Biomedical Science (N59)
Biomedical Laboratory Technology (N59)
Molecular Biotechnology (N49)
Pharmacy Science (N73)
Veterinary Bioscience (NEW) (N90)
Horticulture & Landscape Management (N57)
Chemical & Biomolecular Engineering (N56)
A premier provider of life sciences and chemical technology education with excellent reputation and track record

The first and only polytechnic with graduates gaining direct admission into National University of Singapore’s School of Medicine

Exclusive collaborations with leading industry partners such as National University Hospital, National Parks Board and A*Star to provide real-world experience

State-of-the-art facilities for learning and research
Hort Landscape

Horticulture & Landscape Management — page 28
- only diploma of its kind – a hybrid of plant science, horticulture, landscape design & management

Chemical Technology

Chemical & Biomolecular Engineering — page 32
- unique course that combines biological and chemical sciences with chemical technology

Life Sciences

Biomedical Laboratory Technology — page 9
- exclusive 2-year internship at NUH
- common first year with Biomedical Science

Biomedical Science — page 8
- common first year with Biomedical Laboratory Technology
- exciting new electives in Forensic Science, and Pharmaceutical Science & Clinical Trials

Molecular Biotechnology — page 16
- interesting specialisations in entrepreneurship, biopharmaceuticals and forensic medicine

Pharmacy Science — page 20
- 1-year internship at NUH’s Pharmacy Department

Veterinary Bioscience — page 24
- unique course that combines the biosciences and veterinary science
Recode your DNA
If you are looking for a school to nurture your passion for science and technology, and prepare you well for the rigours of a university education and the challenges of an exciting world out there, look no further. The School of Life Sciences & Chemical Technology (LSCT) is it!

As the premier provider of life sciences and chemical technology education in Singapore, LSCT is well-known for its research capabilities and development of industrial and commercial innovations. You will have an edge graduating from this reputable school.

Dynamic & Exciting Curriculum
At LSCT, our curriculum is regularly reviewed to keep pace with the latest industry developments, so you can be assured of an education that is dynamic, relevant and up-to-date. The curriculum is also designed to be broad-based and flexible, offering multiple options and interesting pathways to meet varied interests.

For example, Chemical & Biomolecular Engineering students can pursue the Pharma and Biopharmaceutical Manufacturing specialisation while Molecular Biotechnology students can choose from exciting options such as Forensic Medicine, Entrepreneurship and Biopharmaceuticals.

You can also take up Diploma Plus programmes in Chemistry, Advanced Engineering Mathematics, and Innovation and Enterprise.

Specialised Facilities & Expertise
Access to state-of-the-art facilities will make a difference to your learning experience. Here at LSCT, we have many well-equipped laboratories and design studios, as well as technology centres such as the Biological & Chemical Research Centre, Centre for Biomanufacturing Excellence, Centre for Aquatic Science and Technology, and Agro-biotechnology Centre.

Along with these specialised facilities, the School has also developed expertise in niche areas such as biofuels, aquatic science and technology, skyrise greening, molecular diagnostics, biopharmaceuticals and bioprocess technology, food microbiology and cancer biology. In fact, LSCT has the most extensive research programmes with excellent funding support.

Distinguished Teaching Faculty
LSCT lecturers and staff are armed with postgraduate qualifications, with many holding Ph.Ds and post-doctoral training from distinguished universities around the world. They also have many years of research and industrial experience. You will benefit from the knowledge and guidance of an academia made up of dedicated, experienced professionals. Our class sizes are also kept small to ensure that every student gets optimal exposure for practice-oriented learning.

Exclusive Industry Partnerships
Working with the best in the industry will give you an added advantage. The School thus actively collaborates with leading industry partners such as National University Hospital (NUH) and National Parks Board (NParks), as well as renowned local and overseas research and academic institutions.
Internships and Overseas Experience

Internships are a crucial component of LSCT courses which are anchored in real-world learning. You can take up an internship with multinational companies such as ExxonMobil, Shell, Lonza and GlaxoSmithKline; in university laboratories and biomedical research institutes at the Biopolis; in hospitals and private diagnostic laboratories; and with government agencies such as AVA, NEA, HSA and NParks.

You can also intern at prestigious research institutes and laboratories in countries such as the UK, Australia, USA, Korea, China and India.

Under our Overseas Immersion Programmes, you even get to study selected modules in an overseas institution. While there, you get to experience a different culture and living environment, and broaden your horizons.

Accolades & Recognition

LSCT students and alumni have excelled in many fields, winning awards in, for example, National Entrepreneurship Competition, Green Wave Competition, SEA Games and Asian Games. Academically, they have made their mark by clinching coveted scholarships for their further studies from organisations such as PSC, A*STAR, EDB, and the UNSW's Golden Jubilee.

Our graduates are also highly valued by the industry. Many have gone on to complete their degree and postgraduate studies at local and overseas universities, and have gained recognition and accolades in their chosen fields.

You can be a part of this chapter too by getting your DNA recoded at the School of Life Sciences & Chemical Technology!

For more information about the School, log on to www.np.edu.sg/lsct
Penny Tan (Class of 2005)
Ngee Ann Kongsi Scholar
Ngee Ann Kongsi Gold Medallist
Lee Kuan Yew Award Winner
Biomedical Science Gold Medallist 2005

Penny clinched a $250,000 Ngee Ann Kongsi scholarship to pursue a Bachelor of Medicine and Bachelor of Surgery course at the University of Leicester in the United Kingdom. She is the first polytechnic student in Singapore to enter a medical degree programme without obtaining a biomedical science degree first.

“Penny clinched a $250,000 Ngee Ann Kongsi scholarship, “The polytechnic provided me with more hands-on research and with the two-year internship, I got to learn with my hands and understand the reality of the job.”

Penny Tan

Denise Tan (Class of 2007)
PSC scholar
Ngee Ann Kongsi Gold Medallist
Lee Kuan Yew Award Winner
Biotechnology Gold Medallist 2007

Denise is the first NP graduate to receive a Singapore Government Scholarship (Open) awarded by the Public Service Commission (PSC). This scholar is currently reading Biotechnology at the University of Melbourne, Australia.

“Ngee Ann presents numerous chances for you to shine, but it’s up to you to pick what you want and to juggle your time to realise your full potential. For me, good grades were not enough. I wanted a full student life with CCAs and lots of fun!”

Denise Tan
Ron Ng & Soong Junwei
(Class of 2007)
LKY-STEP Award winners
National University of Singapore
Undergraduate Scholars

Ron and Junwei made history in 2007 when they became the first polytechnic graduates in Singapore to be directly accepted into NUS' Yong Loo Lin School of Medicine. Both secured the LKY-STEP Award which has helped to finance their medical course.

“Achieving academic excellence only makes you book smart. Doing well in both school and CCAs toughens and preps you for the stress level you’ll experience in the workforce.”
Ron Ng

“Not only did I study theories from textbooks, I also got to put them into practice when I was an intern on job attachment.”
Soong Junwei
Singapore’s most established and recognised biomedical science programme, providing a strong foundation in core and applied biomedical science disciplines

Interesting electives – Molecular Biology of Diseases, Pharmaceutical Science & Clinical Trials, and Forensic Science

Final-year projects and internships with renowned local or foreign research institutions and companies
Excellence joint programme with the National University Hospital (NUH)

Only course of its kind with two years of intensive internship training at NUH, Tan Tock Seng Hospital and the National Healthcare Group polyclinics

Excellent training that allows students to sit for the international certification test for medical laboratory technologists

Graduate with additional qualifications and skills – Certificate in Phlebotomy (blood collection) and competence in performing electrocardiogram (ECG) tests
ABOUT THE DIPLOMA
BIOMEDICAL SCIENCE

Cancer, diabetes, epilepsy, influenza, AIDS – these are diseases that we are all familiar with. The field of biomedical science covers the understanding of the causes of diseases, how diagnosis can be carried out, and the discovery of cures. It is the basic science that underpins medicine.

If you want to play a part in combating diseases, then the Diploma in Biomedical Science (BMS) is the course for you. You will build a foundation required for a career in medical research. Learn how and why diseases affect the human body, how our immune system fights to prevent disease causing agents from harming us and how we sometimes succumb in our battle against them. BMS offers modules in medical microbiology, medical biochemistry, physiology, developmental biology, cell and molecular biology, genomics and proteomics.

The Leading BMS Course in Singapore

BMS has been designed in consultation with experts in the field. It provides a thorough background to the subject as well as opportunities to work with leading scientists and doctors who are conducting research in the various aspects of the human body, in the areas of health and disease. You will enjoy exposure to the world of translational medicine, where biomedical research is directly applied to patients i.e. from the “bench to bedside” concept.

In your final year, you will apply your learning to the real world when you go on a four-month internship programme. This can take place locally or at overseas locations. You will also undertake an intensive research project which serves to hone your skills as a competent researcher. In addition, you can pursue electives in forensic science, the molecular biology of diseases, pharmaceutical science and clinical trials.

Many BMS students have had their research published in prestigious journals. A majority of our graduates have proceeded on to further studies and many have also pursued Ph.D. programmes.

You Have a Choice!

At the end of your first year, you can choose to continue with BMS or opt for the Diploma in Biomedical Laboratory Technology (BLT) which you will have to pass an interview conducted by the National University Hospital.
ABOUT THE DIPLOMA
BIOMEDICAL LABORATORY TECHNOLOGY

Do you want to save lives and be part of Singapore's dynamic healthcare sector? Do you see yourself performing crucial tests to stop a disease outbreak?

If you have an interest in healthcare, specifically in the area of diagnosis, sign up for the Diploma in Biomedical Laboratory Technology (BLT)! Learn to analyse real patient samples and experience first-hand the life of a clinical laboratory professional. The course allows you to apply classroom knowledge to real-life work in diagnostic laboratories. BLT delivers modules in clinical chemistry, clinical microbiology, clinical haematology, bioinformatics, endocrinology, proteomics and genomics.

Exclusive Two-Year Internship with NUH
BLT provides intensive on-the-job training in the laboratories of National University Hospital and Tan Tock Seng Hospital. Lectures and tutorials are delivered by senior clinicians and medical technologists. You will also have a 7-week attachment at one of the National Healthcare Group polyclinics and undertake a final year research project.

Additional Qualification
What’s more, you will receive certification in phlebotomy (blood collection) and learn to carry out electrocardiogram (ECG) tests on patients. Upon graduation, you will be eligible to sit for the international certification test for medical laboratory technologists issued by the American Society for Clinical Pathologists (ASCPi).

You Have a Choice!
BLT has a common entry point with the Diploma in Biomedical Science (BMS). At the end of your first year, you can choose either BMS or BLT. Students who opt for the BLT track have to pass an interview conducted by the National University Hospital.
Learning Pathways for BMS & BLT

**Common Year 1 Curriculum for BMS & BLT**
- Inorganic & Physical Chemistry
- Microbiology
- Mathematics
- Physiology
- Cell Biology
- Organic Chemistry
- Information Technology for the Life Sciences
- Biostatistics
- Creativity & Applied Thinking Skills
- Sports & Wellness
- Communication Toolkit

**Biomedical Science (BMS)**
- Medical Microbiology
- Immunology
- Cell Culture & Tissue Applications
- Developmental Biology & Genetics
- Medical Biochemistry
- Instrumentation & Analytical Chemistry
- Molecular Biology
- Bioinformatics
- Innovation & Enterprise in Action
- Any 2 IS modules

**Biomedical Laboratory Technology (BLT)**
- Advanced Topics in Biomedical Science
- Laboratory Techniques & Instrumentation 1 & 2
- Clinical Chemistry 1
- Clinical Haematology 1
- Clinical Microbiology 1

**Year 2**
- Life Sciences Seminar Series
- Genomics
- Proteomics
- Any 2 Elective modules
  - Forensic Science
  - Pharmaceutical Science & Clinical Trials
  - Molecular Biology of Diseases
- Project
- Internship
- World Issues: A Singapore Perspective
- Any 1 IS module

**Year 3**
- Clinical Chemistry 2
- Clinical Haematology 2
- Clinical Microbiology 2
- Genomics & Proteomics
- Molecular Diagnostics
- Laboratory Endocrinology
- Integrative Module
- Laboratory Management
- Bioinformatics
- Project
- Singapore’s Perspective of World Issues

^ Interdisciplinary Studies (IS) modules

Note: The first year of Biomedical Science and Biomedical Laboratory Technology is common to all students. At the end of the first year, students interested in the Diploma in Biomedical Laboratory Technology will be required to pass an interview conducted by the Department of Laboratory Medicine, NUH. Students not selected will remain in the Biomedical Science course.
WHAT YOU CAN BECOME
BIOMEDICAL SCIENCE

The local biomedical science industry is expanding. There are now seven A*STAR research institutes and many other research laboratories run by hospitals, universities and local and multinational companies. Singapore is moving from basic research to translational medicine and the demand for BMS graduates continues to grow.

You will enjoy excellent career prospects as research assistants, laboratory biologists, laboratory analysts or product specialists, before progressing to senior positions in research, biomedical science, healthcare, pharmaceutical and clinical labs.

WHAT YOU CAN BECOME
BIOMEDICAL LABORATORY TECHNOLOGY

Singapore aims to be Asia’s healthcare service hub by 2012, attracting one million foreign patients a year. With the construction of new hospitals and healthcare facilities in the next few years, healthcare professionals are in high demand. With your extensive training, you will be highly sought-after.

As a medical technologist, you will find excellent careers in hospitals, polyclinics and diagnostic laboratories. Many BLT graduates also work in laboratories in research institutions, universities and private companies.
FURTHER STUDIES
BIOMEDICAL SCIENCE

Each year, about 30 to 40 percent of BMS graduates enrol in degree programmes at National University of Singapore, Nanyang Technological University and Singapore Management University. You can pursue a wide range of degrees ranging from biological science, medicine, chemistry, bioengineering, and medicine to education, arts, architecture, dentistry, business, psychology and social science.

You can obtain up to two years of exemptions from three- or four-year degree courses offered by premier overseas universities such as Cornell University, Imperial College, University of Leicester, University of Manchester, University of Queensland, University of Melbourne, University of Edinburgh, Dundee University and McGill University.

BMS graduates have won many prestigious awards and scholarships. For example, Sylvia Chiang was awarded the NUS Global Merit Scholarship to study life science at NUS in 2007. In 2008, Darren Chua gained direct entry to study medicine at NUS’ medical school. Grace Ang was awarded the 2009 Nanyang Scholarship to study Biological Sciences at NTU. U Kin Pong graduated from Newcastle University in the UK with a First Class Honours Degree (2009) and he was awarded a Wellcome Trust scholarship to pursue his PhD at Imperial College.

FURTHER STUDIES
BIOMEDICAL LABORATORY TECHNOLOGY

BLT graduates can enrol in a wide range of degree programmes offered by National University of Singapore, Nanyang Technological University and Singapore Management University. You can pursue degrees in biological science, chemistry, bioengineering, medicine, education, arts, architecture, dentistry, business, psychology and social science.

You can obtain up to two years of exemption (or up to three years’ exemption for four-year courses) in related courses such as biological science, biomedical science, laboratory medicine or medical technology at overseas universities. These include Royal Melbourne Institute of Technology, University of Melbourne, Monash University, University of Queensland, Leicester University, Imperial College, Queensland University of Technology, McGill University, Queen’s University Belfast, and Armstrong Atlantic State University, Georgia.

BLT graduates have been accepted into the medical degree programmes by universities in Singapore, UK and Australia. In 2005, Penny Tan was admitted into the MBBS degree at Leicester University and in 2007, Ron Ng made history by being one of the first two polytechnic graduates to be granted direct entry into NUS’ Yong Loo Lin School of Medicine. The other was also a graduate of LSCT.
ENTRY REQUIREMENTS  
(for both BMS and BLT)  
To be eligible for consideration, candidates must have the following GCE ‘O’ Level examination (or equivalent) results and fulfill the aggregate computation requirements.

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The aggregate computation for selection is based on grades obtained for English, Mathematics, Science or Design & Technology (Grade 1-9) or Food & Nutrition (Grade 1-9) or a relevant OSIE / Applied Subject and two other subjects.

* Candidates with English as a second language (EL2) must have attained a minimum grade of 6.

"BLT fuelled my interest in scientific research as well as medicine. The 2-year industrial attachment to various hospitals and polyclinics in Singapore was invaluable exposure to a healthcare environment. I learnt to communicate and empathise with patients and their family members. This direct patient contact is what makes the BLT course different from many other science courses."

Penny Tan  
(Ngee Ann Kongsi Award winner, Gold Medalist 2005; currently pursuing a degree in Medicine at the University of Leicester, UK)
diploma in
molecular biotechnology (N49)

Singapore's most established biotechnology programme, providing a strong foundation in applied biology and molecular biosciences.

Interesting specialisation options in entrepreneurship, biopharmaceuticals, and forensic medicine.

Four-month internship with R&D laboratories in universities, research institutes and life science companies.
ABOUT THE DIPLOMA

Imagine creating genetically-altered microbes to convert organic waste into energy. Imagine discovering a cure for dengue. Imagine being a successful bioentrepreneur. With the Diploma in Molecular Biotechnology (MBIO), these dreams can become a reality.

Strong Emphasis on Molecular Bioscience
Molecular bioscience has its beginnings in the discovery of the molecular structure of DNA. This molecular approach to biology affects every biological discipline. The techniques and approaches of molecular bioscience have wide applications in biotechnology.

In MBIO, you will take foundational modules such as Chemistry, Biostatistics, Physiology, Biochemistry, Microbiology and Immunology, and then proceed to applied modules like Cell and Molecular Biology, Cell Culture, Genomics, Proteomics and Bioinformatics.

Interesting Specialisation Options
In addition to these modules, you will pursue one of the following interesting specialisation options:

- Entrepreneurship Option
  Acquire useful skills in product development, marketing, and intellectual property management

- Biopharmaceutical Option
  Gain insights into the ground-breaking science of drug discovery and manufacturing of biopharmaceuticals

- Forensic Medicine Option
  Use science to solve crimes

Most Established Life Science Course
As the most established life science programme in Singapore (since 1989), MBIO has key partnerships with industry players to give you a unique practice-oriented learning experience. In your final year, you will intern at R&D laboratories in universities, research institutes and life science and pharmaceutical companies. You will also undertake an extensive research project. Through the school's unique internship-linked project scheme, you can continue your research throughout your final year.
### WHAT YOU WILL LEARN

#### Year 1
- Inorganic & Physical Chemistry
- Microbiology
- Mathematics
- Physiology
- Cell Biology
- Organic Chemistry
- Information Technology for the Life Sciences
- Biostatistics
- Creativity & Applied Thinking Skills
- Sports & Wellness
- Communication Toolkit

#### Year 2
- Applied Microbiology
- Immunology
- Cell Culture & Bioprocess Engineering
- Biochemistry
- Instrumentation & Analytical Chemistry
- Molecular Biology
- Bioinformatics
- Any 1 Elective module
  - Agrotechnology & Plant Tissue Culture
  - Aquaculture
- Innovation & Enterprise in Action
- Any 2 IS modules

#### Year 3
- Life Sciences Seminar Series
- Genomics
- Proteomics
- Project
- Internship
- World Issues: A Singapore Perspective
- Any 1 IS module
- Any 1 Option
  - **Entrepreneurship Option**
    - Biotech Innovations & Business Ventures
    - Bioscience Sales & Marketing
  - **Biopharmaceutical Option**
    - Drug Discovery & Development
    - Biomanufacturing Practices
  - **Forensic Medicine Option**
    - Forensic Science
    - Drug Discovery & Development

^Interdisciplinary Studies (IS) modules
WHAT YOU CAN BECOME
MBIO graduates have established careers in fields as diverse as research and development, quality control, sales and marketing, education, marine biology, healthcare, clinical trials, pharmaceutical and biologics manufacturing, food technology, forensic science, marine biology and agrotechnology.

Here’s a snapshot of some of the career pathways that MBIO graduates have pursued: Dr. Lok Shee Mei and Dr. Eyleen Goh are assistant professors at the Duke-NUS Graduate Medical School; and Dr. Alex Chang is the head of Research and Development at Qian Hu Corporation. Dr. Lindi Tan completed her Ph.D. at Johns Hopkins University and is now a senior associate with Temasek Holdings.

You will find employment as research assistants, laboratory biologists, technical officers, sales and technical specialists, scientific product executives, laboratory support officers, project executives and production supervisors.

FURTHER STUDIES
Each year, 30-40% of MBIO graduates enter local universities. At National University of Singapore (NUS), Nanyang Technological University (NTU) and Singapore Management University (SMU), you can choose from a wide range of degree programmes such as biological science, medicine, chemistry, chemical engineering, bioengineering, architecture, dentistry and business.

In 2007, Soong Junwei was one of two LSCT graduates to gain direct admission into the Yong Loo Lin School of Medicine at NUS.

With the global recognition of the MBIO diploma, you can gain admission into many overseas universities such as the University of Melbourne, University of Queensland, Australian National University, University of Manchester, Leeds University, Imperial College, Edinburgh University, Cornell University, University of California, Davis, University of Michigan, McGill University and the University of Toronto. You can receive up to two years’ exemption from related degree programmes.

MBIO graduates have also been awarded scholarships from NUS, NTU, A*STAR, Economic Development Board, Defence Science & Technology Agency, University of New South Wales, Cambridge University, University of Melbourne and Leicester University.

In 2007, Denise Tan received a Public Service Commission (PSC) Scholarship. In 2008, Tan Yu Pin was awarded an ASEAN scholarship from NTU. In 2009, Soong Junwei received the LKY-STEP award.

ENTRY REQUIREMENTS
To be eligible for consideration, candidates must have the following GCE ‘O’ Level examination (or equivalent) results and fulfill the aggregate computation requirements.

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* Candidates with English as a second language (EL2) must have attained a minimum grade of 6.
diploma in
pharmacy science (N73)

Broad-based training in pharmacy practice and pharmaceutical sciences, from drug manufacturing, medicinal chemistry and pharmaceutics to drug discovery and clinical trials

Exclusive one-year internship programme with the Pharmacy Department, National University Hospital (NUH)

Graduates are career-ready for employment in hospitals, retail pharmacies and in the pharmaceutical industry

Exciting electives such as Nutraceuticals & Functional Foods, and Complementary Medicine & Traditional Chinese Medicine
ABOUT THE DIPLOMA

Medicines play an important role in keeping us healthy. Each year, our society faces new challenges to our healthcare system. Our population is aging. Heart disease and cancer are major causes of death and diseases such as swine flu, bird flu and AIDS present constant threats. The demand for professionals with solid skills and knowledge in the areas related to the discovery, preparation and properties of medicines is high.

If you want to be part of this exciting field, then the Diploma in Pharmacy Science (PHARM) is the course for you.

Unique and Versatile

PHARM provides a broad-based training which opens doors to careers in hospitals, retail pharmacies, pharmaceutical industry and research and development.

The course covers a wide range of biological and pharmaceutical sciences, from anatomy and physiology, pathology and pharmacology to drug manufacturing, medicinal chemistry, pharmaceutics, drug discovery and clinical trials.

In your final year, you can choose between two elective modules - Complementary Medicine & Traditional Chinese Medicine (TCM) or Nutraceuticals & Functional Foods. These electives will equip you with knowledge to enter these growing sectors of the healthcare industry.

Work Alongside Practising Professionals

You will benefit from PHARM’s exclusive partnership with the NUH’s Department of Pharmacy and its emphasis on clinical training. During your internship, you will work alongside practising healthcare professionals.

Under the supervision of clinical pharmacists and medical practitioners at NUH, you will also undertake a comprehensive research project and participate in the monitoring of actual clinical trials at NUH’s Clinical Trials Unit.

Your one-year attachment at NUH will give you a special edge as you develop your career in pharmacy science.
WHAT YOU WILL LEARN

Year 1
- Introduction to Pharmacy
- Organic & Biological Chemistry
- Cell & Molecular Biology
- Anatomy & Physiology
- Inorganic & Physical Chemistry
- Information Technology for Life Sciences
- Mathematics & Statistics
- Creativity & Applied Thinking Skills
- Sports & Wellness
- Communication Toolkit

Year 2
- Microbiology and Infectious Diseases
- Pharmacology
- Clinical Biochemistry
- Pharmaceutics
- Clinical Immunology
- Pathology
- Pharmaceutical Legislation and cGMP
- Medicinal Chemistry & Drug Discovery
- Pharmaceutical Analysis
- Innovation & Enterprise in Action
- Any 2 IS modules

Year 3
- Clinical Pharmacy
- Pharmacotherapeutics
- Clinical Trials Management
- Pharmacy Practice
- Pharmacy Management & Logistics
- Aseptic Dispensing & Compounding
- Research Project
- World Issues: A Singapore Perspective
- Any 1 IS module
- Any 1 Elective module
  - Complementary Medicine & Traditional Chinese Medicine (TCM)
  - Nutraceuticals & Functional Foods

^Interdisciplinary Studies (IS) modules
WHAT YOU CAN BECOME
Singapore aims to be Asia’s healthcare service hub with an annual growth of one million foreign patients by 2012. The completion of new hospitals and healthcare facilities over the next few years will lead to a high demand for healthcare workers.

In addition, 11 of the world’s top pharmaceutical companies have already set up manufacturing facilities in Singapore. Over the next few years, we will see new biopharmaceutical plants coming on-stream. Many of the world’s clinical research organisations have also set up clinical trial centres here.

With your extensive training in pharmaceutics, clinical trials, pharmaceutical analysis, good manufacturing practices, pharmaceutical microbiology, drug discovery and pharmacology, you will be highly sought-after in positions such as pharmacy technicians in the healthcare industry, quality control or assurance officers or process technologists in pharmaceutical manufacturing, and laboratory technologists in R&D laboratories. You will also be qualified to venture into the area of sales and marketing of pharmaceuticals, be an entrepreneur in healthcare products and services, or a regulatory executive dealing with legislation of pharmaceutical substances and other health products such as TCM and cosmetic products.

FURTHER STUDIES
The strong foundation provided by PHARM will allow you to pursue further studies in local or overseas universities, in chemistry, biomedical science, pharmaceutical science, pharmacy, medicine and dentistry as well as other healthcare related courses.

You can pursue a wide range of other degree programmes offered by National University of Singapore, Nanyang Technological University and Singapore Management University, such as bioengineering, education, arts, architecture, business, psychology and social science.

Well-known overseas universities such as the University of Queensland, University of Melbourne, Monash University, Royal Melbourne Institute of Technology, Massey University, University of London and University of Dundee will grant you up to two years’ exemption from their science or pharmacy degrees.

ENTRY REQUIREMENTS
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* Candidates with English as a second language (EL2) must have attained a minimum grade of 6.
A unique course that integrates bioscience and veterinary science, providing wide career options in the life science and veterinary industries.

Work with animal models to discover new cures for human diseases in the biomedical science industry.

Help veterinarians to carry out clinical diagnosis, surgical manipulations and treatment of animal diseases.

Four-month internship with top local or overseas research institutions, life science companies and veterinary clinics.
ABOUT THE DIPLOMA

Do you want to be a part of the booming bioscience industry, working with researchers to study human diseases with the aid of animal models? Or are you interested in the care and handling of animals? The Diploma in Veterinary Bioscience (VBS), a unique course that integrates the bioscience and veterinary science disciplines, prepares you for a wide array of interesting careers.

Combining Bioscience and Veterinary Science
In the biomedical science sector, animal models enable researchers to study human diseases more effectively. They are critical for the development of new medicines and therapeutics, particularly in translational medicine, preclinical trials and vaccine development. You will be trained to properly care for, handle and manage laboratory animals for scientific purposes.

In addition, with the growth of pet ownership, there is an increasing need for animal care. VBS graduates may assist veterinarians in providing animal care, including such activities as medical examination and treatment, vaccination, and surgical procedures.

Integrating a Life Sciences Programme
In this course, you will learn about animal anatomy & physiology, including the clinical diagnosis and treatment of animal diseases. You will also learn about animal nutrition, animal behavior and welfare. This course also covers the essential elements of a life science programme and provides an excellent pathway for you to enter a career in biomedical research.
WHAT YOU WILL LEARN

Year 1
- Animal Nutrition
- Cell Biology
- Animal Anatomy & Physiology
- Inorganic & Physical Chemistry
- Microbiology
- Biostatistics
- Organic & Biological Chemistry
- Basic Veterinary Pharmacology
- Creativity & Applied Thinking Skills^ 
- Sports & Wellness^ 
- Communication Toolkit^ 

Year 2
- Veterinary immunology
- Laboratory animal care, handling and management
- Animal and fish diseases
- Aquaculture
- Animal behavior, welfare and handling
- Clinical diagnostics
- Veterinary Histopathology
- Molecular biology
- Cell culture and tissue applications
- Developmental Biology & Genetics
- Innovation & Enterprise in Action^ 
- Any 2 IS modules^ 

Year 3
- Bioinformatics and Genomics
- Animal Husbandry and Veterinary Practice Management
- Preclinical and clinical trials
^Interdisciplinary Studies (IS) modules
- Project
- Internship
- World Issues: A Singapore Perspective^ 
- Any 1 IS module^ 

^Interdisciplinary Studies (IS) modules
WHAT YOU CAN BECOME

With the growing biomedical sector and increasing pet ownership, you can find employment in a wide range of jobs in the veterinary bioscience and biomedical science industries. You can become a research assistant and work in research institutions and university laboratories, or a veterinary bioscientist in animal facilities and pre-clinical trial centres, or a veterinary assistant in veterinary clinics and animal hospitals.

You can also work in animal welfare organizations (SPCA), animal theme parks (Singapore Zoological Gardens, Night Safari, Jurong Bird Park, Underwater World), equine establishments (Singapore Turf Club, Singapore Polo Club), animal-related businesses (pet shops, pet hotels, pet supply companies), and in the government sector (Agri-food and Veterinary Authority, Health Sciences Authority).

FURTHER STUDIES

You can be accepted into biological science and biomedical science degrees offered by both local and overseas universities if you wish to pursue careers in the life sciences and do research.

You can even become a veterinarian by enrolling in veterinary science programmes that are offered by universities in Australia, New Zealand, UK and Canada/USA.

ENTRY REQUIREMENTS

To be eligible for consideration, candidates must have the following GCE ‘O’ Level examination (or equivalent) results and fulfil the aggregate computation requirements.

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The aggregate computation for selection is based on grades obtained for English, Mathematics, Science or Design & Technology (Grade 1-9) or Food & Nutrition (Grade 1-9) or a relevant OSIE / Applied Subject and two other subjects.

* Candidates with English as a second language (EL2) must have attained a minimum grade of 6.
The only diploma of its kind in Singapore – a unique course focusing on a hybrid of plant science, horticulture, landscape design & management

Hands-on practical training and outdoor lessons at the Singapore Botanic Gardens and the Learning Park@Clementi Woods, in collaboration with the National Parks Board

Graduate with an additional Workforce Skills Qualification (WSQ) Certificate in Landscape Operations from the Workforce Development Agency
ABOUT THE DIPLOMA

In Greek mythology, King Midas turned everything he touched into gold. With the Diploma in Horticulture & Landscape Management (HLM), you will be able to turn the greenery around you into works of art! If you love nature, have an eye for design and an entrepreneurial spirit, HLM will be a natural fit for you. Be part of an exciting team of professionals who keep our Garden City flourishing.

The only course of its kind

A unique hybrid of plant science, horticulture, landscape design and management, HLM is the only formal tertiary educational programme of its kind in Singapore. Jointly conducted by Ngee Ann Polytechnic and the National Parks Board, the diploma provides practice-oriented learning that is supported by a team of industry experts and professionals.

HLM also gives you the added flexibility to handle both horticulture and landscape projects. You will learn to create gardens, landscapes, urban greenscapes and green spaces!

To top it all, you will receive an additional professional certificate in landscape operations that will give you a boost in the industry.

Outdoor classrooms

Parks and nursery grounds such as those at the Singapore Botanic Gardens are where you will acquire the necessary skills in managing horticultural and landscape projects. Clementi Woods Park is our latest ‘Learning Park’ which serves as an outdoor classroom in a real park setting.
## WHAT YOU WILL LEARN

### Year 1
- Chemistry
- Plant Anatomy & Morphology
- Taxonomy & Plant Identification
- IT Applications
- Digital Graphics Applications
- Landscaping Workskills 1, 2 & 3
- Environmental Science
- Plant Nutrition & Hydroponics
- Landscape Studio I – Design Fundamentals
- Graphics & Communication I
- Soil Science
- Floristry & Interiorscapes
- Creativity & Applied Thinking Skills
- Sports & Wellness
- Communication Toolkit

### Year 2
- Plant Biochemistry & Physiology
- Plant Pathology & Entomology
- Planting & Maintenance
- Computer Aided Drafting
- Landscape Construction Principles
- Softscape Design Principles
- Landscaping Workskills 4 & 5
- Genetics & Plant Breeding
- Propagation & Nursery Management
- Arboriculture
- Landscape Studio 2 - Design Process
- Graphics & Communication 2
- Innovation & Enterprise in Action
- Any 2 IS modules

### Year 3
- Landscape Studio 3 – Independent Projects
- Leisure & Park Management
- Project Management
- Turf Management
- Horticultural Engineering
- Plant Identification 2
- Landscaping Workskills 6 & 7
- World Issues: A Singapore Perspective
- Any 1 IS module
- Any 1 Elective module
  - Project
  - Plant Tissue Culture
- Internship (ITP)

^Interdisciplinary Studies (IS) modules
WHAT YOU CAN BECOME
What better place to carve your career in urban greenery than in Singapore, the Garden City? With the development of three massive gardens at Marina Bay, in addition to the two Integrated Resorts, you will find that career opportunities abound. Enjoy good employment prospects with the large number of golf and country clubs, hotels, and property developments.

Pursue a career starting as a technologist or as a nursery supervisor in the horticultural industry. You can be a landscape project executive or landscape designer, and work your way up to successfully manage a company of your own.

If you have a strong sense of aesthetics, set up your own landscape design firm or join one as a landscape designer.

FURTHER STUDIES
You can enrol in a wide range of degree programmes offered by National University of Singapore, Nanyang Technological University and Singapore Management University. Pursue degrees in Science (Education), Arts (Education), Arts, Arts Design and Media, Industrial Design, Architecture, Business, Economics, Psychology, Sports Science and Management, Social Science and Nursing.

You can also gain advanced standing in related courses (e.g. Architecture, Landscape Architecture, Business, Horticulture, Plant Science, Botany, Biological Science, Environmental Science, and Arboriculture) from universities such as National University of Singapore, Nanyang Technological University, Lincoln University, University of Melbourne, University of New South Wales, University of Queensland, University of Manchester and University of Georgia.

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* Candidates with English as a second language (EL2) must have attained a minimum grade of 6.
A unique course that combines biological and chemical sciences with chemical technology.

Versatile curriculum with environmental and life science components which gives CBE graduates that extra edge.

A Pharma and Biopharmaceutical specialisation that provides a career pathway to the rapidly developing biomedical and biopharmaceutical sectors.

Internationally recognised and first diploma course to be fully accredited by the Institute of Chemical Engineers, UK.
ABOUT THE DIPLOMA

Thinking of turning raw materials (e.g. petrochemicals) into valuable products (e.g. polymers)? You’ll have to design, construct and manage processes to make it happen. To master these skills, you’ll get a head-start with the Diploma in Chemical & Biomolecular Engineering (CBE)!

Powerful Combination of Sciences and Engineering
CBE is the only course in Singapore that combines biological and chemical sciences with chemical technology. It encompasses chemical processing, pharmaceuticals, environmental science and life sciences, making it one of the most versatile engineering courses.

Local & Overseas Hands-on Practice
CBE has a strong focus on hands-on practice. In addition to a six-month local or overseas internship, you will undertake six weeks of practical training at the Chemical Process Technology Centre on Jurong Island. Opportunities to go on overseas programmes will also enhance your learning experience. CBE is internationally recognised and the first to be fully accredited by the Institute of Chemical Engineers, UK.

New Pharma and Biopharmaceutical Specialisation
This is the first and only specialisation in Singapore that exposes students to a training environment that closely resembles the drug manufacturing processes carried out in the industry, using the state-of-the-art Centre for Biomanufacturing Excellence. With the Pharma and Biopharmaceutical Specialisation, you will gain a unique gateway into the rapidly growing biomedical science industry.

With all these benefits, you are likely to secure employment even before you graduate!
## WHAT YOU WILL LEARN

### Year 1
- Engineering Drawing & Computer Applications
- Engineering Mathematics 1 & 2
- Introduction to Chemical & Biochemical Engineering
- Biomolecular Science
- Organic & Biological Chemistry
- Inorganic & Physical Chemistry
- Thermodynamics
- Electrotechnology
- Sports & Wellness
- Creativity & Applied Thinking Skills
- Communication Toolkit

### Year 2
- Chemical Engineering Laboratory 1 & 2
- Engineering Mathematics 3
- Occupational Health & Safety
- Reaction Engineering
- Transfer Processes - Fluid Flow
- Biopharmaceutical Production
- Analysis of Chemical Engineering Processes
- Bioprocess Technology
- Environmental Technology
- Transfer Processes - Heat & Mass
- Engineering Materials
- Analytical Chemistry
- Innovation & Enterprise in Action
- Any 2 IS modules

### Year 3
- Chemical Engineering Laboratory 3
- Process Engineering Design
- Process Instrumentation & Control
- Unit Operations for Chemical Engineering
- Petrochemical Technology
- Industrial Chemical Processes
- Chemical Process Training Program
- Internship & Project
- World Issues: A Singapore Perspective
- Any 1 IS module

### Pharma and Biopharmaceutical Option
- Pharmaceutical Engineering Laboratory
- Process Engineering Design
- Process Instrumentation & Control
- Unit Operations for Pharmaceutical Processes
- Biopharmaceutical Quality Control
- Current Good Manufacturing Processes
- Chemical Process Training Program
- Internship & Project
- World Issues: A Singapore Perspective
- Any 1 IS module

^Interdisciplinary Studies (IS) modules
WHAT YOU CAN BECOME
The strong foundation and versatility that you receive will enable you to enter a wide range of industries - from chemical, petrochemical, biochemical, biotechnology, biomedical and pharmaceutical to food & beverage, electronics and environmental technology.

You can be a technologist, project supervisor or assistant engineer in process, design, control, operations or maintenance units. You can also work as a laboratory technologist, R&D officer, pollution control or plant safety officer, or venture into technical marketing as a sales engineer. Enjoy an attractive pay package – a recent graduate employment survey showed that NP’s CBE graduates have one of the highest average starting salaries.

FURTHER STUDIES
You can enrol in a wide range of degree programmes offered by National University of Singapore, Nanyang Technological University and Singapore Management University. In addition to degree courses in Chemical & Biomolecular Engineering, Chemical Engineering, Environmental Engineering, Material Sciences, Chemistry, Physics and Biological Science, you can also pursue degrees in other disciplines such as bioengineering, education, arts, architecture, dentistry, business, psychology and social science.

You can also expect up to two years of exemption for related degree courses at overseas universities such as the University of Manchester, Imperial College, Newcastle University, University of Birmingham, Loughborough University, University of Melbourne, University of Queensland, University of Adelaide, University of Western Australia and University of New South Wales.

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Join Us
If you took the 2009 GCE ‘O’ Level examinations as a school candidate, you may apply on-line through the Joint Admissions Exercise (JAE). Details will be available in the JAE information booklet that will be distributed by your secondary school.

Applicants who are not eligible to apply under the JAE and holders of other qualifications may refer to our website at www.np.edu.sg/admissions/apply for application details.

Tuition Fees
S$2,100 Per Academic Year (For Local Subsidised Students)