SCHOOL OF CHEMICAL AND BIOMEDICAL ENGINEERING (SCBE)

Bachelor of Engineering
(Chemical and Biomolecular Engineering)
Bachelor of Engineering
(BioEngineering)
The School of Chemical and Biomedical Engineering (SCBE) at Nanyang Technological University (NTU), offers direct honours degree programmes in Chemical & Biomolecular Engineering and Bioengineering, to empower a new generation of engineers. The rigorous curriculum integrates principles of engineering with fundamentals of life and chemical sciences giving our graduates an edge in the economy.

With modern infrastructure, state-of-the-art research and teaching facilities as well as dynamic faculty from internationally renowned universities, the School provides a stimulating learning environment and opportunities for students to achieve personal and professional milestones.

**WHY SCBE AT NTU?**

- Work and learn with the best students from Singapore and the region.
- Fresh graduates with one of the highest employment rate and gross monthly salary in Singapore.
- Yes, we ranked 18th in the world in QS World University Rankings by Subject 2016.
- World renowned professors as mentor.
- Accelerated Bachelor’s Programme (ABP)* - Fast track programme enabling completion of degree in three and a half years.
- Undergraduate Research on Campus (URECA) Programme* - Opportunities for research attachment within NTU.
- Global Immersion Programme (GIP) – Opportunities for six-month stints in one or more of the following countries: China, India, France, Switzerland and USA.

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

**C E B E**

**CHEMICAL & BIOMOLECULAR ENGINEERING PROGRAMMES**

B.Eng. (Hons) Chemical & Biomolecular Engineering

**Related Programmes:**
- CBE with a Second Major in Business
  - B.Eng. (Hons) Chemical & Biomolecular Engineering with 2nd Major in Business
  - B.Eng. (Hons) Chemical & Biomolecular Engineering with 2nd Major in Business (Int’l Trading Programme)

- CBE with Second Major in Food Science Technology
  - 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

**CN Yang**

**B I E**

**BIOENGINEERING PROGRAMMES**

B.Eng. (Hons) In Bioengineering

**Related Programmes:**
- BIE with a Second Major in Business
  - B.Eng. (Hons) In Bioengineering with 2nd Major in Business

- BIE with a Second Major in Food Science and Technology
  - B.Eng. (Hons) In Bioengineering with 2nd Major in Food Science and Technology

- BIE with a Second Major in Pharmaceutical Engineering
  - B.Eng. (Hons) In Bioengineering with 2nd Major in Pharmaceutical Engineering

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

**CN Yang**

**DID YOU KNOW?**

SCBE’s research team has found a new way to treat tumours by using bubbles to deliver drugs deep into cells. This targeted treatment prevents the drug from damaging healthy cells and thus increasing the effectiveness of the treatment.

**“Life in NTU and SCBE was certainly one of the highs of my educational life.”** - Liu Zhengyi

Graduate Class: 2016
Programme: CBE
Organisation: ExxonMobil
Title: Process Engineer
Chemical and biomolecular engineering is the branch of engineering that deals with the application of physical science (e.g., chemistry and physics), and life sciences (e.g., biology, microbiology and biochemistry) with mathematics and economics, to the process of converting raw materials or chemicals into more valuable forms.

Besides producing useful materials, modern chemical and biomolecular engineering is also focused on innovating valuable new materials and techniques — such as nanotechnology, fuel cells and biomedical engineering.

The Chemical and Biomolecular Engineering programme at NTU aims to equip a new generation of chemical and biomolecular engineering graduates with the skills 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.

Since our establishment in 2004, we have attracted the best students from Singapore and the region. Our fresh graduates have achieved one of the highest employment rates and gross monthly salary among graduates from similar fields.

The Chemical and Biomolecular Engineering programme is ranked 18th globally in the QS World University Rankings by Subject (2016).

Our faculty staff from around the world are conducting vibrant interdisciplinary research in fields such as nanotechnology and catalysis, cellular and molecular engineering, bioproduct engineering.

The School offers 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.

*The degree programme in Chemical and Biomolecular Engineering is accredited by the Engineering Accreditation Board (EAB) of the Institution of Engineers Singapore (IES).
In addition to satisfying the General Entry Requirements of NTU, candidates must have a minimum of:

• H2 level (or equivalent) passes in chemistry and mathematics, and
• GCE ‘O’ Level (or equivalent) pass in physics*.

* An ‘O’ level pass in physics is only applicable to candidates without H2 level pass in physics.

Candidates with relevant diplomas from local polytechnics may apply for admission. Eligible candidates who hold a diploma with merit / distinction may be considered for direct entry into the second year* of the programme (i.e. completion of the programme in three years). Other eligible candidates may be admitted into the first year with exemption of courses granted on a case-by-case basis.

*Only applicable to candidates who are applying for admission in Academic Year 2012/13 and onwards.

OVERVIEW of the CURRICULUM

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

Fundamentals of Chemical, Physical & Biological Sciences

Principles of Chemical & Biomolecular Engineering

Electives/Final Year Project
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 Design Project and Management, we introduce a Medical Device Design tailored to look specifically into design aspects of medical devices. We have also introduced labs sessions such as bioimaging, 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.

*The degree programme in Bioengineering is accredited by the Engineering Accreditation Board (EAB) of the Institution of Engineers Singapore (IES).
CAREER PROSPECT

- Manufacturing industries
- Pharmaceutical industries
- Career in research institutes
- Opportunity to work in hospitals
- Opportunities to work in organisations that deal with biomedical instrumentation, medical devices, biomaterials, drug discoveries and other related industries
- Trading and finance related jobs in relevant industries

ADMISSION REQUIREMENTS

In addition to satisfying the General Entry Requirements of NTU, candidates must have a minimum of:

- H2 level (or equivalent) passes in mathematics and biology/chemistry/physics/physical sciences, and
- GCE 'O' Level (or equivalent) pass in physics*.

* An 'O' level pass in physics is only applicable to candidates without H2 level pass in physics.

Candidates with relevant diplomas from local polytechnics may apply for admission. Eligible candidates who hold a diploma with merit / distinction may be considered for direct entry into the second year* of the programme (i.e. completion of the programme in three years).

Other eligible candidates may be admitted into the first year with exemption of courses granted on a case-by-case basis.

*Only applicable to candidates who are applying for admission in Academic Year 2012/13 and onwards.

OVERVIEW of the CURRICULUM

The BIE curriculum blends modern biological principles with advanced engineering methods in electronics, materials, mechanics, biocomputing and informatics to train high standard engineers for biomedical and biotechnology industries as well as healthcare and clinical services.

Fundamentals of Chemical, Physical & Biological Sciences

- YEAR 1
  - Bioengineering Fundamental
  - Physical & Materials Engineering
  - Biocomputing

- YEAR 2 & 3
  - Thermodynamics
  - Computational methods
  - Fluid mechanics
  - Reaction engineering
  - Biomechanics
  - Biomedical electronics
  - Industrial attachment
  - Biocomputing

- YEAR 4
  - Biomedical project design and management
  - Final year project
  - Biomedical and tissue engineering
  - Biomedical and electronics and bioelectronics

CAREER PROSPECT

- Manufacturing industries
- Pharmaceutical industries
- Career in research institutes
- Opportunity to work in hospitals
- Opportunities to work in organisations that deal with biomedical instrumentation, medical devices, biomaterials, drug discoveries and other related industries
- Trading and finance related jobs in relevant industries
EDUCATION BEYOND CLASSROOM

STUDENTS ON EXCHANGE

“Last winter, I was fortunate to be on an overseas exchange programme at the University of Wisconsin, Madison. It added a fresh perspective to my academic journey. Besides, adapting to the hands-on and practical oriented teaching style in the US; I had memorable experiences working with peers from diverse backgrounds, and learnt first-hand what it meant to be a global citizen. Ultimately, university is the time to learn both within and beyond the classroom – not just through a multi-disciplinary education, but a holistic one developing both skills and character – and I am thankful to SCBE for giving me the opportunity to lead, learn and excel beyond the academic environment.”

OCIP TRIP

“Joining SCBE OCIP was one of the best decisions I have taken in my university life. Throughout our stay in Phong Phu commune, Vietnam, I saw myself stepping out of my comfort zone and developing as a person. Speaking in front of a group of people has always been my big fear. Thanks to the constant encouragement from my fellow peers, I managed to overcome my fear and successfully teach a class of kids who enjoyed the lesson and applied the new-found knowledge into practical use. All the power and water shortages during the trip made me cherish what I had taken for granted in Singapore. Despite our different perspectives, I also learnt the importance of working towards a common goal and believe the friendships forged from this trip will serve me well in the years to come.”

SHELL SHORT TERM EXPERIENCE

“I was grateful to be given the opportunity to participate in the Shell Short Term Experience in conjunction with the SCBE-Shell Study Award. It gave me the chance to experience working in an oil and gas manufacturing site, more so in a renowned company like Shell. The biggest takeaway from this stint was the invaluable first-hand experience of how the Pulau Bukom oil refinery functioned on a daily basis. The experience allowed me to apply my contextual knowledge into practical application e.g., the end design and organisation of the various units on-site. Shell’s positive work culture and employees’ safety are two reasons why I would like to pursue a long-term career there. Overall, this attachment was great as it not only gave me an opportunity to work for one of the giants in the oil and gas industry, but also deepened the friendships with my fellow SCBE interns.”

GILP TRIP JAPAN

“Being an NTU student has been the biggest highlight in my educational journey and has seen me develop into a well-rounded individual. I was able to participate in the Global Integration Leadership Programme (GILP), where I served as the main organizer for a cultural immersion trip to Japan last summer. The experience certainly honed my leadership skills. As part of the CN Yang Scholars Programme, research is indisputably my major academic passion. Being under the tutelage of Associate Professor Timothy Tan for my projects, has certainly fueled my desire to pursue a PhD in the near future. Despite the busy academic workload, I was able to participate in various extracurricular activities; playing for my Hall’s table tennis team and being the assistant director for outreach of CN Yang Scholar’s Club 8th executive committee. My journey in NTU has taught me to balance all aspects of life, be it studies or social activities, only then can one have a meaningful education.”

BRYAN CHIN SI HAO
Programme and Year: CBE/2

EUNICE YEE CAI ZHEN
Programme and Year: BIE/2

MICHELLE NG CHEW SUANG
Programme and Year: CBE/3

LOU WEI HAO DARREN
Programme and Year: CBE/2
EXXONMOBIL

“ExxonMobil hires people to develop them professionally instead of just providing them a job. We apply a long-term career-oriented approach that begins with the recruitment of talented individuals. We look for candidates who have strong academic achievements, outstanding teamwork, great leadership qualities, good communication skills, integrity and a willingness to continually learn.

Our manufacturing plants in Singapore hire a total of 10 – 20 graduates and host 30 – 40 interns each year from the NTU School of Chemical and Biomedical Engineering. NTU students consistently demonstrate great capability and generally fit well with our corporate culture. We look forward to bringing more students from SCBE to be part of our ExxonMobil family!”

Ms Veronica L Robertson
Singapore Refinery Process Engineering Manager
ExxonMobil Asia Pacific Pte Ltd

HOW ARE OUR ALUMNI DOING

NG WEI LONG

“My SCBE experience was a very exciting period in my life. Besides my studies, I also participated actively in freshman orientation camp (FOC) and inter-school games (ISG), making many friends in the process. I am forever indebted to Prof Raymond Lau, a star badminton player, who taught me the importance of balancing work and play, when I was representing NTU in ISG. The research opportunities (URECA) during my SCBE days influenced me to further my study in the field of tissue engineering & regenerative medicine (TERM). As a graduate student attached to Singapore Centre of 3D Printing (SC3DP) and Singapore Institute of Manufacturing Technology (SIMTech), I have been grateful for the rigorous BIE curriculum, laying the foundation for my current pursuits. I would like to thank all the professors from SCBE, who have inspired me during my undergraduate years.”

Graduate Class: 2013
Programme: Bioengineering
Organisation: A*Star (SIMTech)
Title: PhD Students

LIU ZHENGYI

“Life in NTU and SCBE was certainly one of the highs of my educational life. I fondly remember being part of the committee for SCBE’s FOC, which gave me the chance to work with people from all walks of life and widen my social circle. 2013 was one of my toughest years in school; juggling a heavy academic workload and my responsibilities as the Chairman of SCBE FOC 2014. However, skills such as leadership and time management learnt then have helped me tremendously in my job interviews. Employers are generally more interested in how you have contributed to the school and the community during your university’s days. Therefore, having good grades alone without these personal development experiences may not be sufficient to secure a job. I was very fortunate to be recruited by ExxonMobil before graduation and a word of advice to my juniors: Be open to all employment opportunities and prepare well for every single interview. For now, work hard and play hard!”

Graduate Class: 2016
Programme: Chemical and Biomolecular Engineering
Organisation: ExxonMobil
Title: Process Engineer
LIM YONG JUN

“SCBE was like my second home. Apart from attending classes, I also made lifelong friendships with some of my course mates. The lessons were taught by passionate professors and lecturers who went the extra mile to help the students. SCBE also holds many fond memories such as my Freshmen Orientation Camp (FOC), the late-night mugging sessions with my peers and the happy times with my classmates. If you want to pick up relevant skills and knowledge for your future career, SCBE is the perfect environment to harness your potential.”

Graduate Class: 2015
Programme: Chemical and Biomolecular Engineering
Organisation: Air Liquide Singapore
Title: Project Engineer

ANGELINE XUYANG ZHANG

“My four years in NTU was when I was totally young and brave as I chased my academic goals with fervor. I was glad that I was young enough to pursue new things and brave enough to take up new challenges to change my status quo. All these valuable experiences were fundamental in my personal and professional growth, adding value to my career. My time in SCBE prepared me to be ready for future opportunities and challenges.”

Graduate Class: 2015
Programme: Bioengineering
Organisation: Procter & Gamble
Title: Demand Planning Associate Manager

MAYA VANIA

“My journey in SCBE has helped me develop the critical thinking skills and perseverance to resolve real-life problems. In SCBE, you will find that there are abundant opportunities to achieve your future career aspirations. Through my industrial attachment programme (IAP), I was able to serve as a researcher in the Singapore Eye Research Institute. The course also allows you explore pursuits beyond your majors. Joining the NTU Investment Club led to my first forays into the world of finance, and was influential in me furthering my post-grad studies in the field as well as pursuing a dream career as a DBS Financial Associate. With the emphasis on a holistic education, I am confident that all prospective SCBE graduates will obtain the requisite knowledge and skills to embark on a fulfilling life journey.”

Graduate Class: 2010
Programme: Bioengineering
Organisation: DBS
Title: Financial Associate

TAN HUI ZHEN

“SCBE was a wonderful platform to make new friends and gain relevant knowledge in the field of engineering. My four years in SCBE has given me a solid foundation to learn fast on the job and become a valuable asset in the workplace. During my course, I was given the opportunities to develop my knowledge and soft skills through an exchange programme and internship in USA. Overall, I truly enjoyed my experience in SCBE and would gladly recommend it to future engineers.”

Graduate Class: 2014
Programme: Chemical and Biomolecular Engineering
Organisation: Abbott Manufacturing Singapore
Title: Process Engineer
PROGRAMME ENQUIRIES
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adm_intnl@ntu.edu.sg (for international students)
Website: www.ntu.edu.sg/admissions

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