentStudents/Undergraduate(FullTime)/Pages/DoubleDegree.aspx
  
  For prospective students: www.mae.ntu.edu.sg/ProspectiveStudents/Undergraduate(Full-Time)/Pages/DoubleDegree.aspx

- **Minor in Systems Management**
  
  The Minor is open to all current students of NTU except those from MAE.
  
  www.mae.ntu.edu.sg/CurrentStudents/Undergraduate(FullTime)/Pages/MinorinSystemsManagement.aspx

- **Degree in Engineering (Mechanical/Aerospace) with Second Major in Business**

- **Degree in Mechanical Engineering (Part-Time Programme)**
  
  For current students: www.mae.ntu.edu.sg/CurrentStudents/Undergraduate(PartTime)
  
  For prospective students: www.mae.ntu.edu.sg/ProspectiveStudents/Undergraduate(Part-Time)

Description of Courses

Please visit our website at www.mae.ntu.edu.sg/CurrentStudents/Pages/Home.aspx for the information on Description of Courses.

College of Humanities, Arts, and Social Sciences

Undergraduate Programmes

The college offers a wide range of undergraduate programmes through its three Schools:

- **School of Art, Design & Media**
  
  Bachelor of Fine Arts in Digital Animation
  Bachelor of Fine Arts in Digital Filmmaking
  Bachelor of Fine Arts in Photography and Digital Imaging
  Bachelor of Fine Arts in Interactive Media
  Bachelor of Fine Arts in Product Design
  Bachelor of Fine Arts in Visual Communication

- **School of Humanities & Social Sciences**
  
  Bachelor of Arts in Chinese
  Bachelor of Arts in Economics
  Bachelor of Arts in English Literature
  Bachelor of Arts in History
  Bachelor of Arts in Linguistics and Multilingual Studies
  Bachelor of Arts in Philosophy
  Bachelor of Arts in Public Policy and Global Affairs
  Bachelor of Arts in Psychology
  Bachelor of Arts in Psychology with 2nd Major in Biological Sciences
  Bachelor of Arts in Sociology
  Bachelor of Arts in Economics and Bachelor of Engineering (A double degree programme offered by the School of Humanities & Social Sciences and the College of Engineering)
School of Art, Design & Media

Bachelor of Science in Mathematics and Economics
(A joint degree programme offered by the School of Physical & Mathematical Sciences and the School of Humanities & Social Sciences)

Wee Kim Wee School of Communication & Information
Bachelor of Communication Studies with Honours – with concentrations in the areas of Journalism, Broadcast and Cinema Studies, Advertising, Public Relations and Communication Policy & Research.

School of Humanities and Social Sciences
Chinese Division
The Division of Chinese at Nanyang Technological University (NTU) has its roots in Nanyang University, as well as the Centre for Chinese Language and Culture (CCLC), which was established in 1994.

In July 2004, the Division of Chinese began to offer the Minor in Chinese and General Electives. The Division also launched its graduate programmes, and offered scholarships to fulltime M.A. and Ph.D research students. In July 2005, it expanded into a full-fledged Division and started offering the B.A. in Chinese programme.

Besides the major programme, the division also offers two unique Minor programme currently, which are open to all NTU students. Minor in Translation is offered to students who are interested in receiving practical and professional trainings in translation between Chinese and English. Minor in Chinese Creative Writing aims to nurture students with an interest in writing in Chinese, providing them with opportunities to study various literary forms and writing techniques. The courses cover areas in fiction, poetry, prose, playwriting and crossmedia writing.

The Division of Chinese is one of the divisions within of the School of Humanities and Social Sciences, which was established as part of NTU’s plan to become a comprehensive university. It is the flagship division in the field of humanities.

Bachelor of Arts (Honours) in Chinese
The B.A. (Honours) in Chinese at NTU is a four-year programme. The objectives of the four year B.A. (Honours) in Chinese programme are:

- To establish a concrete foundation in the reading of both classical and modern texts. With this foundation, the students will be able to pursue critical study of courses in various specialisations with depth and breadth.
- To prepare students with knowledge in primary areas deemed essential to an undergraduate programme in Chinese by offering general survey courses and study in these areas. Courses in these two groups are called the Chinese Major courses.
- To offer an education that not only specialises in selected areas within the traditional disciplines of Chinese studies or Chinese language and literature but also provides interdisciplinary perspectives and crosscultural approaches, which are part and parcel of the present age of globalisation and frequent intercultural exchanges. There is a list of Chinese Prescribed Electives in five categories that serve this objective.

Undergraduate study
(1) Programmes offered
Bachelor of Fine Arts in Digital Animation
Bachelor of Fine Arts in Digital Filmmaking
Bachelor of Fine Arts in Photography and Digital Imaging
Bachelor of Fine Arts in Interactive Media
Bachelor of Fine Arts in Product Design
Bachelor of Fine Arts in Visual Communication

(2) Curriculum structure
The curriculum is based on a common Foundation core. Specialised programmes begin in the second year. The curriculum encourages interdisciplinary study and incorporates the University’s general education requirements.

Please visit our website at:
http://www.adm.ntu.edu.sg/Programmes/Undergraduate/UndergraduateProgrammes/Undergraduate-Degree/Pages/Home.aspx

Bachelor of Communication Studies with Honours – with concentrations in the areas of Journalism, Broadcast and Cinema Studies, Advertising, Public Relations and Communication Policy & Research.
NTU already offers an unrivalled choice of Minors. Starting from AY05/06, the Chinese Division also offers qualified students the option to pursue a double major. The second major may be in any of the disciplines offered at the School of Humanities and Social Sciences.

**The Curriculum (For AY2011/12 Intake onwards)**

To graduate, students must complete two categories of requirements, totaling at least 126 AUs:
- Major Requirements (69 AUs)
- General Education Requirements (GER) (57 AUs)

(a) **Major Requirements 69 AUs**

The major requirements for a Chinese Major are:
1. Chinese Major Core (35 AUs)
2. Major Prescribed Electives (34 AUs)

Students must take at least 2 MPE courses at HC3XXX, and 4 MPE courses at HC4XXX.

(b) **General Education Requirements**

All HSS students will be required to complete nine courses as part of the General Education Requirements.
1. Two courses from GER – Core (6 AUs)
   - HW0100 The Craft of Writing
   - HW0300 Mastering Communication
2. One course from GER – Core: Singapore Studies (3 AUs):
3. Three courses from GER – Core (3 AUs) in the following categories: [E-learning]
   - Environmental Sustainability (1 AUs) [To be taken in Year 1, Sem 2]
   - Ethics and Moral Reasoning (1 AUs) [To be taken in Year 2, Sem 2]
   - Entrepreneurship and Innovation (1 AUs) [To be taken in Year 3, Sem 2]
4. Five courses from a list of GER – Prescribed Electives (PEs) (15 AUs) in the following categories with at least one course in each category:
   - Science and Technology (3 AUs)
   - Business and Management (3 AUs)
   - Liberal Arts (3 AUs)
   - ANY (6 AUs)
5. GER – Unrestricted Electives (30 AUs) to be chosen from any school

Students may fulfill the remaining 30 AUs from any school. They may make use of unrestricted electives to fulfill the requirements for a second Major, one or two Minor(s), or to read more courses from the Chinese Division. Students doing the Chinese Major programme are strongly encouraged to take up a Minor programme. They are especially encouraged to take up the Minor in Translation and/or Minor in Chinese Creative Writing. Upon completion, they will be recognised as having successfully completed a Major in Chinese and a Minor in Translation and/or Chinese Creative Writing although the two programmes are offered by the same Division.

**Major Core (compulsory) Subjects**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC1001</td>
<td>Introduction to the Study of Literature and Culture</td>
</tr>
<tr>
<td>HC1002</td>
<td>Introduction to Chinese Language</td>
</tr>
<tr>
<td>HC2001</td>
<td>Directed Readings of Literary Works: Pre-Qin, Han, Wei and Jin</td>
</tr>
<tr>
<td>HC2003</td>
<td>Directed Readings of Literary Works: Tang and Song</td>
</tr>
<tr>
<td>HC2004</td>
<td>Directed Readings of Literary Works: Yuan, Ming and Qing</td>
</tr>
<tr>
<td>HC2005</td>
<td>General History of China</td>
</tr>
<tr>
<td>HC3001</td>
<td>Modern Chinese Literature</td>
</tr>
<tr>
<td>HC3002</td>
<td>History of Chinese Thought</td>
</tr>
<tr>
<td>HC3003</td>
<td>Southeast Asian Chinese</td>
</tr>
</tbody>
</table>

**Major Prescribed Electives**

**Category A: Chinese Literature and Culture**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>HC1010</td>
<td>Literature in Taiwan and Hong Kong</td>
</tr>
<tr>
<td>HC2010</td>
<td>Classical Chinese Fiction</td>
</tr>
<tr>
<td>HC2011</td>
<td>Tang Poetry</td>
</tr>
<tr>
<td>HC2012</td>
<td>Chinese Folk Literature</td>
</tr>
<tr>
<td>HC2013</td>
<td>Critical Approaches to Chinese Literature and Culture</td>
</tr>
<tr>
<td>HC2014</td>
<td>Chinese Theatre and Performance</td>
</tr>
<tr>
<td>HC3010</td>
<td>Classical Chinese Drama</td>
</tr>
<tr>
<td>HC3011</td>
<td>Studies of Selected Poets</td>
</tr>
<tr>
<td>HC3012</td>
<td>Creative Writing Workshop</td>
</tr>
<tr>
<td>HC3013</td>
<td>Modern Poetry, Modernism and Modernity</td>
</tr>
<tr>
<td>HC3014</td>
<td>Cultural Study of Chinese Cinemas</td>
</tr>
<tr>
<td>HC3015</td>
<td>City and Culture in Modern China</td>
</tr>
<tr>
<td>HC4010</td>
<td>Classical Chinese Literary Theory</td>
</tr>
<tr>
<td>HC4012</td>
<td>Fictional Narratives in Chinese Fiction</td>
</tr>
<tr>
<td>HC4013</td>
<td>Gender and Sexuality in Chinese Literature</td>
</tr>
<tr>
<td>HC4014</td>
<td>Special Topics in Chinese Literary and Cultural Studies</td>
</tr>
<tr>
<td>HC4015</td>
<td>Special Topics in Classical Chinese Literature</td>
</tr>
<tr>
<td>HC4016</td>
<td>Comparative Literature Studies: Theory and Practice</td>
</tr>
<tr>
<td>HC4017</td>
<td>Studies on Lu Xun</td>
</tr>
<tr>
<td>HC4018</td>
<td>Studies on Gao Xingjian</td>
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<tr>
<td>HC4019</td>
<td>Chinese Literary Canon and Images of Art</td>
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</table>

**Category B: Chinese History, Thought and China Studies**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>HC2030</td>
<td>Pre-Qin Thought</td>
</tr>
<tr>
<td>HC2031</td>
<td>Confucian Thought</td>
</tr>
<tr>
<td>HC2032</td>
<td>Division and Integration: From the Spring-Autumn/Warring States to Sui, Tang and the Five Dynasties</td>
</tr>
<tr>
<td>HC2040</td>
<td>Understanding China</td>
</tr>
<tr>
<td>HC2041</td>
<td>Contemporary Chinese Politics and Society</td>
</tr>
<tr>
<td>HC3030</td>
<td>Chinese Buddhism and Daoism</td>
</tr>
<tr>
<td>HC3031</td>
<td>Conquering and Conquered Dynasties: From Song to Qing</td>
</tr>
<tr>
<td>HC3042</td>
<td>China in Asia</td>
</tr>
<tr>
<td>HC4030</td>
<td>Modern Chinese Intellectuals and Political Movements</td>
</tr>
<tr>
<td>HC4031</td>
<td>Interculturalism in Chinese History</td>
</tr>
<tr>
<td>HC4032</td>
<td>Chinese Aesthetic Thought</td>
</tr>
<tr>
<td>HC4033</td>
<td>Special Topics in Chinese History and Thought</td>
</tr>
<tr>
<td>HC4034</td>
<td>Song-Ming Neo-Confucianism</td>
</tr>
<tr>
<td>HC4042</td>
<td>China and Globalisation</td>
</tr>
<tr>
<td>HC4043</td>
<td>Special Topics in Modern China</td>
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</tbody>
</table>

**Category C: Linguistics and Chinese Linguistics**

<table>
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<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>HC1050</td>
<td>The Science of Chinese Characters</td>
</tr>
<tr>
<td>HC1051</td>
<td>Modern Chinese</td>
</tr>
</tbody>
</table>
HC2002  Critical Reading and Writing
HC2050  Chinese Lexicology
HC2052  Language and Society
HC2053  Varieties of Chinese
HC3050  Sound and Prosody in Chinese
HC3051  Sociolinguistics
HC3052  Chinese Language and Grammatical Theories
HC4050  Chinese Semantics
HC4051  Text, Rhetoric and Style
HC4052  Special Topics in Chinese Linguistics
HC4053  Classical & Modern Chinese Grammar
HC4054  Classical Chinese Grammar used in Ma Shi Wen Tong
HC4055  Chinese Language Acquisition
HC4056  Chinese Semasiology

**Category D: Studies of Ethnic-Chinese**

HC1060  History of Singapore and Malaysian Chinese
HC2060  Chinese Education in Southeast Asia
HC2061  Chinese Literature in Singapore and Malaysia
HC3060  Chinese Literature in Europe and America
HC3061  Transcultural Singapore Theatre
HC3062  Chinese Overseas and China
HC3063  Critical Study of Singapore Society and Culture
HC4060  Globalisation and Chinese Overseas
HC4061  Chinese Migration
HC4062  Special Topics in the Studies of Ethnic-Chinese
HC4063  A Study of Sinophone Culture in Singapore and Malaysia

(c) Graduation Project (8AUs)

The Graduate Project, to be performed individually, will have the guidance of a supervisor assigned by the Division of Chinese. The project entails a researched academic paper of not more than 20,000 Chinese characters on a selected topic in one of these four categories:
- Category A: Chinese Literature and Culture
- Category B: Chinese History, Thought and China Studies
- Category C: Linguistics and Chinese Linguistics
- Category D: Studies of Ethnic-Chinese

All students whose CGPA earned by the end of their sixth semester placed them in line for second class honours (upper) and first class honours will be required to complete the final year project. Those who do not take the graduation project are to read two additional MPE courses at HC4XXX.

**Duration of Study**

The curriculum is designed as a four-year programme. Well-prepared students can complete the degree in a shorter period by taking more courses during the semester and/or attending special sessions.

**Admission Requirements**

Students majoring in Chinese will be admitted directly to the B.A. in Chinese programme. In addition to the general admission requirements set by NTU, students need at least:

1. a good pass in GCE ‘O’ level Chinese or Higher Chinese, or
2. a pass in GCE ‘A’ level H1 Chinese or H2 Chinese, or
3. an equivalent.

**Economics Division**

The Division of Economics has its roots in the Division of Applied Economics in the Nanyang Business School that was established in 1993. Economics as a course offering however goes back to the historical days of Nanyang University (1955).

The Division is currently supported by a large mix of local and international faculty comprising more than 30 academic staff, many of whom have Ph.D.s from renowned universities from around the world. Moreover, faculty members have also contributed and participated regularly in major international conferences and have served as consultants to prominent international organisations such as the United Nations, World Bank, International Monetary Fund and Asian Development Bank.

Faculty members have also locally provided advice and expertise to government ministries such as the Ministry of Finance, the Ministry of Trade and Industry, the Ministry of Manpower, the Ministry of the Environment and Water Resources and the Ministry of Health as well as to statutory boards like the Monetary Authority of Singapore, the Economic Development Board, IE Singapore and the Maritime and Port Authority.

Our goals are to: (1) provide a well-rounded undergraduate education in economics with breadth, depth, rigor and flexibility, (2) provide specialised graduate training in chosen areas, (3) create a thriving research environment among faculty that will establish the Division as the hub of intellectual excellence in various areas of research with a focus on Singapore, ASEAN and Asia in general.

The B.A. Hons in Economics is designed as a four year programme. To graduate, students are required to complete at least 126AU.

**Major Core (compulsory) Subjects**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HE1001</td>
<td>Microeconomics Principles (Year 1)</td>
</tr>
<tr>
<td>HE1002</td>
<td>Macroeconomics Principles (Year 1)</td>
</tr>
<tr>
<td>HE2001</td>
<td>Intermediate Microeconomics</td>
</tr>
<tr>
<td>HE2002</td>
<td>Intermediate Macroeconomics</td>
</tr>
<tr>
<td>HE4010</td>
<td>Singapore Economy in a Globalised World</td>
</tr>
</tbody>
</table>

Choose at least ONE from the following:

- HE1004 Introduction to Statistical Theory & Methods
- HE1005 Introduction to Probability and Statistical Inference

Choose at least ONE from the following:

- HE2004 Introductory Econometrics
- HE2005 Principles of Econometrics

**Others**

- HE4099 Graduation Project

**Prescribed Electives**

Choose FOUR from Group A

**Group A**

- HE1003 Basic Mathematics for Economists
- HE2013 International Trade
- HE2006 International Monetary Economics
- HE2007 Money and Banking
Choose EIGHT from Group B of which THREE have to be HE4xxx

Group B
HE2012 Economic Thought
HE2015 Macroeconomic Issues and Policies in Contemporary China
HE2020 Survey Methods & Sampling Techniques
HE3001 Mathematical Economics
HE3002 Game Theory & Applications to Social Sciences
HE3003 The Chinese Economy
HE3004 Health Economics
HE3005 Environmental Economics
HE3006 Urban & Transport Economics
HE3007 Financial Economics
HE3009 Population Economics
HE3010 Energy Economics
HE3011 Cost-benefit Analysis
HE3012 Political Economy of East Asia
HE3014 Economics of Corporate Finance
HE3015 Political Economy
HE3016 Principles of Mathematical Finance
HE3020 Applied Econometrics
HE3021 Intermediate Econometrics
HE3022 Econometric Modelling & Forecasting
HE3023 Econometric Analysis of Financial Data
HE4001 Advanced Microeconomics
HE4002 Advanced Macroeconomics
HE4003 Advanced International Finance
HE4004 Behavioural Economics
HE4005 Growth Theory and Empirics
HE4011 Current Topics in Economics
HE4012 Advanced Financial Economics
HE4013 Experimental Economics
HE4014 Information Economics
HE4015 Personnel Economics
HE4016 Quantitative Economics
HE4020 Econometric Time Series Analysis
HE4021 Advanced Econometrics
HE4099 Graduation Project

Students are encouraged to group their courses such that they specialise in one of the following specific areas:
(1) Development and Public Policy,
(2) Finance and Business,
(3) Quantitative Economics.

Duration of Study
The curriculum is designed as a four-year programme. Well-prepared students can complete the degree in a shorter period by taking more courses during the semester and/or attending special sessions.

John Maynard Keynes once wrote, “The ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed the world is ruled by little else.” Living in a world that is constantly torn by economic problems, economic ideas can definitely shape and sway people’s minds, and economic inquiries can be truly exciting and rewarding.

The English Division
The Division of English currently offers a major and a minor in English Literature, a minor in Creative Writing, the M.A. and Ph.D. by research, and general elective courses that are open to all NTU students. By contributing to students who choose English Literature as their major, as well as to the university at large, we contribute significantly to the New Undergraduate Experience at NTU.

B.A. (Hons) in English Literature
The four-year direct honours Bachelor’s degree in English Literature offers a full range of courses on traditional canonical literature across its academic programmes, while also being constantly alert to developments in contemporary literature and culture. Significant elements of this B.A. degree include Singapore literature and culture, international Asian literature, contemporary literature, world literature, critical and literary theory, drama and film studies, postmodernism, comparative literature, cultural studies, and gender studies. Students who major in English are given the opportunity to specialize in one or more of these areas during their undergraduate education. The direct honours degree will require English majors to work on a final year essay, which will allow the students to give expression to their chosen area(s) of specialization.

The Division of English encourages innovative approaches to literary studies, adventurous thinking from a diversity of perspectives, scholarly rigour, and high levels of interaction and debate between academic staff and students, with the aim of developing a thriving and exciting community that nurtures the development of ideas and creative pursuits.

Major Core (compulsory) Subjects
HL1001 Introduction to the Study of Literature
HL1002 Survey of English Literature I
HL1003 Survey of English Literature II
HL1005 Singapore Literature and Culture I
HL1007 Classical Literature
HL2024 Approaches to Literature
HL2038 Introduction to American Literature

Others
HL4099 Graduation Project

Prescribed Electives
Choose at least FOUR from Category A (including at least one of the following: HL2001, HL2002, HL2003, HL2004). Choose ONE each from Categories B to F and the remaining 3 from any category.(At least FOUR courses must be of HL4xxx.)
Category A: Period Studies
HL2001  Medieval Literature
HL2002  Renaissance Literature
HL2003  Restoration and Eighteenth-Century Literature
HL2004  Sensibility and Romanticism
HL2005  Victorian Literature
HL2006  Modernism
HL2007  Contemporary Literature and Culture
HL2028  Nineteenth-Century American Literature and Culture
HL2029  American Modernism
HL2030  Post-1945 American Literature and Culture

Category B: Asian Literature and Culture
HL2008  Singapore Literature and Culture II
HL2009  Southeast Asian Literature and Culture
HL2010  East Asian Literature
HL2011  Representations of Asia
HL2012  Asian-American Literature
HL2013  British-Asian Literature
HL2014  Urban Culture Asia
HL2041  Asian Historical Fiction

Category C: Film & Theatre
HL2026  Reading Drama
HL2037  History of Film
HL3001  Film Theory
HL3002  Film, Politics and Ethics
HL3003  Film & Literature
HL3004  World Cinema
HL3006  Modern Drama

Category D: World Literature
HL2022  South Asian Literature
HL2032  African Literature
HL3007  Postcolonial Literature
HL3008  Postcolonial Women’s Writing
HL3009  Comparative Literature
HL3010  European Literature
HL3014  Latin American Literature
HL3020  Ethnic American Literature
HL3026  Australasian Literature: Colonial to 1945
HL3031  Scottish Literature
HL3034  Irish Literature

Category E: Literary and Cultural Theory
HL3016  Gender and Sexuality Studies
HL3033  Performance and Cultural Industry
HL4005  Literary Criticism
HL4006  Reading Texts: Advanced Critical Theory
HL4008  Postcolonial Studies
HL4009  Popular Literature and Culture
HL4010  Feminist Studies

Category F: Specific Interest Subjects
HL2015  War in Literature and Film
HL2016  Literature and Madness
HL2017  Directed Study
HL2018  Fantasy Fictions
HL2020  Creative Writing Workshop
HL2021  Literature of Empire
HL2025  Readings in Poetry
HL2036  Virgins and Vixens
HL2040  Adapting the Classics
HL3011  Science Fiction: Origins to Parody
HL3012  The Discourse of Love
HL3013  Postmodernism
HL3017  The Rise of the Novel
HL3024  Contemporary Women’s Writing
HL3029  Arthurian Literature
HL3030  Major Author Study: Shakespeare
HL3023  Literature and the Arts
HL3035  Magical Realism
HL4002  Major Author Study: Chaucer
HL4011  Modern Poetry
HL4012  Advanced Studies in Drama
HL4013  Advanced Study in Literature & Culture
HL4014  Advanced Studies in Film
HL4015  Advanced Studies in Medieval Literature
HL4016  Advanced Studies in Renaissance Literature
HL4017  Advanced Studies in Restoration and Eighteenth-Century Literature
HL4018  Advanced Studies in Romanticism
HL4019  Advanced Studies in Victorian Literature
HL4020  Advanced Studies in Modernist Literature
HL4023  Advanced Studies in Twentieth-Century American Literature
HL4024  Advanced Studies in Contemporary Literature
HL4028  Science and Literature

B.A. (Hons) in History
The History BA (Honours) programme is designed to equip students with the breadth of knowledge about major historical subjects. The structure of the programme enables students to concentrate their studies on what most appeals to them as they advance in their coursework. The undergraduate programme also cultivates interdisciplinarity. All of the training will culminate in the final year research project, where students showcase their capacities to conduct independent research and advance an argument persuasively. To be awarded the BA (Honours), students should demonstrate the capability to master the secondary literature in their chosen areas of study, engage in independent research, exercise critical judgment about the texts that they encounter, and communicate their findings in a well-reasoned and scholarly manner.

The Curriculum
To graduate, students must complete two categories of requirements, totalling at least 126 Academic Units (AUs):
- Major Requirements (69 AUs)
- General Education Requirements (GER) (57 AUs)

I. Major Requirements (69 AUs)
The History Major Requirements comprises three components:
1. History Core Courses (24 AUs)
2. History Prescribed Electives (37 AUs)
3. Graduation Project (FYP) (8 AUs)
Major Core (Compulsory) Subjects
HH1001 What is History?
HH1002 Asia-Pacific in Global History: Pre-1800
HH1003 Asia-Pacific in Global History: From 1800
HH1004 Science and Technology in Historical Perspective
HH2001 Singapore: The Making of a Cosmopolitan City-State
HH3001 Historiography: Theory and Methods
HH3002 Science, Technology, and Medicine in Modern East Asia

Major Prescribed Electives
Students must complete TWELVE (12) prescribed electives--at least EIGHT (8) at HH1000, HH2000 and HH3000 levels and at least FOUR (4) at HH4000 level.

Students must choose at least THREE (3) courses from each of the following three categories.

Global Asia
HH1008 The Emergence of Modern Southeast Asia (3 AUs)
HH2005 East Asia: Tradition and Modernity (3 AUs)
HH2009 China: From Revolution to Reform (3 AUs)
HH2011 Ancient and Medieval South Asia (3 AUs)
HH2013 Chinese Mandarins versus European Merchants (3 AUs)
HH2014 Globalization and Asia (3 AUs)
HH2018 Modern Japanese History in the Atomic Age (3AUs)
HH3003 Migration and Diaspora: Chinese Experiences in Historical and Comparative Perspective (3 AUs)
HH3007 Southeast Asian-China Interactions (3 AUs)
HH3008 Modern South Asia (3 AUs)
HH3011 Crime, Punishment, Law and Disorder in Late Imperial China (3AUs)
HH3015 In the name of the Nation?: Nationalism in Asia (3AUs)
HH3020 Introduction to Korean History (3 AUs)
HH3021 Traitors, TV Stars and Taboos: Representing History in Contemporary China (3AUs)
HH4003 The Silk Road: Old and New (4 AUs)
HH4004 The Transnational Sea: The Indian Ocean in History (4 AUs)
HH4012 Intellectual History of Modern China (4 AUs)
HH4013 The ‘Big Man’ and Political Legitimation in Southeast Asia (4 AUs)
HH4090 Special Topics in History – Global Asia (4 AUs)

Interdisciplinary History
HH1009 Culture and Media in History (3 AUs)
HH2002 Gender in History (3AUs)
HH2007 A Modern History of Global Health (3 AUs)
HH2008 Feasting and Fasting: Food and Drink in History (3 AUs)
HH2012 Cybersociety (3 AUs)
HH2015 Biopolitics and East Asian History (3 AUs)
HH2016 History of Animals (3AUs)
HH2017 History of Information Technology (3 AUs)
HH2020 Science and War (3 AUs)
HH2023 Reading in the History of Health and Medicine (3AUs)
HH3004 Comparative Business History (3 AUs)
HH3010 Biotechnology and Society (3 AUs)
HH3013 Comparative History of Race Science (3AUs)
HH3016 History of Madness (3AUs)
HH3017 World Environmental History (3AUs)
HH3018 The Environmental History of Oceans (3AUs)
HH3019 History of the Body (3AUs)
HH4005 Culture and Heritage: Perspectives from History (4 AUs)
HH4006 The Green Earth: Issues in Environmental History (4 AUs)
HH4091 Special Topics in History – Interdisciplinary History (4 AUs)

World History
HH1006 The West in Global History (3 AUs)
HH1007 The Making of Civilizations (3 AUs)
HH1010 The Unrealized Dream: An Introduction to US History (3 AUs)
HH2004 The Islamicate World (3 AUs)
HH2006 Modern European History (3 AUs)
HH2021 Race, Gender, Class and Colonial Power (3 AUs)
HH3006 The United States and the Modern World (3 AUs)
HH3012 The United States and the IndoChina Wars (3 AUs)
HH3014 The World of the Communists and Communists in the World (3 AUs)
HH4007 An International History of the Cold War (4 AUs)
HH4008 Revolutions and Social Changes in the Modern Times (4 AUs)
HH4009 Studies in Grand Strategy and Policy (4 AUs)
HH4010 Dissent, Resistance, Rebellion (4 AUs)
HH4011 Courtesans, Slaves Soldiers and Domestic Drudgery: Slavery in the Indian Ocean World (4 AUs)
HH4092 Special Topics in History – World History (4 AUs)

Graduation Project
The Graduation Project (FYP) (8AUs) trains students in independent research. Guided by their supervisors, students identify their topics, formulate research questions, engage in archival and secondary source research, and present their findings and arguments in research papers.

It is compulsory for students with GPA of 3.90 and above to complete FYP. Those within the holding band of 3.75 to 3.90 will be allowed to opt-in to do FYP and for those below the required GPA will not be allowed to complete FYP but can read two 4000-level courses instead to fulfill the 8AUs requirement. To obtain a 1st or 2nd class upper honours degree, however, students must read and complete their graduation projects.

FYP is to be read for two consecutive semesters in NTU (locally). Students who are planning to go for exchange are not allowed to register for FYP.

General Education Requirements (GER) (57 AUs)
All HSS students are required to fulfil their GER courses: Students admitted in AY14-15 and onwards must read:

1. Two courses from GER – Core (6AUs):
Two courses from Communication Skills:
HW0101 Introduction to Critical Writing
HW0222 Writing History Essays
2. One course from Singapore Studies* (to self-register and complete in year 2) (3AUs):

   HA0201 Government and Politics of Singapore  
   HC0201 Chinese Literature in Singapore  
   HE0201 The Singapore Economy  
   HG0201 Singapore’s Languages  
   HH0201 Singapore and the Modern World (not for History major students)  
   HL0201 Images of Singapore: Literature, Film and Culture  
   HP0201 Employment Relations for Work and Careers in Singapore  
   HS0201 Understanding Singapore Society

3. Five courses from a list of GER – Prescribed Electives (PEs) (15 AUs) in the following categories with at least one course from each category:

   Business and Management (BM)  
   Science, Technology, and Society (STS)  
   Liberal Arts (LA)

4. Fulfill the following categories of online courses in sequence and in every semester 2 (1 AU each):

   Sustainability (to read in year 1, semester 2)  
   Ethics and Academic Integrity (to read in year 2, semester 2)  
   Enterprise and Innovation (to read in year 3, semester 2)

5. Courses categorized under GER - Unrestricted Electives (30 AUs) that are offered by any School.

Minor in History
To fulfill a minor in History, students must complete at least FIVE (5) courses, including the required course, HH1001 What is History. Even though these FIVE courses can be taken in any sequence and at any time within the four year degree program, students are advised to complete HH1001 prior to taking other history courses.

Linguistics and Multilingual Studies Division
The Division of Linguistics and Multilingual Studies is the first of its kind in Singapore and the region. The study of Linguistics and Multilingual Studies allows students to explore the many interesting facets of language, from the properties of speech sounds to word and sentence structure, from children’s language development to communication in bilingual and multilingual societies. It encompasses a very wide range of topics: how a finite inventory of basic linguistic units is deployed to express an infinite variety of meanings, how sentences are processed and decoded, how the bilingual and multilingual mind is structured, how sociological or cultural factors govern the simultaneous use of two or more languages in a community, and how technology impacts upon people’s everyday use of language, to mention just a few.

B.A. (Hons) in Linguistics and Multilingual Studies
This four-year direct honours Bachelor’s degree in Linguistics and Multilingual Studies contains a focus or a component part that addresses questions central to our understanding of language and multilingualism. Students majoring in LMS may organise their studies around the programme’s five areas of concentrations: Psycholinguistics; Sociolinguistics; Computational Linguistics; General Linguistics and Applied English Linguistics. All of these concentrations share a common focus on the application of linguistic knowledge to practical issues related to languages in modern society.

The Curriculum
To graduate, students must complete two categories of requirements, totalling at least 126 AUs:

- General Education Requirement (GER) (57 AUs)
- LMS Major Requirements (69 AUs)

(a) General Education Requirement (GER) (57 AUs)
The GER consists of 3 sub-areas:

(i) GER – Core (12 AUs)
- 2 Communication Skills Courses (4 AUs)  
  HW0101 Introduction to Critical Writing  
  HW0201 Research Writing in the Social Sciences

(ii) GER - Prescribed Electives (PEs) (15 AUs)
Students are required to complete a distribution of GER-PEs consisting of:

- 1 course from Singapore Studies category (3 AUs)  
  Sustainability (1AU)  
  Ethics & Academic Integrity (1AU)  
  Enterprise & Innovation (1AU)  
  Absolute Basics for Career (1 AU)  
  Career Power Up (1 AU)

(iii) GER - Unrestricted Electives (UEs) (30 AUs)
There are no restrictions on the selection of courses to make up unrestricted electives. Students can:

- Complete a Minor in another discipline;  
- Earn AUs under an International Exchange programme;  
- Earn AUs under the optional Professional Attachment programme offered under HSS;  
- Enrol in any course offered by any School as long as the pre-requisites are satisfied.

(b) Major Requirements (69 AUs)
The Major Requirements for a Linguistics and Multilingual Studies major consists of 2 components:

- Linguistics and Multilingual Studies Core courses (35 AUs)  
- Linguistics and Multilingual Studies Prescribed Electives (34 AUs)

Major Core (compulsory) Subjects
HG1001 Fundamentals of Linguistics (A): Mind and Meaning  
HG1002 Fundamentals of Linguistics (B): Structure and System  
HG2001 Morphology and Syntax  
HG2002 Semantics and Pragmatics  
HG2003 Phonetics and Phonology  
HG2005 Research Methods in Linguistics I - Introduction  
HG2010 Bilingualism and Multilingualism  
HG2020 Language in Society  
HG2034 Structure of Modern English
Prescribed Electives
Choose 10 from the following concentrations (of which at least FOUR must be HG4xxx)

Language, Mind and Multilingualism
HG2012 Cognitive Linguistics
HG2013 Child Language
HG2014 Second Language Acquisition
HG2030 Reading Development and Disorders
HG3005 Research Methods in Linguistics II - Statistical Analysis
HG3010 Language Disorders
HG3012 Deaf Culture and Sign Language
HG3015 Psycholinguistics
HG3016 Language and Cognition in Bilingualism and Multilingualism
HG4011 Language and the Brain
HG4047 Pragmatic Theory

Multilingual Societies and Multiculturalism
HG2021 Intercultural Communication
HG2023 Language and Gender
HG2032 Globalisation and World Englishes
HG3020 Language Planning and Policy
HG3021 Language Change
HG3022 Sociolinguistics of a Region
HG4020 Languages in Contact
HG4031 Multimodality in Situated Contexts

Language Structure
HG3042 Contrastive Linguistics
HG3046 Language Universals and Language Types
HG4040 Phonological Theory
HG4041 Theories of Grammar
HG4045 Field Methods: Structure and Language
HG4046 Malay Linguistics 2 - Dialectology and Language Contact
HG4049 Semantic Analysis

Language and Technology
HG2051 Language and the Computer
HG2052 Language, Technology and the Internet
HG3051 Corpus Linguistics
HG4050 Machine Translation
HG4053 Grammar Engineering

Special Topics in Linguistics
HG2096 What’s in a text? - Analyzing Written Discourse
HG2097 What’s in a Name? - A General Introduction to Etymology
HG2098 Gesture and Discourse
HG2099 Languages of the World
HG2031 The History of English
HG3023 Anthropological Linguistics
HG3040 Language Evolution
HG3043 Malay Linguistics 1 - History and Structure
HG4022 Forensic Linguistics
HG4030 Conversation Analysis
HG4032 The Linguistics of Humour
HG4046 Malay Linguistics 2 - Dialectology and Language
HG4048 Comparative Chinese Dialectology
HG406X Special Topics
HG4063 Advanced World Englishes

HG406X* Special Topics
Undergraduates in their 3rd or 4th year are encouraged to take a seminar course. This will be offered in the first semester of every year and may include topics such as Grammaticalisation, Language and Media, Experimental Phonetics, Language and Identity, etc. Topics will also depend on the academic staff’s areas of expertise.

Students who choose this course are expected to have completed all the core courses for the major.

*The suffix X means that students can take the course more than once, provided that the suffix for the same course code is different.

Note:
- The Division recommends students to take an average of 3 LMS courses every semester.
- We strongly encourage students to complete their Core Courses (2000-level courses) first before attempting the prescribed electives (3000- and 4000-level courses).

Students should avoid delaying the reading of Core Courses and take them as soon as they are offered, as these may constitute prerequisites for some courses offered in subsequent semesters.

A failure to clear the Core Courses as early as possible will impose restrictions on the choice of courses that can be read in later years.

(c) Graduation Project (8AUs)
The objective of HG4099 Graduation Project is to provide students with independent research work under the guidance of a supervisor. They are expected to read widely to develop an in-depth understanding of a topic, and then identify research objectives, isolate new research questions, collect and analyse information or data and write up their findings as a research report. The graduation project integrates linguistic knowledge and analytical skills that the students have acquired throughout their degree programme.

Students must read the graduation project to obtain a 1st or 2nd class upper honours.

B.A. (Hons) in Philosophy
Philosophy ponders fundamental questions about the nature of reality, knowledge, existence, mind, language, science, and morality. The Philosophy BA (Honours) programme is a four-year degree that enables you to read carefully, write well, reason clearly, communicate effectively, think critically, and most importantly, think for yourself. These skills are essential to an enriched life, and they are transferable to many different fields. In addition, the Philosophy BA cultivates a comprehensive perspective in understanding the world, along with a broad base of knowledge that intersects with other disciplines such as mathematics, physics, biology, economics, social sciences, and psychology. Students of philosophy have thus been successful in many different career
paths such as arts, business, computer science, law, medicine, public administration, publishing, writing, and many others.

**B.A. (Hons) Curriculum**

Requirements for Graduation

<table>
<thead>
<tr>
<th>Course</th>
<th>AU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>29</td>
</tr>
<tr>
<td>Core Electives</td>
<td>37</td>
</tr>
<tr>
<td>GER Core</td>
<td>12</td>
</tr>
<tr>
<td>GER Electives</td>
<td>15</td>
</tr>
<tr>
<td>Free Electives</td>
<td>33</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>126</strong></td>
</tr>
</tbody>
</table>

**TABLE A: Core (29 AU)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HY1001</td>
<td>Introduction to Philosophy</td>
</tr>
<tr>
<td>HY1002</td>
<td>Logic and Paradoxes</td>
</tr>
<tr>
<td>HY2002</td>
<td>Moral Philosophy</td>
</tr>
<tr>
<td>HY2010</td>
<td>Ancient Philosophy: The Examined life</td>
</tr>
<tr>
<td>HY2012</td>
<td>Modern Philosophy: Reason and Experience</td>
</tr>
<tr>
<td>HY2003/</td>
<td>Chinese Philosophy</td>
</tr>
<tr>
<td>HY2004</td>
<td>Indian Philosophy</td>
</tr>
<tr>
<td>HY3010/</td>
<td>Philosophy of Science</td>
</tr>
<tr>
<td>HY3012/</td>
<td>Philosophy of Technology</td>
</tr>
<tr>
<td>HY3005</td>
<td>Great Ideas and Innovations</td>
</tr>
<tr>
<td>HY4099</td>
<td>Graduation Project</td>
</tr>
</tbody>
</table>

**TABLE B: Electives (37 AU)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HY2005</td>
<td>Justice, Society, and the State</td>
</tr>
<tr>
<td>HY2008</td>
<td>Environmental Ethics</td>
</tr>
<tr>
<td>HY2014</td>
<td>Love</td>
</tr>
<tr>
<td>HY2015</td>
<td>Happiness</td>
</tr>
<tr>
<td>HY2016</td>
<td>Friendship</td>
</tr>
<tr>
<td>HY2017</td>
<td>Philosophy of Film</td>
</tr>
<tr>
<td>HY3001</td>
<td>Existentialism: Freedom, Being, Death</td>
</tr>
<tr>
<td>HY3003</td>
<td>World Religions</td>
</tr>
<tr>
<td>HY3004</td>
<td>Reason and Faith</td>
</tr>
<tr>
<td>HY3011</td>
<td>Minds and Machines</td>
</tr>
<tr>
<td>HY4002</td>
<td>Knowledge and Reality</td>
</tr>
<tr>
<td>HY4007</td>
<td>Art and Beauty</td>
</tr>
<tr>
<td>HY4013</td>
<td>Language and Being</td>
</tr>
<tr>
<td>HY4015</td>
<td>Medical Ethics</td>
</tr>
<tr>
<td>HY4016</td>
<td>Business Ethics</td>
</tr>
<tr>
<td>HY4110</td>
<td>Special Topics in Philosophy of Science</td>
</tr>
<tr>
<td>HY4111</td>
<td>Special Topics in Ethics</td>
</tr>
<tr>
<td>HY4112</td>
<td>Special Topics in Philosophy</td>
</tr>
<tr>
<td>HY4113</td>
<td>Special Topics in Chinese Philosophy</td>
</tr>
<tr>
<td>HY4118</td>
<td>Independent Study I</td>
</tr>
</tbody>
</table>

**TABLE C: GER Core (12 AU)**

Communication (both compulsory):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HW0101</td>
<td>The Introduction to Critical Writing</td>
</tr>
<tr>
<td>HW0201</td>
<td>Research Writing in the Social Sciences</td>
</tr>
</tbody>
</table>

One course in Singapore Studies

One course in Environmental Sustainability

**TABLE D: GER Electives (15 AU)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAP211/</td>
<td>Quantum Mechanics I</td>
</tr>
<tr>
<td>PH2101</td>
<td>and any course approved by the major programme</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAP311/</td>
<td>Quantum Mechanics II</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
</table>

**Graduation Project**

During their final year, students will complete a capstone graduation project. The graduation project will involve the writing of a supervised research paper on a topic of special interest, or...
Minor in Philosophy

A Philosophy Minor will give students in various disciplines an opportunity to engage in the study of philosophy. This will help them develop critical thinking, reflective consciousness, and other transferable skills, which can strengthen their disciplinary studies and enable them to better adapt to changing circumstances of the world.

Requirements:
The Philosophy Minor requires at least 5 courses (15 AUs), including 2 required courses (6 AUs) and 3 electives (9 AUs).

Required Courses (6 AUs):
HY9001 Intro to Philosophy (3 AUs)
HY9002 Logic and Paradoxes (3 AUs)

Elective Courses (9 AUs, choose 3 from below):
HY9202 Moral Philosophy (3 AUs)
HY9203 Chinese Philosophy (3 AUs)
HY9205 Justice, Society, and the State (3 AUs)
HY9208 Environmental Ethics (3 AUs)
HY9310 Philosophy of Science (3 AUs)
HY9311 Minds and Machines (3 AUs)

Or other relevant courses approved by the Programme Coordinator.

B.A. (Hons) in Public Policy and Global Affairs

The BA (Honours) in Public Policy and Global Affairs is a new four-year programme to prepare students for a career and leadership role in both public and private sectors in Singapore as well as in the Asian region.

With an interdisciplinary orientation and a focus on both Singaporean society and international society, the direct honours degree programme offers courses that equip its graduates with multidimensional practical knowledge in areas such as policy analysis, programme evaluation, public financial management, human resource management, and non-profit management that enables them to contribute to the public, non-profit, or even business sector in Singapore. The professional training in political dynamics, international politics, comparative public administration, and global affairs also lays a solid foundation for graduates for a possible career in regional and international governmental organisations as well as regional and international non-governmental organisations.

The Curriculum

To graduate, students must complete two categories of requirements, totalling at least 126 Academic Units (AUs):
- Major Requirements (69 AUs)
- General Education Requirements (GER) (57 AUs)

I. Major Requirements (69 AUs)
The PPGA Major Requirements comprises three components:

1. PPGA Core Courses (24 AUs)
2. PPGA Prescribed Electives (37 AUs)
3. Graduation Project (FYP) (8 AUs)
Category C: Public Policy
HA1007  Public Policy-Making in Singapore
HA2011  Principles of Public Policy Analysis
HA2012  Global Problems and Policy
HA2013  Comparative Public Policy
HA3010  Mass Media and Public Policy
HA3011  Science, Technology & Public Policy
HA3012  Policy Evaluation
HA3013  Government & Business in East & Southeast Asia
HA4009  Special Issues in Public Policy
HA4010  Technology, Innovation & Policy

Graduation Project
The aim of the HA4099 Graduation Project is to provide training in independent scholarly work. With the guidance of a supervisor, each student will identify a research problem, formulate research questions, develop a theoretical framework and design a methodological approach. By the completion of the project, the student will have gained experience in theoretical reasoning, empirical research (especially the collection, interpretation and analysis of data), and the writing and presentation of research findings.

Students have the flexibility to opt out of the graduation project and read two 4,000-level courses instead. To obtain a 1st or 2nd class upper honours degree, however, students must complete their graduation project.

II. General Education Requirements (GER) (57 AUs)
All HSS students are required to fulfil their GER. They should read:

GER – Core (12AUs)
Two courses from Communication Skills:
- HW0101 Introduction to Critical Writing
- HW0201 Research Writing in the Social Sciences
- One course from Singapore Studies
- Sustainability (1AU)
- Ethics & Academic Integrity (1AU)
- Enterprise & Innovation (1AU)

GER – Prescribed Electives (PEs) (15 AUs)
Students are required to complete a distribution of GERPEs consisting of:
- 1 course in Business & Management (BM)
- 1 course in Science and Technology
- 1 course in Liberal Studies
- 2 courses from any of the above categories

GER - Unrestricted Electives (UEs) (30 AUs)
There are no restrictions on the selection of courses to make up unrestricted electives. Students can choose any of the following:
- Complete a Minor in another discipline.
- Earn AUs under an International Exchange programme.
- Earn AUs under the optional Professional Attachment programme offered under HSS.
- Any course offered by any School as long as the pre-requisites are satisfied.

Psychology Division
The Division of Psychology offers undergraduate and graduate degrees in psychology. Balanced between scientific and professional emphases, the Division offers a comprehensive integrated curriculum for the undergraduate programme. The graduate programme currently consists of the M.A. and Ph.D. degree by Research. The division has active research in various areas including Behavioural and Cognitive Neuroscience; Clinical Psychology; Cognitive Science; Cultural and Social Psychology; Personality Psychology; Humans and Technology; Evolutionary Psychology and Animal Behaviour; Lifespan Development; Organizational Psychology; and Quantitative Psychology.

B.A. (Hons) in Psychology
The B.A. in Psychology (Hons) is a four-year programme for undergraduates interested in a major in Psychology in NTU. It has been offered from July 2005 onwards. Psychology is the scientific study of human behaviour. Its roots lie in the humanities, social sciences, as well as life sciences. It covers a wide spectrum of topics that range from the human nervous system to complex social cultural systems of contemporary societies. This rigorous training in Psychology is conducted in conjunction with a series of broadening courses in social sciences, humanities and business. The curriculum of B.A. (Hons) in Psychology at NTU is designed with both depth and breadth in mind to facilitate the student’s development into an intelligent global citizen.

To graduate, students must complete two categories of requirements, totalling at least 126AUs:

(1) Major Requirements (69AUs)
- Psychology Core (27AUs)
- Psychology Electives (34AUs)
- Graduation Project OR two 4AU 4000-level courses (8AUs)

Major Core (compulsory) Subjects
HP1000  Introduction to Psychology
HP1100  Fundamentals of Social Science Research
HP2100  Research Design and Data Analysis in Psychology
HP2200  Biological Psychology
HP2300  Developmental Psychology
HP2400  Social Psychology
HP2500  Personality and Individual Differences
HP2600  Cognitive Psychology
HP2700  Abnormal Psychology

Prescribed Electives
Choose at least SIX courses from the following:

HP3XXX courses Level 3000
HP3001  Learning and Behavioral Analysis
HP3002  Positive Psychology
HP3003  Engineering Psychology
HP3101  Applied Statistical Methods for Psychological Research
HP3201  Evolutionary Psychology
HP3202  Alcohol, Drugs and Behaviour
HP3203  Conservation Psychology
HP3301  Issues and Concerns in Adolescence
HP3302  Cognitive Development
HP3401  The Social Psychology of Human Communication
Choose at least FOUR from the following HP4XXX courses. (One must be HP4001 to qualify for Graduation Project)

**Psychological Laboratory**
- HP4001 Research Laboratory in Psychology
- HP4002 Qualitative Methods in Psychology
- HP4011 Data Analysis using ANOVA
- HP4012 Applied Multivariate Methods for Psychological Research
- HP4031 Laboratory in Developmental Psychology
- HP4041 Laboratory in Social Psychology
- HP4051 Laboratory in Personality and Individual Differences
- HP4061 Laboratory in Cognitive Psychology
- HP4062 Laboratory in Human Factors
- HP4091 Current Research in Cultural Psychology

**Professional Modules**
- HP4101 Clinical Psychology
- HP4102 Trauma Psychology, Crisis Intervention and Management
- HP4103 The Forensic Psychology of Crime, Terrorism and Disasters
- HP4104 Evidence-based Practice in Clinical Psychology

**Seminars**
- HP4201 Technology and Social Behaviour
- HP4211 Agent-Based Computational Psychology
- HP4221 Primate Psychology
- HP4231 Social and Emotional Development
- HP4232 Development of Self-Regulation
- HP4241 Interpersonal relations and family studies
- HP4242 Social Cognition
- HP4261 Computational and Cognitive Neuroscience of Vision
- HP4262 Multisensory Integration
- HP4263 Language in Perception and Thought
- HP4271 Cognitive Neuropsychiatry
- HP4272 Neuropsychology
- HP4273 Introduction to Functional MRI
- HP4281 Psychology of Leadership
- HP4282 Negotiation and Conflict Resolution

**Graduation Project (HP4099)**
The graduation project is undertaken during a student’s final year. The objective of the Graduation Project in Psychology is to expose students to many of the elements that are inherent in independent research work in psychology.

(2) **General Education Requirement (GER) (57AUs)**
The GER consists of three sub-areas:

**(i) GER-Core**
- Communication Skills
  - HW0101 Introduction to Critical Writing (2 AUs)
  - HW0201 Research Writing in the Social Sciences (2 AUs)
  - Absolute Basics for Career (1 AU)
  - Career Power Up (1 AU)
- Singapore Studies (3 AUs)
- Sustainability (1 AU)
- Ethics & Academic Integrity (1 AU)
- Enterprise & Innovation (1 AU)

**(ii) GER – Prescribed Electives (PEs) (15AUs)**
Any 5 courses from 3 categories of studies with at least 1 course in each category:
- Science, Technology and Society
- Business and Management
- Liberal Studies

**(iii) GER – Unrestricted Electives (30AUs)**

**Minor in Psychology**
To successfully complete a minor in Psychology, students need to read and pass five Psychology courses. These courses include HP1000, HP1100, at least one Foundation course, and at least two psychology electives.

Prerequisites to minor in Psychology:
- An GCE ‘O’ level pass in Additional Mathematics or an GCE ‘AO’ level pass in Mathematics at GCE ‘A’ level (for entry to HP1100)
- Minimum grade of B- for HP1000

**Sociology Division**
Sociology is the study of social relations, how they are formed and what their consequences are.

Sociology is the broadest of all social science disciplines: all spheres of social life – the cultural, the economic, and the political – are open to sociological inquiry. Sociologists strive to understand, for example, how norms and values shape peoples’ lives; how people organize themselves to forge collective action; how power works in a political system and in everyday life; and how social inequalities are maintained or how social equity is achieved. Sociologists also study past and foreign societies and engage in cross-cultural comparison, deepening our understanding of human diversity.

In practicing Sociology, we – and our students – learn to analyze the social conditions that make a significant impact on human lives. In understanding the causes and consequences of social change, we confront difficult issues affecting different people in different ways. These may include moral issues concerning human wellbeing, social justice, and the quality of life. But they may also include strategic issues concerning the effectiveness of how organizations are run or how policies are made and implemented.

**Undergraduate Admissions**
The Sociology Division looks out for candidates with strong critical thinking and writing skills. There is no single subject that gives you
these skills: you can develop them by studying biology, chemistry, economics, geography, history, language, literature, mathematics, physics, etc – any subject that requires you to think through the material and write about it. In addition, we regard an active interest in current affairs, both within Singapore and internationally, as essential in a Sociology applicant.

You need to meet NTU’s general admission requirements, and a good Polytechnic diploma OR strong ‘A’ levels (including a good pass in GP or K&I). If you are a Polytechnic candidate, you’ll need to have at least a pass in GCE ‘O’ Level English Language and your other GCE ‘O’ level subjects may be considered. Applicants are assessed on a case-by-case basis, and the division also interviews and administers writing tests for select candidates.

For more details on admission requirements, refer to link below: http://admissions.ntu.edu.sg/UndergraduateAdmissions/Pages/ApplytoNTU.aspx

Career Prospects
Our graduates will enter the job market equipped with a set of critical thinking skills and practical experience in analyzing many aspects of social life – which they have developed through research training in both qualitative and quantitative methods. Their skills and attitudes make them valuable to potential employers and institutions in areas such as the following:

- Social Research
- Civil Service and Public Administration
- Management (including Human Resources, Corporate Communications, etc.)
- Education and Training
- Media (including Public Relations, Advertising, Journalism, and Broadcasting)
- Business, Marketing, and Private-Sector/Commercial Organizations
- Creative Industries (including the Arts, Arts Management, Heritage, Design, etc.)
- Voluntary Organizations (Non-governmental Organizations, Foundations, etc.)

International Organizations (Embassies, MNCs or TNCs, Regional Bodies, etc.)

In addition to pursuing careers in a wide variety of fields, an NTU Honours degree in Sociology enables you to continue on to graduate-level studies in the social sciences or other relevant fields such as business, law, and government. (Entry requirements for such programmes are established by the respective universities.)

Prospective Students
The Division of Sociology offers BA(hons), BA minor courses, and Graduate degrees up to the PhD level.

The Bachelor of Arts in Sociology at NTU is a four-year direct Honours degree programme. A degree in Sociology at NTU provides graduates with a vast array of job opportunities in both the public and private sectors. Sociology majors are valued for their critical thinking and analytical skills. They also benefit from an in-depth understanding of social organizations, culture, and other social phenomena.

The curriculum provides an intellectually stimulating and rigorous experience for Major students. The academic foundation consists of three core areas: Economy, Technology and Society; Culture, Self and Identity; and Organisations and Organisational Change. It provides both breadth of exposure and depth of engagement that emphasizes both theoretical reasoning and empirical analysis. Students should graduate with not just a body of knowledge and skills but also a ‘sociological imagination’ that will enable them to make the critical and creative difference in the workplace and in society.

Key features of our programme include:
- Stimulating courses, providing both breadth of exposure and depth of engagement
- Immersion in all core substantive areas and research methodologies
- Training and practice in analytical thinking and empirical reasoning
- Informed investigations of Singapore society, Asian societies, and beyond
- Critical perspectives on social change at the local, regional, and global levels.

Programme outline: The Curriculum
To graduate, students must complete 2 categories of requirements, totaling 126 Academic Units (AUs): General Education Requirement (GER) (57 AUs) Major Requirements (69 AUs)

(a) General Education Requirement (GER) (57 AUs):
The GER consists of 3 sub-areas:
- Communication Skills (Compulsory)
  - HW0101 Introduction to Critical Writing (3 AUs)
  - HW0201 Research Writing in the Social Sciences (3 AUs)
- Singapore Studies (3 AUs)
- Sustainability (1 AU)
- Ethics & Academic Integrity (1 AU)
- Enterprise & Innovation (1 AU)

(ii) GER – Prescribed Electives (PEs) (15 AUs):
Any 5 courses from 3 categories of studies with at least 1 course in each category:
- Science, Technology and Society
- Business and Management
- Liberal Studies

(iii) GER Unrestricted Electives (UE) (30 AUs):
There is no restriction on the selection of courses to make up the Unrestricted Electives. Students may choose any course offered by any School so long as any pre-requisites are satisfied. Students are also encouraged to take up a Minor in another discipline, which they can fulfill using Unrestricted Electives.
(b) Major Requirements (69 AUs):
The Major Requirements consists of 3 sub-areas:
- Major Core (25 AUs)
- Major Electives (36 AUs)
- Graduation Project (8 AUs)

Requirements for the Sociology Major
Each course (except the 4000 levels) is equivalent to 3 AUs. Every 4000 level course is equivalent to 4 AUs each.

(A) Major Core – compulsory courses (25 AUs):
Core (compulsory) Subjects:
- HS1001 Person and Society
- HS1004 Doing Social Research
- HS2001 Classical Social Theory
- HS2003 Economy and Society OR
- HS2004 Culture, Self and Identity OR
- HS2005 Organisations and Organisational Change
- Choose 2 from the above 3
- HS3001 Contemporary Social Theory
- HS3002 Understanding Social Statistics

Choose ONE from the following:
- HS4001 Research Practicum I : Qualitative Social Research
- HS4002 Research Practicum II : Quantitative Social Research

For more details on our courses, please refer to: http://www.hss.ntu.edu.sg/Programmes/sociology/Current%20Students/Pages/Course-Descriptions.aspx

(B) Major Electives (PE) (36 AUs):
Core Electives
Students are to take 11 Sociology Core Electives comprising:
- 2 PEs at 1000-level
- 4 PEs at 2000-level
- 2 PEs at 3000-level
- 3 PEs at 4000-level

Economy, Technology and Social Change:
- HS2007 Understanding Globalization
- HS2008 Social Class and Inequality
- HS2009 Sociology of Life Course
- HS2013 Migration and Multiculturalism
- HS2019 Science, Technology and Society
- HS2022 Social Demography Population and Society
- HS2023 Environmental Sociology
- HS3004 Cities and Urban Life
- HS3015 Development and Social Change
- HS4007 Sociology of Entrepreneurship
- HS4015 Sociology of Reproduction
- HS4023 Sociology of Risk and Crisis
- HS4024 Humanitarianism in Question

Culture, Identity and Social Relations:
- HS2011 Ethnicity and Ethnic Relations
- HS2012 Sociology of Language
- HS2018 Media and Society
- HS3007 Religion and Society
- HS3017 Sociology of Tourism
- HS3016 Societies in Comparative Perspective
- HS3054 Social Psychology
- HS4014 New Media and Social Relations
- HS4018 Cultural Change: Conceptual, Analytical, and Substantive Approaches
- HS4022 Sociology of Islam in the Malay World
- HS4025 Emotions in Social Context

Politics, Social Institutions and Collective Behaviour:
- HS2014 The Changing Family
- HS2015 Education and Society
- HS2026 Deviance and Society
- HS3011 Power, Politics and the State
- HS3014 Health, Medicine and Society
- HS3018 Sociology of Gender
- HS3019 Sexuality and Society
- HS4008 Social Institutions of Contemporary China
- HS4016 Social Movements
- HS4019 Body, Self and Society
- HS4021 Postcolonial Sexuality

Contemporary Social Transformations:
- HS1002 Singapore Society in Transition
- HS1003 Social Problems in a Global Context
- HS2028 Graying Society: Issues and Challenges
- HS3050 Society and Culture in Southeast Asia
- HS3051 Contemporary Chinese Societies
- HS3052 Comparative Asian Societies
- HS4011 The Self in Southeast Asia
- HS4013 Youth cultures and subcultures
- HS4020 Readings in South Asian Society and Culture

Selected Topics in Sociology:
- HS4080 Selected Topics in Applied Sociology
- HS4090 Special Topics in Current Sociology
- HS4090 X Honours Seminars

(C) Graduation Project HS4099 (8AUs)
The aim of HS4099 Graduation Project is to provide training in independent scholarly work. With the guidance of a supervisor, each student will identify a research problem, formulate research questions, develop a theoretical framework and design a methodological approach. By the completion of the project the student will have gained experience in theoretical reasoning, empirical research (especially the collection, interpretation and analysis of data), and the writing and presentation of research findings.

Students have the flexibility to opt out for graduation project and replace with two 4000-level courses.

Students must read graduation project to obtain a 1st or 2nd class upper honours.

Minors in Sociology
Students taking up sociology as a minor are encouraged to read subjects which complement their interests and open up new intellectual horizons. A minor in sociology requires reading five subjects, including one required subject (HS1001 Person and Society) and four Electives.
Students are required to achieve a “C” grade or better in HS1001 Person and Society to continue in the Sociology Minor. Students are also required to maintain a GPA of “C” for their Sociology subjects to graduate with a Minor in Sociology.

**Description of Courses**
Please visit our website at http://www.hss.ntu.edu.sg/Current Students/Undergraduate/Pages/Undergraduate.aspx for information on the Description of Courses.

**Wee Kim Wee School of Communications and Information**

**What You Can Become (Careers Available to You)**
The media industry offers a host of viable career opportunities. In Singapore, we have an increasingly vibrant media scene. Media production companies are sprouting not only locally but globally. All across the world, there is a growing demand for entertainment and news. All of which are part of the mass media.

Your education at WKWSCI will give you a taste of what a genuine media environment demands. Upon graduation, you will be conferred the Bachelor of Communications Studies (Honours) degree. This qualification will put you in good stead to take on the real world. Our curriculum is designed to equip you with the necessary skills for a full range of careers in media. The job possibilities are many and examples include the following:

**Journalism** - What you can be:
- Reporter, Columnist, Editor, Photojournalist, International Correspondent, Publisher, News Analyst, Broadcast Journalist

Prepares students for careers in the print media industry and its associated online media. Students must take both “front-end” (writing) and “back-end” (editing and design) subjects. As part of their total intellectual development, students must also develop a substantive knowledge base in chosen “beat” areas such as business or the arts, and will be strongly encouraged to take Minors in these areas.

**Broadcast and Cinema Studies** - What you can be:
- Producer, Director, Broadcast Reporter, Interactive Media Coordinator in media, business, industry and government, audio-video producer

Provides students with the conceptual skills and intellectual training for a multi-skilled television or film producer who can keep pace with rapid changes in media industries.

**Advertising** - What you can be:
- Media Planner, Advertising Account Exec or Planner, Art Director, Copywriter, Creative Director, Marketing Communications Manager and Consultant, Brand Manager

Prepares students for careers in advertising, media and marketing, and corporate communications. The curriculum introduces students to the theoretical and practical applications of advertising and marketing. Subjects include integrated marketing communication, creative writing skills, copywriting, graphic communication, campaign planning, media planning and marketing, issues and ethics in advertising, and a faculty-guided campaign portfolio.

**Public Relations** - What you can be:
- Public Relations Executive, Public Affairs Manager, Corporate Communication Director; Consultant, Events Specialist

Prepares students for careers in corporate and public communication, issues and events management, as well as promotional communication and investor relations. Subjects include public relations writing, campaign development, crisis communication, issues and ethics in public relations, as well as a faculty-guided portfolio practicum.

**Communication Policy and Research** - What you can be:
- Media Consultant, Public Opinion and Market Researcher, Media Audience Analyst, Research Manager in public and private sector

Develops competency in the analysis and interpretation of communication and media. Students will be prepared for management and policy-making positions in public, private and non-profit organisations. Students will also receive the grounding to pursue advanced degrees. Subjects engage the multidisciplinary perspectives of the social sciences, liberal arts, and law and policy, and promote systematic inquiry through empirical, interpretive, and critical methods.

**Inter-Disciplinary Concentration**
Allows students to tailor the curriculum of their choice to meet their specific needs. Students can select subjects from all available Concentrations to build up a distinctive broad-based profile for their future. This Concentration is particularly suited for sponsored students where their employers may have specific needs, skills and competencies that they wish the students acquire from the Programme.

**Divisions**

(1) **Division of Journalism and Publishing**
The Division offers modules in print and broadcast journalism, newswriting and reporting, editing, specialized writing, news writing in Chinese, feature writing, and specialized writing in various news areas.

(2) **Division of Broadcast & Cinema Studies**
The Division offers modules in television, digital/video and radio/audio production, editing, scriptwriting, broadcast journalism, film studies, media and culture analyses, and visual communication.

(3) **Division of Communication Research**
The Division offers modules in research methods, qualitative and quantitative analysis, public opinion, audience research, cultural studies, information society, and psychology of communication.

(4) **Division of Public and Promotional Communication**
The Division offers modules in advertising copywriting and creativity, public relations writing, media and marketing, communication campaigns, and integrated marketing communications.
### (5) Division of Information Studies
The Division offers graduate modules in digital data mining, systems analysis and design, knowledge management, information storage, archival informatics, information systems, and electronic commerce.

### Degree Programmes and Requirements

Wee Kim Wee School of Communication and Information Curriculum for 2014/2015.

<table>
<thead>
<tr>
<th>Lower Level Subjects</th>
<th>Pre-req</th>
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<tbody>
<tr>
<td>CS2021 Foundations of Communication Studies</td>
<td>-</td>
</tr>
<tr>
<td>CS2033 Media in Singapore</td>
<td>-</td>
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<tr>
<td>CS2000 Communication Strategies for Sustainability and Social Changes</td>
<td>-</td>
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<tr>
<td>CS2002 Information Literacy and Interpretation</td>
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<tr>
<td>CS2004 Basic Media Writing</td>
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<tr>
<td>CS2005 Speech and Argumentation</td>
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<td>CS2006 Visual Literacy and Communication</td>
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<tr>
<td>CS2007 Communication History and Theories</td>
<td>CS2021</td>
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<tr>
<td>CS2008 Fundamentals of Research</td>
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<tr>
<td>CS2021 News Reporting and Writing</td>
<td>CS2024</td>
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<tr>
<td>CS2022 Basic Media Writing in Chinese</td>
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<tr>
<td>CS2032 Publication Design</td>
<td>CS2004</td>
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<tr>
<td>CS2024 Web Design and Technologies</td>
<td>-</td>
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<tr>
<td>CS2025 Image and Sound Production</td>
<td>CS2006</td>
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<tr>
<td>CS2026 Media Presentation and Performance</td>
<td>-</td>
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<tr>
<td>CS2027 Genre and Narrative Strategies</td>
<td>-</td>
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<tr>
<td>CS2028 Production Management for TV and Cinema</td>
<td>-</td>
</tr>
<tr>
<td>CS2029 Broadcast Journalism: Concepts and Applications</td>
<td>CS2025</td>
</tr>
<tr>
<td>CS2030 Audio in Media</td>
<td>-</td>
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<tr>
<td>CS2031 Creative Strategies</td>
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<td>CS2032 Graphic Communication</td>
<td>CS2006</td>
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<tr>
<td>CS2051 Comparative Press Systems</td>
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<td>CS2052 Cultural Studies</td>
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<td>CS2053 Cinema Studies</td>
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<td>CS2054 Interpersonal Communication</td>
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<td>CS2055 Organisational Communication</td>
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<td>CS2056 Psychology and Communication</td>
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<td>CS2057 Media Effects</td>
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<td>CS2058 Integrated Marketing Communication</td>
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<tr>
<td>CS2044 Photojournalism</td>
<td>CS2021</td>
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<tr>
<td>CS2045 Online journalism</td>
<td>CS2024</td>
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<tr>
<td>PRACTICUM: 3 or 4 AUs</td>
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<tr>
<td>CS2061 Newspaper Practicum (3 AUs)</td>
<td>CS2024</td>
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<tr>
<td>CS2161 Newspaper Practicum (4 AUs)</td>
<td>CS2024</td>
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<tr>
<td>CS2062 Magazine Practicum (3 AUs)</td>
<td>CS2024</td>
</tr>
<tr>
<td>CS2162 Magazine Practicum (4 AUs)</td>
<td>CS2024</td>
</tr>
<tr>
<td>CS2063 Short Overseas Journalism Practicum (3 AUs)</td>
<td>CS2021</td>
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<table>
<thead>
<tr>
<th>Higher Level Subjects</th>
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<tbody>
<tr>
<td>CS4001 Media Management</td>
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<td>CS4002 Media Law, Ethics and Policy</td>
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<tr>
<td>CS4003 Professional Internship</td>
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<tr>
<td>CS4004 Final Year Project</td>
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<td>CS4011 Newspaper Sub-Editing</td>
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<tr>
<td>CS4015 News Reporting and Writing in Chinese</td>
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<tr>
<td>CS4018 Specialised Journalism: Business and Economics</td>
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<td>CS4019 Specialised Journalism: Contemporary Topics</td>
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<td>CS4020 Magazine Publishing</td>
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<td>CS4023 Advanced Photojournalism</td>
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<td>CS4024 Writing for Cinema and TV</td>
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<td>CS4025 Creative Practices and New Technologies</td>
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<td>CS4026 Documentary Film and TV: Concepts &amp; Apps</td>
<td>CS2025</td>
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<tr>
<td>CS4027 Narrative Film and TV: Concepts and Applications</td>
<td>CS2025</td>
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<tr>
<td>CS4028 Public Relations Writing</td>
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<tr>
<td>CS4029 Advertising Creativity and Copywriting</td>
<td>CS2032</td>
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<tr>
<td>CS4030 Crisis Management</td>
<td>CS2058</td>
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<tr>
<td>CS4031 Market Segmentation and Media Planning</td>
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<td>CS4032 Communication Campaigns</td>
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<td>CS4033 Corporate Communications Management</td>
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<td>CS4034 Brand Management</td>
<td>CS2058</td>
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<tr>
<td>CS4035 Strategic Marketing Communication Management</td>
<td>CS2008 OR CS2058</td>
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<tr>
<td>CS4036 Statistics and Data Analysis</td>
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<tr>
<td>CS4037 Audience Research Methods</td>
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<tr>
<td>CS4053 Popular Cinema</td>
<td>-</td>
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<tr>
<td>CS4054 Asian Cinema</td>
<td>-</td>
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<tr>
<td>CS4055 TV Studies: Critical Approaches</td>
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<td>CS4058 Intercultural Communication</td>
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<td>CS4059 Public Opinion</td>
<td>-</td>
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<tr>
<td>CS4060 Persuasion and Social Influence</td>
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<tr>
<td>CS4042 Advanced Research Methods</td>
<td>CS2008</td>
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<tr>
<td>CS4061 Global Media Issues and Policy</td>
<td>-</td>
</tr>
<tr>
<td>CS4062 Information Society and Policy</td>
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</table>
Higher Level Subjects | Pre-req
---|---
CS4063 Economics of Media and Communication | -
CS4064 International Public Relations | COM428
CS4065 Conflict Management and Negotiation | -
CS4066 Issues in Public Relations | -
CS4067 Issues in Broadcast Media | -
CS4068 Issues in Cinema Studies | -
CS4069 Issues in Journalism | -
CS4070 Issues in Advertising | -
CS4071 Special Topic I | -
CS4072 Special Topic II | -
CS4073 Special Topic III | -
CS4074 Special Topic | -
CS4075 Special Topic V | -
PRACTICUM: 2 or 4 AUs
CS4081 Newspaper Practicum (2 AUs) | CS2004
CS4081A Newspaper Practicum (4 AUs) | CS2004
CS4082 Magazine Practicum (2 AUs) | CS2004
CS4082A Magazine Practicum (4 AUs) | CS2004
CS4083 Television Practicum (2 Aus) | CS2004
CS4083A Television Practicum (4 Aus) | CS2004
CS4084 Radio Practicum (2 Aus) | CS2004
CS4084A Radio Practicum (4 Aus) | CS2004
CS4085 Film Festival Practicum (2 Aus) | CS2066
CS4085A Film Festival Practicum (4 Aus) | CS2166
CS4086 Communication Research Practicum (2 AUs) | CS2008
CS4086A Communication Research Practicum (4 AUs) | CS2008
CS4087 Newsletter Practicum (2 AUs) | -
CS4087A Newsletter Practicum (4 AUs) | -
CS4088 Advertising Portfolio Practicum (2 AUs) | CS4029
CS4088A Advertising Portfolio Practicum (4 AUs) | CS4029
CS4089 Public Relations Portfolio Practicum (2 AUs) | CS4028
CS4089A Public Relations Portfolio Practicum (4 AUs) | CS4028
CS4090 Going Overseas for Advanced Reporting (4 AUs) | CS2021

College of Science
School of Biological Sciences

We provide a 3 to 4 year honours programme that equips graduates with in-depth knowledge and job-relevant and transferrable skill-sets for rewarding careers in the Biomedical industries, Health Care services, and Biomedical Research.

The programme is designed and delivered by an international team of experienced academics and leading researchers in these fields. Coupled with conducive teaching and state-of-the-art research facilities in the School, students will have an exciting and engaging learning experience that promotes innovation, critical and creative thinking. The programme also incorporates elective courses starting from the second year. This allows students to specialize in areas of biological sciences that match their interests and strengths.

Programmes offered:
- Bachelor of Science (Honours) in Biological Sciences
- Bachelor of Science (Honours) in Biological Sciences with Business Minor
- Bachelor of Science (Honours) in Biological Sciences with second major in Psychology
- Bachelor of Science (Honours) in Biological Sciences with second major in Chemical Biology
- Bachelor of Science (Honours) in Biological Sciences with second major in Food Science and Technology
- Bachelor of Science (Honours) in Biological Sciences and Bachelor of Medicine (Chinese Medicine) – a double degree programme jointly offered by the School of Biological Sciences and Beijing University of Chinese Medicine, China

For more information, visit http://www.sbs.ntu.edu.sg/.

School of Physical and Mathematical Sciences

Honours graduates learn more and earn more! The School is the only institution that offers three- to four-year direct honours programmes in Chemistry & Biological Chemistry, Physics & Applied Physics, Mathematical Sciences, Environmental Earth Systems Science, and combined Economics with Mathematics in Singapore. You will be equipped and well prepared for exciting careers and leadership in all echelons of industry and society, by our highly qualified, international faculty members.

At the School of Physical and Mathematical Sciences, you will receive a thorough understanding of the principles and applications of your chosen subject, as well as a rigorous training in the experimental techniques in our new state-of-the-art laboratories. You will develop strong skills in qualitative and quantitative reasoning, and problem solving. We will stimulate your curiosity, maximise your learning opportunities, and prepare you to be a life-long learner. There will be opportunities for you to pursue elective courses in subjects outside of you major, to suit your personal interests and your career goals.

Programmes offered:
- Bachelor of Science (Honours) in Chemistry & Biological Chemistry
- Bachelor of Science (Honours) in Chemistry & Biological Chemistry with second major in Food Science and Technology
- Bachelor of Science (Honours) in Mathematical Sciences
- Bachelor of Science (Honours) in Mathematics & Economics
- Bachelor of Science (Honours) in Mathematical Sciences with Minor in Finance
- Bachelor of Science (Honours) in Physics
- Bachelor of Science (Honours) in Applied Physics
- Bachelor of Science (Honours) in Physics with second major in Mathematical Sciences
- Bachelor of Science (Honours) in Environmental Earth Systems Science

For more information, visit http://www.spms.ntu.edu.sg/.
School of Biological Sciences
Undergraduate Study

Bachelor of Science in Biological Sciences (Honours)

This undergraduate programme provides students with fundamental knowledge in Chemical Biology, Structural and Computational Biology, Molecular and Cell Biology, Genetics and Genomics. A variety of electives are available in the third and fourth years for in-depth study and specialisation. Contact hours are distributed among weekly lectures, tutorials and laboratory sessions.

Bachelor of Science in Biological Sciences (Honours) with Business Minor

In addition to the major degree, the Biological Sciences (Honours) Programme can be taken with a Minor in Business Studies in partnership with Nanyang Business School (NBS). The Business Minor Programme is taught by NBS professors to prepare students with essential financial, management and business skills and tools. This is especially important in a rapidly changing economy where our biological sciences graduates will have the flexibility to become entrepreneurs or cross-over from the biomedical sector to work in the financial and banking sector. In the future, these graduates can enrol in postgraduate business degrees, for example, Master’s degree in Business Administration (MBA). Students can choose any 5 courses from the list of Minor in Business courses and fulfil it as Unrestricted Electives (UE) to earn the minor.

Both programmes are four-year direct B.Sc (Hons) and require 132 AUs for graduation distributed over four compulsory components in the curriculum:

B.Sc (Hons) in Biological Sciences

<table>
<thead>
<tr>
<th>Course Type</th>
<th>Academic Unit (AU) Requirement</th>
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<tbody>
<tr>
<td>Core</td>
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<td>Major Prescribed Elective (Major PE)</td>
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<th>Academic Unit (AU) Requirement</th>
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<tr>
<td></td>
<td>Core</td>
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<td></td>
<td>Major Prescribed Elective (Major PE)</td>
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<th>BS</th>
<th>General Education Requirement (GER)</th>
<th>Prescribed Elective (PE)</th>
<th>Unrestricted Elective (UE)</th>
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<tbody>
<tr>
<td></td>
<td>BS</td>
<td>Core</td>
<td>Art, Humanities &amp; Social Sciences (AHSS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Majors Prescribed Elective (Major PE)</td>
<td>Business &amp; Management (BM)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Liberal Studies (LS)</td>
<td>Science, Technology &amp; Society (STS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Any Category (AHSS, LS, BM or STS)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unrestricted Elective (UE)</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>132</td>
</tr>
</tbody>
</table>

Bachelor of Science (Honours) in Biological Sciences with second major in Psychology

This is a prestigious programme started in 2013 which combines the Biological Sciences (Honours) major degree with a second major in Psychology, in partnership with the School of Humanities and Social Sciences. The interdisciplinary nature of the programme will benefit students who are interested in Biology (in particular Neurobiology) and at the same time have a strong curiosity about human emotions, behaviors and thoughts. This programme is developed in recognition of the growing emphasis on mental well-being and health in our society, with an expected demand for Life Sciences professionals having also an academic background in Psychology. The programme spans 4 years and requires 149 AUs for graduation, out of which 35 AUs comprise of compulsory and elective components in Psychology.

<table>
<thead>
<tr>
<th>BS</th>
<th>General Education Requirement (GER)</th>
<th>Prescribed Elective (PE)</th>
<th>Unrestricted Elective (UE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BS</td>
<td>Core</td>
<td>Art, Humanities &amp; Social Sciences (AHSS)</td>
</tr>
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<td>Liberal Studies (LS)</td>
<td>Science, Technology &amp; Society (STS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Any Category (AHSS, LS, BM or STS)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unrestricted Elective (UE)</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>149</td>
</tr>
</tbody>
</table>

Bachelor of Science (Honours) in Biological Sciences with second major in Chemical Biology

This is a new programme, combining the Biological Sciences (Honours) with Chemical Biology as a second major, in partnership with the Division of Chemistry and Biological Chemistry, School of Physical and Mathematical Sciences. Enrolled students will be cross-trained in Biological Sciences and Chemistry so as to have the relevant foundation to embark on research and development in the area of Chemical Biology.
Bachelor of Science (Honours) in Biological Sciences with second major in Food Science and Technology

In partnership with the Wageningen University (The Netherlands), NTU School of Chemical and Biomedical Engineering and School of Physical and Mathematical Sciences, the interdisciplinary nature of this new unique programme will benefit students who are interested in Biology and further wish to gain understanding about food processes with an engineering and industrial point of view.

Double Degree: Bachelor of Science in Biomedical Sciences (Honours) and Bachelor of Medicine (Chinese Medicine)

This five-year double degree programme is conducted in collaboration with the Beijing University of Chinese Medicine (BUCM), People’s Republic of China, and uses an innovative approach to fuse Western biomedical sciences with traditional Chinese medicine (TCM).

The biomedical components are built on the disciplines of Chemical, Molecular and Cell Biology, leading to thorough understanding of complex systems in courses such as Immunology and Physiology. The theoretical and clinical aspects of TCM are taught by BUCM professors. The first three years of this programme are at NTU which covers Western biomedical topics and laboratory classes, as well as a TCM foundation course and clinical internships at local Chinese medicine clinics. The fourth and fifth years are spent in Beijing for advanced TCM clinical training and study of TCM principles. The B.Sc. in Biomedical Sciences (Honours) will be awarded by NTU while the Bachelor of Medicine (Chinese Medicine) will be awarded by BUCM.

The total number of AUs required in the NTU component of the double degree programme to qualify for graduation is 150 AUs.

Core courses
These are compulsory courses offered throughout the programme of study. Core courses are designed to provide students with an essential foundation in life sciences.
Company Internship Programme (only applicable for Biological Sciences students), Final Year Project

In their final year of study, students are required to undertake either a one-semester of a company internship programme or a final year project.

The company internship is a non-research programme enabling students to experience the administrative and management chores and duties in multi-national companies, for example, Abbott Manufacturing Pte Ltd, Biosensors Pte Ltd, Pfizer Pharmaceuticals Pte Ltd, Exxon-Mobil Pte Ltd, Hyflux Pte Ltd and many more.

The final year project is a research programme where students undertake laboratory projects offered by and supervised by faculty from the school as well as from national research institutions, such as IMCB, GIS and IMB, and health-care laboratories such as at NEA, AVA and HSA.

General Education Requirement (GER)

GER covers a wide spectrum of broadening courses. Students are required to complete 42 AUs of GER to fulfill the requirement to graduate. There are three categories of GER courses:

- GER Core courses. Read during the specific period assigned by the school as indicated in the curriculum.
- GER Unrestricted electives. Courses can be specified by the students within the four years of the programme.
- GER PE. Courses can be specified by the students within the four years of the programme. The GER PE courses are sub-categorized into four fields:
  - Art, Humanities & Social Sciences (AHSS)
  - Business & Management (BM)
  - Liberal Studies (LS)
  - Science, Technology & Society (STS)

Description of Courses

Please visit the following webpages for Description of courses. http://www.sbs.ntu.edu.sg/prospective/undergraduate/Pages/Home.aspx

School of Physical and Mathematical Sciences

Undergraduate study

SPMS offers an interdisciplinary education, allowing for flexibility and innovation without compromising on in-depth knowledge and training for our students’ specialisations. In addition, to stay relevant and to meet the career needs of the students, SPMS offers opportunities, both globally and locally, for industrial and R&D attachments in industries, universities or research institutes that will count towards graduation requirements.

The four-year direct B.Sc. (Hons) programme of Chemistry & Biological Chemistry, Mathematical Sciences, Physics & Applied Physics and Environmental Earth Systems Science will require 132 AUs for graduation distributed over four levels:

- 84 AUs to 90 AUs, effectively two and a half years, in a major (depth components) - Chemistry, Mathematics, Physics or Earth Sciences – including Honours project work;
- 15 AUs to 21 AUs of electives which can be used to fulfill a minor or a concentration requirement;
- 27 AUs of broadening (breadth components) including writing and communication courses.

The major in Chemistry & Biological Chemistry with second major in Food Science and Technology will require 147 AUs for graduation.

- 117 AUs for depth Chemistry & Biological Chemistry including Food Science and Technology components
- 24 AUs of broadening (breadth components) including writing and communication courses

The major in Mathematics and Economics, integrating two disciplines, has a heavier proportion in the depth requirements:

- 105 AUs, effectively three years, in the major (depth components) including Honours project work;
- 6 AUs of electives which can be used to fulfill a minor requirements;
- 21 AUs of broadening or distribution including writing and communication courses.

The major in Physics with second major in Mathematical Sciences will require 176 AUs for graduation distributed over four levels:

- 149 AUs in both Physics and Mathematical Sciences majors (depth components) including Honours project work in Physics;
- 27 AUs of broadening (breadth components) including writing and communication courses

The three-to four-year programme leads to a B.Sc. (Hons) in the following programmes:

1. Division of Chemistry and Biological Chemistry
   - B.Sc. (Hons) in Chemistry and Biological Chemistry
   - B.Sc. (Hons) in Chemistry & Biological Chemistry with second major in Food Science and Technology
   - B.Sc. (Hons) in Chemistry and Biological Chemistry with concentration in Green Chemistry or Medicinal Chemistry or Food Chemistry

The major in Chemistry and Biological Chemistry is modelled on the rigorous American Chemical Society accredited Chemistry programs at major US universities for professional training in the field.
2. Division of Mathematical Sciences
- B.Sc. (Hons) in Mathematical Sciences
- B.Sc. (Hons) in Mathematical Sciences with concentration in Mathematics of Information and Communication or Computational Mathematics

The major in Mathematical Sciences will cover a good mix of fundamental, as well as applied, computational, and industrial aspects of mathematics and statistics.
- B.Sc. (Hons) in Mathematical Sciences with Minor in Finance

The use of mathematical methods has now become pervasive in all areas of finance and economics, creating new opportunities and giving a new edge to the mathematics student. The minor in finance has been designed to respond to this trend, and is offered by the Nanyang Business School exclusively to selected Mathematical Sciences students who will be taking courses in banking and finance in addition to their mathematics curriculum.
- B.Sc. (Hons) in Mathematics and Economics (jointly offered by the School of Physical and Mathematical Sciences and the School of Humanities and Social Sciences).

This major integrates mathematics and economics, and leverages on the synergy between these two disciplines. Students learn to apply advanced mathematical techniques to economic problems and how issues in economics motivate advances in mathematics.

3. Division of Physics and Applied Physics
- B.Sc. (Hons) in Physics
- B.Sc. (Hons) in Applied Physics
- B.Sc. (Hons) in Physics with concentration in Nanotechnology
- B.Sc. (Hons) in Applied Physics with concentration in Nanotechnology or Optical Technology or Semiconductor Technology or Biophysics
- B.Sc. (Hons) in Physics with second major in Mathematical Sciences

The majors in Physics and Applied Physics prepare graduates for a variety of challenging careers through strong theoretical and experimental training. These careers include R&D and engineering positions in industry, management, banking and finance, and professional and scientific positions. Students enjoy the rigorous yet flexible curriculum, and the friendly and stimulating exchanges with professors add to a conductive and thriving environment. Graduates can look forward to fruitful and rewarding prospects in their work, while those who intend to pursue postgraduate degrees will find that the curriculum provides thorough preparation for GRE papers. The Applied Physics concentrations highlight how science advances technologies, and illustrate the applications of physical principles in interdisciplinary fields ranging from materials and engineering, to the life sciences. Students in the Physics programme who possess excellent entrance qualification may also apply for second major in Mathematical Sciences.

4. Division of Earth Sciences
- B.Sc. (Hons) in Environmental Earth Systems Science with specialisation in Society and the Earth System
- B.Sc. (Hons) in Environmental Earth Systems Science with specialisation in Geosciences

The Division of Earth Sciences offers a modern undergraduate major that is designed to prepare students for a variety of career paths. Regardless of specialisation, students in the programme will gain a strong background in supporting mathematics and science subjects, modern computing techniques, and the fundamentals of Earth systems science. In addition, our programme emphasises leadership, group work, and innovative problem-solving skills that are required to be successful in today's workforce regardless of field.

*Refer to www.spms.ntu.edu.sg for the curriculum and courses description.

National Institute of Education

Undergraduate study
The Institute offers a variety of programmes leading to a range of qualifications from diplomas to bachelor's degrees to postgraduate degrees. The bachelor's degree programmes aim to provide rigorous university education and to produce graduates with the skills to teach in schools. The programmes lead to the award of the following degrees:
- Bachelor of Arts (Education) [BA (Ed)] (Full-Time)
- Bachelor of Science (Education) [BSc (Ed)] (Full-Time)

Candidates may be awarded honours degrees based on excellent overall performance in these programmes.

Structure programmes
The BA (Education) / BSc (Education) programmes comprise the following areas of study.

(a) Education Studies
Student teachers will learn the key concepts and principles of education that are necessary for effective teaching and reflective practice in schools. They will also have the opportunity for in-depth study of some significant aspects of education.

(b) Curriculum Studies
BA (Ed)/BSc (Ed) student teachers will specialise in the methodology for teaching at either the primary or secondary school level. These are designed to give student teachers the pedagogical skills in teaching specific subjects in Singapore schools. The choice of Curriculum Studies subjects depends on the track and strand to which the student teacher belongs.

(c) Subject Knowledge
This group of courses helps to reinforce subject content mastery for primary school teaching. Student teachers in the primary track must offer Subject Knowledge subjects aligned with their choice of Curriculum Studies subjects.

For PESS specialization in the primary track, student teachers will offer 5K subjects aligned with the CS2 and CS3 subjects and will read 3 SK courses per subject.
Those in the Secondary track will not be reading SK courses as it is assumed that they would have obtained this knowledge from the 2 AS subjects offered.

(d) Essential Course
There will only be 1 essential course that introduces student teachers to the implications of living in a diverse society entitled ‘Multicultural Studies: Appreciating and Valuing Differences’.

(e) Practicum
Student teachers will be attached to schools for 2, 5, 5, 10 week blocks so that they can develop teaching competencies in a variety of contexts and at different levels.

- School Experience (SE): This is 2 weeks long, with 1 week in a primary school and 1 in a secondary school. The purpose for this is to provide student teachers opportunities to observe lessons in the primary and secondary classrooms.

- Teaching Assistantship (TA): This comprises 5 weeks and its purpose is to provide student teachers opportunities to observe their Cooperating Teachers (CTs) teach and to reflect on the roles and responsibilities of a teacher. They will also be given the practical experience of helping their CTs plan lessons, prepare resources, manage pupils and to do some assisted teaching.

- Teaching Practice 1 (TP1): This is 5 weeks long and its purpose is to help student teachers to begin to teach independently. They will learn to plan their own lessons to teach, prepare relevant resources and to manage pupils independently while still being able to consult their CTs and to observe their CTs teach.

- Teaching Practice 2 (TP2): This is the final component and it lasts for 10 weeks. Besides focusing on independent teaching, TP2 allows for a more holistic school attachment experience which could include exploring other aspects of a teacher’s life, such as, the management of CCAs.

For all teaching attachments, student teachers will be closely supervised by university lecturers and will also learn from experienced teachers in the schools about the schooling process. They will use the knowledge and skills obtained from the Education Studies and Curriculum Studies courses to integrate theory with practice.

(f) Language Enhancement and Academic Discourse Skills
The courses in this component equip student teachers with the basic language and voice skills that they require for teaching, as well as for successfully engaging in academic writing of assignments and theses. BA (Ed)/BSc (Ed) student teachers will have to offer 2 compulsory courses; Communication Skills for Teachers (CST) and Academic Discourse Skills (ADS).

(g) Academic Subjects
This area of study covers knowledge of the content and fundamental concepts and principles of either one or two subjects depending on the programme enrolled for.

In the case of a BA (Ed) (Primary) student, the choice of the first Academic Subject must be an Arts subject while in the case of a BSc (Ed) (Primary) student teacher, the Academic Subject must be a Science Subject.

All BA (Ed) (Secondary) student teachers must read an arts subject as Academic Subject 1 but can choose an Arts or Science subject as Academic Subject 2. Similarly, all BSc (Ed) (Secondary) student teachers must choose a Science subject as Academic Subject 1 but can choose an Arts or Science subject as Academic Subject 2. However, due to the nature of workload for some subjects, the subject combinations allowed will have to be necessarily limited and may vary for different intakes.

(h) General Electives
Only BA (Ed)/BSc (Ed) student teachers in the Secondary track have the option of taking 3AUs of General Electives.

Description of Courses
Please visit our website at http://www.nie.edu.sg/study-nie/admissions/teacher-education-undergraduate-studies/undergraduate-programmes

NTU-NIE Teaching Scholars Programme
The NTU-NIE Teaching Scholars Programme (TSP) is one of NTU’s Premier Scholars’ Programmes (PSP). It is a prestigious award for outstanding scholars with a passion and calling to be professional leaders in education. TSP aims to produce graduates with intellectual rigour, strong leadership, and global perspective to make significant contributions to education.

TSP is a 4-year programme that includes an exciting multi-disciplinary curriculum that supplements the core curriculum in the Bachelor of Arts (Education) / Bachelor of Science (Education) programme. It offers a wide range of electives, seminars, leadership programmes, and learning opportunities that promise to broaden students’ perspectives and give them a global edge.

For details on the TSP Programme including the application process, please refer to the NIE Website (http://www.nie.edu.sg).

Nanyang Technopreneurship Center

Undergraduate study
Minor in Entrepreneurship programme
The Minor in Entrepreneurship is open to undergraduate students from across all disciplines of study. All students are required to undergo an interview before they are selected for this programme. Each class size is kept at the maximum of 50 students per class.

This minor is purposefully and uniquely designed to equip and empower students with basic entrepreneurship skills, business acumen, and the stamina to grow businesses. Students will develop an open mindset and realise that ideas that may appear like impossible dreams can be shaped into small and realisable phases. The course offers new perspectives, possibilities, and has been described as a ‘transformational learning experience’ by many past students.
Students will learn to appreciate that entrepreneurship is not just about starting a new business; it is a mindset. It is about taking advantage of opportunities that change brings along. Working with classmates from different schools, disciplines and stages of study, students learn to work in teams and are able to benefit from the exchange of ideas and opinions. Students will have the opportunity to present their business plans to real life entrepreneurs, business angels and venture capitalists. They are also encouraged to present their analyses on case studies and team-based projects through creative means, such as role play, skit and drama.

We take pride in our interactive teaching seminars, which are conducted by business leaders, entrepreneurs, intellectual property lawyers and dedicated academics with venture experience. As part of the course, students are exposed to social settings where one can meet and mingle with working professionals, government officers and successful entrepreneurs.

The first phase of the minor takes the form of a high impact team building specially designed for NTC by Outward Bound Singapore. Five intensive modules (ET9101 - ET9105) follow, all of which can be completed in a calendar year.

**Minor in Entrepreneurship**
The curriculum structure is depicted as follows:
- ET9131 Entrepreneurship and Marketing for New Ventures
- ET9132 Entrepreneurial Accounting and Finance
- ET9133 Managing Growing Enterprises
- ET9134 Enterprise Strategy
- ET9135 Business Venture Implementation

**ET9121 Introduction of Entrepreneurship**
This course is an exploration into the fundamentals of entrepreneurship. Upon successful completion of the course, students would have a good understanding of entrepreneurship; the issues encountered on the entrepreneurial journey; and most importantly, how they can become an entrepreneur themselves.

**ET9122 E-Startups and Social Media Strategies**
With social media emerging as an important marketing strategy, new businesses increasingly rely on social media marketing tools to engage the stakeholders. This course exposes the students to various social media tools and takes an in-depth look at the different aspects of social media marketing for start-ups. By appreciating the social media trends, students will explore the advantages of establishing a presence on emerging social platforms and communities, as well as the potential to utilise social media marketing for greater returns on investment.

**Entrepreneurship module for School of Biological Sciences BS3006 Bioentrepreneurship**
Singapore has a huge capital and energy outlay to develop life sciences as one of the main sources of the country’s economy. There is tremendous growth potential which makes Singapore and exciting place for business and bio-enterprise. While entrepreneurship and new ventures lead to improved products and services, create jobs and add value for owners, the start up process is most challenging.

The Minor in Entrepreneurship website link: http://www.ntc.ntu.edu.sg/Programmes/UndergraduateProgrammes/Pages/Minor-in-Entrepreneurship.aspx

**Description of Courses**
Please visit our website at http://www.ntc.ntu.edu.sg/Programmes/UndergraduateProgrammes/Pages/Home.aspx for the information on the Description of Courses.

**Graduate Studies**
**Overview**
As a comprehensive university with a proven R&D track record and a robust research infrastructure, NTU is well-positioned to provide Singapore and the region with quality manpower training through graduate education. We offer graduate students the opportunity to develop themselves as leaders and scholars as they work alongside and learn from distinguished academics and researchers.

The University offers a comprehensive range of graduate programmes leading to the awards of the degrees of Master's and Doctor of Philosophy as well as Graduate Diplomas. Graduate degree programmes are either by research or coursework and dissertation.

For details of programmes and courses, please visit the respective school’s website.

**College of Business**
- **Nanyang Business School**
  http://www.nbs.ntu.edu.sg/Graduate/Pages/Home.aspx

**College of Engineering**
- **School of Chemical and Biomedical Engineering**
  http://www.scbe.ntu.edu.sg/Prospective_Students/Pages/Prospective_Students.aspx
- **School of Civil and Environmental Engineering**
  http://www.cee.ntu.edu.sg/ProspectiveStudents/GraduatePages/GraduateStudies.aspx
- **School of Computer Engineering**
  http://www.sce.ntu.edu.sg/CurrentStudents/GraduatePages/GraduateProgrammes.aspx
- **School of Electrical and Electronic Engineering**
  http://www.eee.ntu.edu.sg/CurrentStudents/GraduatePages/Graduate.aspx
- **School of Materials Science and Engineering**
  http://www.mse.ntu.edu.sg/CurrentStudents/GraduatePages/default.aspx
- **School of Mechanical and Aerospace Engineering**
  - Graduate Programmes (by Coursework)
    http://www.mae.ntu.edu.sg/CurrentStudentsGraduateProgrammeCoursework/Pages/Home.aspx
CN Yang Scholars Programme

Curiosity + Dexterity = Infinite Possibilities

The CN Yang Scholars Programme is one of the premier undergraduate programmes at Nanyang Technological University for science and engineering students. The programme is named in honour of Professor CN Yang, Nobel Laureate in Physics (1957) and one of the greatest scientists of our era.

The programme is designed to prepare exceptional students who have a deep passion for science and engineering, for the high-technology world of the 21st century. It provides a strong and broad foundation in science and mathematics so as to empower the student to delve deeper into any discipline in science, technology, engineering and mathematics, and to develop an interest in leading edge research.

CN Yang Scholars are given an opportunity for cutting edge research within NTU and overseas lab attachment. Students graduating from the challenging undergraduate programme will be awarded a special certificate on top of the degree certificate.

Benefits:

- Guaranteed overseas exchange for one semester with one-time award of S$5,000.
- Guaranteed four years of stay in NTU halls of residence.
- Opportunities for research attachment with monetary allowance from year one.
- Opportunities for attending an international conference with full subsidy.
- Opportunities to meet top leading scientists and academics.
- Participation in programmes offered by the NTU Institute of Advanced Studies.
- A mentor will be assigned to each student to provide academic guidance during his/her course of study.

The CN Yang Scholarship will be awarded to successful local applicants.

Eligibility of international students to apply for one of the following scholarships:

- ASEAN Undergraduate Scholarship (for Citizens or Singapore Permanent Residents of ASEAN countries, except Singapore)
- NTU Science and Engineering Undergraduate Scholarship (for Citizens or Singapore Permanent Residents from the Asian countries, except Singapore)

Recipients of other scholarships are eligible to apply for the CN Yang Scholars Programme.

All successful applicants are required to fulfill the terms and conditions of the scholarships.

For more information, please visit www.ntu.edu.sg/cnyang-scholars

Interdisciplinary Graduate School

http://igs.ntu.edu.sg/Divisions/Pages/Home.aspx

College of Humanities, Arts and Social Sciences

- School of Art, Design and Media
  http://www.adm.ntu.edu.sg/ProspectiveADM/GraduateProgrammes/Pages/GraduateProgrammes.aspx

- School of Humanities and Social Sciences
  http://www.hss.ntu.edu.sg/ProspectiveStudents/Graduate/Pages/Graduate.aspx

- Wee Kim Wee School of Communications and Information
  - Current Students
    http://www.wkwsci.ntu.edu.sg/CurrentStudents/Graduate/Pages/Graduate.aspx
  - Prospective Students
    http://www.wkwsci.ntu.edu.sg/ProspectiveStudents/Graduate/Pages/Graduate.aspx

College of Science

- School of Biological Sciences
  http://www.sbs.ntu.edu.sg/Graduate/Pages/Introduction.aspx

- School of Physical and Mathematical Sciences
  - Chemistry & Biological Chemistry
    http://www.spms.ntu.edu.sg/cbc/Graduates/ProgramOverview.html
  - Mathematical Sciences
    http://www.spms.ntu.edu.sg/mas/Graduates/ProgramOverview.html
  - Physics and Applied Physics
    http://www.spms.ntu.edu.sg/pap/Graduates/CourseInformation.html

National Institute of Education

www.nie.edu.sg/gpl/hd

Nanyang Technopreneurship Center

Master of Science Technopreneurship & Innovation Programme (M.Sc.TIP)(English & Chinese)
http://www.ntc.ntu.edu.sg/Programmes/GraduateProgrammes/

S. Rajaratnam School of International Studies

http://www.rsis.edu.sg/grad/

Earth Observatory of Singapore

http://www.earthobservatory.sg/programmes/degreeprogrammes.html

Singapore Centre on Environmental Life Sciences Engineering

- PhD Scholarship
  http://www.scelse.sg/index.php/programs/phdscholarships
- NTU-HU Joint PhD Program
  http://www.scelse.sg/index.php/programs/ntu-hujointphd-program

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The latest that has sounded in the first decade of this new century is global integration with its realities and challenges. We are engaging a world that is connected multi-dimensionally - a global system of systems. The world's business and public sector leaders of today and tomorrow need to be equipped to cope with a rapid escalation of systems-level diversity and complexity that confront them, an unprecedented level of such complexity expected indeed to accelerate in the coming years within the global environment.

This is Renaissance Engineering. This is holistic engineering in the wake of self-awareness of organised diversity. We are making a new wave of engineers with the potential to develop into outstanding Chief Executive Officers (CEOs) or Chief Technology Officers (CTOs) in a complex world.

The Renaissance Engineering Programme (REP) is an integrated co-terminal engineering programme which will admit 50 elite engineering students to NTU in this flagship programme. The REP awards a dual-degree comprising Bachelor of Engineering Science degree (with specialization in a chosen engineering discipline) and Master of Science in Technology Management in 4.5 years.

The REP is an integrated, rigorous and fully residential programme with a curriculum that covers a broad spectrum of multi-disciplinary subjects bridging Engineering, Business and the Liberal Arts which includes Sciences, Mathematics, Engineering Technology Management, and interdisciplinary studies. At the end of REP, students would have mastered all in order that REP graduates will possess the necessary knowledge, skills and attributes within the broader context of engineering science.

The REP adopts a new pedagogy which exposes students to different learning paradigms including supervised, unsupervised and reinforced learning during the course of study. To inculcate a holistic view of real-life issues, an integrated broad-based approach will be embedded in the curriculum drawing connections across disciplines.

The REP undergraduate will spend one year at a partner university such as the University of California Berkeley, USA or Imperial College of London, UK, with an Industrial Orientation in Year 3 in the US or the Europe respectively. This one-year overseas experience will enhance students' learning experience and equip them with a global outlook in preparation for work life.

The REP will be a major inter-college collaboration on an education programme of national prominence. We are onto making creative, dextrous and outstanding Engineering Leaders of Tomorrow.

For more information, please visit http://www.ntu.edu.sg/REP/Pages/default.aspx

### Streaming

The following disciplines are available to students of the programmes indicated:

<table>
<thead>
<tr>
<th>Programme</th>
<th>Discipline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Engineering</td>
<td>Civil Engineering, Electrical and Electronic Engineering, Environmental Engineering, Materials Engineering, Mechanical Engineering</td>
</tr>
<tr>
<td>Physics and Applied Physics</td>
<td>Applied Physics, Physics</td>
</tr>
<tr>
<td>Art, Design and Media</td>
<td>Digital Animation, Digital Filmmaking, Photography and Digital Imaging, Interactive Media, Product Design, Visual Communication</td>
</tr>
<tr>
<td>Renaissance Engineering Programme</td>
<td>Aerospace Engineering, Biomedical Engineering, Chemical Engineering, Civil and Environmental Engineering, Electrical and Electronic Engineering, Computer Engineering, Materials Engineering, Mechanical Engineering</td>
</tr>
</tbody>
</table>

### Specialisation

Students of the following programmes will specialise in one of the specialisations indicated:

<table>
<thead>
<tr>
<th>Programme</th>
<th>Specialisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business (For Single Degree Business and Double Degree Accountancy and Business students only)</td>
<td>Actuarial Science, Banking &amp; Finance, Human Resource Consulting, Information Technology, Marketing, Tourism &amp; Hospitality Management</td>
</tr>
<tr>
<td>Mathematical Sciences</td>
<td>Applied Mathematics, Business Analytics, Pure Mathematics, Statistics</td>
</tr>
</tbody>
</table>

Eligible Mechanical Engineering students may be invited to pursue a specialisation in one of the following areas from Year 2:
- Design
- Mechatronics

The award of a first specialisation will be reflected in a graduate's transcript but not his degree certificate.

### Second Specialisation

- For Single Degree Accountancy and Single Degree Business students only

Eligible Single Degree Accountancy and Business students may be invited to pursue a second specialisation in one of the following areas at the end of Year 1:
  - Banking and Finance
  - Business Law
The award of a second specialisation will be reflected in a graduate's transcript but not his degree certificate. No additional certificate will be issued.

Second Major
http://www.ntu.edu.sg/Students/Undergraduate/AcademicServices/AcademicProgrammes/Pages/SecondMajor.aspx
The following second majors are offered to eligible students of the programmes listed either upon admission or at the end of their Year 1.

<table>
<thead>
<tr>
<th>Second Major</th>
<th>Offered to students in the following College/programmes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art History</td>
<td>All students in the College of Humanities, Arts and Social Sciences except those in Art, Design and Media programme</td>
</tr>
<tr>
<td>Biological Sciences*</td>
<td>Psychology</td>
</tr>
</tbody>
</table>
| Business                      | • Economics  
• Maritime Studies  
• All students in the Engineering programmes*                                                                                 |
| Chemical Biology*             | Biological Sciences                                                                                                      |
| Chinese                       | All students in the College of Humanities, Arts and Social Sciences                                                        |
| Communication Studies         | All students in the College of Humanities, Arts and Social Sciences                                                        |
| Economics                     | • All students in the College of Humanities, Arts and Social Sciences  
• Accountancy (Single Degree)*  
• Business (Single Degree)*                                                                                                    |
| English                       | All students in the College of Humanities, Arts and Social Sciences                                                        |
| Food Science and Technology*  | • Biological Sciences  
• Chemistry and Biological Chemistry  
• Chemical and Biomolecular Engineering                                                                                         |
| History                       | All students in the College of Humanities, Arts and Social Sciences                                                        |
| Linguistics and Multilingual Studies | All students in the College of Humanities, Arts and Social Sciences                                                        |
| Mathematical Sciences         | Physics (Pure Physics)  
- not applicable to students in Physics (Applied Physics)                                                                            |
| Philosophy                    | All students in the College of Humanities, Arts and Social Sciences                                                        |
| Psychology                    | • All students in the College of Humanities, Arts and Social Sciences  
• Biological Sciences*                                                                                                            |
| Public Policy and Global Affairs | All students in the College of Humanities, Arts and Social Sciences                                                        |
| Sociology                     | All students in the College of Humanities, Arts and Social Sciences                                                        |

* for students admitted to Year 1 from AY2011-12  
# for students admitted to Year 1 from AY2013-14  
+ for students admitted to Year 1 from AY2014-15

The award of a second major will be reflected in a graduate's transcript but not his degree certificate.

A separate certificate for the award of a second major will be issued by the College offering the second major for those graduating in 2013 and onwards.

Minor Programmes
Minor programmes equip students with multiple skills and broader knowledge, beyond what their major disciplines may provide.

Unless otherwise stated, students read minor courses as Unrestricted Electives and the academic unit earned will count towards the students' academic unit requirements for Unrestricted Electives. Please refer to the details of the minor programme for the minor requirement.

To be awarded a minor, students must not opt for these courses to be graded Satisfactory (S)/Un-Satisfactory (U). The award of minor will be reflected in a graduate's transcript but not his degree certificate. No additional certificate will be issued.

More than 30 minors are available. Students will not be offered a minor in the same field as his major (single degree, double degree, integrated or double major programme). Students intending to pursue a minor are to indicate their intention and when they have fulfilled the minor requirements, they are to file for the award of the minor.

The full details of each minor, the School that offers it and the programme it is offered to are at: http://www.ntu.edu.sg/Students/Undergraduate/AcademicServices/AcademicProgrammes/Pages/Minor_Programme.aspx

The brief descriptions are as follows:

1. **Art History**

   The Minor in Art History offers a basic introduction to methodologies of art history to students across NTU. Through a study of artworks and monuments from diverse cultural and historical spheres, students acquire a foundational knowledge of artistic cultures and an understanding of their distinctiveness. Students will develop a preliminary facility for looking at artworks and interpreting them in ways that are methodical, purposeful and informed.

2. **Applied Physics**

   The programme emphasises the teaching of basic physical concepts and principles, focusing on topics such as optics, lasers, semiconductors and materials. It also provides training in the development of quantitative reasoning and problem-solving skills.

   This minor is not available to students in the Physics programme.
3. Business
The Business minor equips students with the relevant knowledge and skills to be an effective business manager or owner. It is structured to expose students to the analytical, computational and business skills required to understand how business decisions are made in the business world and in the industry.

This minor is not available to students in the Accountancy and Business programmes.

4. Chemistry and Biological Chemistry
The programme prepares non-Chemistry and Biological Chemistry major students for a variety of career opportunities related to Chemistry and Biological Chemistry.

The programme emphasises the crucial connections of Chemistry and Biological Chemistry with other sciences.

5. Chinese
The minor in Chinese equips students with the knowledge and language skill to deal with communication and work in relevant areas. It exposes students to additional career choices, such as teaching, journalism etc.

6. Chinese Creative Writing
The Division of Chinese in the School of Humanities and Social Sciences will be offering a Minor in Chinese Creative Writing to all NTU Students starting from Semester 1, AY2014/15. The aim is to nurture students with an interest in writing in Chinese, providing them with opportunities to study various literary forms and writing techniques, and create an atmosphere conducive to Chinese literary creation. The courses offered will cover areas in Chinese Fiction, Chinese Poetry, Chinese Prose, Chinese Playwriting and Chinese Cross-media Writing.

7. Communication Studies
This minor instills in students an understanding of the workings and socio-cultural implications of a knowledge-driven society in the rapidly evolving world of info-comm and media technology.

8. Computing
This minor is designed for students who do not wish to become computer engineers but recognise the value of basic computing knowledge and skills in complementing their selected programme.

The minor is not available to students in the Computer Engineering, Computer Science, Information Engineering & Media and Business (with specialisation in Information Technology) programmes.

9. Creative Writing
The Minor in Creative Writing at NTU was designed to provide a training ground for creative thinking and practice, and to contribute to the further development of local literature. The Minor is open to all students interested in exploring their creative talents.

As a discipline, creative writing encourages conceptual speculation and active engagement both with the world as it is and as it might become. Each piece of writing is essentially a “take” on the world, allowing students to explore, test and reinvent sociological, economic, historical, linguistic, and psychological verities.

Accordingly, creative writing contributes to the intellectual and aesthetic development of students. Students who write poems and stories of their own are generally more aware of and sensitive to the finer points of how language operates. Creative writing students become skilled in the expression of emotions, reactions, opinions and intuitive judgments, as well as in the arts of project completion and creative collaboration.

In our courses, students will learn the techniques and practices necessary for the development of original poetry, fiction, drama, screenplays and multimedia works. They will be encouraged to nurture their inventive and critical abilities towards the production of unique and soundly crafted new writing. The courses will comprise workshops that are devoted to literary form and technique, and to the exploration of contemporary trends. They will provide a forum for students to share their work and have it critiqued by other authors in a supportive environment.

10. Drama and Performance
This minor offers practical skills (presentational, co-operative and technical) which can be transferred to diverse careers. It offers an alternative paradigm of academic study which can stand in dialogic relationship with core areas of study and give students a broader vision.

The minor is available only to students in the Art, Design & Media, Chinese, Communication Studies, Economics, English, History, Linguistics and Multilingual Studies, Psychology, Public Policy and Global Affairs and Sociology programmes.

11. Economics
The minor in Economics will help students think logically, rationally and rigorously. It gives students the opportunity to learn more about banking, finance, globalisation, employment, economic growth, and broader issues such as the environment, poverty and the Third World.

12. Education Studies
This minor provides students with exposure to key developments in education and training as future professionals in the knowledge-based economy.

13. Energy
The Energy minor provides an understanding of the various aspects of energy and its effects and challenges on society, as well as alternative and potential energy sources for sustainable development. It aims to increase the energy awareness amongst students just as Singapore gears up to explore other energy alternatives. The minor programme offers nine courses in various energy topics.
14. English Language
The provision of an English Language minor to students from the School of Communication and Information is aimed at providing an in-depth understanding of the nature, structure and use of the English Language, so that they can better appreciate how language is applied in the field of communication and information studies. With this aim in mind, a selection of foundational courses that introduce students to the nature and structure of the English Language as well as elective courses which delve into specific areas of applied linguistics are offered to students.

This minor is available only to students in the Communication Studies programme.

15. English Literature
The Minor in English Literature introduces students to a wide range of courses and provides them with a firm foundation in the methods and practices of literary-critical analysis and study. Students are exposed to a variety of literatures, periods and genres, and are acquainted not only with the literary texts, but also with their authors, the literary movements, and the contemporary cultural and historical cross-currents which influenced both author and text. Apart from foundational and progressively advanced study of the major literary genres or forms such as fiction, poetry and drama, special topics courses will also be offered such as Southeast Asian literatures in English, children’s literature and science fiction as electives. The minor is an excellent concentration for students planning careers in fields as diverse as academic research, education, publishing, journalism, advertising, library science, public relations, business, and the civil service.

16. Entrepreneurship
This minor is purposefully and uniquely designed to equip and empower students with basic entrepreneurship skills, business acumen, and stamina to grow businesses. Students will develop an open mindset and realise that ideas that may appear like impossible dreams can be shaped into small and realisable phases. Students will learn to appreciate that entrepreneurship is not just about starting a new business; it is a mindset. It is about taking advantage of opportunities that change brings along. Working with classmates from different schools, disciplines and stages of study, students are able to benefit from the exchange of ideas and opinions.

17. Environmental Management
The Minor in Environmental Sustainability is designed to offer students from all major programmes at NTU a background in the important environmental issues that will shape our future. The minor in Environmental Sustainability will allow citizens, business leaders, scientists, government officials, and creative thinkers to find creative, interdisciplinary, and sustainable solutions to balance the needs of humans with our impact on the natural environment. The courses will focus on a number of topics related to environmental sustainability, including the relationship between humans and the natural world, the availability and management of natural resources, the basics of how the main parts of the earth system interact, the elements that influence earth’s climate system, and how individuals, communities, and governments can engage with these issues to create more sustainable societies.

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19. Environmental and Urban Studies
This Minor enables students to understand the challenges posed by contemporary environmental and urban issues, taking into account multidisciplinary and interdisciplinary approaches. By drawing upon courses offered by divisions in the School of Humanities and Social Sciences and the School of Civil and Environmental Engineering, students will engage with the social, economic, cultural, and technological aspects of new changes in the global environment and in urban settings. The issues covered include energy, food supply, pollution, cultural diversity, social equity, economic development, and the quality of life. Taken together, the course offerings focus on understanding the multiple causes, consequences, and costs of environmental and urban problems -- with a view towards developing useful perspectives and possible solutions.

20. Film Studies
The Minor in Film Studies at NTU is an interdisciplinary program drawing on courses from the College of Humanities, Arts, and Social Sciences (HASS), comprising School of Art, Design and Media (ADM), School of Humanities and Social Sciences (HSS), and Wee Kim Wee School of Communication and Information (WKWSCI). Thus, Film Studies at NTU draws on the expertise and talents of faculty from across the College curriculum, offers a varied conceptual and academic focus, and a wide range of courses, ensuring students are able to work towards a coherent academic programme while simultaneously pursuing their primary degree subject. Film is an important discipline within the College, and of growing importance within Singapore and the South East Asian Region.

21. Finance
The Minor in Finance programme allows Mathematical Sciences students from the School of Physical and Mathematical Sciences (SPMS) to augment their major with knowledge in financial markets, issues and trends. It complements the Mathematics Sciences programme and will provide the students with added set of skills and knowledge to enhance their career opportunities and job search options upon graduation.
The Minor is open only to Mathematical Sciences students from the School of Physical and Mathematical Sciences.

22. Global Asia
The Minor in History provides students with the tools necessary to understand human experience and thought in different places and times. History as a discipline covers every dimension of human interaction, from the study of social life and cultural practices to political thought and philosophical views. Students of history learn to make sense of the present in terms of the past, and the past from the vantage point of the present. In history, students study individuals, groups, communities, and nations from a multiplicity of perspectives and across various time periods. Documents comprise the primary data historians examine, and studying history allows students to hone their analytical skills and develop convincing arguments. Equipped with these skills, students of history will be prepared for a number of careers from the civil service to jobs in education, public relations, advertising, publishing, and news and other interactive media.

23. History
Studying History helps students understand human experience and thought at different times and places. As a discipline, history encompasses every dimension of human interaction, including social life, economy, culture, thought and politics. By examining continuities and changes through time, students can make sense of the present in terms of the past, and the past in terms of the present.

24. Information & New Media
The Minor in Information and New Media is offered to both Communication Studies and Non-Communication Studies students. The intent of such a programme is to enrich the undergraduate experience by exploring new media from an information perspective and to align the teaching capabilities of the Division of Information Studies with the university’s strategic interest in new media. The continuing evolution of the economy to be higher value-added and services-led provides an opportunity for competencies in information management and new media to complement a host of functions—healthcare, R & D, financial services, education, marketing, digital media, etc.

25. Information-Communication Technology
The minor provides non-infocomm students with the essential knowledge in e-business technology and the competency skills for the infocomm sector. The minor is not available to students in the Electrical & Electronic Engineering, Computer Engineering, Computer Science, Business (with specialisation in Information Technology) and Information Engineering & Media programmes.

26. Life Sciences
The Minor in Life Sciences is offered to all NTU students except students who are registered in the School of Biological Sciences degree programmes. The purpose of this minor programme is to prepare non-Biology major students for a variety of career opportunities in, and related to, the Life Sciences industry.

The minor programme is extremely useful for students majoring in Chemistry & Biological Chemistry, Physics & Applied Physics, Mathematical Sciences, Materials Engineering, Bioengineering, Chemical & Biomolecular Engineering, Sports Science and Management, and Business who are interested in complementing their major study with knowledge of today’s Life Sciences.

27. Linguistics and Multilingual Studies
The minor in Mathematics serves as a valuable and useful complement to students who seek to develop a deeper appreciation of other courses through a better understanding of the associated quantitative tools.

28. Mathematics
The minor in Mathematics serves as a valuable and useful complement to students who seek to develop a deeper appreciation of other courses through a better understanding of the associated quantitative tools.

29. Music
The minor in Music provides foundational skills in music creation, performance, response and research. It provides exposure to major ideas and developments of and about music in both the local and international scene, enhances collaborative work across a range of topics, and offers opportunities for synergy between practical and academic work in music.

30. Philosophy
This minor emphasises the teaching of basic physical concepts and principles, focusing on topics such as quantum physics, electromagnetic theory, thermodynamics and classical mechanics. It provides strong training in the development of quantitative reasoning and problem-solving skills.

The minor is not available to students in the Applied Physics programme.

31. Physics
This minor emphasises the teaching of basic physical concepts and principles, focusing on topics such as quantum physics, electromagnetic theory, thermodynamics and classical mechanics. It provides strong training in the development of quantitative reasoning and problem-solving skills.

The minor is not available to students in the Applied Physics programme.

32. Psychology
The Minor programme provides students with a broad understanding of the major principles in Psychology, as well as knowledge and skills related to research methods commonly used in Psychology. The Minor in Psychology can be combined with a major in a related field and will provide valuable skills for engaging with others and for understanding and analyzing complex individual, group, and social processes.
33. Public Policy and Global Affairs
Public Policy and Global Affairs is an interdisciplinary study of policy issues with global and regional dimensions. This minor enables students to understand the challenges faced by domestic and international governance. It equips students with wide-range practical skills to tackle these policy problems in Singapore and beyond.

34. Risk Management and Insurance
The Minor in Risk Management and Insurance (RMI) prepares students to apply modern risk management knowledge and skill in various financial and insurance areas. This is essential under today’s rapidly changing and more integrated business world, where organisations, financial institutions, and governments encounter different kinds of risks such as market, operational, technological and catastrophic risks. Students who equip themselves with knowledge in RMI will find their career opportunities enhanced via an understanding of the science of risk management, attainment of practical risk management skills and knowing how to adapt those skills to practical circumstances.

35. Sociology
Sociology is dedicated to understanding the social nature of human beings and the social transformation of human life in the modern world. It is also a practical discipline, involving critical judgement and creative reasoning concerning personal choices, organisational decisions, and public policies without resorting to a convenient acceptance of conventional wisdom.

36. Sport Science
Singapore has played host to a number of major sporting events including the Formula 1 Grand Prix and the inaugural Youth Olympic Games in recent years. The prominence of these events along with the success of Singapore’s athletes at the XIX Commonwealth Games in Delhi and the XVI Asian Games in Guangzhou is a demonstration of the investment and commitment of the country to sport which will culminate with the opening of the new Singapore Sports Hub in 2014.

With this expanding interest in sport comes a need to provide sport science support services to athletes, teams, coaches and managers to improve success rates. Along with the investment in elite sport is the national need to maintain fitness of a conscript army, prevent obesity in our children and improve the health and activity of an aging population subject to chronic diseases associated with physical inactivity.

The minor in Sport Science will offer students an insight into the role sports science can play in achieving these aims.

37. Systems Management
Systems Management encompasses the journey of bringing a product, be it big or small, to realisation. Learning outcomes include understanding aspects essential to leaders in industry from the micro aspects of product realisation to the macro aspects of systems engineering and management.

This minor is not available to students in the Aerospace Engineering and Mechanical Engineering programmes.

38. Translation
This minor bridges linguistic and cultural gaps and seeks to accurately convey and retain meaning across languages. Students who equip themselves with translation skills can play important roles in cultural understanding and socio-economic development.

Special Programmes
Singapore Universities Students Exchange Programme
The Singapore Universities Students Exchange Programme (SUSEP) offers NTU students the opportunity to study a few courses or even one semester in NUS and SMU, made possible through a tripartite agreement with NUS and SMU.

Through this programme, students at the 3 institutions are able to study and experience student’s life at a host institution while pursuing their degrees in their university.

In NTU, SUSEP is administered by the Office of Academic Services, and supported by the Schools.

Global Education and Mobility (GEM) Programmes
In this global age, the ability to traverse different sociocultural terrains with ease is an asset for any graduate. NTU is focused on expanding opportunities for its students to become global citizens. We work hand-in-hand with some of the best international partner universities and international organisations to offer student mobility opportunities to learn, work and do research.

These help our students develop global perspectives besides broadening their learning experience.

Currently, one in two students has at least one overseas learning opportunity during their undergraduate studies at NTU and the university is planning to raise this to 70% of each cohort.

At NTU, we offer various outbound mobility opportunities that include the GEM Discoverer, GEM Explorer and the Overseas Attachment Programme. One of the strengths of these global programmes is the flexibility it allows – from deciding on the length of the term of study, to the type of programme chosen. There is also the Singapore Universities Students Exchange Programme (SUSEP) that allows NTU students to study a semester in other universities in Singapore.

GEM Discoverer
GEM Discoverer offers various overseas programmes (ranging from 2 to 20 weeks) that aim to enhance your cross-cultural intelligence and global exposure. You can choose to take part in one of the popular summer studies arrangements or participate in any one of the specially designed thematic programmes during your vacation. For a more insightful overview, embark on a discovery and learning journey into a host country through a semester-long work and study arrangement. You can choose from four exciting opportunities: Work & Study, Prelude, Summer Studies or Language Immersion.

Work & Study
Spend a semester on an internship-cum-study arrangement in China, India or Vietnam.
Prelude
Immerse in the essence of the culture, economy and society in a key Asian city or an emerging economy, such as Vietnam, Indonesia, Turkey through a 2-week uniquely designed programme conducted by one of our partner universities.

Summer Studies
Embark on an exciting summer programme organised by any of our global partner universities during your school vacation and immerse in the academic culture and heritage of the host university.

To learn more about these programmes, please visit http://www.ntu.edu.sg/GEM-Discoverer.

Language Immersion
A short-term programme that allows student to learn a new language overseas.

GEM Explorer
GEM Explorer gives undergraduate students full-semester opportunities for study or research at our partner institutions from all over the world. You can earn academic units (depending on your degree programme) while broadening your global network and perspective.

Study
Take courses in one of over 150 prestigious partner universities spanning across more than 25 countries thus allowing you to broaden your horizons. Not forgetting, a world of adventure that awaits.

Research
Attach yourself to renowned scientists and researchers to undertake challenging research opportunities in universities in Europe or Japan for one semester.

For more details, please refer to http://www.ntu.edu.sg/GEM-Explorer.

Attachment Programmes
In line with NTU’s mission to educate leaders and advance knowledge for Singapore and beyond, NTU provides students with diverse opportunities to enhance their employability by gaining real-life working experience in local or overseas organisations through various attachment programmes as part of their undergraduate studies in Year 2, Year 3 or Year 4.

The various attachment programmes are:

<table>
<thead>
<tr>
<th>Programmes</th>
<th>Duration</th>
<th>Brief Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Orientation (IO)</td>
<td>10 weeks</td>
<td>For third year students from the engineering Schools, i.e. School of Chemical and Biomedical Engineering</td>
</tr>
<tr>
<td>Industrial Attachment (IA)</td>
<td>20 weeks</td>
<td>School of Civil and Environmental Engineering</td>
</tr>
<tr>
<td>Enhanced Industrial Attachment (EIA)</td>
<td>30 weeks</td>
<td>School of Computer Engineering</td>
</tr>
<tr>
<td>International Research Attachment (IRA)</td>
<td>30 weeks</td>
<td>School of Electrical and Electronics Engineering</td>
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<td>School of Materials Science and Engineering</td>
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<td></td>
<td></td>
<td>School of Mechanical and Aerospace Engineering</td>
</tr>
<tr>
<td>Industrial Immersion (II)</td>
<td>10 weeks</td>
<td>For third year Maritime Studies students from the School of Civil and Environmental Engineering</td>
</tr>
<tr>
<td>NBS Professional Attachment (PA)</td>
<td>10 weeks</td>
<td>For third year Double Degree in Business and Computer Science / Computer Engineering students from Nanyang Business School and School of Computer Engineering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For second year Accountancy Business students and Double Degree in Accountancy and Business students from Nanyang Business School</td>
</tr>
<tr>
<td>Professional Internship (PI)</td>
<td>22 weeks</td>
<td>For third year students from the Wee Kim Wee School of Communication and Information</td>
</tr>
<tr>
<td>SSM Internship</td>
<td>22 weeks</td>
<td>For fourth year students from Sport Science &amp; Management programme</td>
</tr>
<tr>
<td>ADM Internship</td>
<td>10 weeks</td>
<td>For third year students from the School of Art, Design &amp; Media</td>
</tr>
<tr>
<td>HSS Professional Attachment Programme</td>
<td>10 weeks</td>
<td>For third year students from the school of Humanities ans Social Sciences</td>
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<tr>
<td>(HAP)</td>
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<tr>
<td>Industrial Internship Programme (IIP)</td>
<td>10 weeks</td>
<td>For third year and fourth year students from the School of Physical &amp; Mathematical Sciences</td>
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<td></td>
<td>(for Physics Students)</td>
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<td></td>
<td>12 weeks</td>
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<td></td>
<td>(for Maths Students)</td>
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</tr>
<tr>
<td></td>
<td>22 weeks</td>
<td></td>
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<tr>
<td></td>
<td>(for Chemistry &amp; Physics Students)</td>
<td></td>
</tr>
<tr>
<td>Industrial Internship Programme (IIP)</td>
<td>22 weeks</td>
<td>For fourth year students from the School of Biological Sciences</td>
</tr>
</tbody>
</table>

Time Schedule:
- 10/12-week attachment - May to July/August (Special Terms)
- 20/22-week attachment - January to May/June (Semester 2) or July/August to December (Semester 1)
- 30-week attachment - January to August (Semester 2)
The attachment programmes which are a hallmark of NTU’s undergraduate education are a unique learning process for the students. They are built on the partnership between the University and the industry in the professional training of students for the knowledge-based economy.

The students can choose from a pool of industry partners in Singapore, Australia, China, France, Germany, Ghana, Hong Kong, India, Indonesia, Japan, Malaysia, Nepal, Pakistan, Sri Lanka, Switzerland, Taiwan, Thailand, UK, USA. To promote a broader and more engaging education and prepare our graduates for new challenges and lifelong learning, the students will get to set their own learning objectives based on the attachment programmes provided by the organisations.

In addition, all incoming undergraduates starting AY2014/2015 will embark on a structured curriculum of essential career skills and values to give them a competitive edge in the job market and equip them to succeed in any workplace under the new Margaret Lien Centre for Professional Success.

The Centre aims to inculcate values-based work ethics, professional department and the “finishing touch” that presents each NTU graduate with the X factor to shine in the job market.

The Undergraduate Research Experience on CAmpus (URECA)
The Undergraduate Research Experience on CAmpus (URECA) programme is now in its eleventh year. URECA is an elite research programme for undergraduate students who have obtained excellent academic standing. The programme enables these students to immerse themselves in a research environment in their second, third or fourth year of undergraduate studies, while earning benefits such as stipend or academic credits. These students will be given the coveted title of NTU President Research Scholar (NTU PRS) and will receive a certificate of participation upon completion of the programme.

URECA creates a platform for aspiring researchers by guiding them through a chosen research project over a period of 11 months (August to June) under the guidance of professors.

URECA students enjoy the flexibility of working on any research project in any discipline at NTU laboratories, external research institutes or national laboratories. In the last academic year, URECA students were given choices of over 1000 research projects proposed by College of Engineering, College of Science, College of Business, College of Humanities, Arts and Social Sciences, Lee Kong Chian School of Medicine and Sport Science & Management.

By undertaking these research projects, the students will:
- Develop a deeper understanding of what they are studying;
- Challenge their knowledge beyond textbook and classroom, and learn to look at an issue from more than one perspective;
- Enhance their prospects of job opportunities with our partner organizations.

URECA students spend approximately 10 hours a week for 11 months on their research and some have opted to commit themselves full-time during breaks and vacations. This substantial research immersion gives them a deeper understanding of their research problem and facilitates more significant research findings.

As a testimony to its effectiveness, URECA has since evolved to encompass collaboration with external research organisations; ATREC-URECA was launched in collaboration with Advanced Technology Research Centre, SIMTech-URECA was launched in collaboration with Singapore Institute of Manufacturing Technology (SIMTech-A*STAR), IME-URECA was launched in collaboration with Institute of Microelectronics (IME-A*STAR), NMC-URECA was launched in collaboration with National Metrology Centre (NMC-A*STAR). NTU professors and senior research staff at these organisations collaborate to provide ideas and supervision for these URECA research projects.

URECA students may also pursue research-based final year projects under the FYP-URECA scheme.

A growing number of URECA students have published research papers in archived journals and international conferences. Some of the research activities undertaken were impressively outstanding that they clinched prizes when presented at prestige international conferences. The students’ participation in these conferences were funded by URECA. Several other excellent research activities were also featured in the local media and international journals.

With an exposure in research, URECA students are able to utilise this advantage to pursue postgraduate studies or embark on a career in research.

Admissions
Admission Criteria

Singapore-Cambridge GCE ‘A’ Level
Applicants, regardless of nationality, presenting the Singapore-Cambridge GCE ‘A’ Level.

Admission Requirements
You are offering the Singapore-Cambridge GCE ‘A’ Level in the English medium and must fulfill all of the following:
- Obtained at least two passes in subjects at H2 Level and attempted General Paper (GP) or Knowledge & Inquiry (KI) in the same sitting;
- Met one of the following Mother Tongue Language (MTL) requirements:
  - A minimum of ‘S’ grade in H1 MTL or General Studies in Chinese or H2 Mother Tongue Language & Literature (MTLL) taken at ‘A’ Level
  - Pass in MTL B syllabus taken at ‘A’ Level
  - A minimum of ‘D7’ in Higher MTL taken at ‘O’ Level
A Mother Tongue subject (Chinese/Malay/Tamil) taken at a separate sitting of the GCE ‘A’ Level examination is acceptable for purpose of admission. H1 non-Tamil Indian Language (Bengali, Gujarati, Hindi, Punjabi and Urdu) or H1 Foreign Language (French, German, Japanese) may be taken in lieu of MTL.

Candidates who do not satisfy the MTL requirement may still submit an application for admission. If selected, he/she will be admitted on a provisional basis. During their course of study, they will be required to meet the minimum MTL requirement before they are allowed to graduate.

In addition to fulfilling the above admission criteria, applicants are required to fulfil the minimum subject requirements of the degree programmes listed below.

<table>
<thead>
<tr>
<th>RENAISSANCE ENGINEERING PROGRAMME</th>
<th>MINIMUM SUBJECT REQUIREMENTS</th>
<th>SELECTION TEST/INTERVIEW</th>
</tr>
</thead>
</table>
| Renaissance Engineering Programme | H2 Level pass in Mathematics, and  
H2 Level pass in Physics/Chemistry/Biology/Computing, and  
H1 Level/O’ Level pass in Physics/equivalent* | Yes |

<table>
<thead>
<tr>
<th>COLLEGE OF ENGINEERING</th>
<th>MINIMUM SUBJECT REQUIREMENTS</th>
<th>SELECTION TEST/INTERVIEW</th>
</tr>
</thead>
</table>
| Aerospace Engineering^* | H2 Level pass in Mathematics, and  
H2 Level pass in Physics/Chemistry/Biology/Computing, and  
H1 Level/O’ Level pass in Physics/equivalent* | |
| Bioengineering^*       |                               | |
| Civil Engineering^*     |                               | |
| Computer Engineering^*  |                               | |
| Computer Science^*      |                               | |
| Electrical & Electronic Engineering^* | | |
| Engineering^@           |                               | |
| Environmental Engineering^* |                             | |
| Information Engineering & Media^* |                     | |
| Mechanical Engineering^* |                               | |

The above single degree programmes are also offered with a Second Major in Business

|                                  |                               | |
| Business & Computing (Double Degree) |                               | |
| Business & Computer Engineering (Double Degree) | | |
| Integrated Programme (BEng [CS] & MSc [CS])# | | |
| Integrated Programme (BEng [CE] & MSc [CS])# | | |
| Integrated Programme (BEng [EEE] & MSc [ECE])# | | |
| Materials Engineering^*         | H2 Level pass in Mathematics, and  
H2 Level pass in Physics/Chemistry/Biology, and  
H1 Level/O’ Level pass in Physics/equivalent* | |
| Materials Engineering with a Second Major in Business NEW | | |
| Chemical & Biomolecular Engineering^* | H2 Level pass in Mathematics and Chemistry, and  
H1 Level/O’ Level pass in Physics/equivalent* | |
| Chemical & Biomolecular Engineering with a Second Major in Business NEW | | |
| Chemical & Biomolecular Engineering with a Second Major in Food Science and Technology NEW | | |
| Maritime Studies**               | H1 Level pass in Mathematics, or  
‘O’ Level/equivalent pass in Additional Mathematics, and  
H1 Level/O’ Level pass in a Science subject | |
### COLLEGE OF HUMANITIES, ARTS, AND SOCIAL SCIENCES

<table>
<thead>
<tr>
<th>Subject</th>
<th>Minimum Subject Requirements</th>
<th>Selection Test/Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Art, Design &amp; Media</strong></td>
<td>‘O’ Level/equivalent pass in Mathematics, and a good grade in General Paper/Knowledge &amp; Inquiry. In addition, applicants are required to produce and submit the following materials for admission assessment: 1. A portfolio 2. A personal statement 3. A creative film/photo sequence/sound piece 4. Three drawings. For specific submission instructions and details, please refer to <a href="http://www.adm.ntu.edu.sg/Programmes/ProspectiveStudents/undergraduatedegrees/Pages/ADM-Admission-Requirements.aspx">http://www.adm.ntu.edu.sg/Programmes/ProspectiveStudents/undergraduatedegrees/Pages/ADM-Admission-Requirements.aspx</a></td>
<td></td>
</tr>
<tr>
<td><strong>Communication Studies</strong></td>
<td>A good grade in General Paper/Knowledge &amp; Inquiry, at least a ‘B’, in order to be considered.</td>
<td>On a selective basis</td>
</tr>
<tr>
<td><strong>Chinese</strong></td>
<td>H2 Level pass in Chinese, or Good H1 Level pass in Chinese/China Studies in Chinese, or Good ‘O’ Level pass in Higher Chinese, or Distinction in ‘O’ Level Chinese.</td>
<td>On a selective basis</td>
</tr>
<tr>
<td><strong>Economics</strong></td>
<td>A good grade in H1 Level Mathematics, and a good grade in General Paper/Knowledge &amp; Inquiry.</td>
<td>On a selective basis</td>
</tr>
<tr>
<td><strong>Psychology</strong></td>
<td>A good grade in H1 Level Mathematics, and a good grade in General Paper/Knowledge &amp; Inquiry.</td>
<td>On a selective basis</td>
</tr>
<tr>
<td><strong>Psychology with a Second Major in Biological Sciences</strong></td>
<td>A good grade in H1 Level Mathematics, and a good grade in General Paper/Knowledge &amp; Inquiry, and H1 Level pass in Physics/Chemistry/Biology.</td>
<td>On a selective basis</td>
</tr>
<tr>
<td><strong>English Literature</strong></td>
<td>A good grade in General Paper/Knowledge &amp; Inquiry/H1 Level English Literature/H2 Level History.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>History</strong></td>
<td>A good grade in General Paper/Knowledge &amp; Inquiry/H1 Level History/English Literature/Geography.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Public Policy &amp; Global Affairs</strong></td>
<td>A good grade in General Paper/Knowledge &amp; Inquiry/H1 Level History/English Literature/Geography.</td>
<td>On a selective basis</td>
</tr>
<tr>
<td><strong>Linguistics &amp; Multilingual Studies</strong></td>
<td>A good grade in General Paper/Knowledge &amp; Inquiry/H1 Level English Literature/History/Geography/Mother Tongue Language.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Sociology</strong></td>
<td>A good grade in General Paper/Knowledge &amp; Inquiry.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Philosophy</strong></td>
<td>A good grade in General Paper/Knowledge &amp; Inquiry/H1 Level English Literature/H2 Level History.</td>
<td>On a selective basis</td>
</tr>
</tbody>
</table>

### COLLEGE OF SCIENCE

<table>
<thead>
<tr>
<th>Subject</th>
<th>Minimum Subject Requirements</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Biological Sciences</strong></td>
<td>H1 Level pass in Mathematics, and H2 Level pass in Physics/Chemistry/Biology.</td>
<td>On a selective basis</td>
</tr>
<tr>
<td><strong>Biological Sciences with a Second Major in Food Science and Technology</strong></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Biological Sciences with a Second Major in Psychology</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Biological Sciences with a Second Major in Chemical Biology</strong></td>
<td>H1 Level pass in Mathematics, and H2 Level pass in Chemistry.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Biomedical Sciences &amp; Chinese Medicine</strong></td>
<td>H1 Level pass in Mathematics, and H2 Level pass in Physics/Chemistry/Biology, and ‘O’ Level pass in Chinese.</td>
<td>On a selective basis</td>
</tr>
</tbody>
</table>
### COLLEGE OF SCIENCE

<table>
<thead>
<tr>
<th>Subject</th>
<th>Minimum Subject Requirements</th>
<th>Selection Test/Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry &amp; Biological Chemistry</td>
<td>H2 Level pass in Chemistry, and H2 Level pass in Mathematics/Physics</td>
<td></td>
</tr>
<tr>
<td>Chemistry &amp; Biological Chemistry with a Second Major in Food Science and Technology NEW</td>
<td>H2 Level pass in Mathematics, and H2 Level pass in Physics/Chemistry/Biology/Economics/Computing</td>
<td></td>
</tr>
<tr>
<td>Environmental Earth Systems Science NEW</td>
<td>H2 Level pass in Mathematics, and H2 Level pass in Physics/Chemistry/Biology/Economics/Computing</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>Mathematical Sciences^^</td>
<td>H2 Level pass in Mathematics</td>
<td></td>
</tr>
<tr>
<td>Mathematics &amp; Economics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physics/Applied Physics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physics with a Second Major in Mathematical Sciences</td>
<td>H2 Level pass in Physics and Mathematics</td>
<td></td>
</tr>
</tbody>
</table>

### LEE KONG CHIAN SCHOOL OF MEDICINE

<table>
<thead>
<tr>
<th>Subject</th>
<th>Minimum Subject Requirements</th>
<th>Selection Test/Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicine</td>
<td>H2 Level pass in Chemistry, and H2 Level pass in Biology/Physics</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>In addition, applicants are required to submit the following materials for admission assessment:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Academic results</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Personal statement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Co-curricular accomplishments (if the applicant would like to be considered under Non-Academic Achievements/Exceptional Individual Scheme)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Official testimonial issued by school</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Two online reference reports</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Any other supporting documents</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>BioMedical Admissions Test (BMAT)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Applicants will have to register for the Biomedical Admissions Test (BMAT) and take the BMAT as part of the criteria for entry to the Lee Kong Chian School of Medicine (LKCmedicine) programme. Applicants take the BMAT around November each year, prior to their application to the LKCmedicine. Only results of the BMAT taken in the 12-month period prior to admission to LKCmedicine will be considered in the selection process. For more details on the BMAT, please refer to <a href="http://www.bmat.org.uk">www.bmat.org.uk</a>.</td>
<td></td>
</tr>
<tr>
<td>For further details, please visit <a href="http://www.lkcmedicine.ntu.edu.sg/Admissions/Pages/index.aspx">www.lkcmedicine.ntu.edu.sg/Admissions/Pages/index.aspx</a>.</td>
<td></td>
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</tr>
</tbody>
</table>

### NANYANG BUSINESS SCHOOL

<table>
<thead>
<tr>
<th>Subject</th>
<th>Minimum Subject Requirements</th>
<th>Selection Test/Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accountancy</td>
<td>H1 Level pass in Mathematics, or ‘O’ Level/equivalent pass in Additional Mathematics</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>Business</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accountancy &amp; Business (Double Degree)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Diploma Awarded by a Polytechnic in Singapore

Applicants, regardless of nationality, should hold a relevant diploma or are a graduating student from one of the following institutions:

- One of the five polytechnics in Singapore
- Nanyang Academy of Fine Arts (NAFA)
- LASALLE College of the Arts
- Building & Construction Academy (BCA)
- Singapore Sports School – Auckland University of Technology (Diploma in Sports Management & Exercise Science only)

Admission Requirements

For more information on the relevant degree programmes that you are eligible for, based on your diploma, please visit https://wis.ntu.edu.sg/webexe/owa/adm_appl.relevant_diploma?student_type=F.

For details on the subject requirements for the respective programmes, you may refer to the footnote on the same website.

Applicants who are applying for programmes offered by the Lee Kong Chian School of Medicine and the Nanyang Business School will need to fulfil the following additional requirements:
## LEE KONG CHIAN SCHOOL OF MEDICINE

<table>
<thead>
<tr>
<th>SUBJECT REQUIREMENTS</th>
<th>SELECTION TEST/INTERVIEW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medicine</strong></td>
<td></td>
</tr>
<tr>
<td>A good GPA in a Health Science-related diploma</td>
<td></td>
</tr>
<tr>
<td>In addition, applicants are required to submit the following materials for admission assessment:</td>
<td></td>
</tr>
<tr>
<td>1. Academic results</td>
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<tr>
<td>2. Personal statement</td>
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<td>3. Co-curricular accomplishments (if the applicant would like to be considered under Non-Academic Achievements/Exceptional Individual Scheme)</td>
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<td>5. Two online reference reports</td>
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<td>6. Any other supporting documents</td>
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<tr>
<td><strong>BioMedical Admissions Test (BMAT)</strong></td>
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## NANYANG BUSINESS SCHOOL

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<tr>
<td><strong>Business</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Accountancy &amp; Business (Double Degree)</strong></td>
<td></td>
</tr>
<tr>
<td>Mathematics skills are essential for entry into Nanyang Business School (NBS).</td>
<td></td>
</tr>
<tr>
<td>Polytechnic applicants are therefore required to take an NTU Mathematics elective upon admission to NBS if</td>
<td></td>
</tr>
<tr>
<td>1. Applicants do not have ‘O’ level Additional Mathematics</td>
<td></td>
</tr>
<tr>
<td>2. Grade obtained for ‘O’ level Additional Mathematics is C6 or below</td>
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</tr>
<tr>
<td>Successful polytechnic applicants who do not meet the minimum Mathematics requirement above will be advised on the registration for the Mathematics elective upon matriculation into the University.</td>
<td></td>
</tr>
<tr>
<td>On a selective basis</td>
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</tr>
</tbody>
</table>

For more information on the admission requirements, please visit http://admissions.ntu.edu.sg/UndergraduateAdmissions/Pages/PolyDiploma.aspx.
## International Baccalaureate (IB) Diploma

Applicants, regardless of nationality, presenting the International Baccalaureate (IB) Diploma.

### Admission Requirements

You are offering the International Baccalaureate (IB) Diploma, and will have completed at least 12 years of general education in the year of admission.

In addition to fulfilling the above admission criteria, applicants have to meet the following minimum subject requirements of the degree programmes listed below.

<table>
<thead>
<tr>
<th>Programme</th>
<th>Minimum Subject Requirements</th>
<th>Selection Test/Interview</th>
</tr>
</thead>
</table>
| **RENAISSANCE ENGINEERING PROGRAMME**  | • Renaissance Engineering Programme
Mathematics at Higher Level, and Physics/Chemistry/Biology/Computer Science at Higher Level, and Physics at Standard Level/equivalent* | Yes                      |

### COLLEGE OF ENGINEERING

<table>
<thead>
<tr>
<th>Programme</th>
<th>Minimum Subject Requirements</th>
<th>Selection Test/Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Aerospace Engineering***</td>
<td>Mathematics at Higher Level, and Physics/Chemistry/Biology/Computer Science at Higher Level, and Physics at Standard Level/equivalent*</td>
<td></td>
</tr>
<tr>
<td>• Bioengineering***</td>
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<tr>
<td>• Civil Engineering***</td>
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<tr>
<td>• Computer Engineering***</td>
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<td></td>
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<tr>
<td>• Computer Science***</td>
<td></td>
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<tr>
<td>• Electrical &amp; Electronic Engineering***</td>
<td></td>
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<tr>
<td>• Engineering***</td>
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<tr>
<td>• Environmental Engineering***</td>
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<tr>
<td>• Information Engineering &amp; Media***</td>
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<tr>
<td>• Mechanical Engineering***</td>
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</tr>
</tbody>
</table>

The above single degree programmes are also offered with a Second Major in Business**

<table>
<thead>
<tr>
<th>Programme</th>
<th>Minimum Subject Requirements</th>
<th>Selection Test/Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Business &amp; Computing (Double Degree)</td>
<td>Mathematics at Higher Level, and Physics/Chemistry/Biology/Computer Science at Higher Level, and Physics at Standard Level/equivalent*</td>
<td></td>
</tr>
<tr>
<td>• Business &amp; Computer Engineering (Double Degree)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Integrated Programme (BEng [CS] &amp; MSc [CS])###</td>
<td>Mathematics at Higher Level, and Physics/Chemistry/Biology/Computer Science at Higher Level, and Physics at Standard Level/equivalent*</td>
<td></td>
</tr>
<tr>
<td>• Integrated Programme (BEng [CE] &amp; MSc [CS])###</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Integrated Programme (BEng [EEE] &amp; MSc [ECE])###</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Materials Engineering***</td>
<td>Mathematics at Higher Level, and Physics/Chemistry/Biology at Higher Level, and Physics at Standard Level/equivalent*</td>
<td></td>
</tr>
<tr>
<td>• Materials Engineering with a Second Major in Business**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Chemical &amp; Biomolecular Engineering***</td>
<td>Mathematics and Chemistry at Higher Level, and Physics at Standard Level/equivalent*</td>
<td></td>
</tr>
<tr>
<td>• Chemical &amp; Biomolecular Engineering with a Second Major in Business**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Chemical &amp; Biomolecular Engineering with a Second Major in Food Science and Technology**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Maritime Studies**</td>
<td>Mathematics at Standard Level, and Physics/Chemistry/Biology at Standard Level</td>
<td></td>
</tr>
<tr>
<td>• Maritime Studies with a Second Major in Business**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NEW: Indicates new programme

**: Indicates double degree programme

### Notes

* Equivalent means 2 years of education below the stated level.

** Indicates new programme

*** Indicates new programme

### Integrated Programmes

- Integrated Programme (BEng [CS] & MSc [CS])#
- Integrated Programme (BEng [CE] & MSc [CS])#
- Integrated Programme (BEng [EEE] & MSc [ECE])#
- Materials Engineering#
- Chemical & Biomolecular Engineering#
- Chemical & Biomolecular Engineering with a Second Major in Business#
- Chemical & Biomolecular Engineering with a Second Major in Food Science and Technology#
- Maritime Studies#
- Maritime Studies with a Second Major in Business#
<table>
<thead>
<tr>
<th>COLLEGE OF HUMANITIES, ARTS, AND SOCIAL SCIENCES</th>
<th>MINIMUM SUBJECT REQUIREMENTS</th>
<th>SELECTION TEST/INTERVIEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Art, Design &amp; Media</td>
<td>Mathematics and English at Standard Level</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In addition, applicants are required to produce and submit the following materials for admission assessment:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. A portfolio</td>
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</tr>
<tr>
<td></td>
<td>2. A personal statement</td>
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<td></td>
<td>3. A creative film/photo sequence/sound piece</td>
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<td></td>
<td>4. Three drawings</td>
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</tr>
<tr>
<td></td>
<td>For specific submission instructions and details, please refer to <a href="http://www.adm.ntu.edu.sg/Programmes/ProspectiveStudents/undergraduatedegrees/Pages/ADM-AdmissionRequirements.aspx">http://www.adm.ntu.edu.sg/Programmes/ProspectiveStudents/undergraduatedegrees/Pages/ADM-AdmissionRequirements.aspx</a></td>
<td></td>
</tr>
<tr>
<td>• Communication Studies</td>
<td>A good grade in English at Standard Level</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Chinese</td>
<td>A good grade in Chinese at Standard Level</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Economics</td>
<td>A good grade in Mathematics and English at Standard Level</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Psychology</td>
<td>A good grade in Mathematics and English at Standard Level</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Psychology with a Second Major in Biological Sciences <strong>NEW</strong></td>
<td>A good grade in Mathematics and English at Standard Level, and Physics/Chemistry/Biology at Standard Level</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• English Literature</td>
<td>A good grade in English at Standard Level</td>
<td>Yes</td>
</tr>
<tr>
<td>• History</td>
<td>A good grade in English at Standard Level</td>
<td></td>
</tr>
<tr>
<td>• Linguistics &amp; Multilingual Studies</td>
<td>A good grade in English at Standard Level</td>
<td></td>
</tr>
<tr>
<td>• Sociology</td>
<td>A good grade in English at Standard Level</td>
<td></td>
</tr>
<tr>
<td>• Philosophy <strong>NEW</strong></td>
<td>A good grade in English at Standard Level</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Public Policy &amp; Global Affairs</td>
<td>A good grade in English at Standard Level</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COLLEGE OF SCIENCE</th>
<th>MINIMUM SUBJECT REQUIREMENTS</th>
<th>SELECTION TEST/INTERVIEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Biological Sciences ^</td>
<td>Mathematics at Standard Level, and Physics/Chemistry/Biology at Higher Level</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Biological Sciences with a Second Major in Food Science and Technology <strong>NEW</strong></td>
<td>Mathematics at Standard Level, and Physics/Chemistry/Biology at Higher Level</td>
<td>Yes</td>
</tr>
<tr>
<td>• Biological Sciences with a Second Major in Physics</td>
<td>Mathematics at Standard Level, and Physics/Chemistry/Biology at Higher Level</td>
<td></td>
</tr>
<tr>
<td>• Biological Sciences with a Second Major in Psychology</td>
<td>Mathematics at Standard Level, and Physics/Chemistry/Biology at Higher Level</td>
<td>Yes</td>
</tr>
<tr>
<td>• Biomedical Sciences &amp; Chinese Medicine (Double Degree)</td>
<td>Mathematics at Standard Level, and Physics/Chemistry/Biology at Higher Level, and Chinese at Standard Level</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Chemistry &amp; Biological Chemistry</td>
<td>Chemistry and Mathematics/Physics at Higher Level</td>
<td></td>
</tr>
<tr>
<td>• Chemistry &amp; Biological Chemistry with a Second Major in Food Science and Technology <strong>NEW</strong></td>
<td>Mathematics at Standard Level, and Physics/Chemistry/Biology at Higher Level, and Chinese at Standard Level</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Environmental Earth Systems Science <strong>NEW</strong></td>
<td>Mathematics at Higher Level, and Physics/Chemistry/Biology/Economics/Computer Science at Higher Level</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Mathematical Sciences ^^</td>
<td>Mathematics at Higher Level</td>
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</tr>
<tr>
<td>• Mathematics &amp; Economics</td>
<td>Mathematics at Higher Level</td>
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</tr>
<tr>
<td>• Physics/Applied Physics</td>
<td>Physics and Mathematics at Higher Level</td>
<td></td>
</tr>
<tr>
<td>• Physics with a Second Major in Mathematical Sciences</td>
<td></td>
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</tr>
</tbody>
</table>
### LEE KONG CHIAN SCHOOL OF MEDICINE

**Minimum Subject Requirements**

- **Medicine**
  - Chemistry at Higher Level, and
  - Biology/Physics at Higher Level

  In addition, applicants are required to submit the following materials for admission assessment:
  1. Academic results
  2. Personal statement
  3. Co-curricular accomplishments (if the applicant would like to be considered under Non-Academic Achievements/Exceptional Individual Scheme)
  4. Official testimonial issued by school
  5. Two online reference reports
  6. Any other supporting documents

**BioMedical Admissions Test (BMAT)**

Applicants will have to register for the Biomedical Admissions Test (BMAT) and take the BMAT as part of the criteria for entry to the Lee Kong Chian School of Medicine (LKCMedicine) programme. Applicants take the BMAT around November each year, prior to their application to the LKCMedicine. Only results of the BMAT taken in the 12-month period prior to admission to LKCMedicine will be considered in the selection process. For more details on the BMAT, please refer to [www.bmat.org.uk](http://www.bmat.org.uk).

For further details, please visit [www lkcmedicine ntu edu sg/Admissions Pages/index aspx](http://www.lkcmedicine.ntu.edu.sg/Admissions/Pages/index.aspx).

### NANYANG BUSINESS SCHOOL

**Minimum Subject Requirements**

- **Accountancy**
- **Business**
- **Accountancy & Business (Double Degree)**

**Selection Test/Interview**

Mathematics at Standard Level

On a selective basis

### NATIONAL INSTITUTE OF EDUCATION

**Minimum Subject Requirements**

- **Arts (Education)**
- **Science (Education)**

**Selection Test/Interview**

Mathematics and English A1/English A: Literature at Standard Level, and Pass in at least 5 subjects, including English as a First Language at “O” level/Junior High School Level

Yes

### SPORT SCIENCE AND MANAGEMENT

**Minimum Subject Requirements**

- **Sport Science & Management**

**Selection Test/Interview**

Mathematics at Standard Level

On a selective basis

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**Note:** The award of a minor or a second major will be reflected in the graduate's transcript but not his degree certificate.

◊ Programme leading to Bachelor of Engineering Science & Master of Science in Technology Management.

* The programme is also offered as a double degree programme with Economics.

^ The programme is also offered as a single degree programme with a Minor in Business.

+ Physics at Standard Level is only applicable to applicants who have not read Physics at Higher Level.

# [CE]: Computer Engineering; [CS]: Computer Science; [ECE]: Electrical & Computer Engineering; [EEE]: Electrical & Electronic Engineering. These integrated programmes are with National InfoComm Scholarship and are only open to Singapore Citizens and Singapore Permanent Residents.

@ For Engineering Programme, students who are undecided on their Engineering major may opt for Engineering at the point of application. After one semester of engineering studies, students will be streamed to either Civil Engineering, Electrical and Electronic Engineering, Environmental Engineering or Mechanical Engineering. In all cases, admission and streaming into an engineering major is merit-based.

** Programme leading to Bachelor of Science.

^^ The programme is also offered as a single degree programme with a Minor in Finance.

¤ These degree programmes offer many courses that may require further subject prerequisites. Please refer to the National Institute of Education (NIE) website for details.
### Admission Requirements
You are offering the NUS High School Diploma and must fulfill one of the following Mother Tongue Language (MTL) requirements:
- A minimum of ‘D7’ in higher MTL taken at ‘O’ Level
- A pass in MTL B or a grade ‘S’ for General Studies in Chinese or H1 MTL or H2 Mother Tongue Language & Literature (MTLL) at ‘A’ Level
- An MOE-approved MTL-in-lieu or MTL-exemption

In addition to fulfilling the above admission criteria, applicants have to meet the following minimum subject requirements of the degree programmes listed below.

<table>
<thead>
<tr>
<th>Programme</th>
<th>Minimum Subject Requirements</th>
<th>Selection Test/ Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renaissance Engineering Programme</td>
<td>Major CAP of 2.0 in Mathematics, and Major CAP of 2.0 in Physics/Chemistry/Biology&lt;sup&gt;+&lt;/sup&gt;</td>
<td>Yes</td>
</tr>
<tr>
<td>College of Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aerospace Engineering</td>
<td>Major CAP of 2.0 in Mathematics, and Major CAP of 2.0 in Physics/Chemistry/Biology&lt;sup&gt;+&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Bioengineering</td>
<td></td>
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<tr>
<td>Civil Engineering</td>
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<tr>
<td>Computer Engineering</td>
<td></td>
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<tr>
<td>Computer Science</td>
<td></td>
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<tr>
<td>Electrical &amp; Electronic Engineering</td>
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<tr>
<td>Engineering</td>
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<tr>
<td>Environmental Engineering</td>
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<tr>
<td>Information Engineering &amp; Media</td>
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<tr>
<td>Materials Engineering</td>
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<tr>
<td>Mechanical Engineering</td>
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<tr>
<td>The above single degree programmes are also offered with a Second Major in Business <strong>NEW</strong></td>
<td></td>
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</tr>
<tr>
<td>Business &amp; Computing (Double Degree)</td>
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<tr>
<td>Business &amp; Computer Engineering (Double Degree)</td>
<td></td>
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</tr>
<tr>
<td>Integrated Programme (BEng [CS] &amp; MSc [CS])#</td>
<td></td>
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</tr>
<tr>
<td>Integrated Programme (BEng [CE] &amp; MSc [CS])#</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integrated Programme (BEng [EEE] &amp; MSc [ECE])#</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemical &amp; Biomolecular Engineering</td>
<td>Major CAP of 2.0 in Mathematics and Chemistry, and Overall CAP of 2.0 in Physics</td>
<td></td>
</tr>
<tr>
<td>Chemical &amp; Biomolecular Engineering with a Second Major in Business <strong>NEW</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemical &amp; Biomolecular Engineering with a Second Major in Food Science and Technology <strong>NEW</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maritime Studies</td>
<td>Major CAP of 2.0 in Mathematics, and Overall CAP of 2.0 in Physics/Chemistry/Biology</td>
<td></td>
</tr>
<tr>
<td>Maritime Studies with a Second Major in Business <strong>NEW</strong></td>
<td></td>
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</tr>
</tbody>
</table>
### COLLEGE OF HUMANITIES, ARTS, AND SOCIAL SCIENCES

<table>
<thead>
<tr>
<th>Major</th>
<th>Minimum Subject Requirements</th>
<th>Selection Test/Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Art, Design &amp; Media</td>
<td>Major CAP of 2.0 in Mathematics, and Good Overall CAP in English Language</td>
<td></td>
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<tr>
<td></td>
<td>In addition, applicants are required to produce and submit the following materials for admission assessment:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. A portfolio</td>
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<td></td>
<td>2. A personal statement</td>
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<tr>
<td></td>
<td>3. A creative film/photo sequence/sound piece</td>
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<td></td>
<td>4. Three drawings</td>
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<tr>
<td></td>
<td>For specific submission instructions and details, please refer to</td>
<td></td>
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<tr>
<td></td>
<td><a href="http://www.adm.ntu.edu.sg/Programmes/ProspectiveStudents/undergraduatedegrees/Pages/ADM-Admission-Requirements.aspx">http://www.adm.ntu.edu.sg/Programmes/ProspectiveStudents/undergraduatedegrees/Pages/ADM-Admission-Requirements.aspx</a></td>
<td></td>
</tr>
<tr>
<td>• Communication Studies</td>
<td>Good Overall CAP in English Language</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Chinese</td>
<td>Good Overall CAP in Chinese Language</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Economics</td>
<td>Major CAP of 2.0 in Mathematics, and Good Overall CAP in English Language</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Psychology</td>
<td>Major CAP of 2.0 in Mathematics, and Good Overall CAP in English Language</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Psychology with a Second Major in</td>
<td>Major CAP of 2.0 in Mathematics, and Good Overall CAP in English Language, and Major CAP of 2.0 in Physics/Chemistry/Biology</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>Biological Sciences <strong>NEW</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• English Literature</td>
<td>Good Overall CAP in English Language</td>
<td>Yes</td>
</tr>
<tr>
<td>• History</td>
<td></td>
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</tr>
<tr>
<td>• Linguistics &amp; Multilingual Studies</td>
<td></td>
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<tr>
<td>• Sociology</td>
<td></td>
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</tr>
<tr>
<td>• Philosophy <strong>NEW</strong></td>
<td>Good Overall CAP in English Language</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Public Policy &amp; Global Affairs</td>
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</tr>
</tbody>
</table>

### COLLEGE OF SCIENCE

<table>
<thead>
<tr>
<th>Major</th>
<th>Minimum Subject Requirements</th>
<th>Selection Test/Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Biological Sciences ^</td>
<td>Major CAP of 2.0 in Mathematics, and Major CAP of 2.0 in Physics/Chemistry/Biology</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Biological Sciences with a Second Major in Food Science and Technology <strong>NEW</strong></td>
<td>Major CAP of 2.0 in Mathematics, and Major CAP of 2.0 in Physics/Chemistry/Biology</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Biological Sciences with a Second Major in Psychology</td>
<td>Major CAP of 2.0 in Mathematics, and Major CAP of 2.0 in Chemistry</td>
<td>Yes</td>
</tr>
<tr>
<td>• Biomedical Sciences &amp; Chinese Medicine (Double Degree)</td>
<td>Major CAP of 2.0 in Mathematics, and Major CAP of 2.0 in Physics/Chemistry/Biology, and Good Overall CAP in Chinese Language</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Chemistry &amp; Biological Chemistry</td>
<td>Major CAP of 2.0 in Chemistry, and Major CAP of 2.0 in Mathematics/Physics</td>
<td>Yes</td>
</tr>
<tr>
<td>• Chemistry &amp; Biological Chemistry with a Second Major in Food Science and Technology <strong>NEW</strong></td>
<td>Major CAP of 2.0 in Mathematics, and Major CAP of 2.0 in Physics/Chemistry/Biology</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Environmental Earth Systems Science <strong>NEW</strong></td>
<td>Major CAP of 2.0 in Mathematics, and Major CAP of 2.0 in Physics/Chemistry/Biology</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Mathematical Sciences ^^</td>
<td>Major CAP of 2.0 in Mathematics, and Major CAP of 2.0 in Physics/Chemistry/Biology</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Mathematics &amp; Economics</td>
<td>Major CAP of 2.0 in Mathematics</td>
<td></td>
</tr>
<tr>
<td>• Physics/Applied Physics</td>
<td>Major CAP of 2.0 in Physics and Mathematics</td>
<td></td>
</tr>
<tr>
<td>• Physics with a Second Major in</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematical Sciences</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Nanyang Business School

<table>
<thead>
<tr>
<th>Programme</th>
<th>Minimum Subject Requirements</th>
<th>Selection Test/Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accountancy</td>
<td>Major CAP of 2.0 in Mathematics</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>Business</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accountancy &amp; Business (Double Degree)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### National Institute of Education

<table>
<thead>
<tr>
<th>Programme</th>
<th>Minimum Subject Requirements</th>
<th>Selection Test/Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts (Education)</td>
<td>Major CAP of 2.0 in Mathematics, and Good Overall CAP in English Language</td>
<td>Yes</td>
</tr>
<tr>
<td>Science (Education)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Sport Science and Management

<table>
<thead>
<tr>
<th>Programme</th>
<th>Minimum Subject Requirements</th>
<th>Selection Test/Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sport Science &amp; Management**</td>
<td>Major CAP of 2.0 in Mathematics</td>
<td>On a selective basis</td>
</tr>
</tbody>
</table>

**Note:** The award of a minor or a second major will be reflected in the graduate’s transcript but not his degree certificate.

◊ Programme leading to Bachelor of Engineering Science & Master of Science in Technology Management.

* The programme is also offered as a double degree programme with Economics.

^ The programme is also offered as a single degree programme with a Minor in Business.

+ Overall CAP of 2.0 in Physics is only applicable to applicants who have not majored in Physics.

# [CE]: Computer Engineering; [CS]: Computer Science; [ECE]: Electrical & Computer Engineering; [EEE]: Electrical & Electronic Engineering. These integrated programmes are with National Infocomm Scholarship and are only open to Singapore Citizens and Singapore Permanent Residents.

@ For Engineering programme, students who are undecided on their Engineering major may opt for Engineering at the point of application. After one semester of engineering studies, students will be streamed to either Civil Engineering, Electrical and Electronic Engineering, Environmental Engineering or Mechanical Engineering. In all cases, admission and streaming into an engineering major is merit-based.

** Programme leading to Bachelor of Science.

^^ The programme is also offered as a single degree programme with a Minor in Finance.

¤ These degree programmes offer many courses that may require further subject prerequisites. Please refer to the National Institute of Education (NIE) website for details.
### International & Other Qualifications

Applicants, regardless of nationality, presenting an international qualification (e.g. Malaysia STPM/UEC, India Standard 12, Indonesia SMA UAN, PRC Gao Kao, Vietnam High School Graduation Certificate, etc.) or other qualifications not specified in the preceding groups above.

<table>
<thead>
<tr>
<th>Programme</th>
<th>Minimum Subject Requirements</th>
<th>Selection Test/Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RENAISSANCE ENGINEERING PROGRAMME</strong></td>
<td>Mathematics at Senior High School Level/IB Higher Level, and Physics/Chemistry/Biology at Senior High School Level/IB Higher Level, or Computer Science at IB Higher Level, and Physics at Junior High School Level/IB Standard Level+, and A good grade in General Paper/English at Senior High School Level/IB Standard Level.</td>
<td>Yes</td>
</tr>
<tr>
<td>• Renaissance Engineering Programme</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| <strong>COLLEGE OF ENGINEERING</strong>                      | Mathematics at Senior High School Level/IB Higher Level, and Physics/Chemistry/Biology at Senior High School Level/IB Higher Level, or Computer Science at IB Higher Level, and Physics at Junior High School Level/IB Standard Level+. |                          |
| • Aerospace Engineering**                       |                                                                                             |                          |
| • Bioengineering**                              |                                                                                             |                          |
| • Business &amp; Computing (Double Degree)          |                                                                                             |                          |
| • Business &amp; Computer Engineering (Double Degree) |                                                                                             |                          |
| • Civil Engineering**                           |                                                                                             |                          |
| • Computer Engineering**                        |                                                                                             |                          |
| • Computer Science**                            |                                                                                             |                          |
| • Electrical &amp; Electronic Engineering**         |                                                                                             |                          |
| • Engineering**                                 |                                                                                             |                          |
| • Environmental Engineering**                   |                                                                                             |                          |
| • Information Engineering &amp; Media**            |                                                                                             |                          |
| • Integrated Programme (BEng [CS] &amp; MSc [CS])# |                                                                                             |                          |
| • Integrated Programme (BEng [CE] &amp; MSc [CS])# |                                                                                             |                          |
| • Integrated Programme (BEng [EEE] &amp; MSc [ECE])# |                                                                                             |                          |
| • Mechanical Engineering**                      |                                                                                             |                          |
| • Materials Engineering**                       | Mathematics at Senior High School Level/IB Higher Level, and Physics/Chemistry/Biology at Senior High School Level/IB Higher Level, and Physics at Junior High School Level/IB Standard Level+. |                          |
| • Chemical &amp; Biomolecular Engineering**         | Mathematics and Chemistry at Senior High School Level/IB Higher Level, and Physics at Junior High School Level/IB Standard Level+. |                          |
| • Chemical &amp; Biomolecular Engineering with a Second Major in Food Science and Technology NEW |                                                                                             |                          |
| • Maritime Studies**                            | Additional Mathematics at Junior High School Level/IB Standard Level, and Physics/Chemistry/Biology/Science at Junior High School Level or Physics/Chemistry/Biology at IB Standard Level. |                          |
| • Maritime Studies with a Second Major in Business** |                                                                                             |                          |</p>
<table>
<thead>
<tr>
<th>College of Humanities, Arts, and Social Sciences</th>
<th>Minimum Subject Requirements</th>
<th>Selection Test/Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Art, Design &amp; Media</td>
<td>Mathematics at Junior High School Level/Mathematics at IB Standard Level, and A good grade in English at Senior High School Level/IB Standard Level</td>
<td>In addition, applicants are required to produce and submit the following materials for admission assessment: 1. A portfolio 2. A personal statement 3. A creative film/photo sequence/sound piece 4. Three drawings For specific submission instructions and details, please refer to <a href="http://www.adm.ntu.edu.sg/Programmes/ProspectiveStudents/undergraduatedegrees/Pages/ADM-Admission-Requirements.aspx">http://www.adm.ntu.edu.sg/Programmes/ProspectiveStudents/undergraduatedegrees/Pages/ADM-Admission-Requirements.aspx</a></td>
</tr>
<tr>
<td>• Communication Studies</td>
<td>A good grade in General Paper/English at Senior High School Level/IB Standard Level</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Chinese</td>
<td>A good grade in Chinese at Junior High School Level/IB Standard Level</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Economics</td>
<td>A good grade in Additional Mathematics at Junior High School Level/Mathematics at IB Standard Level, and A good grade in English at Senior High School Level/IB Standard Level</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Psychology</td>
<td>A good grade in Additional Mathematics at Junior High School Level/Mathematics at IB Standard Level, and A good grade in English at Senior High School Level/IB Standard Level</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Psychology with a Second Major in Biological Sciences /NEW</td>
<td>A good grade in Additional Mathematics at Junior High School Level/Mathematics at IB Standard Level, and A good grade in English at Senior High School Level/IB Standard Level, and A good grade in Physics/Chemistry/Biology at Junior High School Level/IB Standard Level</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• English Literature</td>
<td>A good grade in General Paper/English at Senior High School Level/IB Standard Level</td>
<td>Yes</td>
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<tr>
<td>• History</td>
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<tr>
<td>• Linguistics &amp; Multilingual Studies</td>
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<tr>
<td>• Sociology</td>
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</tr>
<tr>
<td>• Philosophy /NEW</td>
<td>A good grade in General Paper/English at Senior High School Level/IB Standard Level</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>• Public Policy &amp; Global Affairs</td>
<td>A good grade in General Paper/English at Senior High School Level/IB Standard Level</td>
<td>On a selective basis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>College of Science</th>
<th>Minimum Subject Requirements</th>
<th>Selection Test/Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Biological Sciences /NEW</td>
<td>Mathematics at Junior High School Level/IB Standard Level, and Physics/Chemistry/Biology at Senior High School Level/IB Higher Level</td>
<td>On a selective basis</td>
</tr>
</tbody>
</table>
**LEE KONG CHIAN SCHOOL OF MEDICINE**

<table>
<thead>
<tr>
<th>Subject Type</th>
<th>Minimum Subject Requirements</th>
<th>Selection Test/Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicine</td>
<td>Chemistry at Senior High School Level/IB Higher Level, and Biology/Physics at Senior High School Level/IB Higher Level</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>In addition, applicants are required to submit the following materials for admission assessment:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Academic results</td>
<td></td>
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<tr>
<td></td>
<td>2. Personal statement</td>
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<tr>
<td></td>
<td>3. Co-curricular accomplishments (if the applicant would like to be considered for Non-Academic Achievements/Exceptional Individual Scheme)</td>
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<td></td>
<td>4. Official testimonial issued by school</td>
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<td></td>
<td>5. Two online reference reports</td>
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<td>6. Any other supporting documents</td>
<td></td>
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<tr>
<td></td>
<td><strong>BioMedical Admissions Test (BMAT)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Applicants will have to register for the Biomedical Admissions Test (BMAT) and take the BMAT as part of the criteria for entry to the Lee Kong Chian School of Medicine (LKCMedicine) programme. Applicants take the BMAT around November each year, prior to their application to the LKCMedicine. Only results of the BMAT taken in the 12-month period prior to admission to LKCMedicine will be considered in the selection process. For more details on the BMAT, please refer to <a href="http://www.bmat.org.uk">www.bmat.org.uk</a>.</td>
<td></td>
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<tr>
<td></td>
<td>For further details, please visit <a href="http://www.lkcmedicine.ntu.edu.sg/Admissions/Pages/index.aspx">www.lkcmedicine.ntu.edu.sg/Admissions/Pages/index.aspx</a>.</td>
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</tr>
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</table>

**NANYANG BUSINESS SCHOOL**

<table>
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<tr>
<th>Subject Type</th>
<th>Minimum Subject Requirements</th>
<th>Selection Test/Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accountancy</td>
<td>Additional Mathematics at Junior High School Level/IB Standard Level</td>
<td>On a selective basis</td>
</tr>
<tr>
<td>Business</td>
<td>Mathematics at IB Standard Level</td>
<td></td>
</tr>
<tr>
<td>Accountancy &amp; Business (Double Degree)</td>
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</tr>
</tbody>
</table>

**NATIONAL INSTITUTE OF EDUCATION**

<table>
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<tr>
<th>Subject Type</th>
<th>Minimum Subject Requirements</th>
<th>Selection Test/Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts (Education)</td>
<td>Mathematics and English at Senior High School Level/IB Standard Level, and Pass in at least 5 subjects, including English as a First Language at Junior High School Level. Preferably a good score for IELTS or TOEFL</td>
<td>Yes</td>
</tr>
<tr>
<td>Science (Education)</td>
<td></td>
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</tr>
</tbody>
</table>

**SPORT SCIENCE AND MANAGEMENT**

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<tr>
<th>Subject Type</th>
<th>Minimum Subject Requirements</th>
<th>Selection Test/Interview</th>
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</thead>
<tbody>
<tr>
<td>Sport Science &amp; Management**</td>
<td>Additional Mathematics at Junior High School Level/IB Standard Level</td>
<td>On a selective basis</td>
</tr>
</tbody>
</table>
Note: The award of a minor or a second major will be reflected in the graduate’s transcript but not his degree certificate.

◊ Programme leading to Bachelor of Engineering Science & Master of Science in Technology Management.
* The programme is also offered as a double degree programme with Economics.
^ The programme is also offered as a single degree programme with a Minor in Business.
+ Physics at Junior High School Level is only applicable to applicants who have not read Physics at Senior High School Level.
# [CE]: Computer Engineering; [CS]: Computer Science; [ECE]: Electrical & Computer Engineering; [EEE]: Electrical & Electronic Engineering. These integrated programmes are with National Infocomm Scholarship and are only open to Singapore Citizens and Singapore Permanent Residents.
** Programme leading to Bachelor of Science.
^^ The programme is also offered as a single degree programme with a Minor in Finance.
¤ These degree programmes offer many courses that may require further subject prerequisites. Please refer to the National Institute of Education (NIE) website for details.

Application Procedures


Application is done online by submitting an electronic application form during application period. Application will only be processed if the application fee and required supporting documents are received within the stipulated deadlines.

Full-time National Servicemen (NSF) with places already reserved in NTU and who wish to submit new applications may apply under the respective application groups that correspond to their qualifications.

Submission of Supporting Documents

The supporting documents required for submission (if applicable) can be found under ‘Checklist’ via the ‘Check Status’ link after your online application is completed.

If there is/are no link(s) provided for you to upload the relevant documents, this means you are not required to submit any documents for verification at the moment. If we require more information from you, we will contact you via email or your contact number.

You are strongly encouraged to make use of the uploading feature (except for the additional documents required for the Art, Design & Media programme) as it saves cost and speeds up the processing of your application.

International & Other Qualifications

Applicants must have completed at least 12 years of general education or will be taking Year 12 national examinations in the year of application in order to be considered for admission.

Application is done online by submitting an electronic application form during application period. The website is http://www.ntu.edu.sg/intnladmissions.

Inaccurate or false information or omission of material information will render the application invalid and those admitted on the basis of such false or incomplete information will be asked to withdraw.

Submission of Supporting Documents

There are two modes to submit your documents (please use only one mode):

- Scan documents in full colour and upload online to the ‘Checklist’ via ‘Check Status’ link.
- Print checklist and send supporting documents together with the bank draft (where applicable) to the Office of Admissions and Financial Aid by post.

NTU Entrance Examination

International students with Malaysia STPM, Malaysia UEC, ‘A’ Level (AQA, Brunei, Cambridge, Edexcel, Hong Kong, London, Maldives, and Sri Lanka), India Standard 12, Mauritius HSC, PRC Gao Kao, American High School Diploma, German Abitur, Hong Kong Diploma of Secondary Education (HKDSE), French Baccalaureate (FB), International Baccalaureate (IB) Diploma and Spanish Baccalaureate (SB) qualifications are not required to take the NTU entrance examination. In addition, applicants who have won gold, silver or bronze medals in International Science Olympiad Competitions related to the course of study will be exempted from taking the entrance examination.

Applicants with other qualifications may be required to take the NTU entrance examination for the University to assess their suitability for the undergraduate programmes. Details of the examination will be made known to shortlisted applicants. An examination fee will be imposed on shortlisted candidates sitting for the entrance examinations.

For more information, visit http://admissions.ntu.edu.sg/UndergraduateIntnlAdmissions/Pages/EntranceExaminations.aspx.
IELTS/TOEFL/SAT
Submission of IELTS, TOEFL and SAT scores are optional except for:
- Students with PRC Gao Kao qualification – Besides Gao Kao (or Senior Middle 1 & 2 if Gao Kao is not completed yet), student has to present IELTS/TOEFL/SAT Reasoning Test/PTE Academic. Only scores obtained in the two years leading up to the application deadline will be considered.
- Students with American High School Diploma – Besides the final-term high school grades, student has to present SAT Reasoning Test and SAT Subject Tests (at least 3 subjects relevant to the course of study) or at least 3 AP subjects (CollegeBoard).

Academic Year 2014/15 Application Period and Application Fee

<table>
<thead>
<tr>
<th>APPLICATION GROUP</th>
<th>APPLICATION PERIOD</th>
<th>APPLICATION FEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singapore-Cambridge GCE ‘A’ Level</td>
<td>Start : A-Level results release day</td>
<td>VISA or Mastercard or</td>
</tr>
<tr>
<td></td>
<td>End : 1 April 2014</td>
<td>DBS/POSB ATM – S$10</td>
</tr>
<tr>
<td>Diploma Awarded by a Polytechnic in Singapore</td>
<td>Start : 1 February 2014</td>
<td></td>
</tr>
<tr>
<td></td>
<td>End : 23 February 2014</td>
<td></td>
</tr>
<tr>
<td>NUS High School Diploma</td>
<td>Start : 1 December 2013</td>
<td></td>
</tr>
<tr>
<td></td>
<td>End : 15 January 2014</td>
<td></td>
</tr>
<tr>
<td>International Baccalaureate Diploma</td>
<td>Start : 1 October 2013</td>
<td>Singaporean or Singapore Permanent</td>
</tr>
<tr>
<td></td>
<td>End : 1 April 2014</td>
<td>Resident Applicants – VISA or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mastercard or DBS/POSB ATM – S$10</td>
</tr>
<tr>
<td>International &amp; Other Qualifications</td>
<td>Refer to <a href="http://www.ntu.edu.sg/intnladmissions">http://www.ntu.edu.sg/intnladmissions</a></td>
<td>International Applicants – Bank Draft</td>
</tr>
<tr>
<td></td>
<td>for the application period of the respective</td>
<td>– S$30 or US$30 / VISA or Mastercard</td>
</tr>
<tr>
<td></td>
<td>qualifications</td>
<td>– S$20</td>
</tr>
<tr>
<td>Part-Time B.Eng</td>
<td>Start : 1 December 2013</td>
<td>VISA or Mastercard or</td>
</tr>
<tr>
<td></td>
<td>End : 31 January 2014</td>
<td>DBS/POSB ATM – S$65</td>
</tr>
</tbody>
</table>

Please refer to http://admissions.ntu.edu.sg/UndergraduateAdmissions/Pages/default.aspx for updated information.

Tuition Fees
For students offered admission in Academic Year (AY) 2014-15, the annual tuition fee is fixed at the rate for the duration of their degree programme.

<table>
<thead>
<tr>
<th>PROGRAMME OF STUDY</th>
<th>SINGAPORE CITIZENS</th>
<th>SINGAPORE PERMANENT RESIDENTS (SPR)</th>
<th>INTERNATIONAL STUDENTS</th>
<th>NON-SUBSIDISED STUDENTS (NOT RECEIVING TUITION GRANT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Programmes (except for those listed below)</td>
<td>$7,850</td>
<td>$11,000</td>
<td>$15,700</td>
<td>$28,680</td>
</tr>
<tr>
<td>Accountancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accountancy &amp; Business (Double Degree)</td>
<td>$8,850</td>
<td>$12,400</td>
<td>$17,700</td>
<td>$32,430</td>
</tr>
<tr>
<td>Business &amp; Computing (Double Degree)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business &amp; Computer Engineering (Double Degree)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicine</td>
<td>$31,500</td>
<td>$44,100</td>
<td>$63,000</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Renaissance Engineering Programme</td>
<td>$17,050</td>
<td>$23,850</td>
<td>$34,100</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

SPR and international students who are eligible and applied for Tuition Grant are required to sign the MOE Tuition Grant Agreement and will be bonded to work in a Singapore-based company for 3 years upon graduation.
Notes on Payment of Fees

- Students who do not sign the tuition grant agreement or who are not eligible for the tuition grant will have to pay non-subsidised tuition fee.
- Fees (tuition fee and compulsory miscellaneous fees) are payable by students on a semester basis regardless of whether they are on Industrial Attachment, Overseas Exchange Programme etc., or otherwise during the semester.
- Students who are completing one last subject in order to graduate, are also required to pay fees (tuition fee and compulsory miscellaneous fees) on a semester basis.
- Students who withdraw or apply for leave of absence from the University two or more weeks after the commencement of a semester are liable for the payment of fees (tuition fee and other compulsory fees) for the entire semester.
- National Servicemen whose enrolment in the University is delayed by one or two years because of their National Service commitment, are allowed to enjoy a one-year or two-year lag in the payment of their subsidised tuition fee. The fee payable will depend on the year that they had first accepted a place in the University. For example, if they were offered admission in AY2012 and had accepted the offer, they pay the subsidised tuition fee applicable for AY2012 when they join the University in AY2014. If they had reapplied for a new programme in AY2013, they will still pay the subsidised tuition fee applicable for AY2012 regardless of the 2nd application outcome. Students paying the non-subsidised tuition fee will pay the rate based on the year they join the University.
- Office of Finance sends the electronic bill (e-bill) to undergraduates via their NTU student email account at the beginning of each semester. Upon notification, students are required to log on using their StudentLINK account to view and print their e-bill for record/payment.

Tuition Grant

The Ministry of Education, Singapore (MOE) provides tuition grant (TG) which covers a substantial portion of the full tuition fees to eligible students. Students who accept the tuition grant are required to pay only the subsidised tuition fee. Unless informed otherwise, students are eligible for tuition grant up to the normal duration of their degree programmes. Please visit our website at http://admissions.ntu.edu.sg/UndergraduateAdmissions/Pages/TuitionGrant.aspx for more information.
Miscellaneous Fees
In addition to the tuition fee, there is also the compulsory annual miscellaneous fees payable by full-time students admitted in AY2014-15.

<table>
<thead>
<tr>
<th>TYPES OF MISCELLANEOUS FEES</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>One-time fees payable on admission only</strong></td>
<td></td>
</tr>
<tr>
<td>Registration Fee 1</td>
<td>S$16.05 (Non-refundable)</td>
</tr>
<tr>
<td>Students' Union Entrance Fee</td>
<td>S$10.70 (Non-refundable)</td>
</tr>
<tr>
<td><strong>Fees payable per annum</strong></td>
<td></td>
</tr>
<tr>
<td>Students' Union Subscription Fee</td>
<td>S$25.60 (Non-refundable)</td>
</tr>
<tr>
<td>Amenities Fee</td>
<td>S$25.65 (Non-refundable)</td>
</tr>
<tr>
<td>IT Facilities Fee</td>
<td>S$13.90</td>
</tr>
<tr>
<td>Laboratory Fee (for laboratory-based degree programmes)</td>
<td>S$26.75</td>
</tr>
<tr>
<td>University Copyright Licence Fee 3</td>
<td>S$13.00 (Non-refundable. No GST.)</td>
</tr>
<tr>
<td>Sports Fee</td>
<td>S$44.90 (Non-refundable)</td>
</tr>
<tr>
<td>Student Health Service Fee</td>
<td>S$53.50</td>
</tr>
<tr>
<td>Group Personal Accident Insurance Scheme (GPAI)</td>
<td>S$11.25</td>
</tr>
<tr>
<td><strong>Group Hospitalisation &amp; Surgical Insurance (GHSI)</strong></td>
<td></td>
</tr>
<tr>
<td>For Singapore Permanent Residents &amp; International Students Only</td>
<td>S$81.00</td>
</tr>
<tr>
<td>For LKCMedicine Students (Inclusive of rider for needle-stick injury or biological splashes)</td>
<td>S$134.50</td>
</tr>
</tbody>
</table>

This is the compulsory fee payable by students staying in hall.

**Monthly Hall Rental Fees**
(Only required if one chooses to stay in NTU Halls of Residence)
For a single room or a double room

S$225 - S$375**

The above fees are inclusive of prevailing GST except for the Copyright Licence Fee and Hall Rental Fees which do not attract GST.

1 The registration fee is a one-time non-refundable fee payable on admission. It helps to cover the operating expenses for the matriculation of student and includes the cost of the matriculation cards.
2 The laboratory fee applies to students in laboratory-based degree programmes. The fee is collected to defray expenses not covered by the tuition fee such as specialised facilities, software, equipment and services.
3 The copyright fee allows student to have easy, compliant access to comprehensive materials from the most appropriate books, journals and other publications, while respecting the intellectual property of others. The copyright fee is payable to Copyright Licensing and Administration Society of Singapore Limited.

**This figure is effective from 1 August 2014 and subject to revision in subsequent years. More information can be found at http://www.ntu.edu.sg/has/Undergraduate/HallsOfResidence/Pages/UG_SummaryOfRates.aspx

Scholarships and Financial Assistance Schemes

Scholarships
In recognition of academic excellence and leadership potential, NTU offers a variety of scholarships to new as well as current students pursuing their full-time undergraduate studies at NTU. Scholarships are awarded to students based on academic merit, co-curricular records and leadership qualities.

Scholarships for Freshmen
NTU-Administered Scholarships

NANYANG SCHOLARSHIP

Eligibility
- Open to all nationalities.
- Successful awardees should read a full-time undergraduate degree programme. The scholarship will cover the years of study* at NTU.

* For Biomedical Sciences & Chinese Medicine programme and NTU-Georgia Tech Integrated Programmes, the Scholarship will cover only the first three years of study at NTU. For the Renaissance Engineering Programme (REP), the Scholarship is also applicable for the one-year of study at a partnering university, such as University of California, Berkeley and Imperial College London.

Applicants must:
- Possess outstanding Singapore-Cambridge GCE ‘A’ Level, Diploma awarded by a Polytechnic in Singapore, NUS High School Diploma, IB Diploma or Year 12 equivalent qualifications.
- Have excellent co-curricular records.
- Have strong leadership qualities and potential.
### COLLEGE SCHOLARSHIP

**Eligibility**
- Open to all nationalities.
- Successful awardees should read a full-time undergraduate degree programme. The scholarship will cover the years of study* at NTU.

* For Biomedical Sciences & Chinese Medicine programme and NTU-Georgia Tech Integrated Programmes, the Scholarship will cover only the first three years of study at NTU. For the Renaissance Engineering Programme (REP), the Scholarship is also applicable for the one-year of study at a partnering university, such as University of California, Berkeley and Imperial College London.

**Applicants must:**
- Possess outstanding Singapore-Cambridge GCE ‘A’ Level, Diploma awarded by a Polytechnic in Singapore, NUS High School Diploma, IB Diploma or Year 12 equivalent qualifications.
- Have good co-curricular records.
- Have good leadership qualities and potential.

### ASEAN UNDERGRADUATE SCHOLARSHIP

**Eligibility**
- Open to Singapore Permanent Residents or citizens of ASEAN countries (except Singapore).
- Successful awardees should read a full-time undergraduate degree programme leading to a first degree, with the exception of Renaissance Engineering Programme. For Biomedical Sciences & Chinese Medicine programme and NTU-Georgia Tech Integrated Programmes, the scholarship will cover only the first three years of study at NTU.

**Applicants must:**
- Possess outstanding Singapore-Cambridge GCE ‘A’ Level, Diploma awarded by a Polytechnic in Singapore, NUS High School Diploma, IB Diploma or Year 12 equivalent qualifications.
- Have excellent co-curricular records.
- Have strong leadership qualities and potential.

### E. W. BARKER SCHOLARSHIP

**Eligibility**
- Open to Singapore Citizens or Singapore Permanent Residents.
- Successful awardees should read a full-time undergraduate Sport Science & Management programme.

**Applicants must:**
- Have excellent co-curricular records.
- Have strong leadership qualities and potential.

### EARTH OBSERVATORY OF SINGAPORE (EOS) UNDERGRADUATE SCHOLARSHIP

**Eligibility**
- Open to all nationalities.
- Successful awardees should read a full-time undergraduate degree programme in Environmental Earth Systems Science, and may choose a specialisation of their choice within the major. The scholarship will cover four years of study at NTU in this programme.

**Applicants must:**
- Possess outstanding Singapore-Cambridge GCE ‘A’ Level, Diploma awarded by a polytechnic in Singapore, NUS High School Diploma, IB Diploma or Year 12 equivalent qualifications.
- Have excellent co-curricular records.
- Have strong leadership qualities and potential.

### LKM MEDICINE SCHOLARSHIP

**Eligibility**
- Open to Singapore Citizens.
- Successful awardees should read a full-time undergraduate Medicine programme at NTU.

**Applicants must:**
- Possess outstanding Singapore-Cambridge GCE ‘A’ level, Diploma awarded by a Polytechnic in Singapore, NUS High School Diploma or IB Diploma.
- Outstanding contributions or attributes in other areas such as community service, student leadership or sporting excellence.

### LKY-STEP AWARD

**Eligibility**
- Open to Singapore Citizens or Singapore Permanent Residents.
- Successful awardees should read a full-time undergraduate degree programme leading to a first degree, with the exception of Biomedical Sciences & Chinese Medicine programme and NTU-Georgia Tech Integrated Programmes for which the scholarship will only cover the first three years of study at NTU.

**Applicants must:**
- Possess outstanding Diploma awarded by a Polytechnic in Singapore (preferably Diploma with Merit) or SIT (Poly – FSI) qualifications.
- Have excellent co-curricular records.
- Have strong leadership qualities and potential.
NG BOK ENG RENAISSANCE ENGINEERING SCHOLARSHIP

Eligibility
• Open to Singapore Citizens.
• Successful awardees should read the Renaissance Engineering Programme (REP).

Applicants must:
• Possess outstanding Singapore-Cambridge GCE ‘A’ Level, Diploma awarded by a Polytechnic in Singapore, NUS High School Diploma or IB Diploma.
• Have excellent co-curricular records.
• Have strong leadership qualities and potential.
• Have a gross monthly household per capita income (PCI) of S$1,000 and below.

NTU SCIENCE AND ENGINEERING UNDERGRADUATE SCHOLARSHIP

Eligibility
• Open to Singapore Permanent Residents or citizens of Asian countries (except Singapore).
• Successful awardees should read a full-time undergraduate Engineering or Science programme leading to a first degree, with the exception of Medicine programme, Biomedical Sciences & Chinese Medicine programme, NTU-Georgia Tech Integrated Programmes, and Renaissance Engineering Programme.

Applicants must:
• Have excellent co-curricular records.
• Have strong leadership qualities and potential.

TOH KIAN CHUI SCHOLARSHIP

Eligibility
• Open to Singapore Citizens.
• Successful awardees should read a full-time undergraduate Medicine programme at NTU.

Applicants must:
• Possess outstanding Singapore-Cambridge GCE ‘A’ Level, Diploma awarded by a Polytechnic in Singapore, NUS High School Diploma or IB Diploma.
• Outstanding contributions or attributes in other areas such as community service, student leadership or sporting excellence.
• Preference will be given to students from lower income families.

UNIVERSITY ENGINEERING SCHOLARSHIP

Eligibility
• Open to Singapore Citizens or Singapore Permanent Residents.
• Successful awardees should read a full-time undergraduate Engineering or Technology-related programme.

Applicants must:
• Possess outstanding Diploma awarded by a Polytechnic in Singapore (preferably Diploma with Merit) and the Diploma has to be in the discipline of Engineering or Technology.
• Have excellent co-curricular records.
• Have strong leadership qualities and potential.

WEE KIM WEE LEGACY FUND UNDERGRADUATE SCHOLARSHIP

Eligibility
• Open to Singapore Citizens or Singapore Permanent Residents.
• Successful awardees should read a full-time undergraduate Communication Studies programme.

Applicants must:
• Possess outstanding Singapore-Cambridge GCE ‘A’ Level, Diploma awarded by a Polytechnic in Singapore, NUS High School Diploma or IB Diploma.
• Have excellent co-curricular records.
• Have strong leadership qualities and potential.

Scholarships for Current Undergraduate Students

Please visit our website at http://admissions.ntu.edu.sg/UndergraduateAdmissions/Pages/ExistingNTUScholarship.aspx for more information.

Financial Assistance Schemes

NTU believes that no student should be denied the opportunity of a university education because of financial difficulties. In order to enable such students to take up a university education, NTU offers several financial assistance schemes.

Tuition Fee Loan
All applicants pursuing their full-time undergraduate degree programmes are eligible for the loan regardless of family income.

Note:
• Students taking Biomedical Sciences & Chinese Medicine programme will only be covered under the scheme for the first three years of the programme.
• International students paying non-subsidised tuition fees are not eligible to apply for financial aid schemes.

The Tuition Fee Loan covers up to 90% of subsidised tuition fee payable by Singaporeans. It does not cover compulsory miscellaneous fees and hostel fee.
Study Loan
The Study Loan is meant for both local and international NTU full-time undergraduates who require assistance to finance part of their tuition fees and/or living expenses.

Note:
- Students taking Biomedical Sciences & Chinese Medicine programme will only be covered under the scheme for the first three years of the programme.
- International students paying non-subsidised tuition fees are not eligible to apply for financial aid schemes.

The application must be held concurrently with one or combination of the following three schemes: Tuition Fee Loan/CPF Education Scheme/Mendaki Tertiary Tuition Fee Subsidy. The per capita monthly household income must be less than S$2,400 for Singaporean and Singapore Permanent Resident students, and less than S$1,200 for international students.

CPF Education Scheme
The Central Provident Fund (CPF) Education Scheme is for the payment of MOE subsidised tuition fee for full-time undergraduate degree programmes. It does not cover compulsory miscellaneous fees and hostel fee.

Students can use their own, their spouse’s or their parents’ CPF savings to pay for their tuition fees. The CPF Board will consider the use of sibling’s or relative’s CPF savings only on a case-by-case basis.

Note:
- Students taking Biomedical Sciences & Chinese Medicine programme will only be covered under the scheme for the first three years of the programme.

Post Secondary Education Account (PSEA)
The PSEA scheme is administered by the Ministry of Education (MOE) which allows full-time undergraduates to utilise the funds in their own and/or their siblings’ PSEA accounts for the payment of tuition fee and compulsory miscellaneous fees as well as course fees for enrichment programmes approved by the University.

Mendaki Tertiary Tuition Fee Subsidy
The Mendaki Tertiary Tuition Fee Subsidy scheme offered by Yayasan Mendaki is meant for Singaporean and Singapore Permanent Resident Malay full-time undergraduates who are receiving MOE Tuition Grant and are pursuing their first full-time degree. The per capita monthly household income must not exceed S$1,500.

Bursaries
The NTU-administered bursaries are for NTU full-time undergraduates who need financial assistance to cover fees or defray their living costs.

Personal Computer Loan (PC Loan)
The PC Loan is an interest free loan given to financially needy full-time undergraduates to fund their laptop/desktop purchases from the current vendors of the NTU student notebook/PC tender that are in force.

Overseas Student Programme Loan/Travel Awards
This scheme is for full-time undergraduates who need financial assistance to fund their overseas study/exchange programmes or overseas industrial/professional attachments.

Work Study Scheme
The Work Study Scheme is designed to encourage students who need financial assistance to be self-reliant. Through this scheme, students will also gain valuable experience before they enter the workforce. The scheme consolidates jobs available on campus for easy viewing and application by full-time undergraduates.

Matriculation
Matriculation is a formal process where a person registers for study at the University and thus become part of the University student community. All students must matriculate with the University before commencing their academic programme.

Once matriculated, students will be able to print their class timetable for the immediate semester. The timetable shows the courses and the lecture/tutorial/laboratory groupings that they are assigned to.

Collection of Matriculation Packages
All new students will each be issued a matriculation package comprising a matriculation card and clicker device. This package must be collected in person. For the collection schedule and venue, please go to http://www.ntu.edu.sg/Students/Undergraduate/AcademicServices/Matriculation/Pages/Matriculationfornewstudents.aspx for details.

Please note that the clicker device is on loan to you for the duration of your programme in NTU. You are required to return the upon the completion of your programme or leaving NTU, whichever is earlier. For further queries on your clicker device, please email to clickers@ntu.edu.sg.

Freshmen Welcome Ceremony
The Freshmen Welcome Ceremony is an annual event specially organised by the University to officially welcome all freshmen. This is an important rite of passage for freshmen to be inducted into the University.

There will be exciting programmes lined up and attractive freshmen packs to commemorate your induction as part of NTU’s fraternity. Freshmen are strongly encouraged to attend the ceremony assigned for them as it will be an excellent opportunity to meet fellow freshmen, seniors and members of the University Management and Faculty.

Change of Programme
An existing student is allowed to change his programme of study within NTU, subject to the approval of the School(s) of both the current and new programme. Students may apply for change of programme during the two application periods stated at http://www.ntu.edu.sg/Students/Undergraduate/AcademicServices/Pages/ChangeofProgramme.aspx

The School of Art, Design and Media (ADM) and Sport Science and Management (SSM) programme considers students for change of programme only once a year, together with all new applicants.
to the University. Hence, applicants for these two programmes are to apply for change of programme online during the May-July application period for the change to be effected from Semester 1.

The School of ADM also requires applicants to submit their portfolio, write-up and assignment to the School of Art, Design and Media for evaluation by 31 March.

Please refer to http://www.adm.ntu.edu.sg/ProspectiveADM/UndergraduateProgrammes/ApplicationProcedures/Pages/ApplicationProcedures.aspx for the application procedures and requirements for the School of ADM.

All Nanyang Business School (NBS) students applying for change of programme within NBS should do so only at the end of their first year of study during the May to July application period.

Note:
- Freshmen (who have studied in the University for less than one semester) who wish to change programme must make their request by the second teaching week of their first semester to the Office of Admissions and Financial Aid (OAFA) via email at adm_local@ntu.edu.sg or adm_intnl@ntu.edu.sg. Thereafter, any application for change of programme can be made via StudentLINK during the application periods as given above.
- Students who are receiving scholarships are to check with the Scholarship Section of OAFA via email at ug_scholarships@ntu.edu.sg on how the change of programme is going to affect their scholarship status, before applying for change of programme.
- Existing part-time students must complete at least 4 semesters of study before they are eligible to apply for change to a full-time programme.
- Students who have changed their programme of study are not allowed to repeat a course which they have passed in the previous programme.
- Transfer of Credits
  - Students are to apply for transfer of credits by the 3rd teaching week of the first semester in the new programme. The relevant School shall decide on the final list of courses which may be used to satisfy the graduation requirements of the new programme.
  - For programmes involving common Year 1 (e.g. change of programme from Accountancy to Business) or equivalent courses, such courses taken previously, whether passed or failed, will be transferred.
  - For transfer of course credits within the University, both the academic units and grades (including P, F, S or U grade) of these courses will be counted towards the fulfillment of the degree requirements and used in the computation of the GPA.

Please refer to http://www.ntu.edu.sg/Students/Undergraduate/AdminServices/Pages/ApplyforSemesterLeave.aspx for more details.

Candidature

Semester Leave of Absence
Semester leave of absence granted by the University is categorized as follows:

- **Medical Leave**
  Leave of absence must be supported by a medical practitioner or medical report.

- **Personal Leave**
  All other leave of absence for reasons such as to participate in competitions and sports, to work or start up a company, or to attend to personal matters.

Students may be granted up to one year of semester leave each time. Students need to submit another application at the end of the leave period if an extension of leave is required. This extension is subject to support by the School. The cumulative maximum period of leave of absence that can be granted for the entire duration of study is three years.

Students who apply for leave after the second teaching week of the semester are required to pay the fees for that entire semester.

Please refer to: http://www.ntu.edu.sg/Students/Undergraduate/AdminServices/Pages/ApplyforSemesterLeave.aspx for more details.

**Short Leave**

Students must apply for short leave of absence or medical leave with their respective Schools if they cannot attend their laboratory sessions, quizzes/tests or other compulsory classes.

For absence from any attachment or internship or industrial immersion programmes, students must submit their leave application with supporting documents to the Career & Attachment Office.

- **Personal**
  Applications for short leave of absence must be submitted to the respective Schools not later than 7 working days in advance of such leave. Students should not go on leave until approval has been obtained.

- **Medical Leave**
  All medical certificates must be submitted not later than 7 working days after the medical leave to the relevant Schools. If students submit the medical certificate after the deadline, they will be given zero marks for any test or quiz that they were absent from.

- **Compassionate Leave**
  Compassionate leave will be granted in the event of the demise of an immediate family member (defined as parents, siblings and grandparents).

Please note that these categories of leave will not be approved:
1. Returning to home country during festive periods e.g. Chinese New Year, Hari Raya, etc.
2. Participating in activities (in and outside campus) organised by student bodies during the various occasions mentioned in point (1) above.
For more details, please refer to http://www.ntu.edu.sg/Students/Undergraduate/AdminServices/Pages/Applyforshortleave.aspx

Withdrawal from University

Students are advised to consult their academic mentor in School before making an application for withdrawal from the University.

Students who wish to withdraw from the University are to complete and submit the Application for Withdrawal from University (For Undergraduates) form together with the matriculation card and clicker device to their School.

Students who apply for withdrawal from the University after the second teaching week of the semester will be liable to pay fees for that entire semester.

Please refer to:
http://www.ntu.edu.sg/Students/Undergraduate/AdminServices/Pages/Withdrawfromcourse.aspx for more details.

The Academic Unit System
(http://www.ntu.edu.sg/Students/Undergraduate/AcademicServices/Pages/AcademicUnitSystem(AUS).aspx)

The University’s academic structure for its undergraduate programmes is based on the Academic Unit System. The system provides opportunities for students to broaden their learning experience and progress at a pace most suited to their individual needs while maintaining high academic standards.

The main features of the Academic Unit System are the semester arrangement of the academic year and the use of academic units (AU) for measuring academic workload.

Academic Calendar

The academic year starts off with an orientation week. It is divided into two semesters, Semester 1 of 18 weeks and Semester 2 of 17 weeks. Examinations are held at the end of each semester. There are two special terms during the Semester 2 vacation.

Academic Units

Under the Academic Unit System, each course is assigned a certain number of AU.

The AU is a measure of the student’s workload associated with both class attendance and preparation. For a typical one-semester course, the number of AU is calculated as follows:

(a) one hour of lecture/tutorial per week : 1 AU
(b) 3 hours laboratory/fieldwork per week : 1 AU

Curricular Requirements

(1) Curriculum Structure

The curriculum structure comprises 2 categories of requirements:

a. Major Requirement

The courses of study are classified under 2 groups:

(i) Core Courses
- these are compulsory courses required to satisfy programme requirements.

(ii) Major Prescribed Electives
- these are courses for specialisation in a particular degree programme.

b. General Education Requirement (GER)

This is a curriculum requirement for broadening study and is divided into 3 categories as follows:

(i) Core Courses (GER-Core):
- these are courses relating to:
  - Communication Skills
  - Singapore Studies
  - Human Resource Management*
  - Environmental Sustainability*
  - Ethics and Moral Reasoning*
  - Entrepreneurship and Innovation*

(ii) Prescribed Electives (GER-PE):
- the courses are categorised into the following sub-areas of studies:
  - Art, Humanities & Social Sciences (AHSS)*
  - Business & Management (BM)
  - Liberal Studies (LS)*
  - Liberal Arts (LA)*
  - Science, Technology & Society (STS)

(iii) Unrestricted Electives (GER-UE)
- these are courses chosen by students to broaden their learning experience.

Unrestricted electives may be taken from the list of courses offered by the School or, with the approval of the Chair concerned, from courses offered by other Schools in the University. Although unrestricted electives may be taken in any year of study, students are advised to plan carefully when to take the unrestricted electives in order not to delay their graduation.

For the purpose of fulfilling the requirements of the programme and for classification of the degree, once a course is confirmed by the student as being registered as a prescribed elective, it cannot be re-classified as an unrestricted elective, and vice-versa.

* please refer to your curriculum structure in your School’s website for the requirement that applies to you

(2) Prerequisites

Some courses may only be offered to students who have obtained at least the specified grade in related courses offered at a lower level. These lower-level courses are called the “prerequisites” for the higher-level courses.

(3) Academic Structure

The number of academic units that students must obtain in order to graduate is at: http://www.ntu.edu.sg/Students/Undergraduate/AcademicServices/Pages/AcademicUnitSystem(AUS).aspx

4) Period of Candidature

(a) The period of candidature for each programme is as follows:
### Single Degree Programmes (Full-Time)

<table>
<thead>
<tr>
<th>Programme</th>
<th>Period of Candidature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
</tr>
<tr>
<td>Accountancy</td>
<td>3 years</td>
</tr>
<tr>
<td>Business</td>
<td></td>
</tr>
<tr>
<td>Aerospace Engineering</td>
<td></td>
</tr>
<tr>
<td>Art, Design &amp; Media</td>
<td></td>
</tr>
<tr>
<td>Bioengineering</td>
<td></td>
</tr>
<tr>
<td>Biological Sciences</td>
<td></td>
</tr>
<tr>
<td>Chemical &amp; Biomolecular Engineering</td>
<td></td>
</tr>
<tr>
<td>Chemistry &amp; Biological Chemistry</td>
<td></td>
</tr>
<tr>
<td>Chinese</td>
<td></td>
</tr>
<tr>
<td>Civil Engineering</td>
<td></td>
</tr>
<tr>
<td>Communication Studies</td>
<td></td>
</tr>
<tr>
<td>Computer Engineering</td>
<td></td>
</tr>
<tr>
<td>Computer Science</td>
<td></td>
</tr>
<tr>
<td>Economics</td>
<td>4 years</td>
</tr>
<tr>
<td>Electrical &amp; Electronic Engineering</td>
<td></td>
</tr>
<tr>
<td>English</td>
<td></td>
</tr>
<tr>
<td>Environmental Earth Systems Science</td>
<td></td>
</tr>
<tr>
<td>Environmental Engineering</td>
<td></td>
</tr>
<tr>
<td>History</td>
<td></td>
</tr>
<tr>
<td>Information Engineering &amp; Media</td>
<td></td>
</tr>
<tr>
<td>Linguistics &amp; Multilingual Studies</td>
<td></td>
</tr>
<tr>
<td>Maritime Studies</td>
<td></td>
</tr>
<tr>
<td>Materials Engineering</td>
<td></td>
</tr>
<tr>
<td>Mathematical Sciences</td>
<td></td>
</tr>
<tr>
<td>Mathematics &amp; Economics</td>
<td></td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td></td>
</tr>
<tr>
<td>Philosophy</td>
<td></td>
</tr>
<tr>
<td>Physics &amp; Applied Physics</td>
<td></td>
</tr>
<tr>
<td>Psychology</td>
<td></td>
</tr>
<tr>
<td>Public Policy &amp; Global Affairs</td>
<td></td>
</tr>
<tr>
<td>Sociology</td>
<td></td>
</tr>
<tr>
<td>Sport Science and Management</td>
<td></td>
</tr>
</tbody>
</table>

For students admitted directly to the second year of a 4-year programme, the normal, minimum and the maximum periods shall be 3 years, 2.5 years and 5 years respectively.

### Double Degree Programmes (Full-Time)

<table>
<thead>
<tr>
<th>Programme</th>
<th>Period of Candidature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
</tr>
<tr>
<td>Accountancy and Business</td>
<td>4 years</td>
</tr>
<tr>
<td>Biomedical Sciences and Chinese Medicine*</td>
<td>5 years</td>
</tr>
<tr>
<td>Business and Computing</td>
<td>4½ years*</td>
</tr>
<tr>
<td>Business and Computer Engineering</td>
<td>4½ years*</td>
</tr>
<tr>
<td>Engineering and Economics</td>
<td>5 years</td>
</tr>
</tbody>
</table>

* Inclusive of 2 years at Beijing University of Chinese Medicine
* 4 years with acceleration

### Integrated Programme (Full-Time)

<table>
<thead>
<tr>
<th>Programme</th>
<th>Period of Candidature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
</tr>
<tr>
<td>Renaissance Engineering Programme^</td>
<td>4½ years</td>
</tr>
</tbody>
</table>

^ awards two degrees - a Bachelor degree and a Masters degree

The following groups of students are to seek advice from their respective Schools on the period of candidature:

- a) Computer Engineering, Computer Science, and Electrical and Electronic Engineering students who are pursuing the integrated programme offered by NTU in collaboration with the Georgia Institute of Technology
- b) Biological Sciences students who are pursuing the integrated programme in Biological Sciences and Master of Science offered by NTU
- c) Engineering students who are pursuing the integrated programme in Engineering and Master of Science offered by NTU

### (5) Classification of Students

Students are classified as Year 1 to Year 5 students according to the number of AU earned. While re-classification is normally done at the end of an academic year, where appropriate, this may be done at the end of the first semester. Students will not be re-classified if their CGPA is nil. Students placed on Academic Warning and Academic Probation will not be re-classified until they have been restored to good academic standing.

The number of AU that students must earn to be classified to the next year of study is at: [http://www.ntu.edu.sg/Students/Undergraduate/AcademicServices/Pages/AcademicUnitSystem(AUS).aspx](http://www.ntu.edu.sg/Students/Undergraduate/AcademicServices/Pages/AcademicUnitSystem(AUS).aspx)

### (6) Graduation and Residential Requirements

To be eligible for the award of a Bachelor's degree from NTU, a student must fulfill the following conditions:

- a) For all students in the Sport Science & Management programme and full-time students admitted to Year 1 with effect from AY 2011-12, and full-time students admitted directly to Year 2 with effect from AY 2012-13.
The balance AU may consist of AU earned from courses with Pass (P), Exempted (EX) and Satisfactory (S) notations.

* cover all courses i.e. Core, Major Prescribed Electives and GER courses.

# For students in the double degree programmes
- The minimum study period at NTU is one year less than the normal candidature.
- Double degree students are awarded with two degrees. For each degree, the minimum AU of graded courses that students should obtain from NTU is the same as its corresponding single degree programme.

(b) Pass all or been exempted from some of the examinations prescribed for the degree.

(c) Satisfy all other requirements prescribed for the degree.

(7) Transfer of Academic Units
With the prior approval of the Chair concerned, students are allowed to take some courses from another university and transfer the number of AU earned from that university towards fulfilling the degree requirements of NTU. This could include participation in exchange and/or other similar programme.

Students who have taken some courses from another university prior to their admission to NTU may also apply for transfer of credits earned. They must submit their application for transfer of credits within the first semester of their enrolment in NTU.

Grades obtained for credits earned in other institutions are not counted in the classification of the degree awarded.

Students who transfer credits from another university must comply with the requirements in Section (6) on Graduation and Residential Requirements.

Course Registration
(http://www.ntu.edu.sg/Students/Undergraduate/AcademicServices/CourseRegistration/Pages/default.aspx)

(1) Student Automated Registration System
All students must register their courses through the Student Automated Registration System (STARS) according to the schedule announced by the Office of Academic Services.

Students who did not register for the classes they join will not be allowed to take the examinations for these courses.

(2) Outstanding Tuition and Hostel Rental Fees
Students with outstanding tuition and/or hostel rental fees will not be given access to STARS and barred from course registration. Students must pay their outstanding fees before registering courses.

(3) Add/Drop Courses
Students may add or drop any course provided this is done within the add/drop period as announced by the Office of Academic Services.

A course that is dropped during the add/drop period will not appear in the official transcript. A student who is still registered for a course after the add/drop period but did not subsequently sit for the examination will be deemed to have read and failed the course. An ‘F’ will appear on his official transcript.

(4) Academic Load
In order to complete the degree requirements within the normal specified period of candidature, full-time students at NTU are expected to carry an academic load of 16 to 18 AU/21 AU* per semester.
Subject to approval by the Chair concerned, students may be allowed to take up to 3 AU*/8 AU* more or less than the normal semester academic load to enable them to pursue their studies at a pace commensurate with their needs and/or capabilities. Students who are on academic warning or academic probation are allowed to take only up to the normal load.

* applies to students admitted before AY 2011-12 (except students in the Sport Science & Management programme), full-time students admitted directly to Year 2 in AY2011-12

# applies to all students in the Sport Science & Management programme and full-time students admitted to Year 1 with effect from AY 2011-12, and full-time students admitted directly to Year 2 with effect from AY2012-13

(5) Restricted Repeat

Final Year students who have failed any core course which is not offered in the semester following the failure may be permitted to take the failed course(s) as restricted repeat(s). This arrangement is available only for Final Year core courses which students cannot replace with any other courses offered in the following semester. Additionally, only Final Year students deemed to have sufficient AU to meet graduation requirements will be eligible for restricted repeat(s).

Special Terms

(http://www.ntu.edu.sg/Students/Undergraduate/AcademicServices/Pages/SpecialTerms.aspx)
The University offers two Special Terms during the Semester 2 vacation. Special Term I is held from May to June and Special Term II from June to July.

Participation in the Special Terms is optional. It is open only to full-time matriculated students of NTU except for students who will be graduating at the end of Semester 2 prior to the Special Terms.

Students who are not away for activities such as In-Camp Training, attachment programme, sports, holiday, part-time employment, etc may apply for the Special Terms. Students who are reading courses in the Special Terms to complete their degree requirements in that academic year may not be able to join the year’s Convocation.

Information on Special Term fees is available at: http://www.ntu.edu.sg/Students/Undergraduate/AcademicServices/Pages/fees.aspx

Examinations

(http://www.ntu.edu.sg/Students/Undergraduate/AcademicServices/Examination/Pages/default.aspx)
The examination timetables are available at http://www.ntu.edu.sg/Students/Undergraduate/AcademicServices/ExaminationTimetable.aspx

Examination Rules and Regulations

1. A candidate who breaches any of the Examination Regulations will be liable to disciplinary actions including (but not limited to) suspension or expulsion from the University.

2. A candidate who is caught cheating during the examination will be dealt with by the Board of Discipline and is liable to be expelled from the University.

3. All materials and/or devices which are found to violate any examination rules and regulations will be confiscated.

4. Examinations will be conducted during the allocated times shown in the examination timetable.

5. Candidates are allowed into the examination hall ten minutes before the time scheduled for the commencement of the examination. They are, however, not permitted to turn over the question paper placed on their desks until the time for the commencement of the examination.

6. Candidates are not allowed to present themselves for examination later than one hour after the commencement of the examination.

7. The identity of every candidate will be checked during the examination. Candidates are required to bring their matriculation card, identity card, passport, driving licence or EZ-Link card and place them at the upper right-hand corner of their desk at the commencement of each examination.

8. Candidates may bring into the examination hall only those calculators that have been approved by the School. Graphic calculators which are approved for use must be re-set i.e. memory cleared, prior to any examination. Unauthorised calculators are not permitted in the examination hall.

9. No candidate is allowed to bring into the examination hall any unauthorised materials (such as books, papers, documents or pictures) and electronic devices with communication and/or storage capabilities (such as laptop, tablet PC, smart watch, audio/video/gaming devices), with exception of mobile phones. Bags, waist pouches, ear or headphones are not to be brought into the examination hall. This applies to all types of examination.

10. Candidates are allowed to bring their mobile phones into the examination hall. However, the mobile phones must be switched off at all times in the examination hall. Photography is not allowed in the examination hall at all times. Disciplinary action will be taken against a candidate who violates these regulations.

11. Candidates are to comply on the reference materials allowed for the different types of examination as follows:

a. Closed book: no reference materials, in whatever form, are allowed
b. Open book: Any reference materials in paper form are allowed (all electronic devices are not allowed)

C. Restricted open book: restricted materials allowed as defined by course lecturers (e.g. one A4 size cheat sheet or a particular textbook)
12. The University will not be responsible for the loss of candidates’ belongings in or outside the examination hall.

13. No candidate who has entered the examination hall will be allowed to leave the hall, temporarily or otherwise for any reason whatsoever, until the examination has started.

14. Candidates are not allowed to leave their seats without the permission of an invigilator.

15. Candidates who wish to communicate with an invigilator must raise their hands.

16. No communication by word of mouth or otherwise between candidates is allowed in the examination hall.

17. Candidates who have been given permission to leave their seats temporarily must be accompanied by an invigilator throughout their absence from the examination hall. Candidates’ mobile phone must be left on their desk in the examination hall when they leave the examination hall temporarily, e.g., to visit the washroom.

18. Candidates are responsible to check they have the correct question paper. They must carefully read the instructions printed on each answer book and examination question paper. The blank pages in the answer book are to be used only for candidates’ rough work. Solutions or any other materials written on these blank pages will not be marked. All text answers must be written with black/blue pen.

19. Candidates must not write their names on the answer books. They should write only their matriculation numbers in the space provided on the cover of each answer book.

20. Candidates are not allowed to write, mark, highlight or deface any reference materials provided for the examination. Any candidate found doing so is liable to have his reference materials removed from his use for the rest of the examination and be made to pay for the cost of the materials that have to be replaced.

21. Candidates who have presented themselves for an examination will not be allowed to hand in their answer books until one hour has elapsed after the commencement of the examination.

22. Candidates who decided to leave the examination after the commencement of the examination due to illness or any other reasons will be marked as present for the examination and their answer scripts will be marked and graded.

23. Candidates are responsible for ensuring that their answer scripts are ready for invigilator’s collection on their table if they complete and/or leave the examination hall before end of the examination. Any unauthorised removal of answer scripts or part of answer scripts from the examination hall would deem the answer scripts as null and void.

24. Candidates are not allowed to leave their seats during the last 15 minutes before the conclusion of the examination.

25. At the conclusion of the examination, candidates must remain seated and must not communicate with one another while their answer books are being collected and tallied.

26. Candidates may not take with them, used or unused papers, from the examination hall, except their own question paper, unless otherwise instructed.

27. Candidates must comply with the dress code of the University. A candidate who is not properly attired will not be admitted into the examination hall.

28. A student who does not register or who, having registered, fails to take any examination for which he is eligible to sit, shall be deemed to have failed the course unless the Chair concerned is satisfied that there is good and sufficient reason for such failure to register or take the examination.

29. Where a candidate, on account of illness, is absent from an examination for a degree, he may be permitted to appear for the examination at the next period of the examination provided the candidate has been examined by a registered medical practitioner and a medical certificate and a medical report submitted to One Stop@SAC within 2 working days of the absence. Any fee payable for the medical examination shall be borne by the candidate.

Note:
In the event of a major train service disruption lasting more than an hour and if stranded in such a situation on their journey for the examination, candidates are advised to approach the SMRT or SBS Transit staff at the station’s information counter for assistance.

If necessary, the University may delay the start of the examinations by up to 30 minutes. In this instance, a notification will be sent to all affected students via sms and to their NTU email account.

Candidates are advised to plan their schedule and allow for extra travelling time to attend their examinations. Candidates are advised to tune in to the radio for traffic news before leaving home for the examination. No extra time will be given for students who are delayed due to traffic jams, bad weather, etc.

Academic Standing and Grading Systems

(1) Grading Systems
The Grade Point Average (GPA) system applies to students admitted to the School of Humanities and Social Sciences in AY 2004-2005 and all students admitted to Year 1 with effect from AY 2005-2006 and direct-entry students admitted to Year 2 with effect from AY 2006-2007.
(a) Grades and grade points are assigned as follows:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Grade Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>5.00</td>
</tr>
<tr>
<td>A</td>
<td>5.00</td>
</tr>
<tr>
<td>A-</td>
<td>4.50</td>
</tr>
<tr>
<td>B+</td>
<td>4.00</td>
</tr>
<tr>
<td>B</td>
<td>3.50</td>
</tr>
<tr>
<td>B-</td>
<td>3.00</td>
</tr>
<tr>
<td>C+</td>
<td>2.50</td>
</tr>
<tr>
<td>C</td>
<td>2.00</td>
</tr>
<tr>
<td>D+</td>
<td>1.50</td>
</tr>
<tr>
<td>D</td>
<td>1.00</td>
</tr>
<tr>
<td>F</td>
<td>0.00</td>
</tr>
</tbody>
</table>

The above grades also apply to all current students with effect from the AY2005 – 2006.

(b) The following non-letter grades and notations are also used:

* - Course with Pass/Fail grading only
# - Repeated attempt
IP - In Progress
LOA - Absent (with valid reasons)
EX - Exempted from course
TC - Transfer credits
S – Satisfactory
U - Unsatisfactory

(c) The Cumulative Grade Point Average (CGPA) represents the grade average of all courses (including failed courses) attempted by a student. The computation of CGPA is as follows:

\[
\text{CGPA} = \frac{\sum (\text{Grade Point} \times \text{AU for Course 1}) + \sum (\text{Grade Point} \times \text{AU for Course X}) + \ldots}{\text{Total AU attempted in all semesters so far}}
\]

Only letter-graded courses i.e. courses with grades A+, A, A-, B+ ... are included in the computation of CGPA. Courses where only Pass/Fail grades are given, where the Satisfactory/ Unsatisfactory option was invoked, where the students were absent with valid reasons, and courses that the students are exempted from or are incomplete (i.e. awarded an ‘IP’ grade) are not included in the computation of CGPA. A few examples of how CGPA is computed are given below for illustration.

**Example 1**

<table>
<thead>
<tr>
<th>Course</th>
<th>AU</th>
<th>Grade</th>
<th>Grade Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA101</td>
<td>3</td>
<td>B</td>
<td>3.50</td>
</tr>
<tr>
<td>AB102</td>
<td>3</td>
<td>B-</td>
<td>3.00</td>
</tr>
<tr>
<td>AC103</td>
<td>3</td>
<td>C</td>
<td>2.00</td>
</tr>
<tr>
<td>AD104</td>
<td>4</td>
<td>A</td>
<td>5.00</td>
</tr>
<tr>
<td>AE105</td>
<td>3</td>
<td>D</td>
<td>1.00</td>
</tr>
</tbody>
</table>

\[
\text{CGPA} = \frac{3.50 \times 3 + 3.00 \times 3 + 2.00 \times 3 + 5.00 \times 4 + 1.00 \times 3}{3 + 3 + 3 + 4 + 3} = 3.03
\]

**Example 2**

<table>
<thead>
<tr>
<th>Course</th>
<th>AU</th>
<th>Grade</th>
<th>Grade Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA101</td>
<td>3</td>
<td>B</td>
<td>3.50</td>
</tr>
<tr>
<td>AB102</td>
<td>3</td>
<td>B-</td>
<td>3.00</td>
</tr>
<tr>
<td>AC103</td>
<td>3</td>
<td>C</td>
<td>2.00</td>
</tr>
<tr>
<td>AD104</td>
<td>4</td>
<td>A</td>
<td>5.00</td>
</tr>
<tr>
<td>AE105</td>
<td>3</td>
<td>F</td>
<td>0.00</td>
</tr>
</tbody>
</table>

\[
\text{CGPA} = \frac{3.50 \times 3 + 3.00 \times 3 + 2.00 \times 3 + 5.00 \times 4 + 0.00 \times 3}{3 + 3 + 3 + 4 + 3} = 2.84
\]

**Example 3**

(Example 3 uses the S/U option in the computation of CGPA.)

<table>
<thead>
<tr>
<th>Course</th>
<th>AU</th>
<th>Grade</th>
<th>Grade Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA101</td>
<td>3</td>
<td>B</td>
<td>3.50</td>
</tr>
<tr>
<td>AB102</td>
<td>3</td>
<td>B-</td>
<td>3.00</td>
</tr>
<tr>
<td>AC103</td>
<td>3</td>
<td>C</td>
<td>2.00</td>
</tr>
<tr>
<td>AD104</td>
<td>4</td>
<td>U</td>
<td>N.A</td>
</tr>
<tr>
<td>AE105</td>
<td>3</td>
<td>S</td>
<td>N.A</td>
</tr>
</tbody>
</table>

\[
\text{CGPA} = \frac{3.50 \times 3 + 3.00 \times 3 + 2.00 \times 3}{3 + 3 + 3} = 2.83
\]

**Example 4**

(Example 4 is a Pass/Fail course i.e. only P or F grades are awarded. This course is excluded from the computation of the CGPA.)

<table>
<thead>
<tr>
<th>Course</th>
<th>AU</th>
<th>Grade</th>
<th>Grade Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA101</td>
<td>3</td>
<td>B</td>
<td>3.50</td>
</tr>
<tr>
<td>AB102</td>
<td>3</td>
<td>B-</td>
<td>3.00</td>
</tr>
<tr>
<td>AC103</td>
<td>3</td>
<td>C</td>
<td>2.00</td>
</tr>
<tr>
<td>AD104</td>
<td>4</td>
<td>A</td>
<td>5.00</td>
</tr>
<tr>
<td>AE105</td>
<td>3</td>
<td>P</td>
<td>N.A</td>
</tr>
</tbody>
</table>

\[
\text{CGPA} = \frac{3.50 \times 3 + 3.00 \times 3 + 2.00 \times 3 + 5.00 \times 4}{3 + 3 + 3 + 4} = 3.50
\]
Example 5
(If a student is exempted from AE105, the grade ‘EX’ will be shown for this course. This course is excluded from the computation of the CGPA.)

<table>
<thead>
<tr>
<th>Course</th>
<th>AU</th>
<th>Grade</th>
<th>Grade Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA101</td>
<td>3</td>
<td>B</td>
<td>3.50</td>
</tr>
<tr>
<td>AB102</td>
<td>3</td>
<td>B-</td>
<td>3.00</td>
</tr>
<tr>
<td>AC103</td>
<td>3</td>
<td>C</td>
<td>2.00</td>
</tr>
<tr>
<td>AD104</td>
<td>4</td>
<td>A</td>
<td>5.00</td>
</tr>
<tr>
<td>AE105</td>
<td>3</td>
<td>EX</td>
<td>N.A</td>
</tr>
</tbody>
</table>

\[
\text{CGPA} = \frac{[3.50 \times 3] + [3.00 \times 3] + [2.00 \times 3] + [5.00 \times 4]}{[3 + 3 + 3 + 4]} = 3.50
\]

(d) Year Grade Point Average (YGPA) is computed as follows:

\[
\text{YGPA} = \frac{[\text{Grade Point } \times \text{AU for Course 1}] + [\text{Grade Point } \times \text{AU for Course X}] + ...}{[\text{Total AU attempted in all semesters so far}]}
\]

The method of computing the YGPA is similar to that for computing the CGPA. Please refer to the examples for computing CGPA for illustration. Courses attempted in the Special Terms are not included in the computation of the YGPA.

(e) The CGPA will be reflected in students’ transcripts.

(f) An ‘F’ grade obtained in a course and a new grade attained for the subsequent attempt will both be reflected in the transcript. Both grades will also be counted in the computation of YGPA (if they are taken within the same academic year) and CGPA.

(g) Students are not allowed to repeat any courses taken except those graded ‘F’.

(h) Credits for courses taken from approved student exchange programmes are excluded from the CGPA computation, but they will be counted towards the academic unit requirement for graduation, and reflected in the transcript.

(2) Satisfactory/Unsatisfactory (S/U) Option

(a) The S/U option allows a student to take a course on an ‘ungraded’ basis i.e. no letter grade such as A, B, etc will be awarded. A course will be indicated as ‘S’ (Satisfactory) if the final letter grade obtained is a ‘D’ or better. Conversely, it will be indicated as ‘U’ (Unsatisfactory) if the grade obtained is ‘F’. The descriptor ‘Satisfactory’ or ‘Unsatisfactory’ will appear in the result slip and the transcript issued by the University.

(b) A student will receive AU towards his degree only if he attains an ‘Satisfactory’ (S) grade. He earns no AU for courses with a ‘U’ grade.

(c) The ‘S’ or ‘U’ notations carry no grade point and hence have no effect on the CGPA and the classification of degrees.

(d) A student is to select the courses that he would like to be graded S/U online. Students will be informed each semester on the period to declare S/U for the courses that they have registered in that semester. Schools will advise their students on the courses that are available on S/U option.

(e) The S/U option does not apply to:
- Pass/Fail courses
- courses that count towards the requirements for second major or minor programme
- graduate courses
- incoming exchange and non-graduating students

(f) Unless otherwise advised by his School, the maximum number of AU that a student can choose for S/U grading during his candidature is as follows:

<table>
<thead>
<tr>
<th>Programme</th>
<th>S/U quota</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-year (except for Biomedical Sciences programme)</td>
<td>12 AU</td>
</tr>
<tr>
<td>- For Students admitted to Year 1</td>
<td>12 AU</td>
</tr>
<tr>
<td>- For Students admitted to Year 2</td>
<td>9 AU</td>
</tr>
<tr>
<td>Biomedical Sciences programme</td>
<td>9 AU</td>
</tr>
</tbody>
</table>

(g) Once opted for S/U grading, the course AU will count towards the S/U quota regardless of the final results i.e., S, U or absent with valid reasons (LOA).

(h) The S/U option that students have exercised for a course is irrevocable. Hence, students who have invoked S/U cannot appeal for the course(s) to be reversed to letter grade(s) after the exercise for S/U option is over. The S/U option cannot be applied retrospectively after the declaration period or to courses that students have already completed for letter grades.

(i) A student who obtains a ‘U’ can repeat the course. However, the ‘U’ grade that he gets for his first attempt will remain in his academic record and will be printed in the transcript issued by the University.

(j) The repeat attempt(s) of a course will retain the grading option chosen for the first attempt i.e. S/U or letter-graded. The repeat course includes replacement courses. The AU of a course that has been opted for S/U grading will be counted against the S/U quota only once. Its repeat will not be counted against the quota again.

(k) Students who exercise the S/U option must comply with the requirements on Graduation and Residential Requirements.

More information on S/U Option is available at: http://www.ntu.edu.sg/Students/Undergraduate/AcademicServices/CourseRegistration/Pages/satisfactoryUnsatisfactory.aspx.
(3) Classification of Degree

The cut-off for each degree classification is as follows:

<table>
<thead>
<tr>
<th>CGPA range</th>
<th>4-year programme</th>
<th>3-year programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.50 - 5.00</td>
<td>First Class *</td>
<td>First Class</td>
</tr>
<tr>
<td>4.00 - 4.49</td>
<td>Second Class Upper</td>
<td>Second Class Upper</td>
</tr>
<tr>
<td>3.50 - 3.99</td>
<td>Second Class Lower</td>
<td>Second Class Lower</td>
</tr>
<tr>
<td>3.00 - 3.49</td>
<td>Third Class</td>
<td>Pass with Merit</td>
</tr>
<tr>
<td>2.00 - 2.99</td>
<td>Pass</td>
<td>Pass</td>
</tr>
</tbody>
</table>

* For programmes under the College of Engineering (except for the Maritime Studies programme) and College of Science, a minimum CGPA of 4.50 plus at least an ‘A-’ grade for the Final Year Project are required for the award of a First Class Honours degree. For programmes under the School of Humanities and Social Sciences, students who opt out of the Final Year Project will not be eligible for a First Class or Second Upper Honours degree.

(d) A minimum CGPA of 2.0 must be maintained at the end of each semester to qualify for the overloading of courses.

(e) Students enrolled in the Accelerated Bachelor’s Programme must maintain a minimum CGPA of 4.00 in order to remain in the Programme.

Dean’s List

The Dean’s list is compiled on a yearly basis. The top 5% of the cohort, subject to attaining a minimum YGPA of 4.50 and the specified AU of graded courses by curriculum type taken in NTU in the academic year, is eligible for the Dean’s list. Full-time single degree students have to complete at least 16 AU (non-BRC curriculum) or 15 AU (BRC curriculum) of graded courses, while part-time single degree students have to complete at least 9 AU of graded courses. Effective from AV11-12, double-degree students have to complete a total of 16 or 15 AU (for non-BRC and BRC respectively) of discrete graded courses from both degrees, and 9 AU of graded courses from each degree, to be eligible for Dean’s list.

Courses that are graded as Satisfactory/Unsatisfactory (S/U) and Pass/Fail or those with grades ‘EX’ (Exempted), ‘IP’ (In Progress) and ‘LOA’ (Leave of Absence) are not counted in the AU workload for the purpose of determining the Dean’s List. Besides this, final year students must attain at least a Second Upper Honours degree in order to be considered for the Dean’s List.

Medals and Prizes

Medals and prizes are awarded to NTU undergraduates to reward outstanding academic and extra-curricular achievements. The most prestigious awards are the Lee Kuan Yew Gold Medal and Koh Boon Hwee Scholars Award.

Lee Kuan Yew Gold Medal

The Lee Kuan Yew Gold Medals are awarded to the most outstanding students who are first in general proficiency throughout their programme of studies and who have obtained a First Class Honours in their degree programmes.

Koh Boon Hwee Scholars Award

The Koh Boon Hwee Scholars Awards are awarded to students who have achieved excellent academic performance, displayed strong leadership ability, demonstrated potential for contributing to society as well as displayed exemplary conduct and be held as role models for their peers. This award recognizes the achievement of graduating students, while honouring teachers and faculty members who have been an inspiration to them. A cash grant is set

(4) Academic Standing

(a) The requirements for graduation are as follows:

- Successful completion of the prescribed academic unit requirement as set out by the programme curriculum
- A minimum CGPA of 2.00 is required at the end of the final semester of study

(b) The criteria for satisfactory academic standing in any given semester are:

- maintaining a minimum CGPA of 2.00
- completing at least 75% of the normal AU workload

(c) Students with poor results will be accorded the following academic standing and subjected to performance review:

- Academic Warning - if the CGPA falls below 2.00 for any given semester
- Academic Probation - if the CGPA remains below 2.00 for the following semester
- Academic Termination - if the CGPA remains/falls below 2.00 for the third consecutive semester, or at the end of the final semester of study. A letter of termination will be issued. Appeal against termination on the grounds of extenuating circumstances may be made, subject to the following rules:
  - The appeal must be submitted to the relevant School within 2 weeks after release of semester examination results or before the start of next semester, whichever is earlier.
  - Normally only one appeal is allowed per candidature.
up in the name of each teacher honoured, who in turn nominates a prospective student to receive the grant upon admission to NTU. The University aims to perpetuate the virtuous cycle of recognizing student’s achievements and honouring the hard work of teachers in producing well-rounded student achievers.

**Convocation**

Convocation is a watershed event that commemorates a significant milestone in a student’s life. It is a joyous and meaningful occasion for the student, their family and friends as they mark the completion of the journey as a student at NTU and go on to make contributions to society.

Convocation also marks the transition from a student to a proud alumnus of the University. This is an opportunity to celebrate achievements acquired in NTU and look back on the friendships and bonds forged, lessons learnt and challenges overcome.

To help students and guests prepare for the graduation and to help make this occasion memorable for years to come, a webpage will be uploaded nearer the convocation. It is recommended that students check this page every few weeks, and immediately prior to leaving for any convocation activities, to ensure that they have the most updated information.

**Honorary Doctorate**

An honorary doctorate is one of higher education’s most significant accolades. The University awards honorary doctorates to distinguished individuals who have achieved pre-eminence in their field or profession, or who have made significant contributions to their country, the society or in international relations. They are conferred on individuals who have made important contributions to the University and with whom the University has a relationship.
ACADEMIC PROGRAMMES

Overview
As a comprehensive university with a proven R&D track record and a robust research infrastructure, NTU is wellpositioned to provide Singapore and the region with quality manpower training through graduate education. We offer graduate students the opportunity to develop themselves as leaders and scholars as they work alongside and learn from distinguished academics and researchers.Scheme.
The University offers a comprehensive range of graduate programmes leading to the award of the degrees of Master’s and Doctor of Philosophy as well as Graduate Diplomas. Graduate degree programmes are either by research or coursework and dissertation.

For details of programmes and courses, please visit: http://admissions.ntu.edu.sg/graduate/Pages/home.aspx

Higher Degree Programmes by Research
Candidates will pursue independent but supervised research on an approved topic which a thesis must be submitted for examination. Candidates are also required to do at least three to six courses. Selection of courses is made after consultation with the research supervisor.

Research candidates work closely and keep in regular contact with their supervisor on their research project. Supervisors will submit regular reports on the progress of each candidate under their supervision. In addition to being examined on the thesis, a candidate for the degree of Doctor of Philosophy must pass an oral examination on the subject matter of his thesis and related matters. For non-PhD candidates, the oral examination may be prescribed at the discretion of the Board of Examiners.

Programmes Offered by National Institute of Education
The National Institute of Education offers the following programmes by research: Doctor of Philosophy, Master of Arts and Master of Science. It also offers Master of Arts, Master of Science and Master of Education programmes by coursework and dissertation.

Partnership Programmes with Other Universities
The University prides itself on continued, worldwide collaborations with the best in the industry and academia. Partnerships have been developed with more than 200 universities in over 30 different countries, and strong ties have been established with industry through research collaborations.

The following graduate programmes are offered in collaboration with partner universities:

NTU-Waseda Double MBA

This one year full-time joint programme between NTU and Waseda University, a premier Japanese institution in research and technology offers a Double MBA in Management of Technology.

Successful candidates are awarded two Master’s Degrees - an MBA from Nanyang Technological University and an MBA in Technology Management from Waseda University.

M.Sc. in Financial Engineering in Collaboration with Carnegie Mellon University
(http://www.mfe.ntu.edu.sg/Pages/Home.aspx)
The Master of Science in Financial Engineering programme offered by the Nanyang Business School is a highly rigorous programme. It challenges and builds the intellect while at the same time prepares participants for practical use of advanced financial techniques in the industry. Our collaboration with Carnegie Mellon University, USA, brings financial practices in the east and west live to the classrooms. Graduates of this programme can look forward to taking on very challenging careers in the areas of risk management, quantitative asset management, product structuring, quantitative trading, quantitative research, financial information technology as well as other areas in high-technology finance.

M.Sc. programme in Maritime Studies with Norwegian School Management
This programme, conducted jointly by NTU and the Norwegian School of Management (BI), provides an avenue for higher training for young graduates and middle-management executives working in shipping-related areas. The M.Sc. programme enables participants to gain a deeper understanding of key topics related to the maritime business such as shipping management, shipping economics and shipping and transport logistics. The Master of Science (Maritime Studies) programme produces high calibre and talented graduates to play leading roles in fulfilling Singapore's vision to be an internationally renowned maritime hub.

Joint M.Sc.(Integrated Circuit Design) programme with Technical University of Munich
(http://www.eee.ntu.edu.sg/Programmes/ProspectiveStudents/Graduate/Join-MScProgrammes/NTU-TUM_ICD/Pages/NTUTUMICD.aspx)
The international Master of Science programme in Integrated Circuit Design jointly offered by NTU and Technische Universitaet Muenchen will educate the next generation of engineers and leaders for the semiconductor industry. Contents of the programme range from analog, digital and mixed-circuit design to design methodology, automation, product manufacturing and testing. Integrated circuit design is also placed in a broader context, for example, by teaching fundamental concepts of signal processing, which are at the core of today's communications circuits. Non-technical but essential topics such as product marketing, international management, patent law and aspects of culture and globalisation are also covered.

Joint M.Sc.(Aerospace Engineering Programme) with Technical University of Munich
(http://www.mae.ntu.edu.sg/ProspectiveStudents/GraduateProgrammesCoursework/AE/Pages/Home.aspx)
NTU-TUM Master of Science (M.Sc.) in Aerospace Engineering degree is, jointly awarded by Nanyang Technological University (NTU), Singapore and Technische Universitat Munchen (TUM), Germany. This highly specialised programme is jointly taught by international faculty members from both universities, who have extensive experience in aerospace education and research.
Joint M.Sc. (Microelectronics Programme) with Technical University of Munich
http://www.eee.ntu.edu.sg/Programmes/ProspectiveStudents/Graduate/Joint-MScProgrammes/NTUTUMME/Pages/NTUTUMME.aspx

This M.Sc. (Microelectronics) programme is a highly specialized programme jointly offered by Nanyang Technological University and Technische Universitat Munchen (Germany) on a full-time basis for training engineers to work in silicon wafer fabrication industries, engage with the related research institutions and pursue further studies.

NTU-Warwick Double Master's Programme
The NTU-Warwick Double Master’s Programme represents an innovative programme of study offering students the opportunity to live and study in two culturally diverse countries/regions, experiencing the ‘best of both worlds’ in conceptual training, empirical relevance and policy application.

Dual Master's Programme in M.Sc. (Systems and Project Management) and M.E. (Systems Engineering) with Stevens Institute of Technology
(http://www.mae.ntu.edu.sg/ProspectiveStudents/GraduateProgrammesCoursework/Documents/DMP_Brochure.pdf)
The Dual Master’s Programme provides an opportunity for NTU’s M.Sc. (Systems and Project Management) students to broaden and enrich their educational experience by spending one semester at Stevens Institute of Technology (SIT), Hoboken, New Jersey/NY, to take core courses in Systems Engineering in lieu of the core course requirements in NTU.

Doctor in Education, Dual Award programme with Institute of Education, University of London
(http://www.nie.edu.sg/edd)
The programme is designed for professionals who would like to extend your professional expertise and training and develop skills in research, evaluation and reflection on practice. It is of value to academic staff in universities and colleges, school teachers and professionals working in international organisations. It is also suitable for senior administrators in schools, universities and educational and government bodies. It has the rigour and expectations of a PhD, but with a professional focus.

Joint M.A. (Leadership and Educational Change) programme with Teachers College, Columbia University
(http://www.nie.edu.sg/malec)
This is an innovative new programme with a dual focus on organizational and curriculum leadership. The programme aims to prepare educational leaders to go beyond organisational leadership towards embracing leadership capacities in curriculum, teaching and learning. Jointly taught by two internationally-renowned teacher education institutions, the programme prepares a new generation of educational leaders for Singapore, the Asia-Pacific region and the larger international community.

Admissions

Admission Requirements for Research Programmes

(a) Minimum Entry Qualifications for Admission
A bachelor’s degree with minimum 2nd Class Upper Honours and the ability to pursue research in the candidate’s proposed field of advanced study.

(b) Required Test Scores
A valid GRE/GMAT score is required for applicants who are not graduates of the Autonomous Universities in Singapore, unless there is specific requirement stated in the School’s website for the respective programme. Test dates must be within 5 years or less from the date of application.

Applicants from India may use the Graduate Aptitude Test in Engineering [GATE] score of at least 90% in place of GRE.

For applicants whose native language is not English, good TOEFL score is required. Test dates must be within 2 years or less from the date of application. IELTS may be submitted in place of TOEFL.

A photocopy of the GRE/GMAT/TOEFL/IELTS test scores should be attached to the application. Original test scores are not required at the application stage.

Applicants are advised to refer to Schools’ website for specific requirements for the respective programme.

Students may be admitted as Research Students in the first instance with the students expected to be confirmed as PhD candidates or Master’s candidates after a confirmation exercise.

Students with only a Bachelor’s degree can also be admitted as Research Students in the first instance with the students expected to be confirmed as a PhD candidate.

Admission Requirements for Coursework Programmes
Applicants must possess at least a good bachelor’s degree or its equivalent.

TOEFL is a requirement for those who graduated from a university where English was not the medium of instruction. An equivalent IELTS score is acceptable in lieu of TOEFL.

Application Procedures

Programmes by Research
There are two intakes a year, in January and August. Applications for a higher degree by research are to be submitted at least six
months before the desired intake date. The University reserves the right to consider applications for other semesters.

Applications for admission (excluding applications to the National Institute of Education) must be submitted online at http://admissions.ntu.edu.sg/graduate/R-Programs/R-WhenYouApply/Pages/R-ApplyOnline.aspx

Programmes by Coursework and Dissertation
Applications for admission are normally invited through the press in January for admission in July/August.

Please apply online at:
http://admissions.ntu.edu.sg/graduate/coursework

For the following coursework programmes, please visit the website indicated.

MBA Programme
The Nanyang MBA Nanyang Business School
Nanyang Technological University
Nanyang Avenue, S3-B3A-01
Singapore 639798
Tel: (65) 6790 4835/6183, Fax: (65) 6791 3561
Email:nbsmba@ntu.edu.sg
http://www.nbs.ntu.edu.sg/GRADUATE/NANYANG_MBA

MBA (Nanyang Fellows) Programme
The Nanyang Fellows Programme
Nanyang Business School
Nanyang Technological University
Nanyang Avenue, S3-B2A-39
Singapore 639798
Tel: (65) 6790 4779/4803/6413, Fax: (65) 6791 8522
Email: fellows@ntu.edu.sg
http://www.nfp.ntu.edu.sg

Nanyang Executive MBA
Nanyang Business School
Nanyang Technological University
Nanyang Avenue, S3-B3A-03
Singapore 639798
Tel: (65) 6790 5798/4901, Fax: (65) 6792 4535
Email: emba@ntu.edu.sg
http://www.emba.ntu.edu.sg

M.Sc.(Finance) Programme
Nanyang Business School
Nanyang Technological University
Nanyang Avenue, S3-B3A
Singapore 639798
Tel: (65) 6790 5696/5879, Fax: (65) 6792 7690
Email: mscfinance@ntu.edu.sg nance@ntu.edu.sg
http://www.mscf.ntu.edu.sg

M.Sc.(Financial Engineering) Programme
Nanyang Business School
Nanyang Technological University
Nanyang Avenue, S3-B3A
Singapore 639798
Tel: (65) 6790 4758/5025/5794, Fax: (65) 6793 7440
Email: mfe@ntu.edu.sg
http://www.mfe.ntu.edu.sg

M.Sc.(Managerial Economics) Programme
Nanyang Centre for Public Administration,
NTU Block S3.2 Level B4
Nanyang Avenue
Singapore 639798
Tel: (65) 6790 6295, Fax: (65) 6791 7180
Email: ncpa@ntu.edu.sg
http://www.ncpa.ntu.edu.sg/Chi/Programme/Graduate%20Programmes/MME/Pages/Home.aspx

Master of Public Administration Programme
Nanyang Centre for Public Administration,
NTU Block S3.2 Level B4
Nanyang Avenue
Singapore 639798
Tel: (65) 6790 6295, Fax: (65) 6791 7180
Email: ncpa@ntu.edu.sg
Chinese Programme: http://www.ncpa.ntu.edu.sg/Chi/Programme/Graduate%20Programmes/MPA/Pages/Home.aspx
English Programme: http://www.ncpa.ntu.edu.sg/Eng/Programmes/GraduateProgrammes/MasterofPublicAdministrationEnglish/Pages/Home.aspx

Joint M.Sc.(Integrated Circuit Design) Programme
with Technical University of Munich (TUM)
German Institute of Science and Technology
10 Central Exchange Green
#03-01 Pixel Building
Singapore 138649
Tel: (65) 6777 7407, Fax: (65) 6777 7236
Email: info@gist.edu.sg
http://www.eee.ntu.edu.sg/Programmes/ProspectiveStudents/Graduate/Joint-MScProgrammes/NTU-TUM_ICD/Pages/NTUTUMICD.aspx

Joint M.Sc.(Aerospace Engineering) Programme
with Technische Universität München (TUM)
German Institute of Science and Technology – TUM Asia
10 Central Exchange Green
#03-01 Pixel Building
Singapore 138649
Tel: (65) 6777 7407, Fax: (65) 6777 7236
Email: HYPERLINK "mailto:graduate@tum-asia.edu.sg"graduate@tum-asia.edu.sg
http://www.tum-asia.edu.sg
M.Sc.(Technopreneurship and Innovation) Programme
Nanyang Technopreneurship Center
Nanyang Technological University
50 Nanyang Drive, Research TechnoPlaza
Second Floor, BorderX Block
Singapore 637553
Tel: (65) 6316 6778 / 6513 8113, Fax: (65) 6792 0467
Email: tipen@ntu.edu.sg
http://www.nlc.ntu.edu.sg/Programmes/GraduateProgrammes/

M.Sc. (Applied Economics) Programme
Division of Economics
Nanyang Technological University
School of Humanities and Social Sciences
14 Nanyang Drive, HSS-06-18
Singapore 637332
Tel: (65) 67922433
Email: mscae@ntu.edu.sg
http://www.msae.hss.ntu.edu.sg/Pages/Home.aspx

National Institute of Education Programmes
Office of Graduate Studies and Professional Learning
Nanyang Technological University
1 Nanyang Walk
Singapore 637616
Tel: (65) 6790 3888
Email: nieadmpp@nie.edu.sg (for enquiries on admissions matters) and higherdegrees@nie.edu.sg (for enquiries on programme matters)
http://www.nie.edu.sg/gpl

Programmes at the National Institute of Education
There are two intakes a year, in January and August. Please visit NIE’s website for application details and the application form.

Applicants will be notified of their application results by post. For enquiries, please contact the Manager (Higher Degree Admissions) of NIE’s Office of Academic Administration & Services.
Tel: (65) 6592 8208
Email: nieadmpp@nie.edu.sg
http://www.nie.edu.sg

Academic Year
The academic year which commences in August each year is normally divided into two semesters. A few of the coursework programmes run on a three-trimester academic year. For updates, please refer to:
http://www.ntu.edu.sg/Students/Graduate/AcademicServices/Pages/AcademicCalendar.aspx

Candidature Periods
a) Research Programmes
The maximum and minimum periods of candidature are as follows:

<table>
<thead>
<tr>
<th>Programme</th>
<th>Full-Time</th>
<th>Part-Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctor of Philosophy Degree</td>
<td>2 years</td>
<td>5 years</td>
</tr>
<tr>
<td>Master's Degree</td>
<td>1 year</td>
<td>3 years</td>
</tr>
</tbody>
</table>

b) Coursework Programmes

<table>
<thead>
<tr>
<th>Programme Duration</th>
<th>Full-Time</th>
<th>Part-Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.Sc.(Biomedical Engineering)</td>
<td>1 – 2 years</td>
<td>2 – 4 years</td>
</tr>
<tr>
<td>M.Sc.(Civil Engineering)</td>
<td>1 – 3 years</td>
<td>2 – 4 years</td>
</tr>
<tr>
<td>M.Sc.(Environmental Engineering)</td>
<td>1 – 3 years</td>
<td>2 – 4 years</td>
</tr>
<tr>
<td>M.Sc.(International Construction Management)</td>
<td>1 – 3 years</td>
<td>2 – 4 years</td>
</tr>
<tr>
<td>M.Sc.(Maritime Studies)</td>
<td>1 – 3 years</td>
<td>2 – 4 years</td>
</tr>
<tr>
<td>M.Sc.(Communications Engineering)</td>
<td>1 – 3 years</td>
<td>2 – 4 years</td>
</tr>
<tr>
<td>M.Sc.(Computer Control &amp; Automation)</td>
<td>1 – 3 years</td>
<td>2 – 4 years</td>
</tr>
<tr>
<td>M.Sc.(Electronics)</td>
<td>1 – 3 years</td>
<td>2 – 4 years</td>
</tr>
<tr>
<td>M.Sc.(Integrated Circuit Design) – Joint degree with Technical University of Munich (TUM)</td>
<td>1.5 – 3 years</td>
<td>-</td>
</tr>
<tr>
<td>M.Sc.(Microelectronics) – Joint degree with Technical University of Munich (TUM)</td>
<td>1.5 – 3 years</td>
<td>-</td>
</tr>
<tr>
<td>M.Sc.(Power Engineering)</td>
<td>1 – 3 years</td>
<td>2 – 4 years</td>
</tr>
<tr>
<td>M.Sc.(Signal Processing)</td>
<td>1 – 3 years</td>
<td>2 – 4 years</td>
</tr>
<tr>
<td>Graduate Diploma In Information-Communication Technology</td>
<td>-</td>
<td>1 – 3 years</td>
</tr>
<tr>
<td>M.Sc.(Project Management) – Joint degree with University of Manchester (UOM)</td>
<td>1 – 3 years</td>
<td>-</td>
</tr>
<tr>
<td>M.Sc. (Aerospace Engineering) - Joint degree with Technical University of Munich (TUM)</td>
<td>1 – 4 years</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Programme Duration</th>
<th>Full-Time</th>
<th>Part-Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.Sc. (Applied Economics) Programme</td>
<td>1 – 3 years</td>
<td>2 – 4 years</td>
</tr>
<tr>
<td>M.Sc.(Supply Chains &amp; Logistics)</td>
<td>1 – 2 years</td>
<td>2 – 4 years</td>
</tr>
<tr>
<td>M.Sc.(Mechanical Engineering)</td>
<td>1 – 2 years</td>
<td>2 – 4 years</td>
</tr>
<tr>
<td>M.Sc.(Precision Engineering)</td>
<td>1 – 2 years</td>
<td>2 – 4 years</td>
</tr>
<tr>
<td>M.Sc.(Smart Product Design)</td>
<td>1 – 2 years</td>
<td>2 – 4 years</td>
</tr>
<tr>
<td>M.Sc.(Systems and Project Management)</td>
<td>1 – 2 years</td>
<td>2 – 4 years</td>
</tr>
</tbody>
</table>
### List of Programmes (by school)

<table>
<thead>
<tr>
<th>School of Humanities and Social Sciences</th>
<th>Programme Duration</th>
<th>Full-Time</th>
<th>Part-Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master of Public Administration (English)</td>
<td>2 - 4 years</td>
<td>1 - 2 years</td>
<td></td>
</tr>
<tr>
<td>Master of Public Administration (Chinese)</td>
<td>2 - 4 years</td>
<td>1 - 3 years</td>
<td></td>
</tr>
<tr>
<td>MA (Contemporary China)</td>
<td>1 - 4 years</td>
<td>1 - 4 years</td>
<td></td>
</tr>
</tbody>
</table>

### National Institute of Education

<table>
<thead>
<tr>
<th>Programme</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.A (Applied Linguistics)</td>
<td>1 - 2 years</td>
</tr>
<tr>
<td>M.A (Applied Psychology)</td>
<td>2 - 3 years</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Programme</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.A (Counseling &amp; Guidance)</td>
<td>1.5 - 2 years</td>
</tr>
<tr>
<td>M.A (Educational Management)</td>
<td>1 - 2 years</td>
</tr>
<tr>
<td>M.A (Humanities Education)</td>
<td>1 - 2 years</td>
</tr>
<tr>
<td>M.A (Instructional Design &amp; Technology)</td>
<td>1 - 2 years</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Programme</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master of Arts in Professional Education (Training and Development)</td>
<td>1 year</td>
</tr>
<tr>
<td>Master of Education (MEd)</td>
<td>1 - 2 years</td>
</tr>
<tr>
<td>M.Sc (Exercise &amp; Sport Studies)</td>
<td>1 - 3 years</td>
</tr>
<tr>
<td>M.Sc (Life Sciences)</td>
<td>1 - 3 years</td>
</tr>
<tr>
<td>M.Sc (Mathematics for Educators)</td>
<td>1 - 3 years</td>
</tr>
<tr>
<td>Master of Teaching</td>
<td>1 - 3 years</td>
</tr>
</tbody>
</table>

### Tuition Fees

Please refer to these webpages for information about fees, service obligation and other details:

- Programs by Research
  [http://admissions.ntu.edu.sg/graduate/R-Programs/BeforeApplying-Research/Pages/Fees.aspx](http://admissions.ntu.edu.sg/graduate/R-Programs/BeforeApplying-Research/Pages/Fees.aspx)

- Programs by Coursework
  [http://admissions.ntu.edu.sg/graduate/coursework/BeforeApplying/Fees/Pages/NotesonFees.aspx](http://admissions.ntu.edu.sg/graduate/coursework/BeforeApplying/Fees/Pages/NotesonFees.aspx)

- Service Obligation
  [http://admissions.ntu.edu.sg/graduate/Pages/ServiceObligation.aspx](http://admissions.ntu.edu.sg/graduate/Pages/ServiceObligation.aspx)

Fees for programmes offered by National Institute of Education
[www.nie.edu.sg/gpl/fees.htm](http://www.nie.edu.sg/gpl/fees.htm)
Scholarships and Financial Assistance Schemes

Research Programmes

The University provides Research Scholarships to candidates with outstanding academic results to pursue higher degree studies by research on a full-time basis. The scholarship covers research and other university-related fees and includes a monthly stipend. Details are at http://admissions.ntu.edu.sg/graduate/scholarships/Pages/default.aspx

In addition, scholarship awards are also offered by government agencies and industry partners.

<table>
<thead>
<tr>
<th>Scholarship</th>
<th>Eligibility</th>
<th>Award Details &amp; Quantum</th>
</tr>
</thead>
</table>
| Nanyang President's Graduate Scholarship | • Applicants must have a 1st Class Honours degree or equivalent at Bachelor's level and should also demonstrate excellent research abilities  
• No restriction as to the nationality of candidates but, all things being equal, preference will be given to Singapore Citizens and Singapore Permanent Residents  
• There is no bond attached to the scholarship. | • Full tuition fees.  
• Monthly stipend of $3,200*.  
• Conference allowance up to $4,000 per financial year (April previous year to March current year).  
• One-time IT allowance of $1,500.  
• Annual grant of $500 for journal subscription or book purchase.  
• Thesis preparation allowance.  
• Priority for subsidised campus accommodation.  
* With effect from August 2012, the newly admitted students will receive the following monthly stipend:  
  - Singapore Citizens - $3,300  
  - Singapore Permanent Residents - $3,200  
  - International students - $3,000 |
| NTU Research Scholarship            | • Open to local or international students seeking admission as a full-time candidates pursuing a Doctor of Philosophy (Ph.D) programme by research at NTU.  
• Candidates with 1st Class Honours or 2nd Class Upper Honours or its equivalent will be considered for the scholarship regardless of their citizenship.  
• Students should not be on paid employment or accept paid employment or concurrently hold any other scholarship, fellowship, bursary or top-up allowance during the prescribed period of the award.  
• There is no bond attached to the scholarship. | • Tenable for one year in the first instance and renewable every 12 months, subject to the scholar's good progress and availability of funds.  
• Monthly stipends as follows:  
  - Singapore Citizens: $2,500  
  - Singapore Permanent Residents: $2,200  
  - International Students: $2,000  
For students who pass the Ph.D Qualifying Examination/Confirmation, the stipend will be increased by $500, subject to good performance in research and the attainment of required standards for courses taken (the university reserves the right to vary the amount of the stipend at any time by written notice).  
• Maximum period of the award is 4 years for Ph.D candidates, subject to good performance and progress, as well as availability of research funding. |
| Singapore International Graduate Award (SINGA) | • Open to only international student seeking admission as a full-time candidate pursuing a Doctor of Philosophy (Ph.D) programme by research at NTU.  
• Applicant must have excellent academic results, and be in the top 20% of the cohort.  
• Good skills in written and spoken English.  
• Good reports from two academic referees.  
• There is no bond attached to the scholarship. | • Full tuition fees.  
• Monthly stipend of $2,000 (increase to $2,500 upon confirmation).  
• One-time $1,000 settling-in allowance.  
• One-time airfare grant of $1,500. |
<table>
<thead>
<tr>
<th>Scholarship</th>
<th>Eligibility</th>
<th>Award Details &amp; Quantum</th>
<th>Applications</th>
</tr>
</thead>
</table>
| **A*STAR Graduate Scholarship**  | • Singaporeans, Singapore Permanent Residents, citizens of ASEAN countries and other international students seeking admission as full-time Ph.D research candidates in NTU.  
• Successful applicants have to take up Singapore Citizenship.  
• Graduates with (1) 1st Class Honours or (2) 2nd Class Upper Honours and good ‘A’ Level results or polytechnic diploma with merit.  
• Applicants are encouraged to apply with their GRE scores. Applications without GRE test scores will still be considered but successful applicants will have to satisfy the GRE requirement before embarking on their Ph.D studies.  
• The average scores of successful awardees for the combined Verbal and Quantitative components for past batches were 1370 with a standard deviation of 100 with at least 4.5 for the Analytical Writing Components. | • Support for up to 4 years of academic pursuit, leading to a Ph.D.  
• Opportunities for overseas attachment of up to 12 months during the Ph.D studies.  
• Full tuition fees and other compulsory fees.  
• Monthly stipend of $3,100 - $3,300.  
• Conference support of up to $4,000 per year. | |
<table>
<thead>
<tr>
<th>Scholarship</th>
<th>Eligibility</th>
<th>Award Details &amp; Quantum</th>
<th>Applications</th>
</tr>
</thead>
</table>
| **ASEAN Graduate Scholarship** | • Open to nationals of member countries of ASEAN (except Singapore) to pursue designated full-time Master's degree by coursework and dissertation at NTU.  
• Singaporeans and Singapore Permanent Residents are not eligible to apply.  
• Excellent academic record.  
• A very good command of the English language.  
• At least 2 years of working experience.  
• An acceptable score in the Graduate Management Admission Test (GMAT) – for applicants of the MBA programme. | • Each scholarship is tenable for a period of 1 year only for M.Sc., Mass Communication and MBA programmes.  
• It covers:  
  - Monthly stipend of $1,350.  
  - Book allowance of $500.  
  - Tuition fee, health insurance, examination fee and other approved fees, allowances and expenses.  
  - Cost of one overseas Business Study Mission (for MBA candidates only) undertaken within the tenable period of the scholarship.  
  - Cost of travel from home country to Singapore on award of the scholarship. | • Open in November and close in December each year.                                                                                       |
| **Nanyang Fellows Scholarship** | • This scholarship is open to international applicants seeking to pursue a full-time Nanyang Fellows MBA programme at NTU.  
Singaporeans and Singapore Permanent Residents are not eligible to apply.  
Eligibility criteria  
• A good bachelor's degree  
• At least 8 years of management or senior professional experience  
• For applicants whose university degree was not imparted in English, a minimum score of 600 for paper-based, 250 for computer-based and above 100 for internet-based in TOEFL or a minimum band score of 6.5 in IELTS is required.  
• Proven leadership potential  
• Strong academic capability  
• Character and personal qualities  
• One should not hold any other scholarship, fellowship or bursary concurrently during the prescribed period of the award. | • Each scholarship is tenable for a period of 1 year (from start to end of programme) only.  
• Each scholarship shall cover partial tuition fee of the Nanyang Fellows MBA Programme.  
• There is no bond attached to the scholarship. | • Candidates applying to the programme commencing in July 2014, and who intends to apply for the scholarship should submit their online application by 31 January 2014.  
For enquiries, please contact fellows@ntu.edu.sg |
| **Nanyang-MBA Scholarship** | • Open to all students seeking admission to pursue a full-time MBA programme at NTU.  
• Selection is based on scholastic achievements as well as financial circumstances and other relevant factors.  
Note: Recipients of this scholarship may be called upon to assist in some administrative or research work of not more than 5 hours per week.  
• There is no bond attached to the scholarship. | • Coverage of tuition fees for up to 3 trimesters. | For enquiries, contact the MBA office at: nbsmba.ntu.edu.sg |

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For the Nanyang Bulletin 2014/2015
Tuition Fee Loan
Candidates enrolled in research programmes or selected full-time coursework programmes are eligible to apply for a Tuition Fee Loan of up to 90% of the research/tuition fee payable by Singapore citizens. The University has appointed selected banks as agents to administer the Tuition Fee Loan Scheme.

Course Registration
Registration Period
All graduate students are to register for the course(s) they wish to study through the Graduate Course Registration System.

Students who fail to register a course and yet proceed to attend classes in that course, will not be allowed to take the examination in that course. No grade will be awarded if the course has no formal examination.

It is the responsibility of students to register course(s) themselves and ensure that the courses are correctly registered. Students must register for and finalised their courses during their allocated registration period, after which adding and dropping of courses is disallowed. Please refer to the class time-table when selecting courses to avoid clashes in schedules.

Important
A course dropped within the registration period will not appear in the student's result slip and official transcript. However, for a course that has not been dropped within the registration period, the student will be deemed to have sat and failed the course and a fail grade will be reflected in the result slip and official transcript.

Coursework Students
Students should check the AU requirement for the coursework component of study.

Selection of Electives
Selection of an elective is on a first-come, first-served basis. A student who has chosen an elective from another programme will be placed on a waiting list. Electives will be allocated after the stipulated registration period on a first-come, first-served basis.

Research Students
School may have additional or other requirements on courses to be taken by research students. Therefore, research students are strongly advised to check with their own School on the courses requirements.

Maximum Number of Courses/AU Per Term
For information on the maximum number of courses/AU allowed to register per term, please refer to the following webpages:

http://www.ntu.edu.sg/Students/Graduate/AcademicServices/CourseRegistration/Pages/research.aspx (For Research students)

Examinations
Instructions to Candidates
Students are responsible for understanding and complying with the University policies and procedures pertaining to examination matters.

All candidates must follow these instructions conscientiously. You will be dealt with by the Board of Discipline for any breach of regulations.

Cheating
A candidate who is caught cheating in examinations is liable to be expelled from the University.

The University takes a serious view of cheating in examination. All students are to take note of the written examination instructions issued to them as well as the announcement made by the Chief Invigilators during examination.

Examination Rules and Regulations
1. Please read the instructions carefully as a candidate who breaches any of the Examinations Regulations will be dealt with by the Board of Discipline.

2. Examinations will be conducted during the allocated times shown in the examination timetable.

3. Candidates are allowed into the examination hall ten minutes before the time scheduled for the commencement of the examination. They are, however, not permitted to turn over and read the question papers placed on their desks until the commencement of the examination.

4. No candidate is allowed to present himself for examination later than one hour after the commencement of the examination.

5. The identity of every candidate will be checked during the examination. Candidates are required to bring their matriculation cards or identity cards and place them at the top right-hand corner of their desks at the commencement of each examination.

6. Candidates may bring into the examination hall only those calculators that have been approved by the School. Unauthorised calculators are not permitted in the examination hall. Candidates in the M.B.A., M.Sc.(MBA Specialisation), M.Mass Comm., M.Sc. (Info.Studies), M.Sc.(Info.Systems), M.Sc.(Knowledge Management) and Grad.Dip.Mass Comm. Programmes are NOT required to have their calculators approved by the Schools concerned and are allowed to use any calculators.
13. A candidate who wishes to communicate with an invigilator must raise his hand.

14. A candidate who has been given permission to leave his seat temporarily must be accompanied by an invigilator.

15. No communication by word of mouth or otherwise between candidates is allowed in the examination hall.

16. Candidates must carefully read the instructions printed on each answer book and examination question paper. The blank pages in the answer book are to be used only for candidates' rough work. Solutions or any other materials written on these blank pages will not be marked.

17. Candidates must not write their names on the answer books. They should write only their matriculation numbers in the space provided on the cover of each answer book.

18. Candidates are not allowed to write, mark, highlight or deface any reference materials provided for the examination. Any candidate found doing so is liable to have his reference materials removed from his use for the rest of the examination and be made to pay for the cost of the materials that have to be replaced.

19. No candidate who has presented himself for an examination will be allowed to hand in his answer script until one hour has lapsed after the commencement of the examination.

20. No candidate is allowed to leave his seat during the last 15 minutes before the conclusion of the examination.

21. At the conclusion of the examination, candidates must remain seated and must not communicate with one another while their answer scripts are being collected and tallied.

22. No papers, used or unused, may be removed from the examination hall except that a candidate may take with him his own question paper unless instructed otherwise.

23. Candidates must comply with the dress code of the University. A candidate who is not properly attired will not be admitted into the examination hall.

24. Attention is drawn to the following regulation relating to absence from any examination due to illness: “A candidate who is absent from an examination for a degree, on account of illness, may be permitted to appear for the examination at the next period of the examination on the condition that the candidate has been examined by
a registered medical practitioner (registered with the Singapore Medical Council) and a medical report attached with the original medical certificate be submitted to the Graduate Studies Office within two (2) working days of absence from the examination."

The medical report form is available at GSLink-Academic-Examination-Request for Medical Report Form. Candidates are responsible to provide the form to their attending doctor. Any fee payable for the medical examination under the above regulation shall be paid by the candidate.

25. Attention is drawn to the following regulation relating to absence from any examination:
   “A student who does not register or who, having registered, fails to take any examination for which he is eligible to sit, shall be deemed to have sat and failed the examination unless the Chair concerned is satisfied that there is good and sufficient reason for such failure to register or take the examination.”

All appeals must be submitted to the Graduate Studies Office within two (2) working days of absence from the examination.

26. Attention is drawn to the following regulation relating to outstanding fees:
   “No candidate shall be entitled to be admitted to a University examination unless the Chief Financial Officer certifies that he is not in debt to the University (otherwise than as a result of a loan made by the University) or to any University hall of residence.”

Candidates are reminded to settle all outstanding fees with the Office of Finance and/or rental fees with the International Student Centre before they sit for any examination.

**Academic Standing and Grading Systems**

1. Grades and grade points are assigned as follows:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Grade Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>5.00</td>
</tr>
<tr>
<td>A</td>
<td>5.00</td>
</tr>
<tr>
<td>A-</td>
<td>4.50</td>
</tr>
<tr>
<td>B+</td>
<td>4.00</td>
</tr>
<tr>
<td>B</td>
<td>3.50</td>
</tr>
<tr>
<td>B-</td>
<td>3.00</td>
</tr>
<tr>
<td>C+</td>
<td>2.50</td>
</tr>
<tr>
<td>C</td>
<td>2.00</td>
</tr>
<tr>
<td>D+</td>
<td>1.50</td>
</tr>
<tr>
<td>D</td>
<td>1.00</td>
</tr>
<tr>
<td>F</td>
<td>0.00</td>
</tr>
</tbody>
</table>

2. The following non-letter grades and notations will be used. They have no assigned grade point and thus will not be counted in the calculation of TGPA or CGPA.

   * - Course with Pass/Fail grading only
   AT - By attendance only
   IP - In Progress
   W - Withdrawal
   X - Absent

3. Definition of Grade Point Average

3.1. Term Grade Point Average (TGPA)

   TGPA represents the grade point average of all courses attempted by a student in any term of study.

   \[
   TGPA = \frac{\text{Sum of (Grade Point x AU* for course attempted in the term)}}{\text{Total AU* attempted in the term of study}}
   \]

   ‘Term’ refers to either semester or trimester as defined periods of study in each programme.

3.2. Cumulative Grade Point Average (CGPA)

   CGPA represents the grade point average of all courses attempted by a student.

   \[
   CGPA = \frac{\text{Sum of (Grade Point x AU* for course attempted to date)}}{\text{Total AU* attempted to date}}
   \]

   ‘AU* = Academic Unit: Each course is assigned a certain number of AU. It is a measure of the student’s workload associated with both class attendance and preparation.

3.3. The TPGA and CGPA will be reflected in students’ transcript of academic records.

4. Courses that are exempted and courses with approval to transfer credits will not be counted in the calculation of TGPA or CGPA. However, they will be counted towards the AU requirement for graduation, and reflected in the transcript.

5. A Fail (F) grade obtained in a course, and a new grade attained for any subsequent repeat, will be counted in the calculation of TPGA and CGPA. The grades for all attempts will be reflected in the transcript.
Graduation Requirements and Academic Performance

Coursework Programmes

Graduation Requirements
i. Successful completion of all requirements as prescribed by the programme of study; and
ii. A minimum CGPA of 2.50 is attained at the completion of the programme of study.

Satisfactory Academic Performance
A student is considered to be making satisfactory progress in any term of study if he/she attains a minimum TGPA of 2.50.

Poor Academic Performance
A student with poor academic performance will be subjected to the following actions:
1. Academic warning if TGPA < 2.50 in any term of study
2. Candidature termination if TGPA < 2.50 for the second consecutive term of study

Research Programmes

Graduation Requirements
i. Successful completion of all requirements as prescribed by the programme of study or School; and
ii. After completion of all course requirements, a minimum CPGA of 3.00 and 3.50 must be attained for Master’s students and PhD students respectively.

Satisfactory Academic Performance
In any term of study, a research student is considered to be making satisfactory progress if he/she satisfies the following conditions:
1. Attain a minimum TGPA of 3.00 for Master’s students and 3.50 for PhD students; and
2. Attain at least Grade Point 2.50 (grade C+) in every course; and
3. Complete all course requirements within the confirmation period as prescribed under Qualifying Examination.

Poor Academic Performance
A research student with poor academic performance will be subjected to the following actions:

<table>
<thead>
<tr>
<th>Research Programme</th>
<th>Academic Warning</th>
<th>Termination of Financial Aid and/or Candidature</th>
</tr>
</thead>
</table>
| Master             | i. TGPA < 3.00 in any term of study; or
|                    | ii. Any course with Grade Point less than 2.50 (below C+) | i. Fail to complete all course requirements within the confirmation period; or
|                    |                | ii. TGPA < 2.50 in two consecutive terms; or |
| PhD                | i. TGPA < 3.50 in any term of study; or
|                    | ii. Any course with Grade Point less than 2.50 (below C+) | iii. TGPA < 3.00 in three consecutive terms. |
### Medals and Prizes for Graduate Programmes

<table>
<thead>
<tr>
<th>Name of Award</th>
<th>Programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ernst &amp; Young Cash Prize</td>
<td>All MBA Programmes</td>
</tr>
<tr>
<td>Singapore Academy of Law Prize</td>
<td>All MBA Programmes</td>
</tr>
<tr>
<td>Information Systems Audit and Control Association Book Prize</td>
<td>All MBA Programmes</td>
</tr>
<tr>
<td>Institute of Singapore Chartered Accountants Gold Medal cum Cash Award</td>
<td>M.B.A. (Accountancy)</td>
</tr>
<tr>
<td>The Association of Banks in Singapore Gold Medal Cum Cash Award</td>
<td>M.B.A. (Finance)</td>
</tr>
<tr>
<td>Accenture Gold Medal</td>
<td>M.B.A. (Strategy)</td>
</tr>
<tr>
<td>Raffles Hotel Book Prize</td>
<td>M.B.A. (Marketing)</td>
</tr>
<tr>
<td>Professor Lim Chong Yah Gold Medal</td>
<td>M.B.A. (Nanyang Fellows)</td>
</tr>
<tr>
<td>Reuters Gold Medal</td>
<td>M.Sc. (Financial Engineering)</td>
</tr>
<tr>
<td>Furama Ltd Endowed Book Prize</td>
<td>Master of Business Administration</td>
</tr>
<tr>
<td>Willie Wong EMBA Gold Medal</td>
<td>Master of Business Administration</td>
</tr>
<tr>
<td>United Overseas Bank Gold Medal</td>
<td>M.Sc. (Strategic Studies)</td>
</tr>
<tr>
<td>Singapore Technologies Engineering Gold Medal</td>
<td>M.Sc. (International Relations)</td>
</tr>
<tr>
<td>The Lion Group Gold Medal</td>
<td>M.Sc. (International Political Economy)</td>
</tr>
<tr>
<td>The Rajabali Jumbahboy Foundation Gold Medal</td>
<td>M.Sc. (Asian Studies)</td>
</tr>
<tr>
<td>The Association of Nanyang University Graduates Gold Medal</td>
<td>M.Sc. (Managerial Economics)</td>
</tr>
<tr>
<td>Zaobao Gold Medal</td>
<td>Master of Public Administration</td>
</tr>
<tr>
<td>Singapore Chinese Chamber of Commerce &amp; Industry Gold Medal</td>
<td>M.Sc. (Managerial Economics) / Master of Public Administration</td>
</tr>
<tr>
<td>Ng Ghit Cheong Cash Award</td>
<td>Master of Public Administration</td>
</tr>
<tr>
<td>Professional Engineers Board Gold Medal</td>
<td>M.Sc. from any of the programmes offered by the School of CEE / School of EEE / School of MAE</td>
</tr>
<tr>
<td>Guthrie Gold Medal</td>
<td>M.Sc. (International Construction Management)</td>
</tr>
<tr>
<td>Maritime &amp; Port Authority Gold Medal cum Cash Award</td>
<td>M.Sc. (Maritime Studies)</td>
</tr>
<tr>
<td>DSTA Gold Medal &amp; Cash Award</td>
<td>CEE Master of Engineering</td>
</tr>
<tr>
<td>Micron Gold Medal</td>
<td>M.Sc. (Electronics)</td>
</tr>
<tr>
<td>Texas Instruments Book Prize</td>
<td>M.Sc. from any of the programmes offered by the School of EEE</td>
</tr>
<tr>
<td>Systems on Silicon Manufacturing Company Book Prize</td>
<td>M.Sc. from any of the programmes, Master of Engineering &amp; Doctor of Philosophy offered by the School of EEE</td>
</tr>
<tr>
<td>Pearson Education Gold Medal</td>
<td>Master of Mass Communication</td>
</tr>
<tr>
<td>LexisNexis Gold Medal &amp; Cash Award</td>
<td>M.Sc. (Knowledge Management)</td>
</tr>
<tr>
<td>Ministry of Information and The Arts Gold Medal</td>
<td>Graduate Diploma in Mass Communication</td>
</tr>
<tr>
<td>NTU Class of 1985 Cash Prizes Award</td>
<td>M.Sc. (Technopreneurship &amp; Innovation)</td>
</tr>
<tr>
<td>Dr and Mrs Alex Tan Pang Kee Gold Medal</td>
<td>SPMS Doctor of Philosophy</td>
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<tr>
<td>Sembcorp Marine Book Prize in MSc (Systems &amp; Project Management)</td>
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Achieving New Heights in Research Excellence

NTU is a fast-rising, research-intensive university based on engineering, science, education, arts, humanities and more recently medicine. The University is now ranked 39th in the prestigious QS World University Rankings 2014. It has again scaled the global league table and made a quantum leap of 35 places over the last four years. NTU also has made a spectacular leap of 15 places to 61st place worldwide in the Times Higher Education (THE)’s World University Rankings. This is NTU’s fourth straight year of sharp ascent in the Times Higher ranking, having vaulted a phenomenal 113 positions since 2010. Among young elite universities under the age of 50, NTU was placed 1st globally in the QS Top 50 under 50. A key factor to NTU’s rise has been the citations of its research publications.
In FY2013, NTU secured an research grants with a record S$522.5 million external competitive research funding (inclusive of MOE block grants). One of our most pronounced successes the funds we have received with industry (e.g. Rolls Royce Corporate Lab; the Advanced Remanufacturing Technology Centre; 3-D Printing Centre; BMW; Lockheed Martin; Johnson Matthey; SembCorp Marine and many others). NTU was ranked 1st in the world for an industry income and innovation, for the second consecutive year (Times Higher Education 2014). These industrial collaborations will help to build up expertise that is in high demand enables NTU to transform our research into benefits for the world and contribute to Singapore's economic growth.

NTU ranked 12th in the Asia-Pacific region, climbing 3 spots from 35th last year. The number of NTU's publications in international refereed journals with impact factor > 10 jumped to 193 in 2013 from 55 in 2010, and 153 in 2012. The number of publications by NTU faculty in international refereed journals with impact factor of ≥ 20 has more than doubled from only 17 publications in 2012 to 41 publications in 2013.

NTU is a melting pot of top eminent senior academics and outstanding young talents. World renowned research leaders join NTU in the recent years include Prof Ravi Kumar, the new Dean of the Nanyang Business School (NBS), who is a leading expert in global operations from University of Southern California (USC) Marshall School of Business; Prof James Best, the new Dean of Lee Kong Chian School of Medicine, was the Head of Medical School at the University of Melbourne in Australia and a distinguished medical leader in the treatments for diabetes and kidney disease; Prof Daniela Rhodes from the world-renowned MRC Laboratory of Molecular Biology, is internationally recognised for her contributions to chromosome biology; Prof Stephan Schuster, a world-leading expert in Genome evolution in host-adapted bacteria from Penn State University; Prof Phil Ingham, an expert in cardiovascular development and cellular biology from University of Sheffield; Prof Peter Sioot, Director of NTU's Complexity Institute, a distinguished research professor from University of Amsterdam and editor-in-chief of two Elsevier Science Journals (FGCS and JoCS). He received the Leading Scientist award from President Putin in 2010; and Prof Stephen Lansing, Director of Complexity Institute, a professor in the School of Anthropology at the University of Arizona, with a joint appointment in Ecology and Evolutionary Biology. He is also an external professor at the Santa Fe Institute, birthplace of complexity theory, and a senior research fellow at the Stockholm Resilience Centre.

NTU has also attracted some of the world's best young researchers from renowned universities through the prestigious National Research Foundation (NRF) Fellowship and NTU's elite Nanyang Assistant Professorship (NAP) programmes. More than 51% of NRF Fellows chose NTU as their host institution. In addition, NTU has awarded 50 Nanyang Assistant Professors (NAP) out of 2,800 applicants since 2008, with more than 350 qualified applications received annually.

Focusing on five Thematic Peaks of Excellence – Sustainable Earth, Future Healthcare, New Media, the New Silk Road, and Innovation Asia, NTU promotes inter-disciplinary research while building strength and depth in the established disciplines. NTU is already a world leader in sustainability, with more than S$ 1 billion of competitive funding in this area. The two Research Centres of Excellence, the Earth Observatory of Singapore and the Singapore Centre on Environmental Life Sciences Engineering, are the pillars of the university’s efforts in sustainable research.

NTU world renowned scientist Professor Daniela Rhodes. Named the NTU Cryo-Electron Microscopy Laboratory, advanced cryo transmission electron microscope fitted with the latest detector/camera ten times more sensitive than a regular electron microscopy camera. NTU now has a formidable life sciences cluster comprising the NTU Institute of Structural Biology, the Singapore Centre on Environmental Life Sciences Engineering, the School of Biological Sciences and the Lee Kong Chian School of Medicine.

The vibrant research eco-system in NTU composed of numerous university-level research institutes and joint centres with strong national and industry funding, these include the Nanyang Environment & Water Research Institute (NEWRI), Energy Research Institute @ NTU (ERI@N), Institute of Media Innovation (IMI), the Satellite Research Centre, and Institute on Asian Consumer Insight (ACI), the world’s first national research institute focusing on Asian consumer markets. Recent new institutes and centres established include the S$60 million NTU-Northwestern Institute for Nanomedicine focussing on the medical application of nanotechnology; NTU Additive Manufacturing Centre (NAMC), a
$30 million 3D printing research centre; Singapore’s first Air Traffic Management Research Institute (ATMRI), SembCorp Marine Lab @NTU for offshore and marine research and Centre for Research and Development in Learning (CRADLE), to conduct research on the best learning practices specific to Singapore’s tertiary education sector.

Apart from its major collaboration with Imperial College London in the joint Medical School, NTU has been actively engaging leading universities - MIT, Cambridge, Caltech, ETH Zurich, Georgia Tech, Technion, TUM, Berkeley, Ben-Gurion University, Hebrew University, IIT Bombay, Shanghai Jiao Tong and Peking University - through GlobalTech and NRF CREATE (Campus for Research Excellence and Technological Enterprise). NTU has also recently cemented ties up with University of Southampton to foster close collaboration in Photonics research, with Wageningen University to boost research in food science and technology, with RIKEN on human cognition research, as well with Warwick on neuroscience programme.

NTU is vigorously promoting interdisciplinary research in the belief that this will create the new technologies of the future. The Interdisciplinary Graduate School was officially launched on 25 June 2012 with three target research areas — sustainability, healthcare and new media. NTU is also establishing Singapore as an Asian hub in Complexity Science research and have recruited several giants in the field, including Prof Brian Arthur, the pioneer of Complexity Theory from Santa Fe Institute as visiting Professor.

NTU is committed to research integrity. The NTU Research Integrity Policy has been revised to incorporate the Singapore Statement on Research Integrity. Network of Research Integrity has also been established within the university. NTU has also been part of a development group for a new online Research Integrity educational programme from Epigem to teach the key elements of Research Integrity. NTU’s Institutional Review Board chaired by Professor Lee Sing Kong, Director of the National Institute of Education, has also been in operations since August 2010.

NTU benchmarks its research productivity and future research priorities through various bibliometric analytical tools and continues to raise the standards of its research quality through the establishment of the NTU Research Council chaired by Professor Bengt Norden from Chalmers University of Technology, Sweden, as well as the formation of Competitive Research Programme (CRP) panel chaired by Sir David Payne, a world-leading researcher in opto-electronics from Southampton University. Both panels ensure that the university has an independent and open assessment assessment of all NTU’s proposals in order to select the best proposals to be submitted to the funding agencies.

NTU and Elsevier co-hosted the 2014 APAC Research Intelligence Conference from 10-11 June 2014. This is the first APAC-wide large scale conference organized to examine the research management challenges, and to share the available solutions, measurements and best practices across the world to optimize research strategies. The conference was well attended by 109 delegates from 8 different countries. International speakers include Bertil Andersson, President of NTU; Prof Kim Byoung Yoon, Vice President (Research) of Korea Advanced Institute of Science and Technology (KAIST); Prof Paul K H Tam, Pro-Vice-Chancellor and Vice-President (Research), University of Hong Kong, Hong Kong.

Research Centres of Excellence

Earth Observatory of Singapore
Director: Professor Kerry Sieh, AXA-Nanyang Chair in Natural Hazards
Website: www.earthobservatory.sg

Vision
To acquire and develop scientific knowledge of complex earth hazards in the region and pass on this knowledge to populations at risk so they are better equipped to live in sustainable conditions.

Mission
To conduct fundamental research on earthquakes, volcanic eruptions, tsunami and climate change in and around Southeast Asia, towards safer and more sustainable societies.

Research Activities
The Earth Observatory of Singapore (EOS) is focused on research in tectonics, volcanoes, climate change, and art. Our work is both curiosity- and user-driven.

Tectonics
Asia is home to several of the world’s largest and most seismically active faults in the world: millions of people live within the vicinity of these major fault EOS investigates faulting mechanisms with a view to forecast earthquakes and tsunamis more reliably. Research efforts in tectonics address the consequences of the convergence between Indian-Australian and Eurasian tectonic plates, from the Sunda megathrust to the Himalayas and Central Asia.

Volcanoes
Volcanoes in Southeast Asia are among the most active on Earth and in this region hundreds of thousands of people live in their shadow. EOS volcano research increases fundamental knowledge on volcanic processes and histories. Field work ranges from unravelling and interpreting eruptive histories to augmenting monitoring networks, for the purposes of volcanic risk prevention and mitigation. Lab volcanoes and infrasound setups in the Philippines and Indonesia also help the research in magmatic processes and early warning systems.

Climate Change
Several major drivers of global climate are active in Southeast Asia, yet scientific knowledge about them is relatively scant. Global climate change will result in sea-level changes that will pose a threat in the tropics. The emerging EOS programme of climate research is focused on sea-level change, regional climate monitoring, paleo-climate studies, and modeling of past and modern tropical climates. Coastal hazards and environmental change are also investigated.

Art and Applied Projects
EOS values the impact of outreach activities to a general audience and develops programs outside of geoscience research to build greater awareness of Earth science.
The Art Group explores alternative methods of communicating science to a greater audience, producing science-themed and science-inspired interactive media, films and games that closely align with the faculty’s research interests.

The Education and Outreach (E&O) group works with internal and external media to build public’s awareness in Earth science research. Some of the outreach efforts include informal education, field seminars, and museum exhibits. E&O works in close partnership with the Art Group helping to distribute a variety of interactive and audiovisual projects.

The Applied Projects’ Group (APG) identifies the needs and strategies of international organizations to develop customized solutions for geo-risk mitigation and integrate them into the decision-making of clients. By drawing upon EOS’ expertise in natural hazards, the APG offers consulting services to stakeholders both in the public and business sector.

**Singapore Centre on Environmental Life Sciences Engineering (SCELSE)**

*Director: Professor Staffan Kjelleberg*
*Website: www.scelse.sg*

**Mission**

"To be synonymous with the advanced understanding, harnessing and informed control of complex microbial biofilm communities in natural and engineered ecosystems."

SCELSE has state-of-the-art research platforms of inter- as well as multidisciplinary research for unravelling the composition, structure, and function of microbial biofilm populations and communities. Such microbial organisations are key biological entities in all ecosystems. SCELSE’s mandated environmental life sciences engineering (ELSE) platform translates into a research capacity for studying the many habitats of Singapore’s urban ecosystems, thereby significantly addressing a series of conceptual and specific knowledge gaps. These relate to sustainability, the urban water cycle, microbial diversity and public health; and indeed integrate microbially mediated bioconversions and processes in ecology, bioengineering, biotechnology and disease management.

SCELSE is organised into four interactive, multidisciplinary research clusters:

- **Environmental Engineering** – SCELSE works in collaboration with industry and organisational bodies on several key environmental engineering systems, such as used water treatment plants that have been selected for improved understanding and harnessing of biochemical transformation processes, and bioremediation of urban storm water canals using microbial biofilms.
- **Meta-’omics & Systems Biology** – To understand microbial communities in any natural or engineered systems to the level where informed control can be applied requires the development and application of a range of cutting edge, high resolution, genomics, imaging and analytical technologies. Using a top-down approach, SCELSE analyses the structure, function, dynamics and interactions of the millions of different microorganisms in complex biofilm communities, to identify all members of these communities, what they do, and how the responses of the entire biofilm community reflect the conditions of their environment and the performance of the systems.
- **Microbial Biofilms** - Unravelling the mechanisms behind biofilm establishment and functioning is key to integrating engineering and life sciences. SCELSE has adopted a novel and powerful experimental bottom-up approach using model systems - designing habitat specific biofilms in the laboratory - to address defined biofilm-environment interactions in micro-scales.
- **Public Health & Medical Biofilms** – SCELSE employs a thorough understanding of how biofilms provide a basis for pathogens to develop resistance, and how this explains their presence in drinking water biofilms as well as in biofilm mediated chronic infection and inflammation conditions. To develop the next generation biofilm control systems, SCELSE has embarked on a chemical biology approach to target and control the biofilm specific traits.

**Research Institutes in NTU**

**Nanyang Environment & Water Research Institute (NEWRI)**

*Executive Director: Professor Ng Wun Jern*
*Website: www.ntu.edu.sg/newri*

**Mission**

To be the key environmental science and engineering research, education and technology provider in Singapore and the region.

**Overview**

NEWRI a globally recognised environmental research institute and a key component of the Sustainable Earth Peak of Excellence at NTU, represents NTU's efforts to be a committed and active participant in the vibrant and expanding Singapore Environmental and Water Technology (EW) R&D and industry landscape. NEWRI benchmarks itself as a global research and technology partner for sustainable solutions derived from cutting edge research activities, and resulting in technological breakthroughs with spinoffs to the industry. The NEWRI ecosystem comprises 8 multi-disciplinary and complementary member units:
• 4 Centres of Excellence (CoE), supported by EWI/EDB:
  o DHI-NTU Centre – Urban water and process modelling and management
  o Singapore Membrane Technology Centre (SMTC) – Fundamental investigations in and applications of membranes
  o Residues and Resource Reclamation Centre (R3C) – Urban and industrial residues management and resource reclamation
  o Advanced Environmental Biotechnology Centre (AEBCC) – Fundamental investigations and applications of environmental biotechnology and bioprocesses
• Environmental Chemistry and Materials Group (ECMG) – Fundamental investigations and applications of environmental chemistry, treatment materials, and sensing systems
• NEWRI Postgraduate Education Unit (N.PhD) – Nurturing manpower for the industry
• NEWRI Community Development (NEWRICOMM) – NEWRI’s window to society through philanthropic projects
• NEWRITech – NEWRI’s window to the industry for provision of technical support and technology transfer activities

More about the Members of the NEWRI Ecosystem:

Centre of Excellence: DHI-NTU Centre (DHI-NTU)
Director: Associate Professor Law Wing Keung, Adrian (NTU)
Website: www.ntu.edu.sg/newri

Vision
To generate new water management knowledge and to strengthen the water & environment industry in Singapore via the development of innovative technologies and training of water & environment professionals.

Mission
The mission of the DHI-NTU Centre is to conduct research and provide training to uplift Singapore to a higher echelon in the following areas:

• Environmental Modelling and Simulations
• Urban Planning and Water Management
• Industrial Water Management
• Environmental Impact Assessment
• Decision Support System Tools and Technologies

Research and Training Activities
Through an integrated approach, encompassing both research and education, DHI-NTU Water & Environment Research Centre and Education Hub (DHI-NTU Centre) strives towards a sustainable use of the environment while improving the quality of life for all. The Centre was jointly established by DHI Singapore (DHI) and NTU in October 2007, with support from the Environment & Water Industry Development Council (EWI) and EDB. It is an interdisciplinary research and training centre for the water & environment industry in Singapore. The centre works towards development of environmentally friendly solutions, and tools and technologies to support a sustainable ecology.

Centre of Excellence: Singapore Membrane Technology Centre (SMTC)
Director: Associate Professor Wang Rong
Director-Mentor: Nanyang Professor Tony Fane
Website: www.ntu.edu.sg/newri

Vision
To be the Centre of Excellence for world-class research and application in membranes for environment, energy and water technologies.

Mission
To spearhead Singapore’s R&D efforts in fundamental and applied research in the field of membrane science and technology for the environment, water and energy domains.

• Education & Training - provide education and training for the next generation of membrane specialists (PhDs, other researchers) in the application of advanced membrane technology to the protection of the environment, to water industries and to energy in the context of the environment and water domains.
• Research & Development - collaborate actively at the national level with an international network of organizations and provide a vehicle for academic researchers to achieve and maintain an international profile in membranes.
• Industry & Application - support applied and targeted R&D, including development of novel IPs, with the relevant industries.

Research and Training Activities
Established in 2008 and supported by EDB/ EWI, the SMTC has a mission to become a world leader in fundamental and applied research in the field of membrane science and technology for the environment, water and energy domains. The SMTC has been very successful in its phase I period (2008-2012) and this was achieved by combining the multidisciplinary expertise across NTU as well as through collaboration with other universities and industry partners. To date, SMTC has more than 80 full-time researchers from thirteen countries.

Building on the successful research outcomes from Phase I (2008-2012), SMTC in Phase II shall continue to serve the Water Domain and extend its activities into the Energy-Water and Environmental Domains within the following 7 Programme Themes:

Key directions of the centre’s activities are:
• It develops and applies Environmental Modelling and Simulation in Hydrological/Watershed Modeling, Processes Modeling, and Ecological Modeling
• It develops and applies hydrodynamic and water quality models to improve the planning and management of water resources in cities
• It derives environment friendly technologies and solutions to enable effective water management in industrial facilities
• It creates original knowledge and tools to facilitate the assessment of environmental impact by human activities in the water and environment domains
• It educates manpower in the mission areas through professional training and PhD research
• Water production – water treatment, desalination
• Water reclamation – pre-treatment and reversed reverse osmosis
• Membrane bioreactors – conventional and novel
• Energy issues – improving energy efficiency and energy production from chemical potential gradients
• Special Needs – chronic and acute, decentralised
• Sensors and process control - membrane monitoring and performance enhancement
• Cleaner production and environment - modification of production process to reduce its environmental impact and improve its profitability

Centre of Excellence: Residues and Resource Reclamation Centre (R3C)
Director: Associate Professor Wang Jing-Yuan
Deputy Director: Assistant Professor Chang Wei-Chung, Victor
Website: www.ntu.edu.sg/newri

Vision
To conduct cutting edge research and strengthen Singapore environmental industry’s capability in the area of waste resource management with emphasis on use-inspired R3 (Residues, Resource and Reclamation) research and translation for Singapore, Asia and Pacific region.

Mission
To further its research philosophy ‘Waste is not waste, but a misplaced resource’ through activities such as:
• R3 research and translation in Singapore and the Region
• R3 resource and technology transfer
• Education and training of R3 professionals.

Research and Training Activities
Officially launched on 5 October 2009, R3C, a centre supported by EWI/EDB provides a platform for urban waste management research and development, especially for resource recovery and remediation. The main aim is to support the Singapore industry in developing novel and appropriate technologies for the local and regional markets on urban waste management.

R3C aims to conduct research and translation work and ultimately to develop technologies on waste minimization, conversion of residues into resources, contaminated environment remediation, and other related fields. The research programmes within R3C are grouped into three multidisciplinary clusters including both basic and applied research in the R3 field.

These three clusters are:
• Cluster 1: Waste to materials
• Cluster 2: Waste to energy
• Cluster 3: Contaminated site remediation

R3C is a focal point for synergistic research collaborations with government agencies, industry partners, and educational and research institutions, both locally and from around the world. R3C has active collaborations with the key environmental players in Singapore, including the Ministry of the Environment and Water Resources (MEWR), the National Environment Agency (NEA), and the Public Utilities Board (PUB). R3C works with industry partners including ecoWise, SembEnviro, Sulo, Lionapex and Keppel-Seghers. R3C’s overseas partners are internationally renowned and highly regarded for their residues and resource reclamation research. In addition to performing research, R3C provides technical advisory services to various agencies and corporations.

Centre of Excellence: Advanced Environmental Biotechnology Centre (AEBC)
Co-Director: Associate Professor Liu Yu (NTU)
Co-Director: Professor Peter Steinberg (UNSW)
Website: www.ntu.edu.sg/newri

Vision
A Centre of Excellence that will apply environmental biotechnology and bioprocesses to address environmental issues and provide the biotechnology and bioprocess R&D platform for Singapore’s environmental and water industry.

Mission
To address national and global issues relating to increased demand for fresh water, wastewater management, water resource and waste management, and ecosystem stress and health by applying environmental biotechnology to fill the knowledge gap that exists on the biology of engineered systems (ie bioprocesses), resulting in better translation of academic knowledge into industry applications.

Research and Training Activities
Officially launched on 10 May 2010, AEBC is the NEWRI Ecosystem’s latest member to become a centre of excellence, and is supported by EWI/EDB. It is a unique collaboration between two Universities, NTU and UNSW, reflecting their respective complementarities and excellence in R&D. The effort is a merger of strong environmental biology and biotechnology knowhow with technology based bioprocess expertise.

• It applies strong research platforms of fundamental and applied environmental molecular and microbiology to address issues of environmental bioprocesses and sustainability.
• It develops biotechnologies relevant to geographical areas addressed by Singapore’s environmental and water technologies (EWT) industry.
• It provides leadership in use-inspired R&D on bioprocesses.
• It develops and builds a strong educational and research axis for the global research community as well as for water and environmental end users.
• It establishes vibrant collaborative programs for postgraduate education and research, spanning several multidisciplinary programs as well as cutting edge research projects.
• It aims to attract high profile researchers and industry to participate in defining solutions for global and local challenges through strong research platforms in fundamental and applied environmental biotechnology.
• It aims to translate research outcomes into environmental solutions such as for reduced energy consumption, reduced use of potentially toxic chemicals, improved bioprocess efficiencies, and monitoring systems for tracking marine health and ecosystem imbalances.
Environmental Chemistry and Materials Group (ECMG)

Co-ordinators: Associate Professor Lim Teik Thye and Associate Professor Richard Webster
Website: www.ntu.edu.sg/newri

Vision
Solving environmental and water problems with least chemical usage, energy consumption and waste stream generation.

Mission
To develop cost-effective physico-chemical solutions for water treatment, used water reclamation, desalination, site remediation, residues treatment, resource reclamation, and water quality monitoring and modeling.

Research Activities
The group comprises members with diverse expertise in science and engineering and R&D backgrounds in the fields of environmental science, materials, and chemistry. The team is engaged in activities:

- To develop novel, functional materials for environmental applications
- To develop sensitive analytical methods for the detection and quantification of emerging contaminants in urban waters and reclaimed waters.
- To integrate systems for water treatment and used- water reclamation with minimal chemical usage or energy consumption.
- To catalyse knowledge creation and technological improvements through synergistic collaboration with various entities within the NEWRI ecosystem.
- To recommend effective measures for sustainable water resource management and protection of environment and public health.
- To catalyse knowledge creation and technological improvements through synergistic collaboration with various entities within the NEWRI ecosystem.

NEWRI Postgraduate Education Unit (N.PhD)
Coordinator: Professor Chen Wei Ning, William
Website: www.ntu.edu.sg/newri

Vision
To prepare students to be at the forefront of Environmental Science and Engineering for the industry, and shaping Asia’s future leaders who are sensitive to environmental needs and sustainability.

Mission
To produce high calibre environmental engineers trained in fundamentals and equipped for professional practice.

Scope of Programme
As a source of manpower for the industry, NEWRI collaborates with education units across NTU to prepare students to be at the forefront of the Environmental profession. In addition to the PhD research programmes undertaken, candidates are trained in the appropriate fundamentals of Environmental Engineering and Science to better equip them for professional life. While the candidates are enrolled with the various Colleges and Schools, their research work is supported by NEWRI and conducted at its research centres. These research centres have well equipped laboratories with capacities and capabilities related to their particular focus domains – e.g. membranes, biotechnology, mathematical modelling, and wastes management.

NEWRI Community Development (NEWRIComm)
Director: Professor Ng Wun Jern
Website: www.ntu.edu.sg/newri

Vision
An Asian Centre of Excellence in water-related Development Work

Mission
To partner benefactors for social investments for a better shared future in Asia through innovations and holistic solutions in water technologies.

Core Activities of the NEWRIComm
NEWRI endeavours to be more than just a renowned research institute which generates voluminous research documents. It also seeks to make meaningful impact on people’s lives, especially those who lack access to clean water.

Hence, the NEWRI Community Development (NEWRIComm) unit was set up. NEWRIComm works on development projects in partnership with benefactors like individual Philanthropists, Foundations, Global Institutions, and, corporate entities seeking solutions for their sense of corporate responsibility and sustainability endeavours. These are social investments for a better shared future through innovations and holistic solutions in water technologies.
• **Implementation**
  - Partner for implementation of solutions with local stakeholders

**NEWRITech**
Coordinator: Associate Professor Tan Soon Keat
Website: www.ntu.edu.sg/newri

**Vision**
To be a global leading technology provision company built on novel innovations at the frontier of water, wastewater and waste domains.

**Mission**
To lead in the business of research for the water and environment (water, wastewater and waste) industry, to accelerate commercialisation of technologies generated, and to provide technical support to the industry.

**Core Activities of the Centre**
With strong roots planted within the NEWRI Ecosystem, NEWRITech leads in the business of research of water and environment domains, leveraging on novel innovations generated by its research teams. NEWRITech brings the innovations/technologies generated by its teams to the attention of industry partners and arranges for collaboration to exploit the knowhow.

NEWRITech’s activities can include technology test-bedding, IP commercialisation, applications development, environmental specialist consultancy, process modelling/simulation, and feasibility/treatability studies. Through these, NEWRITech strives to generate economic value out of its research activities for its partners.

**Energy Research Institute @ NTU (ERI@N)**
Executive Director: Professor Subodh Mhaisalkar
Co-Director: Professor Chan Siew Hwa, Professor Timothy White and Professor Choo Fook Hoong
Website: erian.ntu.edu.sg

**Vision**
To be a leading research institute for innovative energy solutions.

**Mission**
To be a centre-of-excellence for advanced research, development, and demonstration of innovative energy solutions with global impact by:

- Advanced research enhancing the efficiency of energy systems while maximising the synergies of alternative energy sources
- Enabling knowledge creation and technology transfer by engaging with government agencies, research institutions and industries
- Creating a multidisciplinary and collaborative environment for the delivery of energy solutions and national sustainability goals

**Research Activities**
The Energy Research Institute at NTU (ERI@N), inaugurated in June 2010, aims to be a leading research institute for innovative energy solutions. ERI@N focuses on the areas of sustainable energy, energy efficiency/infrastructure and socio-economic aspects of energy research. Research activities, backed by considerable expertise in these areas, exist within NTU’s research centres and schools. ERI@N provides a unique platform, whereby the various disciplines such as materials; power electronics and systems; biological, physical, and social sciences; as well as humanities and business communities can interact to explore new solutions to a host of current energy issues. These include energy generation, harnessing, storage, distribution, efficiency, as well as impact on climate change and global warming.

Research at ERI@N encompasses seven programmes, namely, fuel cell, energy storage, sustainable building technologies, solar cells and solar fuels, maritime clean energy, wind and marine renewables, and electromobility. They collectively provide an integrated set of expertise in materials design and synthesis, device fabrication and modelling, and systems integration and optimization. Major facilities include 3 cleanrooms for microfabrication, as well as complete facilities for solar cells, charge storage, fuel cells fabrication and characterization, and advanced materials synthesis and characterisation (TEMs/FESEM/XRD/FIB/surface analysis).

ERI@N has cemented important tie-ups with several leading industry players such as BMW Group, Det Norske Veritas Germanischer Lloyd (DNV GL), Johnson Matthey, Rolls-Royce Singapore, Robert Bosch GmbH (Bosch), Singapore Technologies Kinetics (STK), Toshiba, and Vestas Technology R&D Singapore (Vestas) in addition to collaborating with renowned universities such as the University of Cambridge, University of California Berkeley, École Polytechnique Fédérale de Lausanne (EPFL) Switzerland, Imperial College London, Norwegian University of Science and Technology (NTNU) and Technischen Universität München (TUM).

**Research Areas**

**Fuel Cell**
The fuel cell research group, which started in 2001, continues to build and develop core capabilities in fuel cell technology and provides technical leadership to industry through collaborative research and development. The group primarily focuses on polymer exchange membrane fuel cells (PEMFC), solid oxide fuel cells (SOFC) and hydrogen-related technologies including materials, catalysis and electrochemistry, thermofluidics and design, and product prototyping.

**Energy Storage**
Electrochemical charge storage systems (ECSS) are indispensable in a variety of applications from watches and mobile phones, to electric vehicles. These systems can be integrated with clean energy technologies including solar cells, wind turbines and large scale industrial energy storage applications. Each of these fields has its own characteristic challenges, with a suitable ECSS device to be identified. The energy storage group exploits existing technology and develops future-focused solutions to support our myriad of energy needs in a sustainable manner.
Sustainable Building Technologies
The Sustainable Building Technologies group at ERI@N focuses on research, development and demonstration of innovative technologies for providing efficient and cost-effective solutions for green and smart buildings, especially for the tropics. The key technology thrusts in the SBT programme are: building energy modelling/simulation and scientific design support, innovative cooling technologies, building micro grids, information management systems and renewable integration, and building envelope and facade systems.

Solar Energy And Solar Fuels
For millions of years, green plants have employed photosynthesis to capture energy from sunlight and convert it into electrochemical energy. Photochemical hydrogen generation, via splitting of water, as well as conversion of CO2 to hydrocarbons, are some of the thrusts in the solar fuels effort. Inorganic-organic hybrid solar cells and Copper Indium Gallium Sulphide (CIGS)-type cells formed by solution processing and green synthesis routes are also key elements of research at ERI@N.

Maritime Energy
Maritime and Port Authority (MPA) & ERI@N jointly launched the Maritime Clean Energy Research Programme (MCERP) in 2010 to focus on platforms that promote green energy management solutions for Singapore’s maritime industry. MCERP taps on the ecosystem of maritime-related research across NTU, led by the Maritime Institute @ NTU (Mi@NTU), set up in partnership with Singapore Maritime Institute (SMI). MCERP also leverages on the know-how of energy efficiency and low-carbon energy generation across the various research programmes in ERI@N.

Wind And Marine Renewable Energy
Wind and marine renewable energy generation is being adopted worldwide as a source of clean energy. Converting the kinetic energy of wind and water into a usable form has a wide array of technical and economic challenges. ERI@N is addressing these challenges through applied research by leveraging on its close ties with NTU academia, facilities and external networks.

Electromobility
NTU, the National Research Foundation (NRF) and the Technischen Universität München (TUM) collaborate on electromobility research, with the aim of creating a platform for advanced research in electric vehicle solutions for large tropical cities such as Singapore as well as other cities around the world. Electromobility research encompasses the development of high performance batteries and embedded systems, as well as issues pertaining to infrastructural and user considerations.

NTU Institute of Structural Biology (NISB)
Director: Professor Daniela Rhodes
Website: nisb.ntu.edu.sg

Vision
To be inspirational and bring together all structural biologists and their collaborators in NTU and elsewhere in Singapore to address important biological and medical questions.

Mission
- To create a vibrant and multidisciplinary research community to foster world-class research and to nurture collaborations. Research at NISB will integrate chemical, physical and biological sciences to enable us to understand protein function and the molecular mechanisms of pathways contributing to human diseases.
- To create a culture of innovation and a nurturing environment for the mentoring of young scientists. There should be no barrier between different techniques in structural biology and researchers will be encouraged to exploit all available resources to answer important biological questions.
- To consolidate and establish world class facilities as well as the development of joint technology platforms/infrastructures to serve as the foundation for cutting edge research.

Research Activities
The NTU Institute of Structural Biology (NISB) is a new initiative established in April 2014. NISB’s aim is to integrate Structural Biology research across NTU to address important questions in biology and human diseases. NISB will also play a strategic role in the NTU Life/Biomedical Research Cluster that includes the Lee Kong Chian School of Medicine, the School of Biological Sciences and the Singapore Centre on Environmental Life Sciences Engineering (SCELSE). NISB builds on the existing strengths and facilities at the School of Biological Sciences such as the newly established world-class electron microscopy (EM) laboratory, and the joint NTU-IMCB Centre located at Biopolis to create a state-of-the-art technology platform encompassing all structural methods. NISB will facilitate collaborations within NTU and between other Universities to ensure facilities and expertise are used to carry out high quality research.

One of NISB’s core visions is to enhance the research capabilities at NTU by providing the appropriate infrastructure and equipment to enable the best research. The core technology platforms will be electron microscopy (EM), nuclear magnetic resonance (NMR), X-ray crystallography robotics and biophysics unit. These technologies represent the cornerstone of structural biology research and will be supported by the protein production platform to assist in the expression and purification of proteins of interest. These core technologies will strengthen or establish research collaborations focusing (but not limited to) on strategic areas such as:
- Chromosomal Biology & Health
- Synthetic Biology
- Metabolic & Genetic Diseases
- Infectious Diseases
- Neurobiology
- Drug Discovery & Design
Institute for Media Innovation (IMI)
Director: Professor Nadia Magnenat-Thalmann
Website: imi.ntu.edu.sg

Vision
The Institute for Media Innovation (IMI) is an incubator of multidisciplinary, cutting edge, media-related research ideas. It strives to build a strong reputation as a leading, global Interactive Digital Media (IDM) hub. In response to Singapore’s national priority to develop IDM as a strategic R&D area, IMI aspires to facilitate and promote cross-disciplinary collaboration in media research at NTU.

Mission
- To develop cutting-edge new media research within IMI.
- To lead the international collaboration BeingThere Centre on 3D teleconference at NTU.
- To create synergy and interactions with the schools to empower interdisciplinary new media research through integrated projects and joint PhD supervisions.
- To promote and develop industrial applications in Singapore and elsewhere in the world.

Overview
The Institute for Media Innovation (IMI) was founded in April 2008 upon the initiative of Professor Bertil Andersson, NTU President and IMI Founding Chairman. On the launch of IMI, Professor Bertil Andersson envisaged that the institute “is dedicated to create an environment where technology and creativity can coexist and develop”. The Institute is directed by Professor Nadia Magnenat-Thalmann who is a world pioneer in IDM research, particularly in all aspects of Virtual Humans simulation.

The general objective of IMI Core Research framework is to create true synergies between the real and the virtual worlds. This means the development of a true interaction between real people and virtual or artificial creatures like virtual humans, virtual animals and robots in a way of creating a real social relationship.

IMI has created several interdisciplinary research teams across campus in different domains such as autonomous virtual humans, social robots, immersive technology to interact with virtual pink dolphins, crowds and groups simulation for future cities, 3D medical physiological humans and modeling 3D clothes for fashion shows to cite just a few. Some of these projects are supported by IMI seed grants to help researchers proving concepts and developing prototypes for further external funding.

The International Centre, BeingThere, on 3D Telepresence has been established since December 2010 at IMI with an overall funding of S$23 million. It groups together key international partners - Swiss Federal Institute of Technology (ETH) at Zurich in Switzerland, the University of North Carolina (UNC) at Chapel Hill in the United States, and Nanyang Technological University (NTU) in Singapore. In this project, over 15 faculties in NTU have focused their research on various aspects of the Telepresence research and in particular, on virtual humans and social robots who can act as substitutes or additional human resources.

IGS PhD in New Media @ IMI
By enrolling in the Interdisciplinary Graduate School at NTU and selecting the Institute for Media Innovation (IMI) as research institute, students have the great opportunity to prepare a PhD in New Media in the dynamic environment of IMI. Playing a crucial part in ensuring the future of New Media in Singapore, IMI aims to educate the next generation of scientists and technologists and encourage them to share and benefit from their knowledge of engineering, business, design, educational and behavioural research.

IMI offers doctoral students vibrant multidisciplinary research capabilities. In particular, they will have an opportunity to work in the area of cutting-edge interactive 3D simulation with top equipment as Immersive Room and real-time motion capture in a multidisciplinary team. Through their personal work, seminars, courses, and interaction with research experts, PhD candidates are prepared for research positions in leading academic institutions as well as private and public organizations.

Key Research Areas at IMI

1. BeingThere Centre on 3D Telepresence
BeingThere Centre, the international collaborative research centre on 3D telepresence mainly hosted at IMI, continues to make remarkable progress in research. For the period of Jan 2013 – Mar 2014, totally 35 papers have been published in highly recognized international journals and conferences including IEEE Transactions on Pattern Analysis and Machine Intelligence, ACM Transactions on Graphics, IEEE Transactions on Image Processing, etc. The Centre has successfully conducted its 3rd-year review with all KPI targets fulfilled and was recommended for extension by the review panel which was approved by the funding agency. Three members of the Centre have received research achievement recognition awards and three papers by the students have won awards in international conferences including IEEE VR Conference 2013, SIAM/ACM Conference on Geometric and Physical Modelling 2013 and IEEE VR Conference 2014. The professors of the Centre have received S$1.6 million external funding from their research works delivered and inspired from the Centre.

2. Sophie and Nadine: A socially interactive virtual character and humanoid robot in multiparty interactions
The prototype system we developed with Sophie (the virtual human) and Nadine (the humanoid robot) shows how they can interact with multi users using speech, gestures and facial expressions. Our system can detect in real-time who is the speaker and addressee and each character knows when it is...
3. Immersive Interaction with Virtual Pink Dolphins

This application investigates the modeling, simulation and visualization in an immersive situation. Users can interact with virtual pink dolphins for the purpose of special education, therapy, and entertainment. Virtual Reality technology has been studied aiming to equip the virtual pink dolphins with multi-sensorial functions (visual, audio, and tactile) for human-dolphin communication. Special efforts are being made to study the virtual pink dolphin assisted therapy and human-mediated learning for Autism Spectrum Disorder children.

4. Immersive 3D Fashion Show

To experience a virtual fashion show, IMI has designed a dozen of real cloth models, and has simulated them on virtual models. In the immersive room, we can see these various virtual models wearing 3D clothes. The user can really feel the presence of these models walking along the 320 degrees screen. To do a 3D model, we need to design the virtual 2D patterns, assemble them virtually around the body and simulate (physics based simulation of cloth) the behavior of the cloth depending of the quality of the fabric. This part is surely the most difficult one as each cloth should behave differently than the other one and the cloth behavior is also dependent of the body shape and the motion. This fashion show has been showed in various events as our opening house in IMI-NTU.

5. Immersive Interaction with a Virtual Patient

IMI is working on 3D medical simulation to develop novel 3D interactions and immersive techniques for medical simulations. With the collaboration of the Lee Kong Chian School of Medicine, we develop a serious game for training medical students for baby birth simulation. This project allows medical students in their early training to access to realistic information (anatomical and medical) for all the procedures from birth pregnancy to birth. The medical system recognizes the student’s behaviour and uses dynamic full-body gesture analysis for direct 3D interactions with virtual patient. The students can grasp some virtual medical tools and touch the belly on the virtual patient. During the simulation, the system analyses what are the wrong motions and mistakes during the 3D interactions, and the system coaches the student how to improve his/her behaviours.

6. Immersive Art

The project uses the IMI immersive room to immerse the visitor in pure art form. This is a space new media art experimentation. The work explores surreal, abstract and realistic way of painting using medium of 3D stereo and immersive animation. Instead of seeing flat painting on a limited screen, Ina Conradi Chavez has used the 320 degrees scene to allow visitors to really have the feeling on being there, in the art produced.

7. Crowd Simulation

The research of crowd simulation in IMI focuses on the interaction and immersion of the virtual crowds. The immersive 3D display system has been successfully built, which has great potential for the training and evaluation of emergency evacuation and other real-time applications of crowd simulation with interaction.

Institute on Asian Consumer Insight (ACI)
Deputy Director: Associate Professor Lewis Lim
Website: www.aci-institute.com

Asia Business insights
Website: www.asiabusinessinsights.com

ACI is a one-of-its-kind institute focused on Asian consumers. ACI addresses timely and critical business issues of the Asian region such as:
Over the last three years since its inception, ACI made significant contributions to research, education and business practice. The researchers associated with ACI, our “ACI Fellows,” have published their insights and findings in the leading consumer and marketing journals—including the Journal of Marketing, Journal of Marketing Research, Journal of Consumer Research, Journal of Consumer Psychology, and International Journal of Research in Marketing. ACI Fellows conduct their research on Asian consumers and markets frequently in collaboration with scholars and institutions from Asia and around the world. In addition, we tap expertise from numerous scholars who are not formally-appointed fellows but nonetheless pursue active research with us on a range of topics that are highly relevant to business in Asia. ACI also regularly hosts and co-hosts seminars; and we welcome visiting scholars from around the world to Singapore.

In the first three years of its operations, ACI has made significant impacts in all areas (research, education, and practice) in the spirit of the original proposal for setting up the institute. In particular, we have exceeded the target key performance indicators in a number of measurement areas. Importantly, ACI Fellows have addressed business issues and created value by generating insights on Asia consumers’ current attitudes, lifestyles, decision-making, and shopping behaviors.

Starting in 2014, the “Possible Future Worlds” initiative will address how Asians might live, move around, shop and play in 5-20 years, and how business and technology might shape the lives and lifestyles of Asians.

Nanyang Institute of Technology in Health and Medicine (NITHM)

Director: Professor Jan Carlstedt-Duke
Deputy Director (Graduate Education): Professor Subbu Venkatraman
Deputy Director (Clinical): Professor Bernhard Boehm
Deputy Director (Operations): Nanyang Associate Professor Nam-Joon Cho
Website: www.nithm.ntu.edu.sg

Overview

Officially launched on 1st April 2013, the Nanyang Institute of Technology in Health and Medicine (NITHM) is an initiative of the Future Healthcare Peak of Excellence. The establishment of NITHM leverages on NTU’s ongoing technology-inspired research activities in health and medicine at the College of Engineering (CoE) and College of Science (CoS). It strives to drive various interdisciplinary projects between NTU and major healthcare groups and hospitals both locally and internationally, linking up top clinician scientists and doctors with faculty members across NTU’s colleges, schools and research centres including the new Lee Kong Chian School of Medicine.

Not only that NITHM synergises the various biomedical and bioengineering-related research projects within CoE and CoS, it facilitates the interaction of these research groups with other Colleges and Schools in NTU, including the Nanyang Business School and the College of Humanities, Arts, and Social Sciences. NITHM is also geared up to collaborate with industrial partners as it strives to offer engineering-enabled solutions for medicine, health and healthcare in order to spearhead Singapore’s R&D efforts in medical device industry.

Apart from research and development, the institute hosts the Future Healthcare PhD Programme under NTU’s Interdisciplinary Graduate School. It offers students a comprehensive range of inter- and multi-disciplinary research projects build on the institute’s core research programmes of engineering and science in medicine. It provides students with an exciting choice of a new and refreshing integrative sciences and engineering discipline with a challenging and rewarding career.

Overall, NITHM has a tripartite mission of research, education and innovation. It is well poised to harness the synergistic effects of engineering, medicine and business to propel the Future Healthcare Peak of Excellence to greater heights.

Vision

To be a renowned idea incubator for interdisciplinary, cutting edge and innovative research that will serve as a source of knowledge and expertise for the advancement of technological innovations in human health and medicine.

Mission

To facilitate and promote cross-disciplinary collaboration at the interface between engineering, medicine, business and the humanities & social sciences and challenge the boundaries of technological innovation in human health and medicine.

To advance and spread knowledge in the area of health and medicine and promote academic growth by offering state-of-the-art undergraduate, postgraduate and doctoral programmes,
Institute of Catastrophe Risk Management (ICRM)
Executive Director: Professor Pan Tso-Chien
Website: icrm.ntu.edu.sg

Vision
The vision of ICRM is to become Asia’s leading research institute in catastrophe risk management and to help those at risk worldwide in general and Asia in particular.

Mission
The mission of ICRM is:

- To undertake multi-disciplinary research projects in science, engineering, finance, technology, economics and socio-political aspects related to catastrophe risk. Drawing strengths in natural catastrophes in the College of Engineering, ICRM will work with NTU institutions such as the Earth Observatory of Singapore, the Rajaratnam School of International Studies, the Nanyang Business School as well as researchers at local institutions. The ICRM will also form collaborative projects with government agencies and leading centers of catastrophe risk management in industry as well as with similar centers internationally.
- To help the community to better understand the fundamental characteristics of risks related to natural and non-traditional disasters such as earthquakes, tsunamis, typhoons, volcanic eruptions, floods, droughts, and to non-traditional risks due to food security, infectious diseases and terrorism.

About ICRM
In recent years, we have seen massive increase of human and economic losses due to catastrophic events. These events are either natural or manmade. This increase of losses is due to globalization, urbanization, and by some accounts, due to global climatic changes. As a result, the nature and effects of these disasters have changed. The high level of economic activities and the inter-relationship of nations to such activities have brought out some unique and non-traditional risk management issues.

In Asia, where the risk awareness is low and the risk is high, the situation poses special problems and challenges. These include understanding and recognizing risk, risk quantification (monetary, social and human) and risk management. NTU’s Risk Research Agenda is driven by the principle that catastrophic risk impacts the functioning and effectiveness of the whole fabric of society and businesses. Developing strategies for mitigating these risks will require a robust public private partnership amongst government agencies, academia and industry players.

Understanding, communicating and managing catastrophic risk requires comprehensive methodologies for risk quantification. ICRM will be the first multi-disciplinary risk management research institute of its kind in Asia and amongst a handful of such centers in the world. The Institute will focus on catastrophe triggered insurance/reinsurance risks, sovereign risk, societal risk and some non-traditional risks. It will play a lead role in NTU’s new wave of integrative research efforts and its strategic vision of Sustainable Earth. In Asia Pacific, Singapore can take the lead and develop a Center of Excellence to fill this need and to further strengthen its position as a major financial hub.

Institute for Sports Research (ISR)
Director: Pascal Joubert des Ouches
Founding Deputy Directors: Associate Professor Leong Kah Fai; and Associate Professor Alfred Tok Ling Yoong
Website: www.isr.ntu.edu.sg

Vision
To be a world class sports R&D institute for sports research and innovation and the leading research institution in the Asia-Pacific region.

Mission
To be recognized by the sports industry as a world class sports innovation center delivering true innovative products design and technologies impacting the consumer market and sports practices.

ISR envisions a multi- and inter-disciplinary collaborative environment where researchers, engineers and scientists interact with industry partners, elite athletes and healthcare professionals as well as with economists and social scientists. It is distinct with the following features:

- Excellence in sports technology research
- Materials innovation
- Western/Asian-centric innovation
Research Activities

Jointly established in July 2011 by NTU and the Singapore Economic Development Board (EDB), ISR also benefits from an international collaboration with Loughborough University (LU).

The main ISR collaborators from NTU are the School of Materials Science and Engineering (MSE), the School of Mechanical and Aerospace Engineering (MAE) and NIE’s Physical Education and Sports Science (PESS) Academic Group. MSE is one of the largest materials engineering institutions globally and will introduce technologies such as defense materials, clean energy, biomimetics and nanotechnologies to the sporting goods domain. MAE is a well-resourced mechanical engineering department with high calibre academic faculty, and significant expertise in design, manufacturing, robotics, aerodynamics and biomechanics. The PESS group specializes in biomechanics, blood chemistry, exercise physiology, psychomotor and pedagogy. It would provide additional support with their specialized laboratories for the sports science and medicine activities of ISR.

Some of the research and expertise topics include:

- Apparels and technical textiles with innovative functions:
  - Dynamic compression effects
  - Built-in electronic functions for heat or health and sports performance management
  - Functionalized polymer fibers
- Impact protective equipment helmets and body armors (materials & structures)
- Aerodynamic improvement of fast moving sports products by mean of computer fluid dynamic
- Lightweight 100% thermoplastics composites recyclable sandwich structures
- Flexible Chemical/Molecular Sensors
- Robotics/Simulation/Virtual Reality

Maritime Institute (MI@NTU)

Acting Executive Director: Professor Lua Aik Chong
Deputy Directors: Professor Chan Siew Hwa and Associate Professor Lo Yat-Man, Edmond
Website: mi.ntu.edu.sg

Vision

To be a premier global Maritime Institute with excellent reputation in research and innovation in the maritime domain which encompasses Naval Architecture, Marine Engineering, Offshore Technology, Maritime Technology and Environment, Maritime Clean Energy, Shipping, Port and Maritime Services.

Mission

To establish a broad-based maritime education and research platform at NTU by leveraging on NTU’s core competencies and partnering the industry; thereby supporting Singapore’s aspiration to be a global maritime knowledge hub.

Core Capabilities:

- Naval Architecture and Marine Engineering
- Offshore Engineering

Examples of Research Projects

- Drag reduction for marine vessels using air-filled dimpled surfaces
- Two issues on a novel air lubrication system for the ship drag reduction
- Development of adhesive mimics for anti-fouling coatings and adhesion testing in the marine environment
- A practical method to evaluate highly-nonlinear wave runup on columns and air-gap for semi-submersible platforms in harsh wave environments
- Fracture assessment of flawed girth welds in clad pipelines with under/over-mismatch weld strengths
- Experimental and numerical investigation of scour due to vibration of a steel catenary riser
- Contrast enhanced vision for deepwater monitoring system
- Fatigue life prediction methodology for offshore structures, risers and pipelines starting from multiple small surface cracks relevant to welded structures
- On the characteristics of two-phase gas-particle flows in channels and pipes
- Three-dimensional elastic-plastic fracture and fatigue analysis for offshore structures
- Catastrophe risk in shipping: a multivariate approach to assess, model and manage the impacts of climate change on maritime infrastructure and cargo
- The integration of maritime clusters within and out of Singapore
- A tactical planning model for supply chains with nested with nested ordering policy
- Singapore’s maritime cluster analysis and its sustainable strategic advantage
- Effective maritime security management

Maritime Education

- B.Eng (Mech Eng) with specialisation in Naval Architecture and Marine Engineering
- M.Sc (Mech Eng) with specialisation in Naval Architecture and Marine Engineering
- Joint PhD with University of Southampton in Naval Architecture and Marine Engineering
- B.Sc, M.Sc and PhD in Maritime Studies
- EMBA in Shipping, Offshore and Finance

Joint Research Centres

CINTRA UMI CNRS/NTU/THALES 3288
Director: Professor Philippe Coquet
Website: cintra.ntu.edu.sg/Pages/default.aspx

Vision

Investigation of new technologies in the field of nano-electronic and nano-photonic and related applications through both:
• Academic research: leverage on synergies between the universities and research institutes in Singapore and in France to launch high level upstream research
• Applied research: leverage on strategic collaboration with the local R&T&D ecosystem and with our industrial partner Thales to develop innovative technologies and transform concepts into applications

Mission
• To tap research talents from Singapore and Europe for collaborative research
• To develop new technologies supporting co-integration and combination of nanoelectronic and nanophotonic technologies to leverage the properties of both and meet future requirements.
• To focus on upstream dual-use cutting-edge technologies to address near horizon next-generation computing, sensing, and communication applications.

Research Activities
EMERL is the first national-level electromagnetic effects research and measurement test facility that caters to both defence and commercial sectors. With its state-of-the-art facilities and the latest advanced electromagnetic simulation tools, EMERL spearheads national research activities in electromagnetic compatibility (EMC) design at system, board and integrated circuit levels. Besides EMC, our dynamic team of talented researchers also develop cutting-edge electromagnetic concepts, techniques, devices and systems, with strong emphasis on emergent and multidisciplinary topics.

Energetics Research Institute (EnRI)
Director: Professor Ang How Ghee
Website: www3.ntu.edu.sg/EnRI

Mission
A new generation of energetic materials, with special attention on capability development, international collaboration, innovation and cutting edge technology.

Research: Future Direction
• New energetic materials
The research focus of the Institute is on new materials with high energetic performance, ranging from oxidizers to metals. Its research on chemical synthesis of the high energy density materials includes the design of new synthetic routes that are novel, safe, non-polluting and cost-effective.
• Safety and performance
The Institute extends its research to physical and spectroscopic studies of selected energetic materials and metals even at the nano-scale. The critical issues of insensitivity, compatibility of energetic material compositions, and microstructures are examined in order to achieve new goals of enhanced energetic performance and the uncompromising demands of high safety standards.
• Capability Development
Capability development will remain central to the future programs of the Institute in order to enable it to build a strong research foundation and new skills in advanced techniques and frontier technologies. Such new techniques to determine the detonation and combustion velocities and ignition delays would enable a more precise understanding of the principles governing detonation, deflagration and combustion processes of new energetic compositions.
• **Modeling & Simulation**
  The universal technique of computational modeling and simulation will extend the Institute’s theoretical and basic research into diverse areas like identification of improvised energetic materials, optimisation of new energetic compositions, or assessment of thermal hazard potential. It may be time-to-thermal-runaway, adiabatic decomposition temperature rise, explosion potential, shock sensitivity, or critical cook-off temperatures. The technique will also take its fundamental research from the bench to new applications.

• **Cutting Edge Technology**
  The cutting edge technology based on energetic and piezoelectric materials requires multidisciplinary skills. A case in point is the initiation train which is concerned with extremely fast processes operating at the detonation range where their mechanisms can be examined with precision using high speed photography applying simultaneously both framing (100 million frames per second) and streak camera (1ns/mm to 100μs/mm). Such a technique would enable precise measurement within a very short time duration in order to derive physical parameters like velocity of detonation of high energy materials, velocity of plasma evolved during detonation, detonation wave profile, estimation of C-J pressure, analysis of sympathetic detonation, critical diameter performance assessment, and precise ignition delay and function time. It is a state-of-the-art high precision miniaturised technology incorporating the latest green energetic materials. The achievement of much higher safety standards is primarily due to its insensitivity to unintended initiation by radio frequency, electromagnetic interference and electro static discharge. The foregoing description therefore illustrates the kind of research that are of interest to EnRI.

**Fraunhofer IDM @NTU**

Directors: Associate Professor Wolfgang Mueller - Wittig and Associate Professor Chee Yeow Meng
Website: www.fraunhofer.sg

**Vision**
To become one of the leading Applied R&D centres in Visual Computing for Science & Engineering.

**Mission**
• To develop Tools, Technologies and Interfaces with focus on Visual Decision Support & Virtual Engineering
• Applied R&D in Interactive Digital Media Technologies
  o To conduct R&D activities in the areas of Visual Computing with focus on Real-time Rendering, Virtual & Augmented Reality, Visual Analytics, Medical Computing, Visual Haptics and Human-Computer Interaction.
• Link between Industry and Academic Research
  o The centre bridges the gap between academic research and the demands of the industry. It stays internationally competitive and current by engaging various strategic partners such as government agencies, industrial corporations, other research institutes, and the education industry.
• Bridge to Europe and IDM Resource Centre
  o The Centre's emphasis on applied research in interactive digital media complements NTU's focus on basic research.

This combination of Fraunhofer’s applied research with basic research at universities is part of the Fraunhofer model. This has made significant scientific and economic impact at all locations within the network of the Fraunhofer Society. In Singapore, the synergistic link with NTU is an essential cornerstone of the research ecosystem at the centre.

As Singapore expands its international network of R&D institutions, the Centre helps to strengthen local capabilities in research and promotes commercialisation opportunities in interactive digital media applications as well as contributes actively to conferences, exhibitions, seminars, workshops, etc. for academia, government and industry in the Asia-Pacific Region.

**Overview**
The Fraunhofer Project Centre for Interactive Digital Media (Fraunhofer IDM@NTU) was launched in June 2010 under the auspices of Nanyang Technological University (NTU) and Fraunhofer-Gesellschaft, Europe’s largest institution for applied research.

The Centre is facilitated by the IDM Programme Office at the Media Development Authority and funded by the National Research Foundation. Fraunhofer IDM@NTU is part of the International Research Centres landscape in Singapore.

Fraunhofer IDM@NTU brings industry partners to the forefront of innovation by providing expertise and state-of-the-art technologies in Visual Computing. In this way, the Centre envisions transforming the way we learn, live and work.

The Centre’s research in interactive digital media technology covers a range of key topics under Visual Computing. Its human-centred visual solutions make data accessible via intuitive interfaces, anytime and anywhere as well as in the context of the real world.

**Joint PhD Programmes**
Fraunhofer IDM@NTU fosters international research activities through its network of partner universities and is coordinating the joint PhD degree programmes offered between Nanyang Technological University and Graz University of Technology (Austria), Nanyang Technological University and Technische Universität Darmstadt (Germany).

Fraunhofer IDM@NTU provides scholarships and currently, all slots of the Joint PhD-Programmes in Visual Computing with NTU, Technische Universität Darmstadt, Germany, and Graz University of Technology, Austria have been filled.

**Intelligent Systems Centre (IntelliSys)**
Director: Associate Professor Chen I-Ming
Website: www.ntu.edu.sg/intellisys

**Mission**
• To conduct R&D programmes focusing on cutting-edge technologies related to control, communication, perception, decision-making, and autonomous action with applications in the industrial, commercial and military sectors
• To undertake technology innovation for creation and prototyping of new products and services relevant to industry partners.
To serve the interests of NTU and ST Engineering and build a reputation for the centre in the ability to work closely and effectively with the industry.

**Research Activities**
- **IntelliSys** is a research centre jointly set up by ST Engineering and NTU. It is the meeting point of application-specific problems and technologically viable solutions, and it serves as a hotbed for technological development and advancement in the area of intelligent systems. The Centre’s emphasis is on the synergistic integration of physical systems with information technology and complex decision-making processes in the design, manufacturing, and operation of intelligent systems relevant to industrial users.

IntelliSys has 10 principal investigators mainly from the School of Electrical and Electronic Engineering, the School of Computer Engineering, and the School of Mechanical and Aerospace Engineering. The centre receives research grants from industry and government agencies such as MINDEF, DSO, NEA, and A*STAR, etc., to conduct research projects in the following areas:

- **Intelligent Sensor Network:** wireless sensor network, sensor grid, cyber infrastructure, body sensor network, application-driven sensor network technology.
- **AI and Cognitive Technology:** collaborative intelligence, context-awareness computing, optimisation, genetic algorithms, intelligent control.
- **Sensor Development:** vision systems, impedance sensors and technology, wearable sensors.
- **Innovative Robotics and Haptics:** unmanned aerial vehicles, mobile robots, humanoid robots, unmanned surface vehicles, entertainment robotics.

**Satellite Research Centre (SaRC)**
- **Centre Director:** Associate Professor Low Kay Soon
- **Website:** [www.sarc.eee.ntu.edu.sg](http://www.sarc.eee.ntu.edu.sg)

**Mission**
SaRC aims to be a centre of excellence in satellite engineering research, in particular nano-satellite technology and distributed space mission for remote sensing and communication applications.

**Research Activities**
SaRC has several successful satellite programs and is one of the few satellite research centres in the world that has multiple satellites orbiting in the space simultaneously. On 20 April 2011, the Centre has successfully launched the Singapore's first indigenous micro-satellite, X-SAT, on board India’s Polar Satellite Launch Vehicle PSLV-C16 at 10.12am Indian Standard Time (12.42pm, Singapore time). VELOX PII was lifted off on board Russia's RS-20B rocket (Dnepr) at 3:10pm, Singapore time on 21 November 2013. Launched from the Yasny Launch Base located in the Orenburg Region, Russia, the VELOX-Pii is Singapore's second indigenous satellite in space. VELOX-I is the third satellite built by the centre and is successfully launched with the India's launch vehicle PSLV-C23 at 10.00am Indian Standard Time on 30 June 2014.

Presently, all the three satellites are fully functioning and orbiting in the space simultaneously. Weighing 105kg, X-SAT is classified as a micro-satellite. VELOX-I is considered a nano-satellite with a weight of 4.3kg and VELOX-Pii is a pico-satellite at a small weight of 1.3kg. X-Sat is a remote sensing satellite and it has been in space for more than 3 years capturing more than 8000 pictures for environmental monitoring applications such as forest fires in Sumatra, floods in Bangkok and volcanic eruption of Mount Sinabung. VELOX-Pii is the first student satellite in Singapore and it ran tests to prove the viability and robustness of NTU's satellite technology, including hardware and software built in-house by students. This includes the fine sun sensor that is used to determine a satellite's orientation with respect to the sun; control and sensing algorithms that determine and control the satellite's orientation; and a power management system to harvest maximum solar energy from its solar panels.

The VELOX-Pii is developed under SaRC's undergraduate satellite program. The program involves second year to final year undergraduate students with the support of postgraduate students from different schools of college of engineering. Two 1.3kg pico-satellites, named VELOX-I and VELOX-Pii have been completed in August 2012 and a 4.2kg nano-satellite named VELOX-I was completed in Q4 2013.

For VELOX-I, it has an extensible telescopic mechanism and an in-house built CMOS imaging sensor for remote sensing application. In addition, it has incorporated several in-house sensors, actuators, advanced control and signal processing algorithms. VELOX-I carries a 250g pico-satellite with a size of about an iphone and will perform piggyback launch in space for inter-satellite communication experiment.

The present research and development focus of SaRC covers:

- Research in advanced nano-satellite for distributed space system application
- Research in innovative space science technologies for earth observation and communication applications

SaRC has the following facilities for space projects:

- Satellite design laboratories with various design and simulation CAE/CAD tools
- Satellite engineering laboratories with various tests, measurement and prototyping equipment
- Class 5K clean room facility for assembly and integration of Space Level Electronics and Assembly
- Basic thermal test and vacuum test chambers
- Mission control groundstation facilities
Mission
To explore the frontiers of science and develop strategic technology that will deliver effective solutions to enhance the defence and security of Singapore.

Research Activities
Our research activities are organized under 4 clusters:

- **Microsystem Technologies Cluster**
  - Microsystems: The Microsystems Technology Development Centre (MTDC) provides cutting-edge MMIC and related technologies that will enhance Singapore’s defence capabilities. The strategic areas of focus are: (1) Development of GaN HEMT (High Electron Mobility Transistor) and MMIC (Monolithic Microwave Integrated Circuits), (2) GaN Growth and (3) Advanced Ceramic Filters.
  - Thermal Management: The Thermal Management group conducts applied research in thermal management strategies and advanced cooling solutions for applications ranging from micro-scale electronics devices up to macro scale electronics systems.
  - MEMS: The MEMS group focuses on the integration of miniaturized sensors, actuators and read out circuits using micro-fabrication technologies. By working on silicon substrates, the group aims to provide a common platform, making possible the realization of complete systems-on-a-chip and systems-in-package together with our in-house developed low noise integrated circuits.
  - Optoelectronics: The Optoelectronics group develops photonic subsystems, and integrated optoelectronic devices and produce them for testing and evaluation. Their key areas of focus are: (1) Optoelectronics, (2) Microwave Photonics and (3) Integrated Optics.

- **Physical Sciences Cluster**
  - Advanced Materials: The Advanced Materials research group focuses on the development of high value added functional materials in Advanced Composites and Smart Materials. The research activities cover materials innovation, platform integration, technology developments and transfers for various advanced applications in Defence.
  - Protective Materials: The Protective Materials group focuses on the development of advanced armour technology, through the use of new materials, dynamic material characterization, hydrocode simulation and modelling, and ballistic testing. The Ma Jan High Speed Dynamics Laboratory is equipped with facilities for ballistic testing, dynamic material characterization and has simulation capability for armour subject to ballistic threats.

- **Sensor Systems Cluster**
  - Radar Systems: The Radar team explores new radar concepts to develop relevant demonstrators and sub-systems, and research on advanced radar signal processing. Their areas of focus are: (1) Low Frequency Radar, (2) Passive Radar, (3) Urban Non-line-of-sight Surveillance and (4) Advanced Signal Processing Techniques.
  - Sensor Array: The Sensor Array group performs basic and applied research in sensor array signal processing with the emphasis on defence applications. Their research scope extends from the physics of the signal processes and sensors through to the mathematical formulations and algorithm developments, and to implementation issues and experimental investigations.
  - Speech Recognition: The Speech Recognition team develops customized, relevant speech processing solutions in defence applications. The strategic areas of focus are: (1) Robust Large Vocabulary Continuous Speech Recognition, (2) Speech and Feature Enhancement, (3) Speaker Verification / Recognition, (4) Speaker Diarization Task and (5) Voice Conversion (Morphing).

- **Information and Network Systems Cluster**
  - Hardware Assurance: The Hardware Assurance group is made up by two main teams: “Microelectronic Failure Analysis” (MFA) and “Physical Analysis and Cryptographic Engineering” (PACE). The MFA research group develops advanced failure analysis capabilities for submicron microelectronics devices and 3D packages, with the focus on understanding materials failure to ensure reliability of hardware components, while basic cryptographic primitives software routines are investigated by the PACE research group.
  - Signal Research: The Signal Research group focuses on algorithms development for wireless communication receivers covering both forward error correction coding, digital modulation and digital speech coder technologies.
College Research Centres

MINDEF-NTU Protective Technology Research Centre (PTRC)
Director: Professor Tan Kang Hai
Website: www.ptrc.ntu.edu.sg

Mission
The threefold mission of PTRC is:

- To spearhead research efforts in developing advanced protective technology;
- To provide scientific and engineering solutions to meet the national needs in weapons and defence systems; and
- To address emerging national challenges for both government and industry in the field of protective technology and homeland security.

Research Focus
PTRC focuses its activities on three functional areas:

- Research and Development
- Education and Training
- Technology Transfer

The functional areas comprise the following activities:

- Conducting focused R&D programmes in dynamic and weapon effects on buildings and infrastructure
- Effecting technology transfer
- Providing training to engineers to be familiarized with Structural Eurocodes
- Providing specialised advisory services
- Establishing collaborations with top universities, research centres, and industries

Research Facilities
The Protective Engineering Laboratory housed in the School of Civil and Environmental Engineering is designed to conduct dynamic load testing of full-scale structural components. The laboratory has a system of L-shaped reaction walls with multi-cell design, a large shake table that can stimulate earthquake ground motions, and many dynamic actuators of various capacities to support protective engineering research.

Highlights of Research Activity
NTU Protective Technology Research Centre was established on 29 September 1998 via a Memorandum of Understanding (MOU) between the Ministry of Defence (MINDEF) and NTU. Under the strong leadership of the Director, PTRC has developed into the leading centre of excellence in underground technology and rock engineering, as well as building security. This is prominently reflected in PTRC's contribution of essential technologies towards the engineering as well as the construction of underground ammunition facilities. Besides building up PTRC's strength in underground technology and rock engineering, the PTRC research team has also completed a milestone study on the response of high-rise commercial buildings to blast loading. The study results have not only helped identify the R&D needs for building protections in the post-911 era, but also provided the basis from which a national programme on building protection was initiated.

Associated with this, PTRC/NTU has signed an MOU with the Ministry of Home Affairs (MHA) in February 2010 to provide a general framework for collaboration on education, research and development and technical consultancy projects in Building Security. The Centre will also be developing a national design guide to address progressive collapse of important structures.

College of Humanities, Arts and Social Sciences

Centre for Contemporary Art (CCA)
Founding Director: Professor Ute Meta Bauer
Website: www.gillmanbarracks.com/cca

About the Centre
The CCA - Centre for Contemporary Art (CCA) is a research centre of Nanyang Technological University (NTU), developed with support from the Economic Development Board, Singapore. Under the leadership of Ute Meta Bauer, the CCA's founding director and Professor at the School of Art, Design and Media, the centre officially opened in October 2013. The CCA embraces academic and scholarly research, and views contemporary art as a form of knowledge production in its own right. Through a holistic approach, the CCA's four main areas of activity – exhibitions, research, residencies and public programmes – are intertwined and feed into each other, shaping organically the profile and programme of the institution.

The CCA positions itself as a centre for critical discourse and experimental practices for Singapore, the region and beyond. It aims to play an active role within the local art scene, as well as being a part of the development of regional and international art infrastructures.

The CCA comprises several spaces at Gillman Barracks, each dedicated to a specific area of activity: an Exhibition Space and Seminar Room (Block 43); CCA Offices, Research and Public Resource Centre (Block 6); and Artists Studios (Blocks 37 and 38).

Mission
The Centre for Contemporary Art takes a holistic approach towards art and culture, intertwining its various platforms: exhibitions, research residencies, and public programmes.

Key Elements
- Research: The Research programme aims to connect academic research with other forms of knowledge production. The CCA hosts visiting scholars of various disciplines whose research areas address Singapore, the region and beyond, related to topics and fields defined by CCA.
- Residencies: The Artist-in-Residence programme is an integral part of the CCA's mission as a research centre. It comprises a studio programme dedicated to artists and a short- and long-term visiting programme for curators and scholars. The programme aims to support research and development of new work, engaging established and emerging cultural producers from Singapore, Southeast Asia and the rest of the world. Through supporting artistic, curatorial and cultural production, research and practice through the allocation of a studio and curatorial support, the programme aims to work
as a catalyst for critical practices and for building discourses that are especially resonant in the region. The residencies also allow artists-in-residence to engage and familiarise an interested public in contemporary artistic practices. It also supports new and ongoing research of invited scholars and fellows linked to CCA’s fields of engagement.

- Exhibitions and Public Programmes: The exhibition programme of the CCA presents contemporary artistic production on top level. Block 43 showcases world acclaimed artists and collaborations with major art institutions such as Solomon R. Guggenheim Museum. The programme maps certain areas of interest that will be further explored through the CCA residencies and research programmes. The exhibition programme brings together established international, local and regional artists. Each exhibition is complemented by a public programme of workshops and seminars that will offer insights to the curatorial framework and the theoretical context of the works in the exhibition.

Main Areas of Study
The current CCA research clusters engage with contemporary art, questioning postcolonial spaces, migration, diaspora, old and new trade routes.

Recent Activities
CCA has organised the following events since its official opening in October 2013:

1. Free Jazz – a series of events, featuring artists including Lee Wen (Singapore), Zai Kuning (Singapore), Bani Haykal (Singapore), Ade Darmawan (Indonesia), curators Mark Nash (United Kingdom), Cosmin Costinas (Hong Kong), biennale director Bige Örér (Turkey) as well as researchers such as Geert Lovink (Netherlands), Nikos Papastergiadis (Australia) etc., that served as an open format programme that informed the development of the content and infrastructure of this new institution in a playful and imaginative manner (29 Nov to 14 Dec 2013).

2. Paradise Lost – a group exhibition that was conceived as a constellation of three artistic productions of three artists of Asian descent, namely Trinh T. Minh-ha (Vietnam), Zarina Bhimji (Uganda) and Fiona Tan (Singapore), that together explore narratives of histories of the Asian diaspora, travel and trade, place and displacement (17 Jan to 30 Mar 2014).

3. CCA Talks at Art Stage – featured panelists included Prof. Adele Naude Santos (MIT), Assoc Prof Michael Walsh (NTU), Dr Eugene Tan (National Gallery Singapore), Dr Susie Lingham (Singapore Art Museum), Bala Starr (Institute of Contemporary Art) and Prof Ute Meta Bauer (NTU) etc., in conjunction with Art Stage Singapore 2014, to advance knowledge in contemporary art. (18 Jan 2014)

4. No Country; Contemporary Art for South and Southeast Asia — the exhibition was a collaboration between CCA and the Solomon R. Guggenheim Museum with UBS, and curated by Singapore curator, June Yap. It featured contemporary art from South and Southeast Asia and presented thought-provoking recent works in a wide variety of media, including painting, photography, sculpture and video by some of the most compelling artists from the region today such as Navin Rawanchaikul (Thailand), Sheela Gowda (India), Shilpa Gupta (India), Sopheap Pich (Cambodia), Tang Da Wu (Singapore), The Otolith Group (United Kingdom) and Tran Luong (Vietnam) amongst others. This exhibition also reached out beyond the arts community to address discussions that resonate with CCA’s location – Singapore. (10 May to 20 Jul 2014)

5. More than [show]business – it was conceived as a platform for exploring curatorial formats and ways of presenting and distributing art, involving collaborations with Singapore-based artists, and artist-run institutions such as Post-Museum. (13 Jun to Oct 2014)

Centre for Liberal Arts and Social Sciences (CLASS)
Director: Professor Luke Kang Kwong
Website: class.cohass.ntu.edu.sg

About the Centre
The Centre for Liberal Arts and Social Sciences (CLASS) is the key research hub for the College of Humanities, Arts, and Social Sciences. It was created in 2006, at the time under the School of Humanities and Social Sciences, and was established as a College level centre in April 2010. Its aim is to promote research, including inter-disciplinary research, among the Schools in the College. CLASS also provides a platform for interaction among local and international scholars from various disciplines.

Mission
- To establish NTU as a centre of excellence for interdisciplinary research in the humanities, arts, communications, and social sciences. The centre offers a logistical and intellectual space for scholars to engage in original and socially relevant research.
- To promote and facilitate research grant applications by HASS faculty through workshops and schemes.

Research Activities
The activities supported by CLASS include talks, seminars, workshops, symposiums, conferences and hosting visiting scholars and distinguished lecturers. CLASS events seek different levels of discourse – from academic research to public education – and involve eminent scholars, researchers, policy makers, as well as members of the public.

CLASS hosted a number of workshops, symposiums and conferences during 2013, including:

- 9th International Symposium on Bilingualism (ISB9)
- Transcultural Imaginaries: Making New, Making Strange
- Performing the Local in Singapore Arts
- Basics and Advanced Topics in Item Response Theory
- Cinema experiences: Immersive Past and Futures
- SI13 NTU/ADM Symposium on Sound and Interactivity
- The Seventh International Conference on Contemporary Chinese Grammar (ICCCG 7)
- Environmental Visions
- Navigating Academic Publishing for Early Career Researchers - A Roundtable Discussion with Prof. Robert Stecker
- The British Empire and The Great War – Colonial Societies / Cultural Responses
- Second International Workshop on Conversation Analysis
- Women in Photography Symposium
- Cosmic Serpent in Asia

NANYANG BULLETIN 2014/2015
From the FGDs, the recurring issue raised was that medication adherence is a serious problem in the healthcare industry which means that patients are not taking their medication according to the prescribed dosage. The framework consists of three constructs, namely the Alert (medication adherence), Care (social support) and Education, that form the foundation in providing patient care.

The PACE system constitutes two parts: (i) interactive pillbox aka CuePbox, and (ii) Medication Adherence Monitoring Analytics (MAMA). CuePbox is a social media innovation which aims to address two key problems in patient care. Firstly, many patients tend to skip their treatment regimens by forgetting to take medicines on time. Secondly, some patients lose hope and need words of care, concern and encouragement from other patients, recovered patients and doctors for their mental and social well-being. Two versions of the CuePbox (virtual and physical), being connected to the hospital management system, closely monitors the treatment regimens of patients, and sends them constant reminders to complete their medication on time. CuePbox also facilitates forming patient-to-patient communities and patient-to-doctor communities whereby recovered patients and patients themselves can send testimonials and encouragement to each other. This social media innovation helps the patients to go through treatment with a positive outlook. The messages from doctors and healthcare authorities can encourage the patients to complete their treatment regimes. The care component along with the alerts integrated within the pillbox hopes to empower patients to overcome their disease or illness and live a healthy life.

Social Media and Assistive Technologies for Underserved Communities

This project investigates how specific underserved communities such as the older adults and the disabled in Singapore can be supported with novel social media tools and services that most of them do not currently have access to. Underserved communities are defined as communities that lack the privilege to access technologies due to their current physical, physiological or health condition, or the lack of ICT competencies. Thus, the underserved can be anyone so long as they are restricted to use of certain media due to their demographic characteristics, which social media innovations can be developed to enable them. In the context of Singapore, we focus on the elderly and the disabled communities. By 2020, 15% of Singapore’s population will be over 65 years of age and the nation should have increased the number of eldercare staff from the current 18,000 to 48,000 people. It is imperative that the older adults can lead an independent life as well and as long as possible. Broadening of social networks, creating awareness and engagement in various activities are one of the key areas to improve in Singapore’s support for the older adults. New technology such as social media is often seen as part of the youth culture. This project investigates how members of technologically underserved communities could connect to each other in order to promote social well-
being by using innovative social media inspired solutions. Several influencing factors such as motor and mental impairments, culture and organizational factors in eldercare as well as usage costs of the innovations must be taken into consideration.

**Journal Papers**


**Conference Presentations**


Nanyang Centre for Public Administration (NCPA)
Director: Professor Liu Hong
Website: www.ncpa.ntu.edu.sg

About the Centre
The Nanyang Centre for Public Administration (NCPA) at NTU is a leading institution in Asia that provides public governance and administration training programmes for regional and international organisations.

The Centre serves as a premier training institution that promotes good governance and public services, facilitates knowledge exchanges, and strengthens cooperation between governments across the world.

NCPA offers two graduate programmes targeted at senior government officials, namely the Master of Science (Managerial Economics) and the Master of Public Administration programmes. It also works closely with organisations to offer executive training programmes in public administration, economic management, urban planning, and management of institution of higher learning for senior government officials.

Over the last 22 years, NCPA has trained more than 15,000 senior government officials from all over China and from other nations such as Vietnam, Myanmar and Cambodia. Many of its alumni are holding decision-making positions on all levels of government in their countries, including ministerial-level leaders, mayors and heads of organisations.

With generous support from the Lien Foundation, a prominent philanthropic organisation, NCPA conducts and facilitates interdisciplinary fellowship and research & public engagement programmes focusing on public administration, economic development, environmental issues, health care, and social welfare policies.

The Lien Ying Chow Legacy Fellowship has funded prominent and promising leaders of public and private sectors in China and Singapore to undertake policy-oriented research in respective countries and to promote people-to-people connections.

NCPA also receives support from the Tan Chin Tuan Foundation to organise the biennial Tan Chin Tuan Centennial Forum in China. The event provides the resources and the platform to forge meaningful and enduring ties between NTU and the Mayors’ Class alumni. Each forum focuses on a specific theme and features a panel of renowned experts from China, Singapore and overseas to share their experiences and insights, the latest dynamics in their respective fields, as well as the results of their frontier research.

Mission
To establish NTU as an institute of excellence in providing public administration training programmes for senior government officials and conducting interdisciplinary public policy research so as to promote good governance and cooperation across the world.

Research Activities
With funding from Lien Foundation, NCPA collaborates with top universities in China to measure the quality of public service delivery and public management in over 30 cities across Mainland China. Since the project started in 2010, it has proven to be easily operable and scientific in surveying how service-oriented the local government is in the various Mainland Chinese cities. The project annually releases the top 10 Chinese cities with service-oriented government and three sub-rankings in citizen satisfaction, business satisfaction, and provision of general public service. The longitudinal nature of this project is of great use for scholarly studies on a variety of important public administration issues, it is also instrumental for Chinese government to carry out public administration reform and to improve governance capacity and public service delivery.
In relation to the Lien research programme, NCPA published more than 20 articles in international scholarly journals, two book series and 50 over international conference papers.

NCPA’s another research programme, the Lien Ying Chow Legacy Fellowship programme, has compiled and published 7 books on the Lien Fellows’ research works/reports. The Centre also published journals written by Lien Fellows every six months. The articles covered a wide range of topics, including political science, economics, and social sciences.

Apart from research programmes, NCPA organised many international seminars, roundtable forums, and international conferences to facilitate cross borders knowledge exchange. The following are events organised by NCPA from 2013 to first half of 2014:

1) 2013 Lien Conference on Public Administration – Public Service Delivery and Evaluation
2) Mayors’ Class Forum – Facing Challenges and Seizing Opportunities: Regional Economic Development of China in New Times
3) 3rd International Roundtable Forum on Global Talent

College of Business (NBS)

Asian Business Case Centre (ABCC)
Director: Dr Wee Beng Geok
Website: www.asiacase.com

Mission
The Asian Business Case Centre (ABCC) is part of the Nanyang Business School. Its mission is to build a virtual community of people in case writing, teaching, learning and research about Asian management and the Asian business experience. Since its inception in 2000, the ABCC has published more than 225 case studies (English and Chinese), teaching notes and industry/background notes written by NTU faculty. The ABCC also publishes cases submitted by faculty from other universities in the region which are published on a e-journal on www.asiacase.com. ABCC cases are included in the Harvard Business School case study collection as well as the collection of The Case Centre situated in Cranfield University, England.

Research Activities
- Provide research, case writing and editorial support to faculty for publication of teaching case studies under the Nanyang Case Collection.
- Collaborate with industry partners such as Ministry of Manpower, Design Council, Singapore Totalisator Board, SPRING Singapore, Maritime & Port Authority of Singapore and The Singapore CFO Institute (SAC)
- Current collaborations are:
  - The Singapore CFO Institute (SAC) – research, writing and publication of business case study to with issues and challenges of Capital Raising and Management
  - Singapore Totalisator Board – research, writing and publication of business case studies/reports to increase understanding and scholarship of specific non-profit sectors (e.g. social service and arts) in Singapore.

- Presented case study written for the CFO Connect Symposium
- Conduct workshops based on field research for knowledge exchange and dissemination to industry practitioners.
- Research, writing, and publication of business case studies for the prelims and finals of the annual International Case Competition hosted by NBS
- Translation of cases in the Nanyang Case Collection into Chinese language
- Publication of Casebooks under the Asian Management Case Collection Series
  - Government Linked Companies and other Organizations in Singapore
  - Hospitality Industry in Asia
  - Exploring Best Practices in the Hospitality Industry in Asia
  - 亚洲管理案例集：新加坡的政联公司与机构
  - 亚洲管理案例集：亚洲酒店管理案例精选
  - 亚洲餐饮业有效实践初探

- Collaboration with Cor nell-Nanyang Institute of Hospitality Management (CNI) to survey best practices in the Asian hospitality industry and publication of:
  - Exploring Best Practices in the Hospitality Industry in Asia
  - Translation of the Exploring Best Practices Casebook into Chinese (work-in-progress)
- Case Review. Editorial support and publication of cases submitted by faculty from other universities in the e-journal – ‘Asian Case Collection’ on ABCC web portal (www.asiacase.com)

S. Rajaratnam School of International Studies (RSIS)

Institute of Defence and Strategic Studies (IDSS)
Director: Ambassador Barry Desker (concurrently Dean of RSIS)
Website: www.rsis.edu.sg/idss

Vision
To be the world’s foremost think tank on Asia Pacific defence and security affairs.

Mission
To conduct analytically rigorous, cutting-edge research on defence and security-related issues and developments affecting the Asia Pacific region in the service of the Nation and the global research community.

Research Focus
IDSS’ faculty and research staff conduct both academic and policy-oriented research on the sources of strategic stability and security in the Asia Pacific and the means to ensuring a stable and secure region. No Asian peace and prosperity, Singapore’s included, are possible without regional stability and security. To
that end, IDSS’ research agenda aims to understand and explain drivers and boosters of insecurity that destabilise or threaten to destabilise the Asia Pacific and its sub-regions (Northeast Asia, Southeast Asia, South Asia, etc). Secondly, IDSS explores and assesses the requisite structural conditions and the available modalities (unilateral, bilateral and multilateral) that could mitigate instability and strengthen order and security in the region.

Research Activities
While IDSS research programmes conduct research on specialisation-specific issues, these research all work towards supporting IDSS’ broad research focus. IDSS currently hosts nine distinct programmes, of which four are functionally oriented and five are country/area-based:

Functional Programmes:
- Maritime Security Programme
- Military Studies Programme
- Military Transformations Programme
- Multilateralism and Regionalism Programme

Country/Area Programmes:
- China Programme
- Indonesia Programme
- Malaysia Programme
- South Asia Programme
- United States Programme

School Research Centres
College of Engineering

Advanced Materials Research Centre (AMRC)
Director: Associate Professor Chen Zhong
Website: www.ntu.edu.sg/amrc

Vision
To establish a world-class cross-disciplinary programme in discovery, development, and exploitation of advanced materials.

Mission
- To develop new approaches and understanding in the synthesis of advanced and innovative functional materials for applications ranging from Clean Energy to Defence Materials.
- To serve as a platform to connect NTU researchers with industries to translate the latest research outcome into direct economic benefits.

Objectives
- To build upon the strengths in materials innovation and work closer with relevant industries for the commercialization.
- To expand into new areas including Future Soldier System, Clean Energy Materials & Devices, Smart Materials and Defense Material.

Research Activities
AMRC is a multidisciplinary research centre that focuses on the synthesis of advanced and innovative functional materials for applications ranging from Clean Energy to Defence Materials. The Centre focuses on the areas of materials research for Future Soldier system, Solar-energy Conversion, Smart Device, and Light-weight Materials. Its main research facilities include materials synthesis for organics and inorganic materials, thin film deposition, as well as materials characterisation (morphology, thermal, and structure characterisation).

The AMRC hosts several research programmes with participation of faculty from the Schools of Materials Science and Engineering (MSE), Mechanical and Aerospace Engineering (MAE), Electrical and Electronic Engineering (EEE) and Temasek Lab in NTU (TL@NTU).

Several notable contributions were made by AMRC in the field of Defence Materials. Defence Organization has contributed a total over $4 million to a group of Professors and Research Scientists in the Schools of MSE, MAE, EEE, and TL@NTU for their research on defence-related topic. AMRC is also hosting several research project sponsored by MNCs and local funding agents totalling over $5 million.

Biomedical Engineering Research Centre (BMER C)
Director: Professor Subbu S Venkatraman
Website: www.ntu.edu.sg/bmerc

Vision
- To improve quality of life through pioneering scientific and technological discoveries.
- To mould future leaders in biomedical engineering.
- To synergise multidisciplinary advancements in order to create tomorrow’s medical technologies.

Mission
- To create significant research impact through strong coherent synergies between the biomedical sciences and engineering.
- To apply practical solutions from research results that lead to innovative methods and products.

Research Activities
In conjunction with the setting up of the Centre for Biomimetic Sensor Science, the main activities of BMER C were integrated with those of CBSS.

Currently activities include working with CBSS on training students and researchers for careers in biomedicine and in biosensing. A collaborative effort with Tan Tock Seng Hospital (TTSH) is under way, and will provide seed funding for collaborative research between NTU technologists and TTSH medical faculty. BMER C directors and deputy directors will be the gatekeepers for the funding awards and progress of the research efforts. Follow-on grant call has been made and grants awarded to 4 projects each worth $100K.

BMR C activities are now subsumed into the Nanyang Institute of Technology in Health and Medicine.

Centre for Biomimetic Sensor Science (CBSS)
Director: Professor Bo Gunnar Liedberg
Website: www.cbss.ntu.edu.sg
Vision
• Establish a truly multidisciplinary activity at NTU with a strong focus on mimicking cellular architectures and processes for bio- and chemical sensing.
• Develop new sensors platforms and synthetic concepts capable of detecting biomarkers for cancer and infectious diseases, as well as environmental toxins.
• Exploit new sensor technology for biomedical, environmental and industrial applications.
• Develop highly robust sensor technology for field applications.

Mission
• Develop a deeper understanding of i) optical and electrical transduction mechanisms; and ii) the structure-function relationships of potential sensor materials/layers by pursuing both fundamental and applied research projects.
• Establish strong links to industrial partners active in the diagnostic and (bio)analytical sectors.

Research Activities
Centre for Biomimetic Sensor Science (CBSS) relies on a multidisciplinary cooperation between three international research constellations: The School of Materials Science and Engineering (MSE), Linkoping University (LIU) through the Division of Molecular Physics, and Austrian Institute of Technology (AIT) working jointly on the development of the next generation biosensors. MSE has a strong background in materials preparation, nanoscale patterning, electroactive materials including carbon nanotubes and graphene, and device fabrication. The two European partners, on the other hand, have significant experience in surface characterization of thin molecular films and biosensing using primarily optical transducer technologies. They also contribute with expertise in soft matter surface science, more specifically in lipid/polymer and peptide chemistry. This base of both basic and applied science groups, together with strategic recruitment, has established a truly interdisciplinary research environment involving the following research activities:
• Biological and biomimetic materials (Asst. Prof. Ali Miserez)
• Tissue engineering (Assoc. Prof. Nam Joon Cho)
• Biomimetic soft matter (Asst. Prof. Madhavan Nallani)

New and dedicated laboratories to support these activities have been established in Techno Plaza. Two Singapore based companies ACM Biolabs and Optiqua are conducting research at CBSS.

Centre for Biotechnology (CBT)
Director: Professor Chan Bee Eng Mary
Website: www.ntu.edu.sg/scbe/cbe/CBT

CBT works at the interface of chemical engineering sciences and biomolecular engineering to exploit several frontiers of biotechnology including antimicrobial bioengineering, synthetic biology, tissue regeneration, virus-cell dynamics, cell-based biosensor, cell biophysics and systems bioengineering. Researchers at the Centre apply state-of-the-art methods in bioseparations, synthetic chemistry, microbiology, genetic engineering, biomolecular engineering, bio-surface engineering and biophysics to design novel cell therapy, engineered tissue equivalents, biopharmaceuticals, oral vaccines, and biosensor. Most importantly, CBT serves as a focal point for Chemical and Biomedical Engineering undergraduate students, faculty members and research students to foster highly interdisciplinary research at the crossroad of Chemical Engineering Sciences, Life Sciences and System Engineering.

Centre for Computational Intelligence (C2i)
Director: Associate Professor Ong Yew Soon
Deputy Director: Assistant Professor Ivor Tsang
Website: www.c2i.ntu.edu.sg

Overview
Researchers in C2i investigate natural and artificial systems to comprehend principles that render intelligent behaviour possible in complex changing environments. The Centre’s core research is focused on devising intelligent machines capable of learning, understanding and reasoning about past actions, so as to provide creative solutions to real world complex problems.

Research Areas
• Cognitive and Neuro Systems
• Decision Support Systems
• Evolutionary, Memetic and Statistical Learning
• Fuzzy Systems
• Intelligent Multi-Agents
• Intelligent Systems and Devices
• Machine Learning
• Nature-Inspired Systems

Centre for High Performance Embedded Systems (CHiPES)
Director: Professor Thambipillai Srikanthan
Deputy Director: Assistant Professor Suhaib A Fahmy
Website: www.chipes.ntu.edu.sg

Overview
CHiPES carries out use-inspired research using state-of-the art tools and technologies to create intellectual property that can spur sustainable growth in next-generation embedded systems. It also relies on its state-of-the-art knowledge base and research expertise to provide world-class training in Embedded Systems Engineering for future engineers who can contribute to product innovation and developer productivity.

Research Areas
• Algorithms to Architectures
• Design Methodologies
• Embedded Signal Processing
• Embedded Software
• Human Computer Interaction
• Reconfigurable Computing
• Vision Enabled Sensing

Centre for Infrastructure Systems (CIS)
Director: Associate Professor Wong Yik Diew
Deputy Director: Associate Professor Tiong Lee Kong Robert
Website: www.cis.ntu.edu.sg
Mission
To be a centre of excellence in research and education in infrastructure system planning and development.

Objectives
- To continuously conduct fundamental and applied research led by real needs of a sustainable Singapore land transport system.
- To tackle problems identified as research questions and translate the research findings as policies, programmes and countermeasures.
- To provide a sustained and collaborative industry partnership for national research-centric programmes.
- To create a platform to pull in campus-wide expertise beneficial in forging and harnessing multi-disciplinary, cross-school research capabilities.
- To provide academic and professional development opportunities through interdisciplinary courses, training and research.
- To promote professional registration through project participation and collaboration with overseas subject experts.

Current areas of Research and Consultancy focus:
- Road transport infrastructure design, operations and management
- Green and smart construction materials
- Urban Infrastructure construction and management
- Underground transport networks
- Green transport and logistics
- Building Information Modelling (BIM)

Research Projects
- Aging population and road safety – a driver’s perspective
- Braced excavation-induced ground movements
- Derivation of traffic flow models for the development of underground road network (URN) in Singapore
- Driving Simulation as an assessment of elderly driver fitness to drive and driver rehabilitation method
- Environmental Quality and Environment Impacts of Underground Road System
- Modelling multimodal travel behaviour linking non-motorised transport with public transport
- Modelling, simulation, and travel time prediction of a road network disruption
- Research Project on Study of Transport Energy Efficiency, Methodology, Practice and Policy Effect
- Research on User Behaviour and Response regarding Electronic Road Pricing (ERP)
- Research on Driver Behavioural Adaptation to Underground Road Conditions
- Research Study into Signage Framework for Commuter Facilities in Singapore
- Research Study into first/last mile trips (with focus on cycling) at Jurong Lake District
- Research study into the mode split, trip generation and parking provision for ‘shoebox’ retail use
- Why do cyclists violate traffic rules
- Enhancing the process of preparing precast shop drawings through BIM

Technology Exchange
- Research into road transport infrastructure design, operations and management (LTA)
- Research into smart construction and green materials (BCA; JTC)
- Research into transportation-centric aspects of electric vehicles (TUM)
- Working with various organisations to jointly undertake R&D projects for industry applications

Education and Training activities:
- Coursework programmes in MSc (International Construction Management);
- Conduct seminars, short courses, and lecture series in infrastructure-centric fields

Centre for Multimedia and Network Technology (CeMNet)
Director: Associate Professor Cham Tat Jen
Deputy Director: Assistant Professor Luo Jun
Website: www.cemnet.ntu.edu.sg

Overview
CeMNet is recognised for research work in three core areas, namely, Multimedia Understanding, Intelligent Environments as well as Network Technologies, Protocols and Services. The centre works towards ubiquitous computing where communications and media transcend devices, mobility and activities. Their works seek to enhance user experience which can be achieved through the deployment of network, effectors and location and context awareness technologies into our daily lives.

Research Areas
- Broadband Network Protocols and Services
- Interactive Smart Space Integrating Cameras, Projectors, Microphone Arrays, other Sensors and Actuators
- Mobile-Pervasive Computing and Internet of Things
- Multimedia Signal Processing and Communications
- Pervasive and Seamless Mobile Communication
- Semantic Understanding of Multimedia Data for Efficient Indexing, Storage and Retrieval
- Software Defined Radio

Centre for Optical and Laser Engineering (COLE)
Director: Professor Anand Asundi
Website: www.mae.ntu.edu.sg/pages/cole.aspx

Vision
To be a leading centre for research, education and industrial development in optical and laser engineering.

Mission
- To conduct cutting edge research in the area of Optical Engineering with international repute and recognition.
- To support industrial research and development with emphasis in the areas of optical design, manufacturing and testing.
- To train and nurture a pool of talented optical engineers to meet the increasing demands of this sector.
- To excite a new breed of optineers (optical engineers) to the profession through outreach activities.
Research Activities
The Centre’s research broadly falls in the following areas:

- Computational Optics including Optical Design, Simulation and Imaging
- Optical Metrology and Instrumentation
- Optical Fabrication and Laser Processing

The Centre for Optical and Laser Engineering was initiated in Dec. 2011 through support from the Economic Development Board and the School of Mechanical and Aerospace Engineering. It was officially opened on April 8th, 2013. The Centre has more than 15 academic and technical staff and over 30 research students and staff. It has over 10 Industrial partners and research projects with 4 companies. Some of its patented technologies are being sought by industries for licensing and technology transfer. COLE has also signed MoU with some top institutions from the USA, Europe and Asia to help further develop the field within the region. The research generated has been published in high quality peer reviewed journals such as Optics Express, Optics Letters and others. On the teaching front, a new specialization in Optical Engineering within the MSc in Precision Engineering has been formulated. Over 30 students have registered for this course in the first two years since its inception. In its outreach activities, students from high schools such as Raffles Girls School and Hwa Chong Institution have conducted research at the Centre and also presented their findings at International Conferences. To promote the growing field of Optical Engineering, COLE has also organised workshops and short courses in conjunction with the Optics and Photonics Society of Singapore. Most recently it was a co-organiser of the International Conference on Optics in Precision Engineering and Nanotechnology. It works closely with industry to organise and develop courses relevant to the evolving industry.

Going forward, COLE aims to establish closer rapport with local industries, develop research programs with our overseas collaborators, grow the talent pool in this upcoming field and promote Optical Engineering as a new career path for our budding engineers.

Introduction of Centre for Optical Fibre Technology (COFT)
Director: Professor Shum Ping

COFT was formally formed in October 2013. The centre is set-up to develop core capabilities and technologies for specialty optical fibre fabrication and characterisation. Material and device innovations for these specialty fibres range from multi-kW fibre lasers to nano-watt sensors, and from UV fibres to mid-IR fibres for applications in environmental sensing, biomedical sensing, next generation communications and many others. The centre strives to become a centre of excellence in the advanced research of optical fibres and their related technologies as well as to provide training in this field.

The centre is set-up jointly by NTU, ASTAR, DSO and Optoelectronic Research Centre (ORC) of University of Southampton. Many of our staff have been trained at ORC, which is one of the leading research group in this field. Our strength lies in competence and flexibility to develop and fabricate novel and special optical fibres for advanced applications in photonics.

Currently, we have many on-going optical fibre projects with total funding of about S$28M.

The fabrications of the special optical fibres will be carried out in our new facility which houses state of the art optical fibre fabrications and characterizations equipment. The main equipment in COFT includes:

- Modified chemical vapour deposition (MCVD) system
- Rare-earth vapour delivery system for in-situ doping processes
- Glass working lathe
- Triple fibre drawing tower capable of silica fibre, holey fibre, and soft glass fibre drawings
- Preform refractive index profiler
- Fibre refractive index profiler
- Preform machining knee-mill
- Table-top scanning electron microscope
- Large diameter fibre processing stage

Cyber Security Lab
Director: Associate Professor Kong Wai-Kin Adams
Website: www.sce.ntu.edu.sg/Research/cyber/Pages/index.aspx

Overview
Researchers in the Cyber Security Lab study collaborative security, security protocols, mobile security, collaborative intrusion detection networks, web application security, forensics and biometrics. Research is focused on integrating new knowledge and technology to provide law enforcement and security agencies with automatic devices and capabilities to improve prevention, detection and solution of crimes, and acts of terrorism.

Research Areas
- Network Security
- Software Security
- Web Security
- Forensics and Biometrics

Data-Intensive Scalable Computing Lab (DISCO)
Director: Associate Professor Sourav Saha Bhowmick Deputy Director: Associate Professor Sun Aixin
Website: sce.ntu.edu.sg/Research/disco/Pages/index.aspx

Overview
DISCO Research Lab was officially opened in September 2012 to explore fundamental problems in managing data and information that are of significance in the 21st century. It currently consists of 8 faculty members from the School of Computer Engineering in NTU. Specifically, research members of DISCO focus on the areas of data management, data analytics, information retrieval, and information privacy.

Research Areas
- Data Analytics
- Data Center Management
Emerging Research Lab (ER Lab)
Director: Associate Professor Lee Bu Sung, Francis
Deputy Director: Associate Professor Chng Eng Song
Website: http://erlab.ntu.edu.sg

Overview
The Emerging Research lab (ER Lab) aims to nurture interdisciplinary research and innovation in the areas of e-science, human centric application with high research value contribution to society and commercial output. Over the years, ER Lab unique structure has seen the establishment of the Art Living for the Elderly (NRF/MDA Joint NTU-UBC LILY Center), Joint NTU-I2R Research Programme (ASTAR), Temasek Lab Research Program, Medical Informatics, Herbal Informatics (CRP), Game based Online learning (NRF/MOE IDM programmes).

Research Areas
- Agile and Personalised Design and Software Technology
- Cognitive, Neural and Socially Intelligent Systems
- Crowdsourcing, Multi-Agent Systems, Online
- Learning and Knowledge Representation
- Emerging Applications e.g. IDM, Health care, e-Commerce and Life Long Learning (MOOC)
- Human-Centred Service Science and Computing
- Future Internet
- Next Generation of Human Factor Design and Media Fusion
- Ubiquitous AI, Natural User Interface, Speech Technologies

EXQUISITUS, Centre for E-City
Director: Professor Wang Danwei
Website: www.exquisitus.eee.ntu.edu.sg

Vision
To be a world leader in energy resilience, sustainable environment and future mobility; providing system, control and electro solutions to complex challenges of future cities, particularly in areas relating to energy, environmental sustainability and urban mobility.

Mission
To develop multi-disciplinary research capabilities and to provide technical expertise services in Singapore in the areas of smart sensory systems, clean and renewable energy, energy efficiency, sustainable manufacturing and environments, and intelligent transportations.

Research Activities
EXQUISITUS is a Centre of Excellence to advance research and development (R&D) in electrical systems for future cities. It will develop key technologies in power electronic devices, intelligent control and optimization, and autonomy for applications in environmental monitoring, sustainability, renewable energy systems, transportation systems, aerospace engineering, maritime engineering, and defence. The centre’s research activities can be broadly classified into the following major areas: energy conversion devices, clean and renewable energy systems, energy storage, smart grids, energy efficient buildings, control system technologies, mobile robotics, and intelligent transportations.

Game Lab (gameLAB)
Director: Professor Seah Hock Soon
Deputy Director: Associate Professor Ramakrishna Kakarala
Website: www3.gamelab.ntu.edu.sg

Overview
The gameLAB aims to develop technologies and techniques for commercial and experimental digital art, animation and games through research, innovation, education, training and production. Our lab serves as a labyrinth for computer scientists and engineers, artists and animators, storywriters and musicians, and user-interface designers to create new algorithms, tools, and systems to advance the state-of-the-art digital art and animation productions, including interactive forms of animation such as web based animation and games. As one of its goals, the lab will engage key industrial players intensely to accelerate the growth of the digital media industry in Singapore.

The Lab also hosts the Multi-plAtform Game Innovation Centre (MAGIC), a centre supported by the Interactive Digital Media Programme Office (IDMPO) hosted by the Media Development Authority of Singapore.

Research Areas
- Computer Graphics and Animation
- Computer Vision and Image Processing
- Game Artificial Intelligence
- High-Performance Gaming Input Devices
- Human Computer Interface
- Novel Game Design and Genres
- Serious Games and Applications

INFINITUS, Infocomm Centre of Excellence
Interim-Director: Associate Professor Chong Han Joo Peter
Website: www.infinitus.eee.ntu.edu.sg

Vision
To become a leading centre of excellence for research and education in information and communication engineering.

Mission
To spearhead cutting-edge, interdisciplinary research and collaboration in strategic areas of information and communication technologies and applications.

Research Activities

Joint NTU-UBC Research Centre of Excellence in Active Living for the Elderly (LILY)
Director: Associate Professor Miao Chunyan & Visiting Professor Cyril Leung
Website: lily.ntu.edu.sg
Overview
LILY aims to establish Singapore as an age-friendly services and data hub in addressing global aging issues. It will create a new cross-disciplinary paradigm, namely ageless computing, design and services to support active independent living for the elderly and promote quality of life for all ages. With the participation of end-user communities, concepts and technologies will be developed which will showcase how the well-being of the elderly and all ages can be enhanced. In partnership with industry, commercially viable products and services will be created.

Research Areas
- Ageless Computing
- Multi-agent Systems
- Human Factor
- Affective Computing
- Social Signal Processing
- Wireless Computing
- Computational Advertising
- Storytelling and Gamification
- Crowdsourcing and Analytics
- Healthcare Services
- e-Commerce
- Online Education

LUMINOUS! Centre of Excellence for Semiconductor Lighting and Displays
Director: Nanyang Associate Professor Hilmi Volkan Demir (NRF Fellow)
Website: www.luminous.eee.ntu.edu.sg

Vision
To continue serving as the TOP comprehensive research centre dedicated to solid-state lighting in Singapore.

Mission
- To develop leading edge ‘green’ semiconductor lighting and displays by generating new knowledge, new know-how, and new techniques.
- To generate innovative solutions enabled by nanophotonics and exploit quantum-confined and design-based nanostructures.
- To make a strong technological impact in Singapore and around the globe for energy efficiency in lighting and displays.
- To function as a world-class research and development catalyst for feasible commercialization of technologies in semiconductor lighting and displays for the prosperity of Singapore’s economy.

Research Activities
LUMINOUS! pursues multidisciplinary research that offers potential solutions addressing energy efficiency and photometric quality problems in lighting. LUMINOUS! develops and demonstrates new classes of lighting devices employing semiconductor nanocrystal quantum-dot emitters. Its key competencies include III-Nitrides LEDs, white LEDs, nanocrystal LEDs and lasers, and LEDs for solid-state lighting and displays, nanocrystal quantum-dot nanoluminophors, plasmophors, ZnO-based transparent electrodes and emitting devices, electrochromics for smart windows and low-power displays.

Maritime Research Centre (MRC)
Director: Associate Professor Tan Soon Keat
Website: www.mrc.ntu.edu.sg

Vision
- To establish a focused national and regional research centre with major research activities in hydrodynamics, marine and offshore engineering, shipping business and logistics.
- To be a vibrant hub of activity with marine and offshore organizations and the maritime community; and to host courses, R&D programmes, and projects, as well as seminars and conferences on relevant subject areas.
- To gather and nurture a team of enthusiastic and dedicated staff who will be a source of pride and aspiration for students and researchers, faculty, and the maritime community.

Mission
- To establish a focal point for research and development for the local and regional maritime industry.
- To develop innovative approaches towards marine and offshore engineering, port management and management of coastal environment resources.
- To support continuing education and professional training in maritime business, port and terminal operations, marine and offshore engineering, maritime practices and coastal management.
- To act as the catalyst to promote and facilitate the cooperation in the maritime industry and training of manpower to support the maritime clusters.

Overview
The Maritime Research Centre (MRC) has established itself successfully as the bridge between the maritime community and the research community in NTU. MRC has strengthened its links with the Maritime and Port Authority of Singapore (MPA) and the Economic Development Board (EDB), and International Enterprise (IE) Singapore, and has also established new and strong working relationships with Bureau Veritas (BV), Sembcorp, Keppel and other offshore engineering companies such as Aecergy, and Six Tee. The centre is active in outreach activities and establishes contact with local and regional institutes and companies.

Research Activities
Maritime Research Centre, in addition to supporting conventional maritime activities, also focuses on local strategic development on developing new and sustainable approach towards space creation. Using this approach, land can be reclaimed without using a large amount of fill materials and the space below the reclaimed land can also be utilized at the same time for infrastructure or other development. Precast, super-scale cylindrical structures will be used like caverns to form the underwater space. This new approach integrates reclamation, superstructure and underground constructions into one and is thus the most efficient and cost-effective method for space utilization. The design and construction of the super large cylindrical structures poses many challenges to both theories and practice. New technology and innovative solutions are required to make the idea a reality. It is proposed to carry out an intensive inter-discipline study to address problems related to structural, geotechnical, hydrodynamic, risk analysis, and socio-technical aspects. From the study, a series of innovative
methods, new materials, and new construction technologies will be developed to make the proposed approach technical feasible and cost-effective.

**Medical Informatics Centre (MIC)**
Director: Associate Professor Lin Feng
Website: www3.ntu.edu.sg/birc

**Overview**
In collaborations with clinical institutions and medical schools, MIC is the focus of the education, research and development, and human-resource training in medical informatics and systems at NTU. Research includes development of techniques and tools for computational analysis and visualisation of biomedical data and processes, leading to the understanding of biomedical phenomena and the discovery of novel therapeutic methods. MIC also facilitates teaching and research projects of Master’s and PhD programmes.

**Research Areas**
- Embedded Systems for Diagnostic Instrumentation
- Advanced Medical Imaging and Visualisation
- Physiological Models and Computer Simulation
- Bioinformatics and Computational Biology
- Quantitative Methods in Medicine
- Healthcare Information Systems
- Security Telemedicine
- Clinical Data Mining

**Multi-plAtform Game Innovation Centre (MAGIC)**
Director: Professor Seah Hock Soon
Website: http://magic.ntu.edu.sg/

**Overview**
MAGIC champions games technology and related research and education to translate scientific ideas into technological products and services for the Studios of the Future, allowing companies and individuals to learn, experience, innovate and collaborate.

MAGIC covers a wide spectrum in games-related R&D areas, from Next-Generation Artificial Intelligence (AI) for entertainment, cloud gaming, 3D technologies for content creation and processing to game design and impact.

As a validation of various state-of-the-art technologies developed in-house, MAGIC will work with the industry on innovation projects to adopt the technology. To nurture the next-generation talents for the game industry, MAGIC provides real world training experience for PhD, MSc and undergraduate students. MAGIC also facilitates partners with access to its test users for experimentation and trial of games and other related applications.

By working with strong academic and industry partners from around the world, MAGIC will serve as a blueprint and platform for future studios to collaborate on best industry practices, solutions and workflows.

**Research Areas**
- Serious Game
- Game Content

**Nanyang Centre for Underground Space (NCUS)**
Interim Director: Associate Professor Zhao Zhiye
Website: www.ncus.ntu.edu.sg

**Mission**
NCUS aims to scientifically lead Singapore’s deep underground development efforts enabling the nation to plan the use of its key resources (space, materials and environment) effectively in three dimensions. This presents a major innovation challenge that has not yet been fully achieved in other world cities.

The NCUS’s research focus includes:
- Conceptualize, plan and undertake feasibility studies for large-scale deep underground space utilization in Singapore
- Lead technology development and innovation for underground space development at the national and international scene
- Attract, retain and support world-class researchers to perform high-impact research in Singapore for underground development
- Establish a broad-based education and research platform at NTU in the area of rock engineering and underground development, in line with the goals of NTU’s Sustainable Earth Peak.

**Research and Other Activities**
Current projects:
- MND/SUL: Biogrouting for Underground Construction
- NCUS project: Advanced rock mass modelling using discontinuous deformation analysis
- NCUS project: Fiber optic sensors in rock engineering applications
- NCUS inter-school project: Open sensor platform for engineering applications (SCE).

NCUS will co-organize the following conference in Singapore in Nov 2015:
- TBM DiGs (Tunnel Boring Machines in Difficult Grounds) International Conference.

**NOVITAS, Nanoelectronics Centre of Excellence**
Director: Professor Zhang Qing
Website: www.novitas.eee.ntu.edu.sg

**Vision**
To become a global research centre of excellence in nanoelectronics and contribute to significant positive global social and economic impact.

**Mission**
- By spearheading the research and development of novel electronic materials and devices for next-generation integrated circuits and systems.
• By spearheading multidisciplinary research of future electronic materials, devices and system integration technologies.
• By engaging actively, via partnership with industrial and academic allies, in the search for disruptive electronic materials and device technologies.
• By providing quality educational training and nurturing young talents in the areas of nanoelectronics.

**Research Activities**
NOVITAS has strong expertise in material growth and characterization, device and IC processing, electrical and reliability measurements, modeling and simulation. The Centre’s research activities are classified into three groups: Advanced Silicon Device and Integration Technologies, Compound Semiconductor Device and IC Technologies, and Nanotechnologies.

**Singapore Centre for 3D Printing (SC3DP)**
Director: Professor Chua Chee Kai

**Vision**
The Singapore Centre for 3D Printing (SC3DP) aspires to be the world’s leading research institute in 3D Printing to achieve prominent and outstanding breakthroughs in the research and development of innovative 3D printing technologies, processes and materials. This will be done through attracting leading researchers to the Centre, nurturing a skilled talent pool, as well as establishing strong linkages with and delivering state of the art and innovative solutions to the industry.

**Research Activities**
With increasing worldwide interest and attention in 3D printing, it is crucial for Singapore to capitalise on its current strengths and intensify current efforts in this area so as to enhance its competitive edge. In collaboration with major industry partners, the Singapore Centre for 3D Printing (SC3DP) which is funded by the National Research Foundation, will harness, strengthen and expand 3D printing capabilities in Singapore in four key areas, namely: (1) Aerospace and Defence, (2) Building and Construction, (3) Marine and Offshore, and (4) Future of Manufacturing. SC3DP targets to train 100 PhD students and 27 full-time researchers over the next ten years.

**NTU-JTC Industrial Infrastructure Innovation Centre**
Director: Visiting Professor Lu Ming
Website: ntu-jtc-centre.ntu.edu.sg/Pages/Home.aspx

**Vision**
To create a vibrant industrial infrastructure research ecosystem.

**Mission**
To carry out research, development and demonstration (RD&D) projects to support Singapore’s dynamic industrial landscape.

**Objective**
The objective for the NTU-JTC I3 Centre is to create a systematic and structured platform to conduct RD&D projects to expand JTC’s innovation capacity and build up our technical bench strength in specialized and complex projects over time.

**Research Activities**
The Centre provides seed funding to support RD&D projects to spearhead research and engineering efforts in developing innovative and sustainable industrial infrastructure and industrial real estate solutions.

In addition to providing funding, the Centre also organises and carries out research projects. The Centre focuses its research efforts in four areas:

- Reclamation & Marine Infrastructure
- Sustainable Infrastructure
- Underground Infrastructure
- Infrastructure Systems and Materials

The Centre also sponsors Final Year, URECA Projects and Nanyang Research Programme (NRP) Projects.

**Other Activities**
The Centre organises technical seminars and workshops for NTU staff and students. These seminars are open to the public. The Centre also organises networking sessions and visits to JTC sites for NTU students.

**Ocular Therapeutic Engineering Centre (OTEC)**
Directors: Professor Subbu Venkatraman and Adjunct Assistant Professor Tina Wong

**Vision**
To facilitate applied research in ocular drug and gene delivery.

**Mission**
To accelerate applied research in ocular therapeutics from the lab to the clinic.

**Research and Other Activities**
Glaucoma is the major eye disease of interest, along with uveitis, artificial cornea and inflammation. Our research focuses on sustained delivery products for eye diseases, and developing synthetic and natural materials that can be shaped into artificial cornea.

**OPTIMUS, Photonics Centre of Excellence**
Director: Professor Shum Ping
Website: www.optimus.eee.ntu.edu.sg

**Vision**
To become a Centre of Excellence in research and development in the various emerging areas of photonics.

**Mission**
- To develop innovative photonics techniques and technologies that have significant impacts on the human society.
- To conduct research in the various areas of Photonics that is relevant to the industry.
- To establish excellence in photonics teaching and research for the photonics industry.
- To become a leading research centre in advanced photonics sciences and technologies as well as their applications.
Research Activities

OPTIMUS focuses on research topics in advanced photonics science and associated enabling technologies in the important field of photonics, with potential impacts expected in areas such as very-high-capacity optical communications, nanophotonics, biophotonics, and other related broadband information technology systems. The centre’s research activities are divided into four programmes namely: (1) Novel Photonic Materials and Devices focusing on organic and inorganic photonic materials and devices, nanomaterial structures, silicon photonics, semiconductor lasers and detectors, surface plasmon resonance biosensors and semiconductor nano rods labeling of live human cancer cells biomedical photonics, (2) Photonic Nano-Structures and Applications focusing on surface plasmonics, photonic crystals, metamaterials and devices, and magnetic opto-electronic devices, (3) Optical Fiber Technology focusing on fiber lasers, fiber-based sensors, special fibers for wavelength conversion, ultra-short pulse generation and super-continuum generation, and (4) Advanced Optical Communications focusing on energy-efficient optical systems to green optical networks.

Rapid-Rich Object Search (ROSE) Lab
Director: Prof Alex Kot
Website: rose.ntu.edu.sg

Overview

The ROSE Lab addresses the growing need to expand search beyond text’s limited capability in describing real-world objects. The Lab aims to build visual search technology on media cloud platforms to support real-time applications with scalability to user demand. The ROSE Lab was jointly set up between NTU and Peking University (PKU), China, drawing upon each university’s strength in media, computer vision, and cloud computing technologies. The lab is creating an innovation platform for media applications, and develops visual object search tools by working with major industry players, including Tencent.

The ROSE Lab’s research focuses on three areas:
1) Large-scale structured database of media objects – To facilitate effective mobile search, it is important to collect, analyse, and manage a large-scale database of the images and other information on real-life objects for machine learning and testing. The datasets are structured into application domains (e.g. eCommerce & Digital Advertising, Tourism, Lifestyle & Hobbies).
2) Next generation object search – To enable fast and rich mobile object search with constrained network and computational resources, compact and innovative feature coding, scalable indexing and search algorithms are necessary.
3) Media cloud platform – This platform will support the enormous demand in storage and computation for mobile object search, and will serve as a test-bed for experimentation.

Research Areas

Parallel & Distributed Computing Centre (PDCC)
Director: Professor Cai Wentong
Deputy Director: Professor Sun Chengzheng
Website: pdcc.ntu.edu.sg

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<td>Media object database design</td>
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<td>Media Cloud Platform</td>
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Mission

The mission of the Parallel and Distributed Computing Centre (PDCC) is to form a centre of excellence in the areas of parallel and distributed computing. It has organised several leading international conferences in these areas. Particularly, it has gained an international reputation for its research on distributed simulation and collaborative technology. PDCC also strives to seek new industrial projects where parallel and distributed processing can provide a solution to real problems and foster research collaborations both nationally and internationally. PDCC has excellent computing equipments and network infrastructure including a CPU/GP/GPU cluster and several Linux clusters.

Research Areas

- High Performance Computing: Grid and Cloud Computing, GPGPU, Performance Optimisation and Tools
- Large Scale Simulation: Agent-based Simulation, Decision Support Systems, Virtual Environments

Robotics Research Centre (RRC)
Director: Professor Chen I-Ming
Website: www.mae.ntu.edu.sg/AboutMAE/Divisions/RRC

Mission

- To consolidate, focus and accelerate robotics research activities within the University;
- To bring together researchers in the area of robotics into a conducive environment equipped with state-of-the-art research facilities;
- To cooperate with industrial partners and government agencies in fields of strategic importance to robotics;
- To provide consultancy services to the local industry in robotics and related areas.
**Research Activities**

The Centre emphasises its research on:

- Customised robotic solution for industrial and hazardous applications;
- Domain applications: underwater robotic vehicles, underwater imaging, mixed-multi agent collaboration, motion capture, biomedical manipulation and sensing;
- Mobile robotic “hardware-in-loop” simulation.

The Robotics Research Centre (RRC) was formed in May 1994, as an inter-school centre of the Nanyang Technological University, Singapore. Today RRC has equipment assets of over S$5 Million and research grants amounting to S$10 Million. It has supported the research of over 70 M.Eng. and Ph.D. candidates, and currently supports over 40 researchers. The research focus of RRC remains firmly focused on intelligent robotic systems in specialised applications. The RRC provides modern state-of-the-art equipment and a stimulating environment for those who are participating in research activities. Research facilities include high speed imaging and laser illumination system, complex mobile robot systems, industrial manipulators, dynamic simulation and analysis software, suite of sensors and mobile platforms.

The centre is consulted by defence and industrial sectors for robotic/mechatronic solutions. In addition, it hosts research attachments of students from various countries including Korea, France, Switzerland, India, America and Poland. The RRC has become synonymous with robotics research and applications in Singapore and the region. Its research partners include the Defence agencies, Police, Hospitals and Interactive Media, collaborating on novel applications and sensing systems.

**Solar Fuels Laboratory**

Director: Associate Professor Joachim Loo and Professor James Barber

**Vision**

To be a centre internationally renowned for its scientific and technological contributions in the field of solar fuels.

**Mission**

To develop cost-effective & efficient co-catalysts for solar fuels generation.

**Objectives / Research Philosophy**

- Sustain & Rejuvenate Singapore’s Future Economic Growth
  - Venture more into Discovery, Design and Development (DDD) IC design activities.
  - Foster innovation and entrepreneurial spirit and culture among Singaporeans.
- Promote Environmental Friendliness
  - Reduce Singapore’s water and energy dependency via low-power IC design.
- Provide a Continual Stream of Technical Prowess
  - Mould an outstanding cluster of IC design professionals to nourish IC design companies.
- Inculcate Intellectual Property (IP) Entrepreneurship
  - Infuse an active IC design community that thrives on the ownership and management of IP.

**Research Activities**

The current key research focus areas are:

1. H2O oxidation and reduction;
2. CO2 reduction;
3. Overall H2O splitting in tandem cells. The goal is to develop cheap, yet efficient, material systems that can allow for the generation of solar fuels, either hydrogen production through water reduction or carbon-based fuels through carbon dioxide reduction. Novel hybrid systems, such as semiconductor-metal systems and metal-organic frameworks (MOFs) are also explored.

**VIRTUS, IC Design Centre of Excellence**

Director: Associate Professor Siek Liter
Website: www.virtus.eee.ntu.edu.sg

**Vision**

To become a global IC design power hub for creative and innovative excellence.

**Mission**

To provide the highest quality in education and create leading-edge research in IC design so as to shore up future new research areas and industries.

**Objectives / Research Philosophy**

- Sustain & Rejuvenate Singapore’s Future Economic Growth
  - Venture more into Discovery, Design and Development (DDD) IC design activities.
  - Foster innovation and entrepreneurial spirit and culture among Singaporeans.
- Promote Environmental Friendliness
  - Reduce Singapore’s water and energy dependency via low-power IC design.
- Provide a Continual Stream of Technical Prowess
  - Mould an outstanding cluster of IC design professionals to nourish IC design companies.
- Inculcate Intellectual Property (IP) Entrepreneurship
  - Infuse an active IC design community that thrives on the ownership and management of IP.

**Research Activities**

VIRTUS advances discovery and design (D&D) as well as research and development (R&D) in IC design and technology for applications in medical technology, clean technology
and consumer electronics. Jointly funded by the Nanyang Technological University and Economic Development Board, the centre’s research areas are mainly in analog, mixed-signal, power management and data converters, energy harvesting, low-power RF and mm-wave ICs, and new technology directions such as 3D-integration and physical design, 3D RF and mixed- signal circuits, and terahertz IC.

College of Science

Centre for Disruptive Photonic Technologies, CDPT
Director: Professor Nikolay Zheludev
Co-Director: Professor Zexiang Shen
Deputy Director: Nanyang Assistant Professor Cesare Soci (NAP)
Website: www.nanophotonics.sg and cdpt.ntu.edu.sg

Vision
Our vision is to become a world-leading centre of science of light at the nanoscale that aims at developing revolutionary, disruptive technologies with outlook beyond a ten years horizon.

Mission
Photonics is now recognized worldwide as a major enabling technology. By advancing the physics of control, guiding and amplification of light in nanostructures and by mastering new nanofabrication techniques and methods of growth of different novel photonic material structures, we will develop novel concepts and ground-breaking solutions allowing a new generation of “nano-photonics inside” devices for data processing and green energy applications.

Research and Training Activities
CDPT Research Programme is on the crossroads of two closely interlinked fields, nanophotonics and metamaterials with a focus on new artificial dynamic & reconfigurable photonic media. Nanophotonics is now a major research direction in optical physics and engineering. The aim is to control light in a minute device containing only a few layers of atoms using signals carried by only a few photons and to do it very fast, within only a few oscillation cycles of the light wave. Metamaterials are artificial electromagnetic media achieved by structuring on a sub-wavelength scale. Today its meaning encompasses linear, nonlinear, switchable and artificial gain media with all sorts of unusual and useful functionalities, achieved by artificially structuring at sizes smaller than the length scale of the external stimulus. Nanophotonics and metamaterials are the most dynamic areas of physics, engineering and material science development. Internationally there are about 50 major research groups and centres in the world-leading economies currently involved in this field of research. CDPT has put under a single umbrella a cohort of world-class scientists with expertise than span over a broad range in photonics and CDPT already involves seven Principal Investigators from SPMS and EEE, seven Associate Investigators and eight outstanding International Collaborators, word-leaders in their own sectors of research, two major photonics research Centres in UK and Japan and 5 local collaborators in Singapore. The CDPT also aspires to train future technology and research leaders by building a strong cohort of highly dedicated and talented researchers and PhD students. By the end of 2014 CDPT will host more than 10 Research Fellow and more than 10 PhD students.

Finally, CDPT also aims at becoming a hub for international collaborations with leading research groups in USA, Australia,
Europe and Asia that is centered at Singapore and at fostering exchange of ideas and sharing new results by organizing and hosting international meeting in Singapore, such as recent “META 2014”, “NTU -Technion Workshop on Nanophotonics” and forthcoming “Japan-Singapore International Workshop on Nanophotonics”.

**Cryogenic Facility Centre**
Director: Christos Panagopoulos, Research Professor
Website: http://phyne.spms.ntu.edu.sg/Facility/cryoface/

**Vision**
To combine and utilise a wide range of user-friendly thermodynamic, electronic transport and crystal structure characterisation tools in hard and soft condensed matter.

**Mission**
The Cryogenic Facility Centre (Cryo-FaCe) provides a multidisciplinary foundation for a broad spectrum of scientific research areas including mesoscopic devices, magnetic recording and storage media, electronic materials, superconductors, optoelectronics, nanoscale systems and phenomena, polymeric and biological materials, crystal growth, and thin film synthesis of complex oxides. Other growing fields include bioelectromagnetism and biomagnetism including ion currents in muscles, nerves, and organs such as the brain, lungs and liver and signals of iron in animal tissue, chlorophyll and the study of magnetism in the design of pharmaceuticals.

**Research Activities**
A high precision magnetometer performs studies from -271 degrees Celsius up to several hundred degrees. The instrument operates in the presence of applied magnetic fields lower than the Earth’s field and up to seven orders of magnitude higher. Its sensitivity surpasses that of nuclear magnetic relaxation, neutron scattering and other commonly used spectroscopic techniques. Further to the basic magnetisation function, custom made experiments including magneto-optic and magneto-electric are possible either at ambient or high pressures.

Further to the above apparatus, a physical properties measurement system enriches and complements the multidisciplinary research programme: an automated variable temperature, magnetic and electric field apparatus providing a suite of electro- and thermal transport, heat capacity, magnetometry and scanning probe microscopy measurement capabilities. The apparatus is a major tool in the effort to understand and optimise the synthesis processes of materials such as amorphous alloys, intermetallic compounds, magneto-optic materials, mesostructures, multilayered materials, nanocomposite materials, rare earth compounds, superlattices and thin films. Surface reactions and catalysis, chemical, biological and multifunctional sensors, electronic and optoelectronic devices, thin film solar cells, nanostructure technology, molecular liquids, polymer and polymer surfaces, nucleation phenomena, pattern formation, self-organised criticality, structure and dynamics of complex materials are only a few topics of research which are being addressed using this apparatus.

Cryo-FaCe is also supported by a general diffractometer for theta/2-theta scans, rocking curve measurements and reciprocal space mapping on single crystals and thin films, including thickness analysis, small angle scattering and absorption with the option to operate at low temperatures.

**College of Humanities, Arts and Social Sciences**

**Centre for Chinese Language and Culture (CCLC)**
Director (Interim): Professor Liu Hong
Deputy Director: Assistant Professor Yow Cheun Hoe
Website: www.cclc.hss.ntu.edu.sg

**About the Centre**
Centre for Chinese Language and Culture (CCLC) was officially set up in April 1994, geared towards excellence in teaching and research, and offering courses related to Chinese language and culture for NTU students to take as general education requirement. Since September 2003, CCLC has transferred its teaching responsibilities to the Division of Chinese, HSS, and continued to strive for excellence in the research of Chinese language and culture and in related academic activities.

**Mission**
- To facilitate, coordinate and encourage inter-disciplinary and discipline-specific research in Chinese language and cultural issues of interest in the Chinese world.
- To provide a platform for interaction among international and local scholars from various disciplines to exchange latest research findings and ideas.
- To organise a range of integrated activities such as international conferences, public lectures, academic seminars, public forums and workshops.
- To produce academic publications including working papers, monographs, books and journals.
- To serve as the point of contact between NTU and similar research centres in other international and local academic institutions; and
- To serve as a rallying site for NTU alumni, and establish a contact point between NTU and its alumni.

**Research Areas**
- Chinese Tradition and Modern Cultures in Asia 华人传统与文化
- Chinese Language and Dialects in Asia 华族语言与方言
- Chinese Literature in Asia 华文文学
- Chinese Migration and Networks: Localization and Globalization 华人移民与网络
- Chinese Education in Southeast Asia 东南亚华人教育

**Research**
Since its setup, CCLC has undertaken research projects in the fields of Southeast Asian Chinese Language and Dialects, Southeast Asian Literature in Chinese, Southeast Asian Chinese History and Folklore, Literary and Social Traditions in the Chinese World, and so on.

CCLC has been awarded external research grants by MOE, Lee Foundation, and Chiang Ching-kuo Foundation (CCK), and has invited local and overseas scholars to be engaged in the collaboration projects together with local and overseas institutions and organizations. Research results are published as monographs under CCLC’s book series.
Academic Activities
CCLC, as an important research institution in the region of Southeast Asia, has a well-established reputation, locally and internationally, with successful academic activities including international conferences, workshops, seminars, public lectures and forums. Especially, CCLC has been organizing the “Tan Lark Sye Professorship in Chinese Language and Culture Public Lecture Series” by inviting prominent scholars and professors from various countries to deliver public lectures on the topics related to Chinese language and cultural studies, Chinese literary and education studies and studies on Chinese migration and networks, etc. The public lectures are well-received by eminent scholars, researchers as well as members of the public, especially the NTU alumni.

CCLC has also organized joint seminar series, international conferences and workshops, and conducted research collaborations and joint publication projects with local and overseas institutions and organizations.

The recent major events of CCLC include:
1. International Conference on “New Horizons on Diasporic Chinese Studies: Evolving Themes, Changing Frameworks, Future Directions” – The conference, held on 21-22 March 2014, comprised of both English and Chinese panels, and its participants included 36 scholars from 13 different countries and regions;
2. Tan Lark Sye Professorship in Chinese Language and Culture Public Lecture Series (Visiting Professor: Professor Michael A. Szonyi) – Professor Szonyi from Harvard University visited CCLC as the Visiting Professor of the Tan Lark Sye Professorship from 15-30 March 2014, and delivered, during his visit, a keynote speech (in Mandarin) at the aforementioned international conference, a public lecture in Mandarin, and a seminar in English;
3. Public seminar on “The Construction and Prospects of Sinology and Chinese Studies” – Co-organized with NTU Division of Chinese and Confucius Institute, the seminar was conducted in Mandarin on 23 March 2014 at the National Library of Singapore. Speakers were Professor Chen Yong from University of California at Irvine, USA, and Prof Giuseppina Merchionne from Catholic University of the Sacred Heart of Milan, Italy.

Academic publications
Since 1996, CCLC has attached great importance to academic publications including book series, journals, monographs and public lecture series. Its major publication projects are as follows:
1. Nantah Journal of Chinese Language and Culture (南大语言文化学报) (14 issues published)
2. Nantah Chinese Language and Culture Series “南大语言文化丛书” (23 monographs published)
3. Nanyang Series of Humanities Studies “南洋人文丛书” (17 monographs published since 2006)
5. The Tan Lark Sye Professorship in Chinese Language and Culture Public Lecture Series “陈六使中华语言文化教授基金公开演讲系列” (5 collections of the public lectures published since 2010)
6. Chinese Migration in Comparative Perspectives: Adaptation and Development 《华人移民比较研究：适应与发展》 (1 edition in English, and 1 edition in Chinese. Both are jointly published by CCLC and CHC, as the outcome of an international conference held in October 2007)

Centre for Asian Art and Design (CAAD)
School of Art, Design and Media
Director: ADM Chair and Professor, Vibeke Sorensen
Advisors: Associate Provost Student Life and Professor, School of Humanities and Social Sciences, NTU, Dr Kwok Kian Woon; Professor, University of Toronto/Vice President Royal Ontario Museum, Dr Chen Shen
Website: www.adm.ntu.edu.sg/CAAD/Pages/Home.aspx

Mission
The centre is devoted to researching and preserving historical and contemporary Asian Art and Design; to producing new knowledge through these studies and to leveraging and transferring this knowledge to further the cause.

About the Centre
An interdisciplinary research centre of the School of Art, Design and Media (ADM), Nanyang Technological University, Singapore, the Centre for Asian Art and Design (CAAD) focuses on the study of the historical and related contemporary issues in Asian Art and Design, with emphasis on their influence on local, regional and transnational cultures. This includes the way Asian cultures are encoded and expressed through a range of art and design fields, as well as the translation of international art and design knowledge
into practice in Asia. It involves the study of cosmology and human relationships to nature and to traditional and contemporary technologies. This includes the social, built, and natural environments, aesthetics, art and design concerns and how they impact life and living conditions, with ethnographic documentary and digital technologies playing a central role. They are closely connected to the folk and fine art traditions of the region, and therefore a component of the centre’s activities involve fine artists as well as master craftspeople of the past and present.

International design today must respond to a widening array of cultures and around the world. Not only is there a large Asian diaspora, including many Asian artists and designers who have been internationally educated, but through digital technologies they are bringing their cultures into dialogue with the international art and design fields more broadly. In addition the largest demographic in the world today is Asian. It may be that the future of international art and design will be an international form of Asian Art and Design.

**Key Areas of Study**

- Understanding and preserving Asian cultural traditions, including fine art and craft
- Ecology, cosmology, art and design
- Visual and multimodal symbol systems for encoding information in traditional physical media, how they are being transformed by new technologies and exposure to other cultures
- Crossover and interrelationship of traditional and contemporary media traditions, e.g. architecture, music, dance, and painting, with computer animation and immersive multimedia
- Asian and International Visual Music as a contemporary expression of these interrelationships
- Asian and International Experience and Exhibition Design
- Socially conscious product and interaction design
- Film and video, including ethnography
- Tangible and intangible heritage preservation

**Our Activities**

Our centre activities will include:

- Hosting of artists and designers-in-residence, visiting professors and post-doctoral scholars;
- Pioneering projects in Asian art, design and cultural preservation, such as the use of motion capture to portray, preserve, and extend the movements of Asian dancers, and Chinese Martial Arts (i.e. Wushu) into new creative works.;
- Visualizations of cultural heritage sites;
- Collaboration with Centres, Museums and Galleries locally, regionally and nationally on exhibitions, talks, workshops and special events;
- And others.

**Economic Growth Centre (EGC)**

*Director: Professor Euston Quah  
Co-Director: Associate Professor Low Chan Kee  
Website: egc.hss.ntu.edu.sg*

**Mission**

The Economic Growth Centre (EGC) was set up by the Division in 2004. The Centre has two Research Units: Growth & Macroeconomic Policy and Microeconomic Policy & Social Research. The Centre conducts research and publishes papers with a focus on global economic development and underdevelopment with special reference to East Asian countries. For example, one EGC topic area concerns global poverty and affluence with special case studies on China, Taiwan, Japan, Singapore and selected ASEAN countries to understand the process and factors for economic growth of countries. The analysis of policy areas related to economic performance such as education, social security and welfare, environmental management, health, housing, and population are also areas of significant research.

The EGC organizes conferences, workshops and public talks on key issues relevant to Singapore and the region. It also provides and designs executive and professional workshops “tailor-made” for government ministries, statutory boards, private organizations, foreign governments and international agencies. Networks are established with relevant public and private sector leaders while intellectual discussions with international bodies and local research affiliates such as the East Asian Institute, Institute of Policy Studies and Institute of Southeast Asian Studies are included.

In addition to seminars led by distinguished academics from around the world, the Centre also organizes seminars as directed by global policy leaders. These include Mr. Lam Chuan Leong (Former Permanent Secretary of various Singapore ministries, and presently Ambassador-at-Large), Dr. Khor Hoe Ee (Assistant Managing Director of the Monetary Authority of Singapore) and Dr. Yukon Huang (Former World Bank Country Director for China and Russia).

Other activities of the EGC include joint research workshops, research seminar series and research collaborations with universities overseas as well as with the National University of Singapore, Singapore Management University and the Singapore Institute of Management University. Through its various activities, the Centre is thus engaged in the training of the next generation of economic and policy research scholars and future East Asian leaders.

The EGC directorate is comprised of a Director, with assistance from a Co-Director. The Centre is always seeking outstanding collaborators for its many programmes and activities.
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<tr>
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<th>Title</th>
<th>Speaker/Institution</th>
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<td>8 May 2014</td>
<td>Why Do People Volunteer? An Experimental Analysis of Preferences for Time Donations</td>
<td>Assistant Professor Jonathan Meer, Texas A&amp;M University and NBER</td>
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<td>7 May 2014</td>
<td>A Structural Model of Demand, Cost, and Export Market Selection for Chinese Footwear Producers</td>
<td>Assistant Professor Daniel Yi Xu, Duke University</td>
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<td>Levels and Trends in United States Income and Its Distribution: A Crosswalk from Market Income towards A Comprehensive Haig-Simons Income Approach</td>
<td>Professor Richard V. Burkhauser, Sarah Gibson Blanding, Professor of Public Policy, Cornell University</td>
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<td>Innovation and Financial Liberalization: The Case of India</td>
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<td>13 March 2014</td>
<td>The Exchange Value of RMB and China’s Trade Balance</td>
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<td>20 February 2014</td>
<td>Minimum Wages and Employment in China</td>
<td>Associate Professor Tony Fang, Monash University</td>
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<td>17 January 2014</td>
<td>Price Subsidies vs. Income Transfers</td>
<td>Professor Parkash Chander Jindal School of Government and Public Policy</td>
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<td>Assistant Professor Nilanjan Roy Singapore University of Technology and Design</td>
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<td>A nonlinear view of long-run PPP using cross-sectionally dependent heterogeneous panels</td>
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<td>The Power of BRICS in the World Trade and Growth: Will China and India exert monopoly power to control world finances?</td>
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<td>12 September 2013</td>
<td>Natural Disaster in Japan: Economy, Energy and Environment</td>
<td>Associate Professor Shunsuke Managi Tohoku University</td>
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<td>11 September 2013</td>
<td>Gradient Based Smoothing Parameter Selection for Nonparametric Regression Estimation</td>
<td>Associate Professor Daniel J. Henderson University of Alabama</td>
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<td>Professor Peter Warr Australian National University</td>
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<td>Economic Growth and Development of Malaysia: Achievements and Challenges</td>
<td>Professor Tan Eu Chye University of Malaya</td>
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<td>Professor Daniel Houser George Mason University</td>
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<td>Professor Volker Böhm Bielefeld University</td>
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<td>15 August 2013</td>
<td>Absorptive Capacity and the Growth and Investment Effects of Regional Transfers: A Regression Discontinuity Design with Heterogeneous Treatment Effects</td>
<td>Dr Maximilian von Ehrlich KOF Swiss Economic Institute</td>
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<td>12 August 2013</td>
<td>Endogenous Matching in University-Industry Collaboration: Theory and Empirical Evidence from the UK</td>
<td>Professor Inés Macho-Stadler and Professor David Pérez-Castañllo Universitat Autònoma de Barcelona/Universitat Autònoma de Barcelona</td>
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<td>5 August 2013</td>
<td>Axiomatic Bargaining with Inequality Aversion: Norms vs. Preferences</td>
<td>Professor William Neilson University of Tennessee</td>
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</table>
The Singapore Internet Research Centre (SiRC) was launched in January 2004 and is hosted at the Wee Kim Wee School of Communication and Information. It works on an affiliate model where faculty work together under the Centre only when there is a project. It is recognized as a premier Asian research institute on the new media as faculty associated with the Centre frequently are invited to apply for or be directly involved in research projects. SiRC associates engage in a wide variety of collaborative research efforts with other researchers around the globe.

The SiRC itself does conduct research related to new media/internet across Asia, including East, Southeast, and South Asia. It brings Asian experiences and perspectives to the global discussion about the development, impact, and potential of the Internet. The SiRC is seeing an increasing number of academics from the region requesting research stints at the Centre.

The Centre started with core funding from the School. The bulk of the income is currently from a major project funded by the International Development Research Centre from Canada.

**Vision**
- To be a key node for internet and new media research in Asia, covering social, political, and cultural impact of information technologies
- Bring Asian experiences and perspectives to the global discussion about the innovation, development and impact of the internet and information technologies

**Mission**
- Initiate and conduct research related to the internet and new media across Asia
- Supported through the following strategic thrusts:
  - Education (including training)
  - Service (including consulting)
  - Public policy

**Research Activities**
A top-flight research centre should have activities in four key areas: research, education, service and public policy.

In research, SiRC has produced a commendable list of publications and conference presentations. SiRC has in the past few years spearheaded numerous research projects, conducted workshops and conferences, hosted visiting fellows, all of which have helped build our international profile and media contacts.

Designed to support research projects that will strengthen the body of methodologically sound and theoretically-based social science research in Information Societies, the Strengthening Information Society Research Capacity Alliance (SIRCA II), one of the latest and second biggest grant award to-date to SiRC by the Inter national Development Research Centre, aims to improve the inter-disciplinary research skills of emerging scholars in ICTD and Information Societies in the Global South. Learning from the experience of building capacity in the ICTD field in Asia, SIRCA II includes researchers from Africa, Latin America as well as Asia, in order to address the very lack of Global South scholars in this area of study. SIRCA I and II have achieved three overarching goals:

- Supported theoretically-based and methodologically rigorous social science research into Information and Communication Technologies and Development (ICTD).
- Covered a geographical footprint across the Global South (The SIRCA II programme had principal investigators in Latin America, Africa and Asia) and fostered connections through mentorship and collaboration networks. The SIRCA programme has also strongly emphasized research capacity building and training.
- Disseminated research findings through such venues as academic journals, conferences and other relevant online and print media outlets.

SIRCA II funded 15 grant awardees, reaching out to emerging ICTD scholars in 15 countries from the three regions, with a unique mentorship component provided to awardees with the assistance and guidance to ensure steady progress and completion of project, while the mentors were able to enhance their own personal and professional knowledge. The learning and exchange between mentor and mentee (mentor and awardee and PI) facilitated the outcome of stronger and more rigorous research findings within the programme.
<table>
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<td>Singapore Internet Research Centre, Nanyang Technological University, Singapore</td>
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<td>Dr. Rajesh Kumar Chandwani</td>
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<td>Indian Institute of Management Bangalore</td>
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<td>Dr. Baohua Zhou</td>
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<td>Jack Qiu</td>
<td>The School of Journalism and Communication, the Chinese University of Hong Kong</td>
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<tr>
<td>Mr. Nikos Dacanay</td>
<td>Thailand/Burma border region</td>
<td>Gender</td>
<td>ICT Usage Among Burmese Ethnic Women Organizations in Thailand: Enabling Change For Women and Communities</td>
<td>Roger Harris Associates</td>
<td></td>
</tr>
<tr>
<td>Mrs. Ezmieralda Melissa</td>
<td>Indonesia</td>
<td>Gender</td>
<td>The Internet and Women Empowerment - A Study of How Women in Indonesian Urban Areas Use Social Media to Become Entrepreneurs</td>
<td>Alexander Fior University of the Philippines, Open University</td>
<td></td>
</tr>
<tr>
<td>Ms. Andrea Lucia Ordóñez Llanos</td>
<td>Ecuador</td>
<td>Labour</td>
<td>A new set of questions: ICT4D research and policy</td>
<td>Hernan Galperin Center for Technology and Society at the Universidad de San Andrés, Argentina</td>
<td></td>
</tr>
<tr>
<td>Dr. Fabro Boaz Steibel</td>
<td>Brazil</td>
<td>New Media</td>
<td>Designing web 2.0 tools for online public consultation</td>
<td>Elsa Estevez International Institute for Software Technology - United Nations University</td>
<td></td>
</tr>
<tr>
<td>Dr. Héctor Sebastián Benítez Larghi</td>
<td>Argentina</td>
<td>Education</td>
<td>Gender, social class &amp; ICT. The constitution of social and digital inequalities among Argentinian adolescents</td>
<td>Roxana Barrantes Instituto de Estudios Peruanos, Peru</td>
<td></td>
</tr>
<tr>
<td>Ms. María Paz Olivera Rodríguez</td>
<td>Peru</td>
<td>Education</td>
<td>Utilizing participatory action research in developing educational applications: The case of Peruvian primary schools</td>
<td>Arul Chib Singapore Internet Research Centre, Nanyang Technological University, Singapore</td>
<td></td>
</tr>
<tr>
<td>Mr. Matías Dodel Schubert</td>
<td>Uruguay</td>
<td>Labour</td>
<td>Lowering barriers to entry: An analytical framework to incorporate ICT as an independent variable</td>
<td>Maria Soledad Ramirez Montoya Universidad Virtual del Sistema Tecnológico de Monterrey, Mexico</td>
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</tbody>
</table>

More information about the programme can be found at www.sirca.org.sg.

In training, workshops have been held for the internet community, such as, for example, workshops on the legal issues facing bloggers, journals publication and personal data protections.
### List of Seminars for 2012 to 2014:

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 February 2014</td>
<td>Rise of Global Religious Organizing: Authority, Community &amp; Mediated Paradoxes</td>
<td>Dr Pauline Hope Cheong, Associate Professor at the Hugh Downs School of Human Communication, Arizona State University.</td>
</tr>
<tr>
<td>27 February 2014</td>
<td>From Traditional to Digital Media</td>
<td>Fernando Samaniego, International new media manager and consultant</td>
</tr>
<tr>
<td>20 January 2014</td>
<td>The “Smart City” as a Platform for Collaboration: Leveraging Data-driven Innovations and Connected Citizens to Foster Sustainable Cities</td>
<td>Dennis Linder, SiRC Visiting Scholar and PhD Candidate at the University of Maryland School</td>
</tr>
<tr>
<td>14 October 2013</td>
<td>Disability and Development as a “Grand Challenge” for the ASEAN Region: Collaborative Research Opportunities in the UNCRPD and the Incheon Strategy to “Make the Right Real” for Persons with Disabilities in the Asia Pacific Region</td>
<td>Dr. Derrick L. Cogburn, Associate Professor, School of International Service at American University, and Executive Director of COTELCO: The Collaboration Laboratory and its Institute on Disability and Public Policy</td>
</tr>
<tr>
<td>31 October 2013</td>
<td>Personal Data Protection: Singapore and Beyond</td>
<td>Abu Bakar Munir, Faculty of Law, University of Malaya, Malaysia and Global Privacy Expert, Protiviti, Singapore</td>
</tr>
<tr>
<td>27 August 2013</td>
<td>The Next Generation Classroom: Videogames, Online Learning and the Freedom of Experimentation</td>
<td>Mr Scot Osterweil, Creative Director of the MIT Education Arcade and a research director in the MIT Comparative Media Studies Programme</td>
</tr>
<tr>
<td>17 April 2013</td>
<td>A Modified Unified Theory of Acceptance and Use of Technology for 3G Mobile Multimedia Services in Indonesia</td>
<td>Dr Chew Kok Wai, Associate Professor, Multimedia University Malaysia</td>
</tr>
<tr>
<td>13 March 2013</td>
<td>Appropriation of mobile media in various contexts – evidences over the past decade</td>
<td>Dr Veronica Karnowski, Research Associate, Department of Communication Studies and Media Research, Ludwig-Maximilians-University, Munich</td>
</tr>
<tr>
<td>1 February 2013</td>
<td>Not Seen on TV: The Truth about Media’s Effect on Youth</td>
<td>Dr Douglas Gentile, Associate Professor, Department of Psychology, Iowa State University</td>
</tr>
<tr>
<td>27 November 2012</td>
<td>The Multiple Crises of Electronic News in India</td>
<td>Dr Vibodh Parthasarathi, Centre for Culture, Media &amp; Governance, Jamia Millia Islamia, New Delhi</td>
</tr>
<tr>
<td>7 November 2012</td>
<td>On Air, Off Air</td>
<td>Mishal Husain, BBC World News journalist</td>
</tr>
<tr>
<td>24 August 2012</td>
<td>Where’s the European Union going in the Digital Landscape?</td>
<td>Dr Carmina Crusafon, Senior Lecturer, Department of Journalism and Communication Studies, Autonomous University of Barcelona</td>
</tr>
<tr>
<td>4 May 2012</td>
<td>Regulation of harmful content on TV under media convergence</td>
<td>Ms Chanansara Oranop, Ph.D. Candidate from Chulalongkorn University, Thailand</td>
</tr>
<tr>
<td>3 May 2012</td>
<td>Data Protection Law: Singapore Follows Suit</td>
<td>Professor Abu Bakar Munir, Faculty of Law, University of Malaya, Malaysia</td>
</tr>
</tbody>
</table>
The number of short-term research visitors has also been increasing steadily.

<table>
<thead>
<tr>
<th>Year</th>
<th>Name / Position / Organisation</th>
<th>Name of Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>Arul Chib&lt;br&gt;School for Communication, University of Southern California, USA</td>
<td>Information Communication Technologies for Development (ICT4D): Cases from Tsunami-affected Communities in Indonesia and India</td>
</tr>
<tr>
<td></td>
<td>Jasper Lim&lt;br&gt;Senior Researcher and Doctoral Candidate, Faculty of Technology, Policy &amp; Management, Delft University of Technology, The Netherlands</td>
<td>Solving travel time losses through e-working</td>
</tr>
<tr>
<td></td>
<td>Jeannie Goh&lt;br&gt;University of Manchester, UK</td>
<td>Facing the Future: The Presence of Others in the Age of Video-Mediated Communication</td>
</tr>
<tr>
<td>2006</td>
<td>Jens Damm&lt;br&gt;Free University Berlin, Institute for East Asian Studies, Germany</td>
<td>China’s Internet as Signifier: Contradicting Discourses, Paradigms, and Interpretations</td>
</tr>
<tr>
<td>2007</td>
<td>Kou Ji Hong&lt;br&gt;Wuhan University, China</td>
<td>Information Resource Management (IRM)/Informatization of Higher Education in China</td>
</tr>
<tr>
<td></td>
<td>Natalie Lee-San Pang&lt;br&gt;Monash University, Australia</td>
<td>Cultural Institutions in Singapore: Investigating Knowledge Commons, Communities, and the Design Interplay in Contemporary Media Environment</td>
</tr>
<tr>
<td></td>
<td>Andrade Gomes Norberto Nuno&lt;br&gt;European University Institute (EUI), Italy</td>
<td>Virtual Worlds – The Place of Law in New Digital Environments</td>
</tr>
<tr>
<td>2008</td>
<td>Daniel Reimold&lt;br&gt;Ohio University, USA</td>
<td>Evolution and current state of Singapore’s campus news media</td>
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<tr>
<td>2009</td>
<td>Carsten Gäbel&lt;br&gt;University of Leipzig, Germany</td>
<td>Media Politics in Singapore</td>
</tr>
<tr>
<td></td>
<td>Soh Chin Hooi&lt;br&gt;多媒体大学, Malaysia</td>
<td>Internet Usage and Consequences Amongst School Children in Malaysia</td>
</tr>
<tr>
<td>2010</td>
<td>Natasha Cowan&lt;br&gt;Flinders University, Australia</td>
<td>The Capacity of the Internet to Enhance Political Communication and Participation in Strong State Democracies</td>
</tr>
<tr>
<td></td>
<td>Joe J Phua&lt;br&gt;University of Southern California, USA</td>
<td>Online health websites for smoking cessation employing Social Identity theory, Social norms approach and Social capital</td>
</tr>
<tr>
<td></td>
<td>Benjamin Sanders&lt;br&gt;University of Plymouth, UK</td>
<td>Online Gaming Addiction: An Emerging Avenue for Exploitation</td>
</tr>
<tr>
<td>2011</td>
<td>Michelle Helena van Velthoven, Postgraduate researcher&lt;br&gt;Global eHealth, Global eHealth Unit, School of Public Health, Department of Primary Care and Public Health, Imperial College London, UK</td>
<td>Adoption of Mobile Phone Interventions for Health Care in Low and Middle-Income Countries</td>
</tr>
<tr>
<td></td>
<td>Low Mei Mei&lt;br&gt;Singapore</td>
<td>Mapping Digital Media</td>
</tr>
<tr>
<td>Year</td>
<td>Author/Institution</td>
<td>Title</td>
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<tr>
<td>2012</td>
<td>Dr. Heinz Scheifinger</td>
<td>The Relationship between Hinduism and the Internet in Singapore with Particular Reference to the Glocalization Processes Occurring as a Result of Temples’ Engagement with the Internet</td>
</tr>
<tr>
<td></td>
<td>Chanansara Oranup na Ayutthaya</td>
<td>Regulation of Harmful Content in Broadcasting under Media Convergence: from Overseas to Thai experience</td>
</tr>
<tr>
<td>2013</td>
<td>Dennis Linders</td>
<td>The City as a Platform for Collaboration: Investigating Singapore’s use of social media and open data to promote community action on climate change.</td>
</tr>
<tr>
<td></td>
<td>Dr Chew Kok Wai</td>
<td>Determine suitable leadership styles and skills for an organization that uses knowledge management to achieve competitive advantage</td>
</tr>
<tr>
<td></td>
<td>Yu Chunjiang</td>
<td>New media and social public governance based on the background of Internet</td>
</tr>
<tr>
<td></td>
<td>Garry Tan Wei Han</td>
<td>Mobile Tourism: A Neglected Tourism Research Area in Singapore</td>
</tr>
<tr>
<td>2014</td>
<td>Dr Wha-Chul Son</td>
<td>Connecting Media Ecology and Philosophy of Technology: Big-data Technology in Asia as a Case Study</td>
</tr>
</tbody>
</table>

In public consulting and policy, SiRC associates have given feedback on public consultation papers.

SiRC will continue to look for new ways to improve the Centre’s local and international profile, research projects as well as media contacts through meaningful projects.

**College of Business (NBS)**

**Centre for Accounting and Auditing Research (CAAR)**

*Director: Professor Tan Hun Tong*

*Website: [www.nbs.ntu.edu.sg/Faculty_Research/Research_Centres/CAAR/Pages/CAAR.aspx](http://www.nbs.ntu.edu.sg/Faculty_Research/Research_Centres/CAAR/Pages/CAAR.aspx)*

**Mission**

To promote quality academic and applied research in accounting and auditing as well as to foster links with industry through joint research and consulting.

**Research activities**

- Planning, conducting; and providing administrative support for research on significant issues relating to accounting or auditing
- Organising research seminars, workshops, round-table discussions and forums on emerging or controversial issues affecting the accounting and auditing profession
- Circulating working papers and other monographs to disseminate research findings amongst academics and professionals
- Organising or supporting the organisation of local and regional accounting conferences for academics and professionals in the Asia-Pacific region. Please refer to [www.isarhq.org for details of the International Symposium of Audit Research (ISAR)](http://www.isarhq.org)

**Center for Leadership & Cultural Intelligence (CLCI)**

*Executive Director: Professor Ang Soon*

*Director of Research: Associate Professor Ng Kok Yee*

*Website: [www.clci.ntu.edu.sg](http://www.clci.ntu.edu.sg)*

**Mission**

To lead in the generation of Knowledge, Assessments, and Programs (KAP) for growing culturally intelligent individuals and organizations.

**Research Activities**

- Developing and validating novel and rigorous methodologies/instruments for assessing cultural intelligence
- Establishing the predictive validity and impact of cultural intelligence through field and experimental studies. Findings of our studies are disseminated in international publications and conferences
- Partnering corporate and government organizations in R&D on CQ and global talent issues, and in developing their global leaders through CQ training and coaching programs.
Participants in our programs come from various continents including Asia, North and South America, Europe and Australia.

- Enhancing CQ and global leadership skills development in undergraduate and graduate students in the university through innovative pedagogies and systematic assessment of students' learning outcomes.

Information Management Research Centre (IMARC)

Director: Associate Professor Sia Siew Kien
Website: www.nbs.ntu.edu.sg/Faculty_Research/Research_Centres/IMARC/Pages/IMARC.aspx

Information Management Research Centre (IMARC) is known for research and executive education in the management of information technology.

IMARC’s research projects are conducted by university faculty in collaboration with industry partners, with a focus on understanding, integrating, creating and disseminating new concepts and best practices in the management and use of information technology in Singapore and throughout the Asia Pacific. IMARC faculty publish their research widely in leading IT management journals and books.

IMARC organises public as well as in-house seminars for organisations as part of its ongoing efforts at sharing critical knowledge on strategic issues with its corporate partners and industry.

IMARC has been engaged in joint research with many organisations and collaborates with researchers world-wide on publications. The major research themes are listed below:

- Managing Complex IT Projects
- Cultural Intelligence and the IT Workforce
- Knowledge and Innovation Management
- Managing Global IT
- Social Media and Information Goods

Managing Complex IT Projects

This research stream focuses on the studying of complex IT projects. The various research projects tend to be multi-year, multi-million, enterprise wide, involve diverse stakeholders, and several vendors. For many of these studies, we were able to collect longitudinal data as the project unfolded, and to observe the challenges faced and solutions tried. The broad research question pursued was how complex IT projects are managed. Key issues explored are the management of multiple stakeholders, project control, vendor transition, global-local tensions, and the challenges of enterprise integration.


Cultural Intelligence and the IT Workforce

This stream of research examines issues at the boundaries where the IT work environment interacts directly with the IT professional. In particular, the global use of IT has brought about a blurring of geographical boundaries, and IT professionals today must increasingly work in global IT work teams to deliver seamless IT services to organizations. To be effective, IT professionals need new capabilities to work effectively with clients, users, vendors, and other IT professionals from different cultures. This research stream focuses on the role of cultural intelligence for IT professionals, and its implications on work practices and performance. This complements our existing research on enduring issues such as (1) retention of IT talent; (2) socialization and integration of IT professionals into the organization and the IT profession, (3) development of IT careers, (4) managing professional obsolescence in the workforce, and (5) compensation, reward and incentive systems for IT professionals.


Knowledge and Innovation Management

This research stream seeks to understand what types of innovation behavior lead to the best performance and how organizations should cultivate the desired innovation behavior and encourage knowledge sharing amongst their employees. A recent project examines inter-organizational collaborations in the public sector, and explores the how social capital elements enable individuals to overcome constraints in the institutional context to effectively collaborate across organizations. Other research projects explore the process from innovation to successful commercialization in product development. A research project has been conducted with 3M to examine how the expertise of research scientists affects their ability to become effective inventors and effective innovators. A research grant proposal was recently submitted to explore such issues in sustainability-related technological innovation.

Communities of Practice: Forums versus Repositories” Database for Advances in Information Systems.


Global Enterprises and IT Management

As businesses reconfigure their value chains and scale up their global expansions, they have to cope with a myriad of complex IT management challenges. This research examines how enterprises realign their global IT strategies to achieve scale, responsiveness, and innovation. Anchored in the organization design literature of MNC structures and IT structure-governance, we seek to unravel the challenges in dynamically structuring and governing global IT organizations to balance the inherent global-local tensions. Working in collaboration, we conducted field interviews with CIOs and senior executives of global or regional enterprises with established Asian presence, e.g., P&G, Microsoft, Intel, Siemens, DBS Bank, OCBC Bank, and Neptune Oriental Line. More field studies will be conducted next year as we expand the studies outside Singapore.


Social Media and Information Goods

Popular social media sites are highly valued economically, with widespread economic activities surrounding these technology
providers. These research projects examine the dimensions of social media technologies and examine how different types of social media affect the conversion of information into business value. We also examine how information propagates through the use of social media technologies, i.e., the nature of information dissemination social media, the speed and timing of information propagation, the routes through which information is disseminated, and the differences in the propagation of positive versus negative information. A closely related topic is the provision of digital information goods and services. Given their unique properties, we investigate issues of pricing, bundling, versioning, sales strategy as well as consumption patterns of these digital information goods and services.


S. Rajaratnam School of International Studies (RSIS)

Centre for Multilateralism Studies (CMS)
Head: Associate Professor Tan See Seng
Website: www.rsis.edu.sg/cms

Vision
To be an international knowledge hub for multilateral cooperation and regional integration by contributing to international academic and public debates on architectures for global and regional governance in Asia Pacific.

Mission
- To conduct scholarly and policy research on multilateral and regional cooperation and governance issues.
- To facilitate policy dialogue and academic debate on regional cooperation and integration.
- To enhance the capacity of current and future leaders, officials, professionals, and students through executive and graduate education.
- To network and collaborate with other academic and research institutions.

Research Activities
In meeting its objectives, the Centre works through the following scope of activities:
- Annual conferences and workshops
- Research Fellow programme
- Curriculum development
- Capacity building
- Policy-relevant research outputs

CMS is committed to generate a regular stream of high impact scholarly and policy-oriented research as well as to disseminate them through myriad formats, media and outlets, which are targeted at policymakers, think tanks and academic audiences.

Research Focus
The Centre’s research agenda includes international and global forms as well as expressions of cooperative multilateralism:
- Economic Multilateralism
  Research areas include trade, monetary, and financial integration in ASEAN, ASEAN+3, South Asia, and Central Asia; evolving linkages between various Asian sub-regions and with countries/sub-regions outside the region (such as the Asia Pacific Economic Cooperation, APEC and Trans-Pacific
Diplomatic and Security Multilateralism
Research areas include intergovernmental and non-official arrangements such as the ASEAN Regional Forum (ARF), ASEAN+3, East Asia Summit (EAS), Shanghai Cooperation Organisation (SCO), Six-Party Talks, the Council for Security Cooperation in the Asia Pacific (CSCAP), etc. Initiatives in defence diplomacy include the ASEAN Defence Ministers’ Meeting (ADMM) and ADMM Plus, the Shangri-La Dialogue, and alliances.

Centre for Non-Traditional Security (NTS) Studies
Head: Associate Professor Mely Caballero-Anthony
Website: www.rsis.edu.sg/nts

Vision
The Centre for NTS Studies aims to mainstream and advance the field of NTS studies in regional and international security discourse to complement traditional approaches to security that emphasises sovereignty, political and military independence, and defence. NTS issues are challenges to the survival and well-being of peoples and states that arise from non-military sources, such as climate change, resource scarcity, infectious diseases, natural disasters, food shortages and transnational crime. These dangers are transnational in scope, defying unilateral remedies and requiring comprehensive – political, economic and social – responses, as well as the humanitarian use of military force.

Mission
The Centre for NTS Studies conducts research and produces policy-relevant analyses aimed at furthering awareness and building capacity to address NTS issues and challenges in the Asia Pacific region and beyond.

Research Activities
To fulfil this mission, the Centre for NTS Studies aims to:

- Advance the understanding of NTS issues and challenges in the Asia Pacific by highlighting gaps in knowledge and policy, and identifying best practices among state and non-state actors in responding to these challenges.
- Provide a platform for scholars and policymakers within and outside Asia to discuss and analyse NTS issues in the region.
- Network with institutions and organisations worldwide to exchange information, insights and experiences in the area of NTS.
- Engage policymakers on the importance of NTS in guiding political responses to NTS emergencies and developing strategies to mitigate the risks to state and human security.
- Contribute to building the institutional capacity of governments, and regional and inter national organisations to respond to NTS challenges.

The Centre’s research activities focus on the following key programmes:

1. Internal and Cross-Border Conflict
   - Dynamics of Internal Conflicts
   - Multi-level and Multilateral Approaches to Internal Conflict
   - Responsibility to Protect (RtoP) in Asia
   - Peace-building
2. Climate Change, Environmental Security and Natural Disasters
   - Mitigation and Adaptation Policy Studies
   - Politics and Diplomacy of Climate Change
3. Energy and Human Security
   - Security and Safety of Energy Infrastructure
   - Stability of Energy Markets
   - Energy Sustainability
   - Nuclear Energy and Security

Centre of Excellence for National Security (CENS)
Head: Associate Professor Kumar Ramakrishna
Website: www.rsis.edu.sg/cens

Vision
To be an international leader in the multi-disciplinary study of the concept of resilience, and in the policy-relevant application of such research in order to promote homeland/national security.

Mission
To produce rigorous policy-relevant analysis of a range of national security issues and increase the intellectual capital invested in strategising national security.

Research Activities
As a research unit of RSIS, CENS works closely with not just other RSIS research programmes, but also national security agencies such as the National Security Coordination Secretariat within the Prime Minister’s Office.

CENS is composed of three research clusters sharing the broad research agenda of studying and assessing extant issues and debates on national security through the concept of resilience and its applicability to policy. The three research clusters are:

- Radicalisation Studies
  Which examines the processes of radicalisation to violence of individuals and groups of individuals in the specific contexts within which they occur using a multidisciplinary approach that draws on theories from criminology, psychology, sociology, history and political science.

- Homeland Defence
  Which focuses on research that enhances the resilience of key niches of the national security ecosystem in three main areas of inquiry: Strategic Communication, Cybersecurity and Social Media Analysis.

- Social Resilience
  Which examines the concept of resilience in framing national security as well as the constitutive elements of social resilience such as multiculturalism, citizenship, class, and immigration using a multidisciplinary approach and multiple research methodologies.
Policy Relevant Publications
The Centre for NTS Studies produces a range of output such as research reports, books, monographs, policy briefs and conference proceedings.

Training
Based in RSIS, which has an excellent record of postgraduate teaching, an international faculty, and an extensive network of policy institutes worldwide, the Centre is well-placed to develop robust research capabilities, conduct training courses and facilitate advanced education on NTS. These are aimed at, but not limited to, academics, analysts, policymakers and non-governmental organisations (NGOs).

Networking and Outreach
The Centre for NTS Studies serves as a networking hub for researchers, policy analysts, policymakers, NGOs and media from across Asia and farther afield interested in NTS issues and challenges.

It is also the Secretariat of the Consortium of Non-Traditional Security Studies in Asia (NTS-Asia), which brings together 20 research institutes and think tanks from across Asia, and strives to develop the process of networking, consolidate existing research on NTS-related issues, and mainstream NTS studies in Asia. In addition, the Centre is the Coordinator of the ASEAN-Canada Research Partnership (2012–15) supported by the International Development Research Centre (IDRC), Canada. It also serves as the Secretariat of the initiative.

Temasek Foundation Centre for Trade & Negotiations (TFCTN)
Head: Dr Deborah Elms
Website: www.rsis.edu.sg/tfctn

Mission
To aid development by increasing knowledge of trade negotiations and building the capacity of government and business leaders in the Asia Pacific region to better participate in economic globalisation.

Research Activities
TFCTN is leading the Trans-Pacific Partnership (TPP) Research Network. The TPP Research Network is intended to provide a better base of knowledge for officials. The Network members are inter-disciplinary, and selected from across a wide range of countries. Each is an expert in relevant topics for research.

The Network has two primary roles: to examine past FTA practices for relevant lessons and to project forward to key elements of an evolving TPP FTA. The specific areas of research will evolve over time, as the TPP moves from early negotiations through completion with the nine original members and on to a likely expansion with the addition of new members.

Network participants will undertake research, disseminate information and facilitate discussion on TPP-related issues. An annual conference will provide an opportunity for academics and scholars to discuss their research and to identify areas for regional collaboration. Researchers will also prepare regular policy briefings for dissemination to the TPP policy community.

Other areas of research that TFCTN embarks on include international political economy, trade disputes, political psychology, conflict resolution, trade nexus climate change, American foreign and security policies.

International Centre for Political Violence and Terrorism Research (ICPVTR)
Head: Professor Rohan Gunaratna
Website: www.pvtr.org/index.htm

Vision
To integrate academic theory with practical knowledge, which is essential for a complete and comprehensive understanding of threats from politically motivated violence and terrorism.

Mission
To conduct research, training, and outreach programmes aimed at reducing the threat of politically motivated violence and at mitigating its effects on the international system.

Core Objectives
ICPVTR conducts several core research projects with the following aims:

- To conduct sustained research and analyses on terrorist, and extremist political groups and their support bases. To this end, the Centre collects and analyses literature seeking to politicise, radicalise and mobilise the public into supporting extremism and participating in violence.
To identify the strengths and weaknesses of international, state, and societal responses in managing the threat of terrorism and political violence.

To provide high quality instruction and training for officials and future leaders engaged in combating terrorism and other forms of political violence.

To advise governments and inform societies affected by terrorism and political violence on how best to manage the current and evolving threat.

Core Projects

Database
The ICPVTR Terrorism Database – Global Pathfinder – is a one-stop repository for information on current and emerging terrorist threats. This integrated database contains comprehensive profiles of terrorist groups, key terrorist personalities, terrorist and counter-terrorist incidents as well as terrorist training camps. The Centre has also established a database for extremist publications of security interest. Known as VIPER, this database aims to be the first of its kind to identify and analyse extremist publications.

Capacity Building
In addition to teaching courses at the Masters level, ICPVTR threat specialists conduct various levels of specialised courses for local and foreign law enforcement personnel from the military and police forces. The ICPVTR capacity building programme is geared towards providing world-class education and training for serving and future leaders in counter-terrorism.

Strategic Counter-Terrorism Projects
ICPVTR’s strategic counter-terrorism projects include ideological, legislative, educational, financial, media, informatics and developmental initiatives. These strategic projects seek to create an environment hostile to terrorist groups and their supporters. ICPVTR seeks to build a norm and an ethic against politically motivated violence, especially terrorism.

Counter-Terrorism Security
ICPVTR’s Counter-terrorism Security projects seek to develop a coherent picture of the threats faced by critical industries and infrastructures, and key industries and services including the energy, transportation and hospitality sectors.

Research Activities

- Produce analyses, threat assessments and projections in relation to terrorism, extremism and political violence.
- Produce policy briefs.
- Profile terrorist and extremists groups, important individuals, significant attacks and religious and educational institutions linked to extremism.
- Study and produce reports on high profile terrorist attacks.
- Conduct field research on topics related to terrorism, political violence and extremism.
- Monitor, translate and analyse various extremist websites in Arabic, English, and other Southeast Asian languages.
- Maintain database of videos, terrorist manuals, and websites downloaded from the Internet and from terrorism investigations and court proceedings.
- Research on the developments in the ideology, propaganda, tactics, postings of operational and tactical manuals, and terrorist group activities.
- Conduct the Counter-Terrorism Leadership Programme for professionals from law enforcement, intelligence, military and security industries.
- Conduct the Terrorism Analysis Training Course, an annual course for law enforcement, intelligence and other government officials.
- Organise conferences and workshops on relevant topics.
- Develop courses/curriculum for various agencies on topics related to terrorism and political violence.
- Collaborate with the public and private sectors to develop best practices in countering terrorism and extremism.

National Institute of Education (NIE)

Centre for Research in Pedagogy and Practice (CRPP)
Head: Professor David Hung
Website: www.nie.edu.sg/research-centres/centre-research-pedagogy-practice-crpp

Research Activities
The Centre for Research in Pedagogy and Practice (CRPP) conducts world-class educational research that focuses on the analysis and improvement of pedagogy and practice in Singapore schools. Established in 2002 and funded by the Ministry of Education, the centre has collaborated with policymakers, educators, teachers and administrators to examine and improve educational practices.

The Learning Sciences Laboratory (LSL)
Head: Associate Professor Manu Kapur
Website: lsl.nie.edu.sg

Research Activities
The Learning Sciences Laboratory aims to empower learners, in schools and beyond, through design research centred on enabling tools and participatory cultures. As the first such laboratory in Asia, it focuses on transforming learning using interdisciplinary approaches that cut across methodologies and scales of educational theory and practice.

Education and Cognitive Development Lab (ECDL)
Head: Assoc Prof Kerry Lee
Website: www.nie.edu.sg/office-education-research/research-centres/ECDL

Research Activities
The Education and Cognitive Development Lab (ECDL) focuses on four thematic research areas: Applied Cognitive Development, Atypical Development, Bilingual Development, and Educational Intervention. Our work aims to describe and understand the impact of children's cognitive and non-cognitive capabilities, disposition, and out-of-school influences on their development, learning, and schooling. A related aim is to identify, describe, and understand factors that influence development and learning, focusing specifically on the acquisition of skills and knowledge,
and the effectiveness of schooling. Although much of our focus is on improving our basic understanding of development and learning, the ultimate aim of our work is to design effective pedagogical and individually focused interventions that optimise children’s development.

**Centre for Arts Research in Education (CARE)**
Head: Asst Prof Lum Chee Hoo
Website: http://www.unesco-care.nie.edu.sg/

**Research Activities**
The Centre for Arts Research in Education is a UNESCO Observatory based in NIE. CARE facilitates research that promotes education in and through the arts. It also seeks to foster a strong collaborative network between NIE and UNESCO, and with researchers in the Asia-Pacific region.

**Motivation in Educational Research Laboratory (MERL)**
Head: Prof John Wang and Assoc Prof Liu Woon Chia
Website: http://merl.nie.edu.sg/about.html

**Research Activities**
The Motivation in Educational Research Laboratory was set up to promote research pertaining to motivational issues in education and translate research findings into practical guides for teachers and practitioners. It also serves to provide a platform for practitioners and researchers to discuss issues and research related to education, and to translate theories into knowledge for evidenced-based practice in education.
NTU Libraries

The strength of our Libraries lies in the expertise and friendliness of our staff, the wide range and depth of electronic resources made available, the well-supported collaborative and individual study spaces, and our instructional and outreach activities aimed at enriching the learning and research environment of NTU.
Resources
NTU Libraries hold a range of library materials catering to various learning needs and preferences. Search tools to aid in exploring our collection and finding relevant items are available from the Library Homepage at http://www.ntu.edu.sg/library. Students and academic staff can borrow up to 20 and 40 physical items, respectively, at any one time. Access the Libraries’ rich electronic resources on any computer on campus or off-campus via our easy to use OneSearch platform, or connect to over 200 focused databases. The full text of student theses, examination papers and other publications from NTU staff and students are available in our Digital Repository – DR-NTU. One of the aims of DR-NTU is to showcase research articles published by our faculty to a global audience.

Services
Our librarians assist users in choosing and using the most relevant library resources and tools, and conduct classes on how to do literature reviews, find, evaluate and use information effectively, and understand the scholarly communication environment. All our librarians specialize in various subject disciplines and can help users meet information needs in their course and research areas. They also play an important role in helping users understand how to avoid plagiarism and manage their information and sources for a variety of needs. In an era of increased content creation outside of traditional publishing, our librarians also offer platform solutions to archive and make content globally accessible. Finally, they organise regular get-togethers with users to understand their changing information needs and obtain feedback on our services.

Lee Wee Nam Library
Location: Blk NS3 Level 3
This is our flagship library building, named in order to recognize a generous donation by the family of the late Mr Lee Wee Nam. LWN Library houses the Engineering and Science collections and the Library administration. This well photographed building has reading space to cater for both group discussion and collaboration as well as individual quiet reading. The window seats, in particular at Level 5, overlook the green campus surroundings and have an excellent view of Jurong West and even parts of the Straits of Johor. Level 2 boasts a state of the art learning commons with technology focused on supporting group learning activities.

Art, Design & Media Library
Location: ART-01-03
ADM Library is located within the School of Art, Design & Media and is specifically designed to reflect the creative and artistic nature of its environment. It houses a growing collection of resources in the visual arts, architecture, drawing, design, illustration, painting and photography and a strong collection of audio-visual materials. Interesting areas in the Library include a mini cinema, a group viewing area that can play 3D blu-ray movies, flexible seating space and a large, black glass wall for doodling.

Communication and Information Library
Location: WKWSCI-01-18
CML, formerly known as the Asian Communication Resource Centre (ACRC) is located in the Wee Kim Wee School of Communication & Information and incorporates materials from the former Asian Media Information and Communication Centre (AMIC) Documentation Unit and the SCI Resource Centre. The collection comprises resources on advertising, broadcasting, communication studies, information studies, journalism, knowledge management, library science, media law and ethics, amongst others.

Business Library
Location: N2-B2b-07
This Library houses the core business collection comprising of books and journals in the field of accounting, banking, business law, entrepreneurship, finance, hospitality management, inter national business, management, marketing and strategy. It also holds the main audio-visual collection comprising music CDs as well as VCD and DVD titles in all subject areas and genres. A cinema room and individual workstations are provided for the
listening and viewing pleasure of these audio-visual materials. This library also has a Business Lounge, with access to subscribed databases, and a Boardroom. Technology assisted group learning areas, language learning facilities and resources on specialist career research materials are provided in the Learning Commons area on Level B3.

**Chinese Library**

Location: S4-B3c

The Chinese Library houses resources in the Chinese language on Chinese literature and history, philosophy and religion, linguistics, politics, economy, sociology and management science. It is a small but welcoming area popular with users wishing to read Chinese language materials.

**Humanities and Social Sciences Library**

Location: S4-B3c

HSSL provides a growing collection relating to psychology, sociology, history, linguistics, literature, philosophy and public administration. To meet the diverse needs of users, the library has facilities for group learning and quiet study. Facing a gentle green slope, it also offers a conducive setting for reflection and leisure reading. Shaded outdoor seating is also provided.

**Wang Gungwu Library**

Location: CHC-02

In 2003, Professor Wang Gungwu made a generous book donation to the Resource Centre at the Chinese Heritage Centre. The Resource Centre was renamed the Wang Gungwu Library in recognition of this significant contribution to research on Chinese overseas and for Professor Wang’s generous donation. WGWL focuses on collecting materials related to Chinese overseas, and showcases an impressive Early Textbook Collection housed in a beautiful old classroom style room.

**Medical Library**

Location: 2nd Floor, 11 Mandalay Road, Novena Campus

The interim Medical Library opened in July 2013 in support of the new Lee Kong Chian School of Medicine. The Library’s growing collection will include materials in both the basic and clinical sciences in support of the medical curriculum. The Medical Library will move to its permanent home in the new Clinical Sciences Building in 2015.

For general enquiries and feedback, please email library@ntu.edu.sg.

For queries on specific resources, contact one of the subject librarians listed in http://www.ntu.edu.sg/library/about/Pages/ContactUs.aspx

**Centre for IT Services**

The Centre for IT Services (CITS) manages the campus-wide IT infrastructure to facilitate access to all campus IT resources, and coordinates the deployment of all campus e-services and IT technical support.

Every matriculated student is provided with a computer account to facilitate convenient access to online services such as course registration, examination matters, e-learning and e-billing. With the university’s high-speed campus-wide wired and wireless computer networks, our students enjoy:

- Free global Internet, national and campus network access.
- Campus-wide computing mobility via wireless network.
- High-speed network access via network points in every student hostel room.
- Convenient access to many teaching computing facilities.
- Remote connection to the NTU campus network via Internet service providers.
- Free wireless access to NTU online resources at other Institutes of Higher Learning.

Student learning is further facilitated and enriched by:

- A lifelong free personal email box with large storage space.
- Convenient one-stop access to online services and resources via Intranet portal iNTU.
- 24/7 access to online learning materials and library resources.
- Access to e-services and information on mobile devices.
- Live video web casts of interesting seminars and events.
- Free subscription to mailing lists and e-newsletters on campus events.
- Free e-collaboration services.
- Free web-accessible storage for personal use or sharing.
- Free use of laptop-friendly learning hub and collaborative spaces on campus.
Interest-free loan and special discounts for purchase of personal computers.

Access to online learning platform where students can connect, communicate and collaborate with their classmates and course instructors. This can be done through wikis, forums, blogs, course-sites and communities of practice. Students can use their PCs, notebooks, tablets or smartphones to access and connect, creating a “Learning is everywhere with Everybody” environment.

In addition, CITS offers services and resources that advance the quality of education by enhancing students’ learning and professional teaching in the University through pedagogically sound solutions and applications:

- Design and development of pedagogically sound blended and online learning modules.
- Consultation and planning for faculty development and training of pedagogically sound learning tools.
- Conceptualisation and development of customised video and lesson recordings that form the backbone of the online and blended learning modules.
- Adoption of participative learning and teaching through the use of blended learning tools in both the offline and online space. They include tools such as NTULearn, LAMS, i-Ngage, Clickers, etc.
- User consultation on effective courseware learning design including the use of the flipped classroom pedagogy.
- Creation of interactive assessment and evaluation tools.
- Training for faculty on the use of eLearning services.
- Provision of audio-video, graphics, multimedia and photography services to enhance the corporate image of schools and departments, and support faculty in faculty development, content creation and development, teaching, research and publication.

Find out more at CITS website: http://www.ntu.edu.sg/cits

Language and Communication Centre

The Language and Communication Centre provides courses to help NTU students to improve their communication skills in using English for academic and professional purposes. Our courses combine theory with hands-on practice and group work, to allow for active and engaging learning. Students learn to communicate ideas through writing and speaking in ways directly relevant to their academic studies and intended careers.

GER-Core courses include writing courses that help students improve their written skills in their disciplines, as well as communication courses that assist students to communicate effectively in different contexts, including the workplace. Foundation courses are designed to help students cope with the demands of using English in their university studies.

Centre for Modern Languages

The Centre for Modern Languages (CML) seeks to build cross-cultural understanding by teaching a number of foreign languages to NTU and NIE students. The language electives offered allow students to experience the intellectual, cultural and personal enrichment that comes from learning a new language. Our language courses, from introductory to advanced levels, include Arabic, Chinese, French, German, Hindi, Italian, Japanese, Korean, Malay, Spanish, Thai and Vietnamese, and more languages will be offered soon. As well as first-class learning resources, the CML provides excellent teaching by qualified and experienced professionals, so that learning a language is both enjoyable and rewarding. The CML ensures that our students are exposed to a comprehensive and innovative curriculum where they also exposed to the unique culture and traditions related to the language they are studying. Our students, therefore, are equipped with the linguistic and cultural knowledge that will enable them to communicate effectively with the outside world, and, therefore, enhance the political, economic and cultural ties between Singapore and other parts of the world.
SMOKE-FREE CAMPUS

The NTU Yunnan Garden Campus is a smoke-free campus. This is to create a cleaner, safer and healthier environment for the NTU community and protect students, faculty and staff members, and the public from the harmful effects of second-hand smoke.
All faculty, staff members and students are encouraged to play a role in keeping NTU clean and smoke-free. Under the Smoking (Prohibition in Certain Places) Act, an individual who is caught smoking in a prohibited place is liable on conviction to a fine of $200. Individuals who repeatedly flout regulations will be referred to the National Environment Agency (NEA) for appropriate action which can include a fine of up to $1,000.

Medical and Counselling Services
NTU Student Wellbeing Centre
The Student Wellbeing Centre provides professional and holistic services to meet the wellbeing needs of NTU students so as to enhance their personal growth and development through the provision of professional counselling, pastoral care support and/or mental health resources and initiatives.

SWC organises talks regularly to promote mental health awareness and wellness among NTU students and staff. It also conducts workshops such as Stress Management for students to help them cope with the demands of their academic studies. The centre provides self-help resources such as brochures on personal effectiveness, mental health, study techniques and relationships. They are available online or at the resource racks of the Student Wellbeing Centre.

As part of the Peer Helping Programme, the student counsellors provide training for a group of student volunteers known as ‘confidants’ to identify and befriend fellow students with emotional issues.

They are also equipped with mental health resources and knowledge on how to refer students in a crisis to a counsellor or doctor.

To have a chat with the student counsellors or confidants, email us at studentwellbeing@ntu.edu.sg and we will be in touch. For more information about SWC, visit www.ntu.edu.sg/studentwellbeing.

Medical Centre
The Medical Centre on campus is operated by a private medical group Gethin-Jones Medical Practice Pte Ltd, which is owned by Fullerton Healthcare Group Pte Ltd.

More information is available at http://www.ntu.edu.sg/Students/Undergraduate/StudentServices/HealthAndCounselling/Pages/MedicalCentres.aspx

Medical Scheme
Besides operating the clinic on campus, Gethin-Jones Medical Practice Pte Ltd is also contracted to administer the Medical Scheme for full-time undergraduates and NIE trainee teachers. Those covered under the Medical Scheme are entitled to prepaid outpatient treatment and standard medicine at the Centre, as well as limited medical coverage for admissible specialist outpatient and hospitalisation expenses at public restructured hospitals. This scheme is also applicable to all full-time graduate students (on an opt-out option basis).

Campus Dining / Retail and Services
Canteens / Food Courts
NTU is a haven for foodies looking for delectable yet reasonably priced food. One could find a variety of Chinese, Western, Malay, Indian, Japanese, Korean, Indonesian and Vietnamese fare. Besides the heavily-patronized food courts located at Block N2.1 (North Spine) and at the Koufu @ the South Spine, canteens and food courts can also be found in Halls of Residence 1, 2, 4, 9, 11, 13, 14 and 16. Hot and cold beverages, fruits and popular local desserts add to the wide array of dishes. For those looking for healthy beverages using natural ingredients such special flavoured drinks stalls can also be spotted at NTU. Not to be missed is Koufu @ the South Spine, which offers a wide variety of food, snacks and beverages through 15 stalls. From dim sum to sushi to sushi, there’s bound to be something for every palette. A specialty natural yogurt outlet (llao llao) is also available as well.

Canteens in the Halls of Residence are open daily from 7 am to 9pm. Some canteens, like Canteen 1 and 2, even operate till 10pm or more. Food Courts at Block N2.1 and South Spine are open from 7am to 9pm from Mondays to Fridays. They stay open till 3pm on Saturdays. Fast Food outlets ranging from Mcdonald’s, Subway, KFC, Pizza Hut, Starbucks, and Jollibean are conveniently located at Block N2.1.

Cafes and Restaurants
For an outdoor dining experiences, students may make their way to the Quad Café. It offers Asian and Western set meals to tempt the taste buds.

Another dining spot you may want to visit is Art Pastry @ ADM which provides you with a selection of cakes, sandwiches, snacks and western meals. You can also visit Pitchstop at Innovation Centre for pizza, pastries and beer after a hard day at work.

Adding to the campus food scene is the Spruce Bistro @ WKWSCI, which serves both Asian and Western specialties. There is also the Artease café at the HSS Block at South Spine, offering tasteful drinks and snacks to customers.

There is also New World Café at North Spine which provides delightful Asian and Indian Vegetarian meals, plus bubble tea selections.

For chilling out after a long day of studying, the Fusion Spoon and the Attic are places to be at the Campus Clubhouse. The Clubhouse, at a secluded but not inaccessible building in campus, provides a thrilling venue for after-dark parties, dances or even karaoke singing.
Retail and Services
Smashs Sports, NTU’s first dedicated sports shop will be located at Pioneer Hall. Here, you can purchase sports equipment, apparel, footwear and accessories. In addition, tournament-grade racquet restringing, the printing of T-shirts and the engraving of sports-related trophies will all be available.

The campus also provide some retail outlets for your convenience.

A OCBC Bank is available at North Spine to take care of your banking needs. Several ATMs, AXS, SAM and Photo-Me machines are also situated at strategic points, to facilitate cash withdrawals, electronic payment of bills, application of government services and taking instant photos respectively.

Fancy a haircut? A hairdressing salon is available near Canteen 2. Computer accessories may be purchased at the Eight Flags store at the South Spine.

Finally, there is a Giant Super supermarket (opens 0800h till 2300h daily) at Canteen 2 vicinity to take care of your grocery needs. There are also a few convenience stores – Cheers and 7-Eleven – around campus which allows for that quick grab of snacks and drinks while you shuffle among the lectures and tutorial sessions.

More information about above mentioned eateries & retail and services (as well as several others not discussed here) are available at www.ntu.edu.sg/has

Campus Media
ChannelNTU
The ChannelNTU system is driven by the Scala digital signage solution. With this new publishing solution, the content creator can seamlessly combine text, graphic, sound and video into broadcast-quality multimedia on the computer. The new system allows users to author and schedule professional media in an attention-grabbing environment for virtually any type of display application. It now gives users more creative control with the files they have already produced with other industry-standard applications. When the content is created, it can be readily distributed to the multiple plasma screens around campus.

The publication of new content can be triggered automatically at set schedules, with the built-in FTP server. The intelligent file transfer also allows different screens on the campus to show different contents. Multiple designers can work on a project simultaneously, and the administrator can perform Remote Player administration of files, synchronise clocks, reboot machines, etc. The administrator can monitor the status of all players through the software.

Nanyang Chronicle
The Nanyang Chronicle is a student-run campus newspaper, published by the Wee Kim Wee School of Communication and Information, once every three weeks. The Chronicle provides campus news and information as well as being the voice of the campus population. The paper also provides practical training for undergraduates who are keen to work in the field of journalism after graduation.

Housing
Residential life on campus
Hall living, which builds a sense of camaraderie and belonging, is an integral part of the educational experience. All freshmen are especially encouraged to stay in the Halls where they can mingle and interact with one another by taking part in sports, social functions, cultural activities, entrepreneurial activities and other leisure pursuits.

NTU has 18 halls of residence that can accommodate some 10,400 students. Senior and new students can choose either single or double rooms as well as either air-conditioned or non-air-conditioned rooms. On average, 19 percent of the rooms are single rooms. The size of hall rooms range from 8.75 sqm to 21.45 sqm. The monthly rates for single and double rooms are $305 – $375 and $225 - $280 respectively and are subject to revision.

All halls are co-ed, with male and female residents housed on separate floors or in separate wings. The halls come with facilities and amenities such as lounges, television rooms, air-conditioned reading rooms, kitchenettes, laundry rooms with washing machines and computer rooms with PC terminals.

Each hall is served by a group of five academic or administrative staff members who are appointed by the NTU President to carry out the important responsibilities of mentoring the students, promoting the quality of residential life and, in collaboration with the student bodies in the halls (known as the Junior Common Room Committees), forging a Hall and NTU identity. For more information on residential living, please visit the website at http://www.ntu.edu.sg/has/Undergraduate/HallsofResidence/Pages/Halls.aspx.

Off-campus Accommodation
Please visit our website for information on HDB flats and private residences that are available for rental. (http://www.ntu.edu.sg/has/Off-Campus/Pages/index.aspx)

Rental rates range from $450 to $1,500 per month for a room and $2,200 to $3,500 per month for an apartment, depending on factors such as the size and type of apartment, furniture or furnishings provided and proximity to facilities.

When looking for off-campus accommodation, consider factors such as proximity to the University. Jurong West, Boon Lay and Jurong East are near campus. Proximity to direct bus services is another consideration, and it is important that you choose to live near a direct bus route to the University. Direct SBS bus services 179 and 199 ply the route between the Boon Lay Bus Interchange and NTU from 6am to 12:00am daily.
Other considerations may include proximity to shopping centres, shops, coffee shops, restaurants and supermarkets.

By and large, Singapore is a safe city, but everyone should still take precautions for his or her own security.

After having decided on your ideal accommodation, make direct contact with the house owners to inspect the premises and discuss rental terms. Remember to take into consideration other costs which may not be included in the rental such as utility and telephone bills.

Last but not least, do pay careful attention to the terms and conditions of the agreement, in particular the tenure and security deposits, before signing any documents.

A Rich and Vibrant Student Life

Students’ Union and other student organisations

More than 100 student organisations are available for students to explore diverse interests and create their own unique NTU story. The Students’ Union represents the interests of all full-time undergraduates, while 14 academic constituent clubs and 16 Junior Common Room Committees cater to the specific interests of students in the various Schools and residents at the Halls of Residence respectively. There are also three non-academic constituent clubs (Cultural Activities Club, Sports Club and Welfare Services Club) and close to 80 other groups catering to special interests such as board games, fishing, food appreciation, current affairs and investing.

Some notable events on the student activities calendar include:

- Students’ Union: International Culture and Travel Fair, Freshmen Welcome Week
- Welfare Services Club: Camp Outreach (an expedition for hearing impaired youth and volunteers), Project IDentity (a public showcase of the talents of persons with intellectual disability), Golden Generation (a volunteering opportunity to bring elderly persons on a day out)
- Cultural Activities Club: Nanyang Arts Festival (a month-long series of concerts and performing arts workshops), Impresario (a nationwide talent search competition)
- Sports Club: National Vertical Marathon (Singapore’s version of the Empire State Building Run-up), Surf and Sweat (competitive and leisure sports events open to the public held at the beach)

Student Activities Centre and Global Lounge

Located at the North Spine near amenities such as the bank, convenience store and food court, the Student Activities Centre (SAC) and the Global Lounge are campus hotspots for students to chill out with friends or engage in project discussions with professors and classmates.

Planned for students by students, the one-stop centre is open daily from 7am to 2am to meet both learning and recreational needs. Facilities such as a study zone, meeting rooms, computer terminals and a game zone are well within reach. One can even catch news and shows from all around the world on the wide screens available. Whether it is studying or relaxing, the SAC and the Global Lounge offer it in both style and comfort.

Nanyang House

The Nanyang House, one of the few places where one can admire unblocked views of the sprawling Yunnan Garden campus, offers a spread of facilities for students to carry out and participate in activities such as trainings, workshops and get-togethers. Generations of students have thronged the dance studio and music rooms to practise their routines and instruments; the air rifle shooting range and billiard room to train their precision; and the seminar and function rooms to hold cosy gatherings.

Sports and Recreation

An active sporting calendar and ample recreational opportunities provided by the Sports and Recreation Centre ensure a complete learning experience for our students as participation in competitive sports and recreation activities forms an integral part of University education.

Competitive sports

The serious athlete may vie to represent NTU in any of the over 40 sports competed at the Singapore University Games (SUniG), the Institute-Varsity-Polytechnic (IVP) Games, local leagues and tournaments. They may also strive towards representing Singapore and the University in Regional and International Games like the World University Games, World University Championships, ASEAN University Games and Asian University Championships.

Sports Exchanges

Besides competitions, student athletes may also bring their sport to a higher level through sports exchanges and invitational competitions overseas.

Re’kre-at NTU

The objectives of this programme are to offer opportunities for students to learn and participate actively in sports and recreational activities according to their interest and ability.

Students will be able to join learn-to-play courses of various sports, acquire vital skills such as being able to swim or engage in recreational competitions. A nominal sum is payable for certain programmes.

Pretty Tuff

Pretty Tuff is a programme geared towards encouraging female students at NTU to exercise. Participants pay a nominal sum of membership fee each semester to join the 5-week exercise programmes that include courses such as belly dancing, pilates, yoga, kick boxing, etc. All courses are conducted by professional instructors.
Healthy lifestyle

Members of the university can look forward to a host of health and fitness events, quizzes and talks, as well as health and fitness assessments which are organized by the Healthy Lifestyle Unit.

Facilities

The Sports and Recreation Centre administers the use of a comprehensive range of sports facilities and provides services such as loan of equipment/ lockers, pool memberships, first aid assistance, etc. Indoor facilities include: three Multi-Purpose Sports Halls (with provisions for Badminton, Table Tennis, Volleyball, Floorball, Basketball & Martial Arts), four Activity Rooms, two Fitness Gyms and four Squash Courts. Outdoor facilities include: one Cricket Training Net, one 8-lane 400m Running Track, one Artificial Football Field with an estimated gallery seating capacity of 1000pax, two Artificial Multi-Purpose Fields (with provisions for Softball, Football, Rugby, Cricket & Ultimate Frisbee), three Basketball Courts, one Street Soccer Court, three Multi-Purpose Courts (with provisions for Handball, Netball, Volleyball & Street Soccer), six Tennis Courts (one with practice wall), one 50m 8-lane Swimming Pool, one Diving Pool, one Wading Pool.

Student Support Services

Student’s Pass

All international students are required to hold a valid Student’s Pass issued by the Immigration and Checkpoints Authority (ICA). Before departing their home country for Singapore, they are required to apply for this pass (Form 16) using the Student’s Pass On-Line Application and Registration (SOLAR) system at the ICA website: http://www.ica.gov.sg. The SOLAR application number and other details needed by applicants to log in to the SOLAR system will be sent to them respectively.

Those who require a visa to enter Singapore are required to submit Form 16 in their hometown before departing for Singapore. When successful in their application, they will receive from NTU the In-Principle Approval Letter for a Student’s Pass cum the single-journey entry visa to enter Singapore.

The Student Affairs Office main office administers Student’s Pass applications by undergraduates.

• http://www.ntu.edu.sg/Students/Undergraduate/StudentServices/Immigration/Pages/default.aspx

Student’s Pass matters for graduate and exchange/ non-graduating students are handled by the International Student Centre:

• http://www.ntu.edu.sg/isc/LivinginSingapore/immigration/Pages/StudentsPass.aspx

Group Personal Accident Insurance Scheme

The Group Personal Accident Insurance Scheme is applicable to full-time and part-time undergraduates as well as NIE students, providing personal accident insurance coverage of up to $3,000 per accident (out of this $3,000, a cap of $1,000 is applied on outpatient expenses). NIE students are advised to contact their Student Services Centre for any enquiry on the scheme. This scheme is also applicable to all full-time graduate students (on an opt-out option basis).

Group Hospitalisation and Surgical Insurance

Group Hospitalisation and Surgical Insurance (GHSI) is compulsory for all full-time international students, including Singapore permanent residents. This Scheme is extended to other categories of students where deemed necessary.

Falling ill and being hospitalised in Singapore can be a financial drain on international students. Not only are international students not entitled to the medical subsidies that Singapore citizens enjoy, hospitals also typically require a deposit of the entire estimated bill size upon admission. For eligible students on the GHSI, the underwriter of GHSI will prepare a Letter of Guarantee, which the student can present to the hospital in lieu of the cash deposit, subject to terms and conditions of the insurance scheme. Details of this insurance scheme, including the annual limit, coverage, and exclusion can be found at http://www.ntughsi.com.sg

Employment schemes

Full-time matriculated international students may seek prior endorsement from the University to work part-time during their studies.

Scholarship recipients must obtain the approval of their scholarship sponsors if they wish to work part-time. Details of the terms and conditions for part-time employment can be found at http://www.ntu.edu.sg/Students/Undergraduate/StudentServices/StudentJobs/Pages/default.aspx

Exchange students are not allowed to work part-time unless they are on the Work Experience Programme.

Transport services

Public bus services 179, 179A and 199 (SBS Transit) take students to and from NTU and the Boon Lay Bus Interchange. Students staying on campus can either walk to class or take the fare-free NTU shuttle buses.

International Student Centre Services and Information

The International Student Centre (ISC) and the Student Affairs Office offer a full range of services and programmes to foster student success, global perspectives, intercultural awareness and international goodwill. We assist international students with:

• Pre-arrival information
• Application for a student’s pass
• Enquiries on immigration
• Insurance
Pastoral care
Help during a crisis
Enquiries on part-time employment

Events and Activities
The centre promotes cross-cultural understanding and interaction. All students at NTU are welcome to attend ISC’s events and activities, which include:
- Orientation
- Campus tours
- Coffee sessions
- Community service work
- Cultural tours and outings
- Festive open house
- Host family scheme
- Luncheons
- Pre-graduation seminars
- Growth, Embracement & Learn Programme

CONTACT ISC
Need assistance? Contact ISC today. Students are welcome to speak with a staff member during office hours, call or send us an email.

International Student Centre
Student Affairs Office
Nanyang Technological University
42, Nanyang Avenue
Singapore 639815

Location:
Visit us at the temporary office behind Student Services Centre building (from July 2013 onwards until further notice).

Tel: (65) 6790 6823 Fax: (65) 6793 4558
Email: isc@ntu.edu.sg

Office Hours
Monday to Thursday: 8:30am to 5:45pm
Friday: 8:30am to 5:15pm
Closed on weekends and public holidays

For more information, please visit www.ntu.edu.sg/isc or email ISC (isc@ntu.edu.sg).

CareerHub@CAO
CareerHub@CAO is a unit under Career & Attachment Office (CAO). It caters specifically to NTU students and alumni. CareerHub@CAO strives to develop NTU students’ ability to make informed career decisions throughout their life and support them in achieving success and satisfaction in their careers. CareerHub@CAO is the focal point that connects NTU students, alumni and employers through a variety of services and events:
- Career Coaching and Advising
  Career coaches are available to help guide and advise students on their career interests and preferences.
- Career Assessment Tools
  Career coaches help students identify suitable career options and their desired career paths using suitable career tools such as Talent Finder and the Harrison Career Suitability Profiling Tool.
- Mentor-Link
  Students can connect with alumni in various industries to gain insiders’ perspectives and advice on their career queries.
- Career Resource Centre
  Students may visit the Career Resource Centre to access to the latest career books and videos as well as a collection of company profiles and recruitment brochures. To aid in career preparation, students can download CareerScope and receive information on career-related skills. CareerScope is available for download on AppStore and Google Play.
- Career Skills Preparation Workshops and Industry Talks
  Workshops and talks are organised on a regular basis to enhance students’ career skills and industry knowledge. Topics for workshops include resume writing, interview skills, networking, grooming, business etiquette, career management, wine appreciation, etc. Industry players are also invited down to conduct talks on their particular industry, the outlook of the industry, career paths available, skills requirements and more.
- Recruitment Drives
  A number of services are in placed to provide graduating students the opportunities to be noticed and hired by employers. Career events are organised regularly to attract prospective employers to campus and to create opportunities for graduating students to network and interact with potential employers. These activities include:
  - Networking events
  - Recruitment talks
  - Career Fair
  - iFair
  - Campus Interviews

Students of all years can jumpstart their future career by connecting with potential employers in our one-stop career service platform NTU Talent Site (www.talentsite.ntu.edu.sg). On this web-based system, students can gain access to view available job vacancies, submit job applications, get shortlisted and schedule interviews conveniently. To value-add, students can also discover their interests, ability and career matches by taking the NTU Talent Finder tests (www.talentsite.ntu.edu.sg/talentfinder).

In addition, students can download Talent Site’s mobile application - NTU JobPASS and receive instant notifications for recommended jobs, job application statuses, events, career tips and news. NTU JobPASS is available for download on App Store and Google Play.
Academic Integrity

Understanding and practising academic integrity is vital to success in your studies at NTU, and to your professional life when you graduate from NTU. But as a new student, you may not yet understand what is meant by academic integrity, and what is required of you. Often, academic integrity is described as the avoidance of plagiarism, but it can also include the avoidance of academic fraud. This short introduction is designed to give you a brief outline of what you need to know and where you can go to find out more.
Why is the practice of academic integrity vital to success? To begin with, by avoiding both plagiarism and academic fraud, you are demonstrating a greater level of sophistication in your work to your professors. Properly citing references, quoting correctly, and using secondary material in a scholarly way, makes visible how much extra work you have done, and it also shows your ability to evaluate evidence and to use evidence to support your work. If you simply cut and paste, or copy from another source, without any referencing or quotation marks, then it looks as if you have not used any other sources.

Academic work at university is about building new knowledge on already existing knowledge, and by clearly showing that you have used other sources in your work to build on, you are demonstrating how well you have learnt good academic practice.

The principles of academic integrity are shared by students and faculty alike. They apply just as much to faculty undertaking research, as to students undertaking a degree programme.

What you have to do to learn more

1. Read the Academic Integrity website (http://academicintegrity.ntu.edu.sg). Here you will find more detail about what academic integrity refers to, and how to practise it and maintain it. The Academic Integrity website will also help you to complete the Academic Integrity Course, an interactive online self-study course that you have to pass in order to graduate.

2. Do the Academic Integrity Course. You are required to complete the Academic Integrity Online Module which includes reading the information provided online and doing an online quiz.

3. Use Turnitin. Turnitin is a “text-matching” software. You can submit your assignments to Turnitin if your lecturers have created it as a Turnitin assignment and it will show you exactly where your work matches that of other students and where it matches published work. From this, your professors can see whether you have made proper acknowledgement of the work of others. Turnitin is a useful tool for you to learn and to help you maintain academic integrity.

Academic Integrity at NTU

NTU takes academic integrity seriously. Academic misconduct is regarded as a very serious offence by the University. It is considered as an instance of violation of the NTU Honour Code which could warrant disciplinary actions ranging from failing the assignment, failing the course, suspension and to expulsion from the University. So to begin with, it’s important that you understand the definitions set out below.

Plagiarism

NTU Honour Code currently defines ‘plagiarism’ as ‘to use or pass off as one’s own, writings or ideas of another, without acknowledging or crediting the source from which the ideas are taken’. This includes:

- The use of words, images, diagrams, graphs or ideas derived from books, journals, magazines, visual media, and the internet without proper acknowledgement;
- Copying of work from the internet or any other sources and presenting as one’s own; and
- Submitting the same piece of work for different courses or to different journals and publications.

Plagiarism undermines academic integrity as it is a form of intellectual dishonesty. It affects the University’s reputation and devalues the degrees offered.

Academic Fraud

Academic fraud is a form of academic dishonesty involving cheating, lying and stealing. This includes:

- Cheating - Bringing or having access to unauthorised books or materials during an examination or assessment, or in any work to be used by the lecturer, tutor, instructor or examiner as a basis of grading.
- Collusion - Copying the work of another student, having another person write one’s assignments, or allowing another student to borrow one’s work.
- Falsification of Data – Fabrication or alteration of data to mislead such as changing data to get better experiment results.
- False Citation – Citing a source that was never utilised or attributing work to a source from which the referenced material was not obtained.

Facilitating Academic Dishonesty

This includes allowing another student to copy an assignment that is supposed to be done individually, allowing another student to copy answers during an examination/assessment and taking an examination/ assessment or doing an assignment for another student.
Copyright and You

What is Copyright?

When a person expresses himself by creating a literary, dramatic, musical or artistic work, he has copyright in the work. Such work include books, periodicals, magazines, compilations of information, photographs, diagrams, dances, scripts for plays, computer programs, drawings, sculpture, musical scores, lyrics, sound recordings, cinematographic films, television broadcasts and cable programmes.

The law protects the creator’s expression manifested through the work but not the information contained in the work. For example, where 2 persons present the same statistics in different ways, the law will allow each of them to publish their presentation and prevent others from publishing the same presentation. Others may use the same statistics to make different presentations.

Copyright in literary, dramatic, musical and artistic works last for the lifetime of the creator and continues for 70 years after his death.

Copyright in sound recordings and films last for 70 years from the date of first publication. Copyright in television and sound broadcasts and cable programmes last for 50 years from the end of the calendar year in which they were first broadcast or included in a cable programme service.

Who Owns Copyright and What Rights Does the Owner Have?

The creator of the work will own the copyright in it and so the law gives him the exclusive right to publish, reproduce, communicate and benefit from the work in other ways. Other persons cannot do so without the permission of the copyright owner.

The copyright owner may permit others to publish, reproduce or communicate the work through agreements like licences. The owner may set conditions for such permission such as charging a fee.

Exceptions

However the permission of the owner is not required:
1. Where the work is copied for self-study or research, that is, only 1 article in a periodical publication is copied or not more than 10% is copied of a published work which consists of 10 pages or more or not more than 1 chapter is copied of a work which is divided into chapters.
2. Where the work is in electronic form and not more than 10% of the total number of bytes in that edition is copied or 10% of the total number of words in that edition or of the contents of that edition is copied.
3. Where a computer program is reproduced is made on behalf of the owner as a back-up copy of the original computer program.
4. Where an audio visual work (such as sound recording, cinematograph film, sound broadcast, television broadcast or cable programme) is copied for research or private study, subject to certain qualifications specified in the Copyright Act.
5. Where a film or recording of television or sound broadcast or cable programmes is copied for private and domestic use. It should not be seen or heard in public.
6. Where a literary, dramatic, musical or artistic work is copied for criticism or review, and for the reporting of current events, and sufficient acknowledgment of the work is made.
7. Where a work is copied after the copyright in the work ceases.

What Are The Consequences Of Copyright Infringement?

In Singapore, copyright is protected mainly by the Copyright Act (Cap. 63).

A person who publishes, reproduces or communicates a copyright work without the permission of the Owner infringes his copyright.
It is also an infringement to authorise others to infringe copyright, such as requesting a photocopying shop to make a copy of the book.

The person who infringes copyright may be sued by the owner for monetary compensation such as profits made from the infringement. The owner may also obtain a court order to prevent further infringement.

Where the infringement is intentional and the infringement is significant or gives the infringer a commercial benefit, the infringer may be fined in court up to $20,000 and/or jailed for not more than 6 months. Second or subsequent offences may attract the maximum fine of $50,000 and the longest imprisonment term of 3 years. An example of a significant infringement is the massive regular downloading of songs or movies using peer-to-peer networks.

A person who is found with 5 or more infringing copies of any work is presumed to be in possession of them for sale and may be fined $10,000/- for each infringing article or $100,000/- whichever is lower. He may also be jailed for not longer than 5 years. In both cases, the infringing copies or anything used to make the infringing copies may be destroyed or surrendered to the copyright owner.

**Conclusion**

The University takes a serious view of any infringement of copyright by students and a contravention of the provisions of the Copyright Act is deemed to be a breach of the University’s rules and regulations, which could result in disciplinary action.

The University advises all students to respect the copyright of all copyright owners’ works and encourages the purchase of original textbooks, CDs, DVDs and/or other copyrighted materials that are required for your courses of study. The cost of these materials is insignificant compared to the penalties for copyright infringement.

**Honour Code**

All matriculated students by virtue of admission to the University are committed to uphold the Honour Code and to pledge their agreement to abide by it. For details on the Honour Code, please log on to [http://www.ntu.edu.sg/SAO/Pages/HonourCode.aspx](http://www.ntu.edu.sg/SAO/Pages/HonourCode.aspx).

**Disciplinary Processes**

Every student is subject to the University’s discipline regulation from the time of admission as a candidate for any program of the University until he completes the program or withdraws from it. A student in breach of the Statutes or Regulations of the University, or who has been convicted of a crime, or whose conduct is prejudicial to the good name of the University or whose conduct is unworthy of a student of the University, may be required to appear before the Board of Discipline.

The Board of Discipline may, if it finds a student guilty of a disciplinary offence, do one or more of the following things:

i) expel or suspend the student from the University or deprive him of his status as a matriculated or registered student;

ii) deprive the student of a pass in the whole or part of any examination; and

iii) impose a fine not exceeding $10,000

A student whom the Board has imposed a penalty as outlined below may submit an appeal to the Appeal Committee within 14 days from the date of the decision of the Board:

i. expelled from the University; or

ii. suspended or excluded from the University or any course or subject; or

iii. deprived of status as a matriculated or registered student for more than 14 days; or

iv. excluded from any examination; or

v. fined more than $5,000; or

vi. deprived of a pass in the whole or part of any examination.
## Undergraduate Academic Calendar 2014-15


<table>
<thead>
<tr>
<th>Academic Year 2014-15</th>
<th>From</th>
<th>to</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Semester 1</strong></td>
<td><strong>04-Aug-14</strong></td>
<td><strong>05-Dec-14</strong></td>
<td><strong>18 weeks</strong></td>
</tr>
<tr>
<td>Orientation Week</td>
<td>04-Aug-14</td>
<td>08-Aug-14</td>
<td>1 week</td>
</tr>
<tr>
<td>Teaching Weeks</td>
<td>11-Aug-14*</td>
<td>26-Sep-14</td>
<td>7 weeks</td>
</tr>
<tr>
<td>Recess Week</td>
<td>29-Sep-14</td>
<td>03-Oct-14</td>
<td>1 week</td>
</tr>
<tr>
<td>Teaching Weeks</td>
<td>06-Oct-14</td>
<td>14-Nov-14</td>
<td>6 weeks</td>
</tr>
<tr>
<td>Revision and Examination</td>
<td>17-Nov-14</td>
<td>05-Dec-14</td>
<td>3 weeks</td>
</tr>
<tr>
<td>Semester 1 Vacation</td>
<td>08-Dec-14</td>
<td>09-Jan-15</td>
<td>5 weeks</td>
</tr>
</tbody>
</table>
### Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convocation 2014</td>
<td>29 Jul to 5 Aug 14</td>
<td></td>
</tr>
<tr>
<td>Qualifying English Test</td>
<td>5 Aug 14</td>
<td></td>
</tr>
<tr>
<td>Freshmen Welcome Ceremony</td>
<td>6 to 8 Aug 14</td>
<td></td>
</tr>
<tr>
<td>Union Day/Academic Council Meeting</td>
<td>28 Aug 14</td>
<td>No classes from 1030 to 1430 hours</td>
</tr>
<tr>
<td>Celebrate NTU!*</td>
<td>10 Mar 15 (TBC)</td>
<td>* Campus-wide celebratory event including the State of the University Address by President</td>
</tr>
</tbody>
</table>

### Calendar

#### Semester 2

<table>
<thead>
<tr>
<th>Event</th>
<th>Start Date</th>
<th>End Date</th>
<th>Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching Weeks</td>
<td>12-Jan-15</td>
<td>08-May-15</td>
<td>17</td>
</tr>
<tr>
<td>Recess Week</td>
<td>12-Jan-15</td>
<td>08-May-15</td>
<td></td>
</tr>
<tr>
<td>Teaching Weeks</td>
<td>02-Mar-15</td>
<td>08-May-15</td>
<td></td>
</tr>
<tr>
<td>Revision and Examination</td>
<td>09-Mar-15</td>
<td>17-Apr-15</td>
<td></td>
</tr>
<tr>
<td>Semester 2 Vacation</td>
<td>20-Apr-15</td>
<td>08-May-15</td>
<td></td>
</tr>
<tr>
<td>Special Term I</td>
<td>11-May-15</td>
<td>19-Jun-15</td>
<td>6</td>
</tr>
<tr>
<td>Teaching Weeks</td>
<td>11-May-15</td>
<td>19-Jun-15</td>
<td></td>
</tr>
<tr>
<td>Revision and Examination</td>
<td>15-Jun-15</td>
<td>19-Jun-15</td>
<td></td>
</tr>
<tr>
<td>Special Term II</td>
<td>22-Jun-15</td>
<td>31-Jul-15</td>
<td>6</td>
</tr>
<tr>
<td>Teaching Weeks</td>
<td>22-Jun-15</td>
<td>31-Jul-15</td>
<td></td>
</tr>
<tr>
<td>Revision and Examination</td>
<td>27-Jul-15</td>
<td>31-Jul-15</td>
<td></td>
</tr>
<tr>
<td>Attachment &amp; Internship Programmes</td>
<td>From</td>
<td>To</td>
<td>Duration</td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
<td>------------</td>
<td>------------</td>
<td>----------</td>
</tr>
<tr>
<td><strong>Engineering Year 2/3/4</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial Attachment (Semester 1)</td>
<td>04-Aug-14</td>
<td>20-Dec-14</td>
<td>20 weeks</td>
</tr>
<tr>
<td>Industrial Attachment (Semester 2)</td>
<td>12-Jan-15</td>
<td>30-May-15</td>
<td>20 weeks</td>
</tr>
<tr>
<td>Enhanced Industrial Attachment</td>
<td>12-Jan-15</td>
<td>08-Aug-15</td>
<td>30 weeks</td>
</tr>
<tr>
<td>International Research Attachment</td>
<td>12-Jan-15</td>
<td>08-Aug-15</td>
<td>30 weeks</td>
</tr>
<tr>
<td>Industrial Orientation</td>
<td>18-May-15</td>
<td>25-JUL-15</td>
<td>10 weeks</td>
</tr>
<tr>
<td><strong>Attachment &amp; Internship Programmes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sport Science &amp; Management Year 4</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSM Internship</td>
<td>07-Jul-14</td>
<td>06-Dec-14</td>
<td>22 weeks</td>
</tr>
<tr>
<td><strong>Art, Design &amp; Media Year 3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADM Internship</td>
<td>11-May-15</td>
<td>18-Jul-15</td>
<td>10 weeks</td>
</tr>
<tr>
<td><strong>Communication Studies Year 3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional Internship</td>
<td>05-Jan-15</td>
<td>06-Jun-15</td>
<td>22 weeks</td>
</tr>
<tr>
<td><strong>Accountancy/Business Year 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accountancy and Business Year 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business and Computer Science Year 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business and Computer Engineering Year 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional Attachment</td>
<td>11-May-15</td>
<td>18-Jul-15</td>
<td>10 weeks</td>
</tr>
<tr>
<td><strong>Humanities and Social Sciences Year 3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HSS Professional Attachment (HPAP)</td>
<td>11-May-15</td>
<td>18-Jul-15</td>
<td>10 weeks</td>
</tr>
<tr>
<td><strong>Maritime Studies Year 3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial Immession (II)</td>
<td>11-May-15</td>
<td>18-Jul-15</td>
<td>10 weeks</td>
</tr>
<tr>
<td><strong>School of Physical &amp; Mathematical Sciences</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Semester 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial Internship Programme (CBC Year 4 and PAP Year 3/4)</td>
<td>07-Jul-14</td>
<td>06-Dec-14</td>
<td>22 weeks</td>
</tr>
<tr>
<td><strong>Semester 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial Internship Programme (CBC Year 4 and PAP Year 3/4)</td>
<td>12-Jan-15</td>
<td>13-Jun-15</td>
<td>22 weeks</td>
</tr>
<tr>
<td><strong>Special Term</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial Internship Programme (PAP Year 3/4)</td>
<td>11-May-15</td>
<td>18-Jul-15</td>
<td>10 weeks</td>
</tr>
<tr>
<td>Industrial Internship Programme (MAS Year 3)</td>
<td>11-May-15</td>
<td>01-Aug-15</td>
<td>12 weeks</td>
</tr>
<tr>
<td><strong>Biological Sciences Year 4</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial Internship Programme</td>
<td>12-Jan-15</td>
<td>13-Jun-15</td>
<td>22 weeks</td>
</tr>
</tbody>
</table>

Please click here for schedule of Key Academic Activities.
All Dates Subject To Change At The Discretion Of The University

In-lieu of National Day on 9 August 2014, there will be no classes on Monday 11 August 2014. Classes will start from Tuesday 12 August 2014.

For attachment and internship programmes, please note that different companies may have different practices for substituting a public holiday that falls on a Saturday and some companies may not be on a 5-day work week. Please refer to the start date of the attachment programme as provided by the Career & Attachment Office.

Notice to All Undergraduate NSmen

Ministry of Defence (MINDEF) has advised that all undergraduate NSmen are liable to be called up for In-Camp Training (ICT). It has made a standing arrangement with the universities that undergraduate NSmen would be called up for In-Camp Training (ICT) only during specific parts of the university vacations. During these periods, the university will not conduct any compulsory academic programme. MINDEF will not grant deferment on the ground of academic commitments. The call-up periods are indicated in the table below:

<table>
<thead>
<tr>
<th>Year of Study</th>
<th>ICT Call-Up Period and Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>8 Dec 14 – 4 Jan 15</td>
</tr>
<tr>
<td></td>
<td>8 Jun to 2 Aug 2015</td>
</tr>
<tr>
<td>2nd</td>
<td>22 Jun to 2 Aug 2015</td>
</tr>
<tr>
<td>3rd</td>
<td>22 Jun to 2 Aug 2015</td>
</tr>
<tr>
<td></td>
<td>4 weeks</td>
</tr>
<tr>
<td></td>
<td>6 or 8 weeks</td>
</tr>
</tbody>
</table>

Attachment programmes may overlap with the call-up period. NSmen students called up during their attachment can apply for leave and extend their attachment to make up for the period missed.


Academic Calendar

Graduate Studies Academic Calendar 2014-15

<table>
<thead>
<tr>
<th>SEMESTER 1</th>
<th>04 August 2014 - 11 January 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching Weeks</td>
<td>11 August 2014 - 28 September 2014</td>
</tr>
<tr>
<td>Recess Weeks **</td>
<td>11 August 2014 - 28 September 2014</td>
</tr>
<tr>
<td>Teaching Weeks</td>
<td>29 September 2014 - 05 October 2014</td>
</tr>
<tr>
<td>Revision &amp; Examination</td>
<td>06 October 2014 - 16 November 2014</td>
</tr>
<tr>
<td>Semester 1 Vacation **</td>
<td>08 December 2014 - 11 January 2015</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SEMESTER 2</th>
<th>12 January 2015 - 02 August 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching Weeks</td>
<td>12 January 2015 - 01 March 2015</td>
</tr>
<tr>
<td>Recess Week **</td>
<td>02 March 2015 - 08 March 2015</td>
</tr>
<tr>
<td>Teaching Weeks</td>
<td>09 March 2015 - 19 April 2015</td>
</tr>
<tr>
<td>Revision and Examination</td>
<td>21 April 2015 - 10 May 2015</td>
</tr>
<tr>
<td>Semester 2 Vacation **</td>
<td>11 May 2015 - 02 August 2015</td>
</tr>
</tbody>
</table>

** Research students are expected to work on their research projects throughout the period of their candidature subject to the student terms, requirements and entitlements.

* For students under the following coursework programmes, please click on the individual programme for its academic calendar:

- Grad.Dip. in Information-Communication Technology
- M.Sc. (Financial Engineering)
- M.Sc. (Managerial Economics)
- Master of Public Administration
- MBA / M.Sc. (with a specialisation)
- MBA (Nanyang Fellows)
- M.Sc. (Applied Economics)
- M.Sc. (Marketing and Consumer Insight)
Launched on 13 May 2010, the new interactive Campus Map enables you to search for a place, find buildings and landmarks in NTU as well as get directions to places easily. You may also print the map or send a friend an email with information on a location or direction. Google street view and internal shuttle bus routes are also integrated in the Campus Map.

http://maps.ntu.edu.sg/maps