“ADVANCING A SUSTAINABLE FUTURE THROUGH CHEMICAL AND BIOMEDICAL INNOVATION”

INTRODUCTION

Core areas of Chemical & Biomolecular Engineering and Bioengineering expertise are being augmented by new expertise in science and engineering at molecular and nanometer scales, in biosystems, in sustainability, and in cyber-tools. Be the catalyst to advance wide-ranging fields spanning biotechnology, pharmaceuticals, medical devices, etc.

Chemical & Biomolecular engineers and Bioengineers have unique backgrounds that allow you to apply fundamental principles and problem-solving skills to many different areas of need (e.g., energy, water, materials, medicine). Even as these areas of need evolve, you will be ready.

Due to the cross-disciplinary nature encompassing biology, chemistry, materials, physics, advanced mathematics, and all the wide-ranging research areas observed today, you will be well-positioned to address and harness technological and societal opportunities yet to be conceived. Embark on this exciting journey with us - the future is full of potential and opportunity for you.

WHY SCBE

Our accredited Chemical Engineering (CBE) and Bioengineering (BIE) programmes offer you a state-of-the-art curriculum that is industry-centric. Students can experience a holistic educational experience and are able to thrive beyond classroom learning:

• To equip you with the competitive edge to be leaders of the future in solving real-world multidisciplinary issues, and to prepare you in being well-rounded with advanced chemical engineering or bioengineering engineering skillset through close collaborations with the industry and professional internships with practical training exposures.

• To fast-track your career in the new era of chemical engineering or bioengineering industries, we empower you with entrepreneurship skills at the interface between engineering and the business world.

• To ensure you realise your fullest potential, we nurture your creativity and leadership skills in our stimulating, dynamic and energizing environment specially tailored with inputs from industry and our Career Attachment Office.

Fresh graduates with HIGH EMPLOYMENT RATE AND GROSS MONTHLY SALARY in Singapore

Offers DIRECT-HONOURS DEGREE programmes

RANKED 14TH in the world in the QS World University Rankings by Subject 2018

World RENOWNED PROFESSORS

WORK AND LEARN WITH THE BEST STUDENTS from Singapore and the region

GLOBAL IMMERSION PROGRAMME (GIP)

Opportunities for six-month stints
- choose from more than 300 universities around the world

UNDERGRADUATE RESEARCH ON CAMPUS (URECA) PROGRAMME*

Opportunities for research attachment within NTU

*Students need to satisfy certain requirement to be eligible for these special programmes offered by NTU
PROGRAMMES
OFFERED

B.ENG. (HONS) CHEMICAL & BIOMOLECULAR ENGINEERING

Second Major
• B.Eng. (Hons) Chemical & Biomolecular Engineering with 2nd Major in Business*
• B.Eng. (Hons) Chemical & Biomolecular Engineering with 2nd Major in Food, Science and Technology+

Double Degree
• B.Eng. (Hons) in Chemical & Biomolecular Engineering & B.A. (Hons) in Economics^*

Focus Tracks:
• Advanced Pharmaceutical Manufacturing
• Intellectual Property
• Machine Learning and Data Analytics

* In collaboration with the Nanyang Business School
+ In partnership with the Wageningen University (The Netherlands), NTU School of Biological Sciences and School of Physical and Mathematical Sciences
^ Jointly offered with the College of Humanities, Arts and Social Sciences

B.ENG. (HONS) IN BIOENGINEERING

Second Major
• B.Eng. (Hons) In Bioengineering with 2nd Major in Business*
• B.Eng. (Hons) In Bioengineering with 2nd Major in Food, Science and Technology+
• B.Eng. (Hons) In Bioengineering with 2nd Major in Pharmaceutical Engineering

Double Degree
• B.Eng. (Hons) in Bioengineering & B.A. (Hons) in Economics^*

Focus Tracks:
• Advanced Pharmaceutical Manufacturing
• Intellectual Property
• Machine Learning and Data Analytics

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ADMISSION REQUIREMENTS
In addition to satisfying the General Entry Requirements of NTU Singapore, candidates must have a minimum of:
• H2 level (or equivalent) pass in Mathematics, and
• H2 level (or equivalent) pass in Physics*/Chemistry/Biology/Computing

Candidates with relevant diplomas from local polytechnics may apply for admission.

* H1 Level/O level pass in Physics (or equivalent) is required for applicants without Physics at H2 Level
Chemical and biomolecular engineering is the branch of engineering that deals with the application of physical (e.g., chemistry and physics) and life (e.g., biology, microbiology and biochemistry) sciences, along with mathematics and economics, to convert raw materials or chemicals into more valuable forms. Applications span food science, carbon capture and utilization, pharmaceuticals and drug delivery, nanotechnology, fuel cells and biomedical engineering.

The Chemical and Biomolecular Engineering programme at NTU aims to equip a new generation of chemical and biomolecular engineers with the right skill sets to meet the challenges of the chemical and biomedical sciences industries in Singapore and the world.

Our accredited** undergraduate programme incorporates biomolecular engineering and physical sciences with chemical engineering principles. This is a four-year direct honours undergraduate degree programme in Chemical and Biomolecular Engineering (CBE). Students are empowered to solve challenging problems in chemical & biomolecular engineering and its related areas and better understand the implications of these solutions on society.

Our young Chemical Engineering programme is ranked 14th globally in the QS World University Rankings by Subject in 2018. Since our establishment in 2004, we have attracted the best students from Singapore and the region.

**The degree programme in Chemical and Biomolecular Engineering is accredited by the Engineering Accreditation Board (EAB) of the Institution of Engineers Singapore (IES).
Areas of bioengineering seamlessly fuses the various disciplines of engineering and biomedical science as one. Both fields are complementary; the core technologies from engineering are applied in several biomedical science areas and has led engineering to progress into areas including biomedical imaging, biomedical instrumentation, biomaterials and tissue engineering.

The Bioengineering programme at SCBE empowers students with advanced skill sets to apply fundamental principles and methods of engineering to address industrial trending challenges in bioengineering, medical/ life sciences and its related areas, and to understanding the implications of these solutions on real-life industry situations.

The School offers a four-year direct honours undergraduate degree programme in Bioengineering (BIE). The accredited programme blends modern biological principles with advanced engineering methods in electronics, materials, mechanics and computing to develop the best engineers for biomedical and biotechnology industries as well as healthcare and clinical services.

The curriculum aims to meet the needs of the biomedical industry in Singapore and better prepare our graduates for immediate employment in the healthcare industry. We concentrate on applying knowledge to innovations in healthcare with a focus on entrepreneurship.

In modules such as Biomedical Project Design & Management and Medical Device Design, students are exposed to look specifically into practical design aspects of medical devices. We have also introduced labs sessions such as bio imaging, so that students can have hands-on experiences. Our commitment to our students ensures that we continuously evolve by providing a balanced, in-depth programme through free electives, which will better prepare our graduates for the rigorous demands of today's bioengineering industry.

**INDUSTRIES AND CAREER OPPORTUNITIES**

- Manufacturing industries:
  - Pharmaceutical/bio-pharmaceuticals
  - Semiconductor
  - Biomedical instrumentation
  - Medical devices
  - Biomaterials

- Research and development:
  - Biotechnology
  - Drug discoveries
  - Biomedical instrumentation
  - Medical devices
  - Biomaterials
  - Start ups

- Regulatory affairs
- Trading and finance related jobs in relevant industries

*The degree programme in Bioengineering is accredited by the Engineering Accreditation Board (EAB) of the Institution of Engineers Singapore (IES).
Savour every moment with our inspiring academic and non-academic training, as well as enriching and fulfilling on-/off-campus experiences. Our curriculum, mentorship, local/overseas and leadership training programmes ensure that you fulfil your fullest potential and you are fully prepared to take on meaningful roles beyond NTU. Your immersive experience starts with choosing the right academic path.
When the team decided on their next project: to build a second hydroponics system in Sunrise Children Village and to provide educational materials for the students, the process of planning began.

This year, the team returned to the same place to continue the construction of a second hydroponics system, in addition to the first hydroponics system built in 2017. The team aimed to deliver sustainable service and thus, the team decided to undertake this project for a second time. Regardless of the uncertainties faced, the team put in their very best to create the best lesson plans and activities to be conducted for the children. Leadership training were conducted for a selected few to further develop their leadership skills. To ensure that the team was well-prepared, training on the management of hydroponics systems were arranged.

Excitement engulfed the team as they prepared for the 2-week long trip. Prepared and ready, Project Transcend Across Boundaries (T. A. B) team made their annual trip to Phnom Penh, Cambodia, on 27 May 2018. Although the team was equipped with basic knowledge on how to conduct lessons and to manage a hydroponics system, challenges were faced. However, determination and passion kept the team going.

Giving back to the community may be tough but through the process, new friendships were found and stronger bonds were formed within the team. While bidding farewell was difficult, the team knew their effort had been paid off after seeing the smiles on the children.

“If a job is worth doing, it’s worth doing it twice,” Margaret Mahy once quoted. To me, I am very grateful to be able to work with Sunrise Children Village twice. It has been a wonderful experience for me. If I’m given another opportunity, I will be more than willing to do it all over again with my team.”

Chua Ming Rou
Chemical and Biomolecular Engineering, Year 3

The School of Chemical and Biomedical Engineering (SCBE) constantly provides opportunities for students to discover their leadership potential. The initiative of sending students to the annual USLS has become an integral part of the leadership development. As the school hopes that the event will enable students to acquire robust confidence, goal-setting capabilities, self-reliance and independence.

“I had the privilege of representing Singapore as a delegate at the 9th University Scholars Leadership Symposium held at the United Nations Building, Bangkok, in August 2018. As there were 1,057 delegates from 87 countries at the symposium, it gave me a good opportunity to interact and exchange cultures and ideas with people from all over the world, who shared the dream of making a positive change in the Earth we live in — to improve areas such as education, poverty, human trafficking, and many more. I will never forget those conversations I had with people from places such as Africa, Lebanon, Greece, and many others whom made me feel fortunate to live in Singapore, but more than that, it made me ask myself: “How do I play a part in this?”

One of the most memorable experiences I had was on Service Day, where I went to Wat Bangplad School to exchange cultures with the Thai students. I learnt Thai language in NTU and I was able to converse with the students. I tagged along with one of them and had so much fun teaching her basic English words. We had our faces painted by each other, as well as learning a Thai traditional dance as part of the activities. At the end of the day, I remember having a few of the other delegates asking me for help in translating what the kids were saying. Most of them were asking questions such like, “When will you be coming again?” And I was extremely heartened by the fact that even with the language barrier and limited time spent together, we brought so much fun, love and joy to the children in that school.

Overall, I am humbled by the experiences I had, and I am also thankful to be able to glean from the hearts of the many inspirational speakers who have helped countless of people who are in need — all because of one decision to do more, not just for themselves. I am reminded once again of how small actions can go a long way in making a difference, or rather, a dent in the lives of others. And through the symposium, I realised that there is so much more to life than good grades and CCA achievements (although they are great to have), but there is a greater life that we can all live — to love others and to be a friend to someone in need.”

Ling Cher Keane
Chemical & Biomolecular Engineering Student, Year 3

“I AM REMINDED ONCE AGAIN OF HOW SMALL ACTIONS CAN GO A LONG WAY IN MAKING A DIFFERENCE, OR RATHER, A DENT IN THE LIVES OF OTHERS.”
HOW ARE
OUR ALUMNI DOING

CRISTABEL
CHOU
Class Of 2017; Process Engineer, Roche

The Industrial Attachment and FYP experience that I got from the BIE curriculum has helped me secure 8 interviews for the various different functions in the Local BOOST Training Programme at Roche, allowing me a choice of four functions that have shortlisted me thereafter.

TAN YONG ZEN
Class of 2014 Postgraduate, NTU

The nature of research requires me to be determined, creative and able to collaborate and work with others. Besides equipping me with necessary skills and knowledge, being in NTU SCBE gave me many opportunities to work with many international students. These gave me confidence to face the challenges in research, knowing that I am well-prepared.

LIU ZHENG YI
Class of 2016; Process Engineer, ExxonMobil

Life in SCBE was certainly one of the highs of my education life. The knowledge and skills that I learnt here helped me tremendously in my job interview. I was very fortunate to be recruited by ExxonMobil even before my graduation.

AMANDA CHIA
Class of 2018 Engineer, Micron

SCBE has prepared me, not just on a technical level, but also skills that are relevant in the industry. I have learnt to be an analytical engineer, where solving engineering problems require a holistic skillset which SCBE has inculcated in me. I am grateful towards SCBE and certainly confident as an engineer.

MA KOU
Class of 2018 Process Technologist, Shell

SCBE has not only prepared me well in technical knowledge and skills for the industry, it also drills the engineering mindset in me: focused, detail-oriented, and always curious to know how things work.