NEW PROGRAMME
Bachelor of Science (Honours) in Chemistry and Biological Chemistry with Second Major in Business (International Trading)

This selective Second Major programme is run in collaboration with the Nanyang Business School (NBS) and the Centre of Excellence International Trading (CEIT). It aims to equip students with business knowledge and competencies that are relevant to the chemical industry. Graduates of this programme will be well equipped with valuable soft skills and knowledge in management, business, and international trading. These sets of skills, together with their technical expertise in chemistry, will give them a competitive advantage and uniquely position them to undertake executive roles in the chemical industry.

Launching in AY2021-22

Our 4-Year Degree Programmes

Bachelor of Science (Honours) in Chemistry and Biological Chemistry

Bachelor of Science (Honours) in Chemistry and Biological Chemistry with Second Major in Food Science and Technology

In collaboration with Wageningen University (The Netherlands), the School of Biological Sciences (SBS), and the School of Chemical and Biomedical Engineering (SCBE)

Launched in AY2020-21

Bachelor of Science (Honours) in Chemistry and Biological Chemistry with Second Major in Environmental Science

In collaboration with the Asian School of Environment (ASE) and the School of Civil and Environmental Engineering (CEE)

Launched in AY2020-21

AY2021-22 Curriculum Structure
Starting from AY2021-22, all undergraduate degree programmes in SPMS will incorporate the curriculum structure of the Interdisciplinary Collaborative Core (ICC). Please refer to Figure 1 below for more information.

Figure 1

Interdisciplinary Collaborative Core (ICC)
- Common university wide core (7 courses focusing on key transferable skills and grand challenges)
- Foundational core (including effective communication, digital literacy, and a mandatory Professional Internship or Attachment)
- Co-curricular modules

Broadening & Deepening Electives (BDE)*

Major Requirement
(Core and Major Prescribed Electives)

Core Courses
- Inorganic Chemistry with Laboratory, Organic Chemistry with Laboratory, Physical Chemistry with Laboratory, Biochemistry, etc.
- Analytical and Bioanalytical Chemistry, Inorganic and Bioinorganic Chemistry, Organic Chemistry and Bioorganic Chemistry, Physical and Biophysical Chemistry, Synthetik, Analytical and Physical Chemistry Laboratory I, etc.

Core Courses
- Chemical Spectroscopy, Organometallic Chemistry, Physical and Biological Chemistry, etc.

Elective Courses
- Materials Chemistry, Drug Design and Synthesis, Medicinal Chemistry, etc.

Either Honours Project + Professional Attachment or Professional Internship

Advanced Elective Courses
- Pharmaceutical Chemistry, Nanoscience and Nanotechnology, Biomedical Imaging and Sensing, etc.

* BDE allows for undergraduates to either broaden their interests by reading courses that are outside their disciplines; or deepen their skills by reading more challenging and advanced topics within their chosen discipline.

Further information on the curriculum for other undergraduate programmes, and modules can be found on our website.

For admission criteria, please refer to:
https://tinyurl.com/CBCAdmission

Our current website, spms.ntu.edu.sg will be updated to ntu.edu.sg/spms, from April 2021.
MESSAGE FROM THE HEAD

The Division of Chemistry and Biological Chemistry is one of the most rapidly growing chemistry departments in the region. Over the past decade, we have grown from zero to a department with 41 faculty members, 24 support staff, about 300 PhD students and research staff, and over 1000 undergraduates.

In our direct BSc Honours programme, students receive rigorous training that qualifies them to be educators, professional chemists in the industry, or to enter graduate school in the chemical sciences. Our curriculum places special emphasis on problem-solving, laboratory training, and project work – allowing our graduates to build teamwork and communication skills that are valued throughout the job market. Undergraduates have the chance to participate in research projects, under one-to-one supervision by our professors, from year one of their studies through to the final year research project and also have the option to experience a semester-long stint of industrial internship with leading local and international companies and research institutes. Students can also spend a semester or two studying abroad at various top institutions as part of our international exchange programme.

I hope that you find subsequent pages of this brochure informative and interesting. Come and enrol with us for your undergraduate studies to start a fascinating journey into the molecular world!

ASSOCIATE PROFESSOR
LING XING YI
Head, Division of Chemistry and Biological Chemistry
FOUR-YEAR DEGREE PROGRAMMES

BACHELOR OF SCIENCE (HONOURS) IN CHEMISTRY AND BIOLOGICAL CHEMISTRY

- World-class curriculum, based on guidelines from the American Chemical Society, emphasising broad exposure to multiple chemistry disciplines.
- Top-notch undergraduate laboratory training with hands on access to state-of-the-art equipment.
- Final-year students can choose between doing a Final-Year Project or a Professional Internship.
- Opportunities for international exchange with partner universities all over the world.

BACHELOR OF SCIENCE (HONOURS) IN CHEMISTRY AND BIOLOGICAL CHEMISTRY WITH SECOND MAJOR IN FOOD SCIENCE AND TECHNOLOGY

- Highly selective interdisciplinary programme offered in partnership with Wageningen University (The Netherlands) and the School of Biological Sciences (SBS) and the School of Chemical and Biomedical Engineering (SCBE).
- Students gain an understanding of processes in the food industry from the perspectives of chemistry, physics, biology, engineering, and industry.
- Some modules are taught by professors from Wageningen University, one of the world’s top centres of expertise in Food Science. Wide range of electives available from SPMS, SBS and SCBE.

BACHELOR OF SCIENCE (HONOURS) IN CHEMISTRY AND BIOLOGICAL CHEMISTRY WITH SECOND MAJOR IN ENVIRONMENTAL SCIENCE

- Highly selective interdisciplinary programme offered in partnership with the Asian School of Environment (ASE), and the School of Civil and Environmental Engineering (SCEE).
- Designed to train chemistry majors in the fundamental principles of environmental science and environmental resource management.
- Graduates from this programme are expected to gain employment in environmental consultancies, regulatory agencies and the chemical industry.
- Includes courses offered by ASE and SCEE covering areas such as Climate Change, Environmental Sustainability, Biogeochemistry, Air Quality Management and many more.
CURRICULUM OVERVIEW
BSC (HONS) IN CHEMISTRY AND BIOLOGICAL CHEMISTRY

YEAR 1
- Inorganic Chemistry with Laboratory
- Organic Chemistry with Laboratory
- Physical Chemistry with Laboratory
- Biochemistry
- Research Project and/or Elective Courses

YEAR 2
- Analytical Chemistry
- Inorganic Chemistry
- Organic Chemistry
- Physical Chemistry
- Chemistry and Biological Chemistry Laboratory
- Research Project and/or Elective Courses

YEAR 3
- Chemical Spectroscopy
- Organometallic Chemistry
- Physical Chemistry
- Organic Chemistry
- Chemistry and Biological Chemistry Laboratory
- Research Project and/or Elective Courses

YEAR 4
- Choice of Honours Project or Professional Internship
- Advanced Elective Courses
Additional Courses for Second Major in Food Science and Technology

- Food Microbiology
- Food Chemistry
- Food Physics
- Food Process Engineering

Choice of Elective Courses, including:
- Biomedical Nanotechnology
- Pharmacokinetics and Biopharmaceutics
- Food Analysis and Safety

Additional Courses for Second Major in Environmental Science

- Environment and Society
- Natural Hazards, Climate Change and Society
- Climate Change
- Environmental Sustainability

Choice of Elective Courses, including:
- Biogeochemistry
- Environmental Quality, Health and Safety Management
- Environmental Impact Assessment

Elective Courses

- Advanced Analytical Chemistry
- Nanoscience and Nanotechnology
- Medicinal Chemistry
- Biomedical Imaging and Sensing
- Quantum Chemistry, Statistical Thermodynamics & Molecular Modelling
- Drug Design and Synthesis
- Analytical & Manufacturing Techniques in Pharmaceutical Industry
- and many more

General Education Requirement (GER) Courses

- Introduction to Computational Thinking
- Sustainability: Seeing Through the Haze
- Forensic Science
- Enterprise & Innovation
- Introduction to Data Science and Artificial Intelligence
- and many more
CAREER PROSPECTS

Chemistry graduates find ready employment in a wide range of chemical-related industries, both in Singapore and overseas.

INDUSTRY

1. Pharmaceutical & Biological Product Manufacturing
2. Public Administration and Defence
3. Education & Research
4. Finance and Insurance
5. Healthcare
6. Other Sectors

* Source: Graduate Employment Survey 2017

The following is a list of job opportunities in Singapore that Chemistry and Biological Chemistry graduates are particularly well positioned for and in which many of our graduates are currently employed:

**Pharmaceutical Companies**
- GlaxoSmithKline, Schering-Plough, Pfizer, Merck Sharpe & Dome, Kaneka, S*Bio, Merlion Pharmaceuticals, Novartis, Albany Molecular Research, Galileo Pharmaceuticals, Roche, Eli Lilly, and Aventis

**Education**
- Educational Institutions and National Institute of Education (NIE). Many of our graduates also pursue further studies with us or at overseas institutions and are employed as faculty in tertiary education institutions

**Food and Beverage Industry**
- Asia Pacific Breweries, Fraser & Neave

**Petrochemical Companies**
- Shell, ExxonMobil, Sumitomo Chemicals, and Mitsui Chemicals

**Polymer/Paint/Semiconductor/Materials Companies**
- TECH Semiconductor, Chartered Semiconductor Manufacturing, HP Inc, 3M Singapore, DuPont, Honeywell, Micron

**Research Institutes**
- Institute of Chemical Engineering and Sciences (ICES), Institute of Bioengineering and Nanotechnology (IBN), Institute of Materials Research and Engineering (IMRE), and Institute of Microelectronics (IME)

**Other Sectors**
- Our graduates have gone into patent law, bioinformatics, and other intellectual property related jobs

**Government Agencies**
- Health Sciences Authority (HSA), DSO National Laboratories, Defence Science and Technology Agency (DSTA), National Environment Agency (NEA), and Intellectual Property Office of Singapore (IPOS)

Scan to find out more about our career prospects!
PROFESSIONAL INTERNSHIPS

Our undergraduate programmes emphasise the importance of practical training. Students are provided with opportunities to undergo a professional internship, varying from 10 to 22 weeks, during their course of study. This internship can be conducted at a private or public organisation, either locally or overseas.

My industrial attachment experience helped me immensely in seeking employment. The skills I picked up during my undergraduate research experiences, and the knowledge I acquired throughout the Chemistry and Biological Chemistry (CBC) programme played a role. While I was still interning at GlaxoSmithKline (GSK), I managed to secure employment during my final semester via GSK’s Future Leaders’ Programme.

The attachment gave me a channel to explore and apply the skills I picked up as a CBC undergraduate, in the context of the pharmaceutical industry. The experience helped me to settle into my job quickly. I recommend juniors who are considering a career in chemistry to take chemistry in NTU.

LIM JIE SHENG
Chemist Associate,
Technical Development Global Manufacturing & Supply GlaxoSmithKline (GSK)
BSc (Hons) in Chemistry & Biological Chemistry

Our students have interned at numerous companies, institutes and R&D centers such as:

- Abbott Nutrition Research and Development
- Akzo Nobel Paints (Singapore)
- Asia Pacific Breweries (S)
- Genome Institute of Singapore
- Givaudan Singapore
- GlaxoSmithKline (GSK)
- Health Sciences Authority (HSA)
- Institute of Materials Research & Engineering (IMRE)
- International Flavors & Fragrances (Greater Asia)
- Nestlé
- Novartis Singapore
- Public Utilities Board (PUB)
- Robert Bosch (SEA)
- Roche Singapore
- Shimadzu (Asia Pacific)
- Symrise Asia Pacific (Flavors and Scent & Care)

RESEARCH OPPORTUNITIES

Research within the Division covers a wide spectrum of fields in the realm of Chemical Sciences. We are particularly strong in the following areas with many of our faculty recognised internationally as leaders in their respective areas.

Undergraduate students have various opportunities to immerse themselves in research right from year-1 of their studies via the CBC Summer Research programme, URECA and Final-Year Projects. Students interested in research also have opportunities to pursue a PhD programme in NTU upon graduation with full scholarship support.
I feel very grateful to have had an opportunity to be part of a young and energetic department like CBC and to have had wonderful supervisors and mentors during my time there. I greatly appreciate the opportunities that were given to me which allowed me to expand my knowledge and build confidence in my abilities. The valuable skills I’ve learned have given me a solid foundation upon which to build my career.

Science is more than just understanding the theoretical and technical concepts. It encompasses creative thinking, logical and analytical reasoning, and sensitivity to details. These skills have been very useful to me even when I later decided to pursue a career outside of the chemicals industry.

I strongly believe there is a direct correlation between the environment you’re in and the person you become; all of the academics in SPMS were passionate about science, which created an ideal environment for the growth of my interest and led me to pursue my postgraduate studies in SPMS.

I chose to spend more time in the research laboratories, which built a strong foundation to pursue postgraduate research with a relevant skill set. The most enjoyable part of the SPMS experience was the interspersed work-and-play attitude for both the staff and students. Classes and lectures became more personal and there was a strong social support network because of various activities held in the SPMS community.

NUR FILZA BINTE MOHAMMED ASLAM
Medical Science Liaison, Perspectum Diagnostics (Singapore)
BSc (Hons) in Chemistry & Biological Chemistry, Class of 2009
PhD in Chemistry & Biological Chemistry, Class of 2017

CHERYL ONG
Governance & Strategy Manager, Business Governance Markets, Australia and New Zealand Banking Group Ltd
BSc in Chemistry & Biological Chemistry, Class of 2016

SIVARAJAN S/O KASINATHAN
Senior Process Development Scientist, Process Development, Pfizer Asia Pacific Pte Ltd
BSc (Hons) in Chemistry & Biological Chemistry, Class of 2013

TAY WEE SHAN
PhD student, School of Physical and Mathematical Sciences, Nanyang Technological University
BSc (Hons) in Chemistry & Biological Chemistry, Class of 2016

NUR FILZA BINTE MOHAMMED ASLAM
Medical Science Liaison, Perspectum Diagnostics (Singapore)
BSc (Hons) in Chemistry & Biological Chemistry, Class of 2009
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Senior Process Development Scientist, Process Development, Pfizer Asia Pacific Pte Ltd
BSc (Hons) in Chemistry & Biological Chemistry, Class of 2013

TAY WEE SHAN
PhD student, School of Physical and Mathematical Sciences, Nanyang Technological University
BSc (Hons) in Chemistry & Biological Chemistry, Class of 2016
OVERSEAS EXPERIENCE

NORTH AMERICA
- University of Waterloo
- University of Ottawa
- University of Western Ontario

EUROPE
- Imperial College, UK
- KTH Royal Institute of Technology, Sweden
- Norwegian University of Science & Technology, Norway
- Stockholm University, Sweden
- University College London, UK
- University of Edinburgh, UK
- University of Southern Denmark, Denmark
- University of Sussex, UK
- University of Warwick, UK
- University of York, UK

ASIA
- Hong Kong University of Science & Technology, Hong Kong
- Korea University, South Korea
- Pohang University of Science & Technology (POSTECH), South Korea
- Pusan National University, South Korea

One of the best decisions I have made during my undergraduate years in CBC was to do my Final-Year Project (FYP) overseas at University of Bath, UK. Not only did I forge new friendships with my overseas supervisor and lab group, I also had ample time for travel and leisure.

DERRICK TAN JING YANG
PhD student, School of Physical and Mathematical Sciences
Nanyang Technological University
BSc (Hons) in Chemistry & Biological Chemistry, Class of 2016

I did my Final-Year Project (FYP) at the Institute Curie in Paris, France. It was a fantastic experience! I was able to expand my knowledge on synthetic chemistry and also gain hands-on experience in various purification and analytical equipment while not forgetting to travel around and enjoy the beautiful places in France.

LEONG SHI XUAN
PhD student, School of Physical and Mathematical Sciences
Nanyang Technological University
BSc (Hons) in Chemistry & Biological Chemistry, Class of 2018

Scan to find out more about our overseas exchange!

Scan to find out more about our Global Education Mobility (GEM) initiatives!
SCHOLARSHIPS

THE NANYANG SCHOLARSHIP

Awarded to students who excel academically, with strong leadership potential and outstanding CCA track records.

- Full coverage of subsidised tuition fees (after Tuition Grant).
- Living allowance of S$6,500 per academic year.
- Accommodation allowance of up to S$2,000 per academic year.
  (Applicable to scholarship holders who reside in NTU hostels only.)
- Travel grant of S$5,000 for an overseas programme (one-off).
- Computer allowance of S$1,750 (one-off).
- Priority for Overseas Programme.
- Participation in Scholars Orientation Programme, Scholars Award Ceremony, Outreach Programmes, and Eminent Speaker Series.
- No bond is attached to the Nanyang Scholarship apart from the three-year bond applicable to all Singapore PRs and international students under the MOE Tuition Grant Scheme.

THE COLLEGE OF SCIENCE SCHOLARSHIP

Awarded to students with a record of good academic performance.

- Full coverage of subsidised tuition fees (after Tuition Grant).
- Living allowance of S$5,000 per academic year.
- No bond is attached to the College Scholarship apart from the three-year bond applicable to all Singapore PRs and international students under the MOE Tuition Grant Scheme.

For enquiries pertaining to financial assistance:
Tel: (65) 6790 4115
Email: FinAid@ntu.edu.sg

For enquiries pertaining to scholarships:
Tel: (65) 6790 6766
Email: ug_scholarships@ntu.edu.sg

ADMISSION REQUIREMENTS

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<tr>
<th>Programme</th>
<th>GCE A-Lessons</th>
<th>Polytechnic Diploma awarded in Singapore</th>
<th>International Baccalaureate Diploma</th>
<th>NUS High School Diploma</th>
<th>International &amp; Other Qualifications</th>
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<td>Chemistry &amp; Biological Chemistry</td>
<td>Good H2 level passes in Chemistry and Mathematics or Physics</td>
<td>Good GPA in a relevant diploma</td>
<td>Chemistry and Mathematics/Physics at Higher Level</td>
<td>Major CAP of 2.0 in Chemistry and Mathematics/Physics</td>
<td>Chemistry and Mathematics/Physics at Senior High School Level/IB Higher Level</td>
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<td>Chemistry &amp; Biological Chemistry with 2nd major in Food Science and Technology</td>
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<td>Chemistry &amp; Biological Chemistry with 2nd major in Environmental Sciences</td>
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Office of Admissions
Student & Academic Services Department
Nanyang Technological University
Student Services Centre, #03-01
42 Nanyang Avenue, Singapore 639815

For local students
Tel: 6790 5055 / 6790 5972 • Email: adm_local@ntu.edu.sg

For international students
Tel: (65) 6790 5806 / (65) 6790 5807 • Email: adm_intnl@ntu.edu.sg

Visit our Admissions page for more details
Visit our Scholarships page for more details