The School of Chemical and Biomedical Engineering (SCBE) at Nanyang Technological University (NTU) aims to empower a new generation of engineers through a rigorous curriculum that integrates principles of engineering with fundamentals of life and chemical sciences.

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

The School aims to provide educational experiences that facilitate students to gain a thorough understanding of the fundamentals of life and chemical sciences.

Chemical 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 useful or valuable forms. In addition to producing useful materials, modern chemical engineering is also concerned with pioneering valuable new materials and techniques—such as nanotechnology, fuel cells and biomedical engineering.

The Chemical and Biomolecular Engineering programme at the Nanyang Technological University aims to produce a new generation of chemical and biomolecular engineering graduates with the necessary 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. Students can choose to major in Chemical and Biomolecular Engineering, Chemical and Biomolecular Engineering with Business Minor, Chemical and Biomolecular Engineering/Economics Double degree. Our students can also take a minor in various fields from other schools in the university. Since founded in 2004, we have attracted the best students from Singapore and the region. Our fresh graduates have achieved one of the highest employment rate and gross monthly salary in Singapore. At the post-graduate level, we offer a doctoral degree program in Chemical Engineering.

Our research objectives are:
- Be a leading research department in chemical and biomolecular engineering.
- Disseminate research knowledge and outcomes internationally.
- Create healthy networks of international academic and industry collaborators.

Our teaching and training objective is to provide educational experiences that challenge the students to:
- Learn the biological and physical science principles and to integrate such knowledge to solve engineering problems encountered in the chemical and life science industries.
- Identify and pursue their personal and professional goals within an innovative and entrepreneurial environment that is sufficiently flexible.
- Use and apply the latest experimental and computational methodologies in solving chemical engineering problems.
- Develop good communication and management skills through team work in the execution of experimental and design projects.
- Explore the synergy of combining chemical and biomolecular engineering principles in solving problems of multi-disciplinary nature.
- Understand the impact of engineering principles and solutions on society and the nation at large, particularly on the safety, economic and environmental impact.

Our faculties from around the world are conducting vibrant interdisciplinary research on nanotechnology and catalysis, cellular and molecular engineering, bioproduct engineering, as well as basic chemical science and engineering. We have won two 10-million competitive research programmes funded by the National Research Foundation, Singapore. Our young chemical engineering programme is ranked 30 in the world on QS chemical engineering ranking (2012).
Chemical and Biomolecular Engineering Programme

Students can solve challenging problems in biomedical engineering and its related areas and better understand the implications of these solutions on society

The School offers a four-year undergraduate degree programme in Chemical and Biomolecular Engineering (CBE). Upon graduation, successful students will be awarded direct honours. The programme amalgamates 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.

Accreditation
The degree programme in Chemical and Biomolecular Engineering is accredited by the Engineering Accreditation Board (EAB) of the Institution of Engineers Singapore (IES).

Unique Features
- Strong grounding in the fundamentals of chemical and biomolecular engineering principles.
- Rigorous training in systematic problem solving skills.
- Multi-disciplinary training in emerging chemical and biomolecular engineering areas.
- Industrial attachment—Valuable experience either at local or overseas firms in manufacturing or R&D.
- Global Immersion Programme (GIP)—Opportunities for six-month stints in one or more of the following countries: China, India, France, Switzerland and USA.
- Accelerated Bachelors Programme (ABP)*—Fast track programme enabling completion of undergraduate degree in three and a half years.
- Undergraduate REsearch on CAmpus (URECA) programme*—Opportunities for research attachments within NTU.

Admission Requirements
In addition to satisfying the general entry requirements of NTU, candidates seeking admission to the CBE undergraduate programme must have a minimum of H2 level (or equivalent) passes in chemistry and mathematics and a GCE ‘O’ Level (or equivalent) pass in physics. An ‘O’ level (or equivalent) pass in physics is only applicable to candidates without H2 level (or equivalent) 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.

Students will develop good communication and management skills through team work in the execution of experimental and design projects.

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

Year 1
Foundation courses
- Chemical sciences
- Biological sciences
- Engineering mathematics
- Chemical engineering fundamentals
- Biomolecular engineering fundamentals

Year 2&3
Principles of Chemical & Biomolecular Engineering
- Chemical thermodynamics
- Fluid systems
- Heat and Mass Transfer
- Unit Operations
- Reaction Engineering
- Process Control and Dynamics
- Chemical and Biological Plant Safety
- Unit Operation Design Studio
- Multidisciplinary Engineering
- Decision Tools for Engineering and Business

Year 4
Electives/ Specialisation
- Chemical and Energy Engineering
- Pharmaceutical Engineering and Biotechnology
- Electronics (Processing)
- Independent Research Project
- Final Year Design Project

About 1/3 of the course consists of electives which include a diverse range of topic offered by NTU in sustainability, entrepreneurship, business, humanities, sciences, etc.

Facilities

The School is housed in two buildings totaling 30,000 square meters, providing learning experiences essential to a first-rate education in chemical and biomedical engineering. The buildings are designed with ample room to conduct lectures and tutorials in seminar style, undergraduate laboratory work and postgraduate research. By every measure, the facilities are set to emphasize a quality learning environment—from state-of-the-art laboratory equipment and our high-tech teaching stations to aesthetically soothing interior design that is conducive for learning and research.
Employment Opportunities

Chemical and biomolecular engineers obtain training in diverse areas and have the flexibility to adapt to different industrial sectors. The chemical and pharmaceutical sectors constitute a key part of Singapore’s constellation of industries. Graduates can find challenging opportunities in traditional as well as emerging engineering fields such as petrochemicals, bio-pharmaceuticals, specialty chemicals, food/flavours/fragrances, nanotechnology, and trading and finance related jobs in relevant industries.

Ms Pang Si Qi
SCBE Alumni

“Enjoy what you are learning rather than seeing it as a chore to study. It is not easy, but the truth is, when you enjoy the materials, the knowledge comes to you easily and naturally. Also, participate in events actively as possible, be it in school or outside of school! There’s a lot to be learnt from such activities other than having fun..... And these will be part of the beautiful memories of your university life!”

Pang Si Qi graduated from the School of Chemical and Biomedical Engineering in 2011. She has joined Shell as a Process Technologist upon her graduation. The dynamic nature of her job requires her to be sharp, attentive to details and the need to be analytical. Being part of CN Yang programme, the Industrial Attachment experience and having learnt SCBE modules equipped her with the skills required. She gains immense satisfaction from solving work challenges which differ daily.”
SCBE Club
The SCBE Club was first established in 2004, underpinned by fundamental ideals in supporting a cohesive community for the SCBE family. As of AY12/13, the SCBE Club sees its 8th Management Committee.

Being in SCBE has definitely been one of the most defining moments in my life. Apart from the firm academic grounding and friendships forged during the 4 years in SCBE, I have also had many opportunities to widen my horizons and achieve holistic personal development. Some of my personal highlights include spending a semester on exchange at Georgia Tech, doing two internships with big names like ExxonMobil and P&G as well as doing research in the pioneering field of synthetic biology. The opportunities to shine are aplenty here at SCBE, as long as you are driven and passionate about your goals!

SCBE has provided me with ample opportunities to explore my strengths and interests. Having been in the SCBE Club Management Committee for 3 years, I was part of the organizing team behind many events held in SCBE. I also had the opportunity to participate in the Abbott University Innovation Challenge in 2012, attaining an honourable mention among all international teams. Undeniably, the challenging workload in SCBE has trained me well in balancing both academic and non-academic work. In 2012, I was part of the team of 30 people who went to Yangon, Myanmar to teach in an orphanage and to help raise fund for their operations.

Mary Chan
Professor
Prof Mary Chan attended Raffles Girls Secondary School and National Junior College, after which she secured several scholarships to pursue Chemical Engineering at National University Singapore. She went on to win a scholarship to pursue her Ph.D. degree in MIT in polymer science. After her Ph.D., she held several R&D and managerial positions in industry in the United States for about 10 years before returning to Singapore, where she joined NTU as a faculty member.

Timothy Tan
Associate Professor
Associate Professor Timothy Tan is the Outreach Director at the School of Chemical and Biomedical Engineering. He obtained his B.Eng. and Ph.D in Chemical Engineering in 2000 and 2004 respectively from the University of New South Wales, Australia. His laboratory, Nanostructure Synthesis and Tailoring Lab (NanoST Lab), focuses on tailoring architecture and nanostructures of materials for sustainable technology (energy harvesting and waste remediation) and cancer and regenerative nanomedicine. He was awarded the Young Investigator Award at the 2012 International Symposium of Materials on Regenerative Medicine (ISOMRM).

Raymond Lau
Assistant Professor
Assistant Professor Lau’s areas of expertise are Multiphase Flow, Fluidization, and Reactor Design. His current research works focus on applications of fluidized bed separation process, particle formulation and inhaler design in dry powder inhalation, and process engineering on microalgae utilizations. He is the recipient of the Nanyang Award 2011 for Excellence in Teaching in recognition of his dedication in student education.

Mary Chan
Professor
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Visiting Professors
Bazan, Gui (PhD Massachusetts Institute of Technology)
Gladden, Lynn F. (PhD University of Cambridge)
K.C. Tam (PhD Monash)
Huimin Zhao (PhD California Institute of Technology)

Faculty
Chan, Mary B. (PhD MIT)
Chan-Park, Mary B. (PhD University of Pennsylvania)
Chang, Matthew Wook (PhD University of Maryland)
Chen, William Wei Ning (PhD University of Louvain)
Chen, Yuan (PhD Yale University)
Chew, Sing Yuan (PhD Johns Hopkins University)
Hadinoto, Kurni Ong (PhD Purdue University)
Yee, Yeli (PhD Clarkson University)
Jiang, Rongrong (PhD Georgia Institute of Technology)
Zaher, Jad (PhD University of New South Wales)
Lau, Raymond Wai Man (PhD The Ohio State University)
Lee, Jong-Min (PhD Columbia University)
Leong, Susanna Su Jin (PhD University of Cambridge)
Lim, Kok Hwa (PhD Technical University of Munich)
Lin, Bin (PhD University of Minnesota)
Loo, Leslie Sun Sun (PhD MIT)
Lou, David Xiong Wen (PhD Cornell University)
Hemant Moustik (PhD McGill University)
Choon, Siu Choon (PhD University of Oxford)
Tang, Timothy Thatt Yang (PhD University of New South Wales)
Vasu Deva Suriya (PhD National University of Singapore)
Wang, Mingteng (PhD University of Toronto)
Xin, Wang (PhD Hong Kong University of Science & Technology)
Hong, Xu (PhD National University of Singapore)
Yatit, Yang (PhD Yale University)