School of ENGINEERING

Embrace Change in the Century of Engineering
World Rankings of HKUST School of Engineering

No.1
in Hong Kong

No.23
in the World in the area of Engineering & Technology

Times Higher Education World University Rankings, 2019

HKUST in QS World University Rankings by Subject - Engineering & Technology (2019)

- Chemical Engineering
  World No. 34
  (No. 1 in Hong Kong)

- Civil & Structural Engineering
  World No. 17

- Computer Science & Information Systems
  World No. 26
  (No. 1 in Hong Kong)

- Electrical & Electronic Engineering
  World No. 22
  (No. 1 in Hong Kong)

- Mechanical, Aeronautical & Manufacturing Engineering
  World No. 29
  (No. 1 in Hong Kong)

- Statistics and Operational Research
  World No. 29
  (No. 1 in Hong Kong)
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WHY HKUST ENGINEERING?
Our young, forward looking university with one of the best schools of Engineering in the world has established high global rankings. You will learn from professors with PhD degrees from first-class universities around the globe, who closely follow pedagogical developments to increase their teaching effectiveness. We have achieved leadership in teaching in both established and emerging engineering fields with our student-centric approach, whole-person development and active career guidance. The School of Engineering (SENG) is globally renowned for its research excellence.

**World-Class Education**

Our high standards are acknowledged by a range of local and international official professional recognitions. Our programs are not only accredited by the Hong Kong Institution of Engineers, they are also officially recognized by more than 20 countries, which are members of the Washington Accord. These include Australia, Canada, Korea, Malaysia, Singapore, New Zealand, the UK, the US and others.

Programs related to IT and computing are recognized under the Seoul Accord, with signatories including Australia, Canada, Japan, Korea, the UK and the US.

Widely recognized, HKUST engineering degrees open up a spectrum of international job and career prospects.

**International Professional Recognition**
Step out of the classroom and widen your horizon with a multitude of global learning offerings.

**Overseas Exchange**
Be one of the 40 per cent of our engineering students who spend a term outside of Hong Kong. Study overseas at one of more than 120 host institutions, while only paying the normative HKUST tuition fee.

**Study Abroad**
Choose from the wide range of study abroad programs available through HKUST’s extensive collaborative network. Discounts and scholarships are available on some programs.

**International Research**
Join an international research team at a top-notch research university, such as the Ivy-League Princeton University’s engineering-only research program. Alternatively, join hands with students from Harvard University on an engineering design project. (more details about the Princeton research program on p.28 and p.29).

**Global Virtual Exchange**
Gain global insight by joining credit-bearing virtual courses offered by top universities around the globe.
Eden TI
BEng (Chemical Engineering) and BBA (General Business Management)
University College London (UK)

“Learn how to become more independent and mature. No one was making decisions for me anymore. Things were never as hard as I expected them to be. In future, I will try my best to achieve more in different areas.”
In the four-year undergraduate program, students are admitted to SENG first. In the first year, you learn the fundamentals of engineering and explore various engineering disciplines through introductory courses. At the end of the first year, you will make an informed choice of the discipline you will be studying at SENG for the next three years.

The broad-based, student-centered program allows you to take up additional major or minor programs or dual degree programs involving both engineering and non-engineering areas. Students with substantial credit transfer upon admission may be able to graduate in less than four years.
Major Programs

Choose from a wide spectrum of world-class engineering programs after the first year at Hong Kong’s No.1 School of Engineering.

- BEng in Aerospace Engineering
- BEng in Bioengineering
- BEng in Chemical Engineering
- BEng in Chemical and Environmental Engineering
- BEng in Civil Engineering
- BEng in Civil and Environmental Engineering
- BEng in Computer Engineering
- BEng/BSc in Computer Science
- BEng in Decision Analytics
- BEng in Electronic Engineering
- BEng in Industrial Engineering and Engineering Management
- BEng in Mechanical Engineering
- BEng in Sustainable Energy Engineering
- BSc in Integrative Systems and Design

Minor Programs

You can enrich your learning experience by taking up one or more insightful minor programs, such as the ones listed below.

- Actuarial Mathematics
- Aeronautical Engineering
- Astrophysics and Cosmology
- Big Data Technology
- Bioengineering
- Biotechnology
- Business
- China Studies
- Design
- Entrepreneurship
- Environmental Sustainability and Management
- Humanities
- Information Technology
- Robotics
- Social Science
- Sustainable Energy Engineering
- Technology Management

Interdisciplinary Major Programs

Widen your career options! After the first year at SENG, you can also select a cutting-edge interdisciplinary major covering management, business intelligence, the environment or risk management.

- Dual Degree Program (BEng and BBA) in Technology and Management
- BSc in Data Science and Technology
- BSc in Environmental Management and Technology
- BSc in Risk Management and Business Intelligence
- BSc in Individualized Interdisciplinary Major
WHAT IS ENGINEERING?

Service to humanity is the best work of life” - I served the university as the Head Student Ambassador and Core Peer Mentor of the School of Engineering at HKUST. The international exposure and analytical skills that I acquired from HKUST turned me into a social entrepreneur when I was 19. I co-founded a social enterprise to promote empathy for the elderly. Upon graduation, I worked at the United Nations Headquarters in New York on health and environmental literacy. Looking back, I realized the engineering knowledge and mindset that I learnt in HKUST were indeed very useful in laying a solid foundation for the career I enjoy immensely. It also inspired me that the true meaning of life is to empower people to create positive changes, a conviction that prepares me for the professional environmental engineer that I am today.”
Are you a problem solver who likes to make things work more efficiently and effectively? Then engineering, which uses scientific, mathematical, economic, social and practical knowledge to solve problems in our daily lives, will interest you.

Engineering strives to improve our lives with great inventions, such as computers, satellites, medical devices, artificial intelligence and renewable energy technologies. Whether we live in a tall building or work in a skyscraper, take the MTR or use our mobile phone, invest our personal savings or make critical business decisions, now more than ever, we constantly enjoy the fruits of engineering in our daily lives. They are not only around us everywhere, but develop at an unprecedented speed led by incredible new discoveries and inventions.

**BEng in Aerospace Engineering**

Aerospace engineering is an important academic program at HKUST. The program places emphasis on green aviation and new flying vehicles. The program aims at equipping graduates with necessary understanding of the essential disciplines of aerodynamics, aircraft structures, flying vehicle dynamics and control, propulsion, material, aero elasticity and interdisciplinary design with a strong theoretical base which is well suited for careers in aerospace and related engineering fields.
BEng in Bioengineering

Bioengineering combines both engineering and the life sciences. Bioengineers use engineering principles and the power of biology to tackle medical challenges and improve human health, as well as a wide range of issues, ranging from energy shortage, food and water security, environmental pollution, and an ageing population. The program includes a foundation of mathematics and sciences specially designed for bioengineers and two areas of specialization (data-oriented, and molecular-oriented). Graduates will find employment as bioengineering innovators, researchers, clinical scientists, and entrepreneurs.

BEng in Chemical Engineering

Chemical Engineering is a discipline in which the principles of physical, chemical and natural sciences are used to solve applied chemistry related problems in manufacturing processes and plants. Students learn to design a manufacturing plant; transform raw materials into valuable products; purify the products to meet consumer demands; ensure high quality standard; automate the plant to make production safe and economical; minimize waste and pollution; market and sell the products at a profit; and work effectively with chemical engineering equipment.
BEng in Chemical and Environmental Engineering

This program emphasizes processes that turn raw materials into valuable products without producing effluents and wastes. All companies handling such processes need environmental engineers with a basic knowledge of chemical engineering to design, control, manage and operate environmental treatment facilities. This combined degree enables students to understand various industrial processes and realize where environmental control measures can be implemented, thus making the community a better place to live in.

BEng in Civil Engineering

Civil Engineering concerns the planning, design, construction, maintenance and management of various structures such as buildings, bridges, roads, railways, tunnels, slopes, airports, harbor facilities, solid waste treatment and landfills, water/sewage treatment plants, dams, water pipes, gas mains, etc. In short, Civil Engineering is about the infrastructure of modern civilization.

Coeinne LOH
BEng (Electronic Engineering)
University of California, Berkeley (USA)

“The exchange at Berkeley meant a lot to me. It made me realize that I am much more capable than I thought I am, it changed my perspective on the world and it definitely changed my life.”
BEng in Computer Science

Computer Science studies the application of computers in solving important problems in scientific, engineering and commercial domains. Our BEng program provides a broad education, teaching problem solving skills to tackle computation problems in all core areas, including programming, data structures and algorithms, operating systems, and software engineering. Students can then choose to learn diverse areas of computer science, such as databases and data mining, networking, embedded systems, computer graphics, image processing, artificial intelligence, machine learning, computer vision, computer security, and theoretical computer science.

BEng in Computer Engineering

Computer Engineering focuses on the analysis, design, implementation and utilization of computer systems, from embedded microprocessors, notebook/desktop computers to supercomputers, as well as how they are integrated with other systems to meet the challenges of real-world applications. It bridges the gap between computer science and electronic engineering, and offers students a balanced training on both hardware and software skills, by taking full advantages of the human resources and laboratory facilities of both Department of Electronic & Computer Engineering and Department of Computer Science & Engineering. It’s a well-integrated 2-in-1 program!

BEng in Civil and Environmental Engineering

The program provides broad engineering training with an emphasis on the areas of water and wastewater engineering, solid and hazardous waste management, and air/noise pollution control. As environmental quality is a major public concern all over the world, along with the rapid economic development in Hong Kong and Asia at large, more and more resources will be committed to improving and managing our environment. Thus, there will be a great need for properly trained environmental engineers.
BSc in Data Science and Technology

The Program equips students with various mathematical tools, data analytical skills and IT technologies to make sense of data obtained from various sources and to utilize them. For example, in industry, data science and technology would help to improve their productivity, whereas in commerce, it would serve as quick analytics to predict the stock price, design new investment tools, etc. Through four years of rigorous training, students are expected to be well versed with useful tools to deal with data such as data analytics, programming skills and mathematical modeling, all of which give students a solid foundation for their future career.

(Jointly offered by the Department of Mathematics and the Department of Computer Science and Engineering)

BSc in Computer Science

BSc in Computer Science (COSC) is uniquely designed to be utilized as one half of a double-major declaration. Students enrolled in COSC are required to be simultaneously enrolled in at least one other major, e.g. Mathematics, Physics, Quantitative Finance, Quantitative Social Analysis, Biotechnology, etc. Students who wish to double-major can either start in Computer Science and declare their second major afterwards or start in another major and then add COSC.
BEng in Decision Analytics

Our new major in Decision Analytics was introduced in 2018 to align the aspirations of students with current and future societal needs of the knowledge economy. Students are trained to analyze real-world data, build and fit models that are consistent with data, develop algorithms, simulate models, and design process and system innovations seeking optimal solutions to important decision problems in domain specific areas such as Financial Engineering and Consulting Services. Graduates who are equipped with predictive and prescriptive analytical tools will be better able to source high-value added jobs in banks, insurance companies, consulting-firms, e-commerce, travel and leisure industry and health-care organizations.

Ivan GONDOPRASTOWO
from Indonesia 2014 BEng (Computer Science)
Banking and Finance Executive,
JPMorgan Chase & Co.

“Global opportunities offered by HKUST are just priceless. Being a part of one of the world’s renowned universities certainly opens up exciting opportunities in Hong Kong, Mainland China, and the world... I spent a summer in India and joined a prestigious internship program by an IT giant, Infosys. I went to Tsinghua University for a short-term exchange program and spent my penultimate year summer with one of the biggest financial services firm in the world, J.P. Morgan, at their APAC Headquarters in Hong Kong. I believe that the training, network, partnership and HKUST worldwide recognition are the ones that make this kind of experience possible, and HKUST is one of the few universities in Asia, or in the world, that has all these to offer.”
Frank WANG  
2006 BEng (Electronic Engineering)  
2011 MPhil (Electronic and Computer Engineering)  
Founder and Chief Executive Officer, DJI Innovations

HKUST provided me with excellent opportunities to explore my interests outside the classroom, and I also found a professor willing to support me in ways that have helped me immensely over the years. Learning the fundamentals in my electronics courses and taking part in Robocon Competitions helped me build a solid foundation in remote-controlled flying machines. HKUST taught me the importance of being a good team player and a disciplined perfectionist. This just shows that in addition to its solid curriculum, HKUST has excellent professors who always find ways to inspire. They have a global vision, and while some have a great entrepreneurial spirit, others are very scholarly.”

BEng in Electronic Engineering

Energy and information flow in electrical form, and electronic engineers develop technologies that have vastly improved our quality of life. The BEng in Electronic Engineering program covers technologies that found applications in artificial intelligence (AI), big data, robotics, internet of things, etc. These advanced technologies include signal and information processing, communications and networks, computer engineering and embedded system design, robotics and automation, microelectronics and integrated circuit design, photonics and optics, and biomedical electronics. These areas are critical to the growth of our information-based society and mastering them opens up vast career opportunities.
Industrial Engineering is the active and dynamic discipline of advanced scientific management – the engineering of making smart decisions. By adopting a decision analytics approach with the use of real-world data to drive decision models, graduates of this program are equipped with strong analytical skills as well as the ability to develop algorithms and simulation models for decision-making in domain specific knowledge of problems ranging from operations planning and scheduling to transportation systems and policies, and from global supply chain management to quality control.
**BEng in Mechanical Engineering**

The program is structured in three stages. The first stage concentrates on the fundamentals of mechanical engineering. The second stage integrates engineering sciences with laboratory work and exposes students to state-of-the-art tools and equipment. The third stage comprises electives that provide students with sufficient depth in one of the following areas of specialization: (i) Building Services, Energy and Environmental Engineering, (ii) Mechatronics, Design and Manufacturing, and (iii) Structure, Materials and Reliability Engineering.

**BEng in Sustainable Energy Engineering**

Sustainable Energy Engineering is an interdisciplinary program covering energy generation, delivery, efficiency, conversion and storage, sustainability, and energy policy. It aims to develop leading professionals who can design and implement both traditional and renewable energy systems to respond to expanding global environmental and energy needs. This advanced training enables graduates to develop career in the government and companies in energy related fields.

**BSc in Integrative Systems and Design**

This program provides a multi-disciplinary training to students in integrative systems and design. It adopts a student-centric curriculum, which is created based on their talents and interests, and a project-based learning approach in which students study and work in teams. Students acquire knowledge in design and systems thinking, specific technology and entrepreneurial spirit through learning-by-doing. The birth of disruptive innovations requires both cutting-edge science and engineering advancement and creates a huge demand for innovators who can integrate know-hows that span different disciplines in a user-oriented and human-centered mindset.
DOUBLE DEGREE WITH LAW

Engineering + Law

A legal dimension added to your engineering degree can widen your horizon, expand your perspectives and open up more opportunities. That is why the HKUST School of Engineering has partnered with the UK’s renowned University of Exeter and offers an accelerated pathway to earn a BEng or BSc degree in Engineering or Computer Science from HKUST, and a law degree from the University of Exeter within five years. Students from HKUST will complete the first three years at HKUST and an additional two years at the University of Exeter. For Year 4, students will enjoy a tuition waiver from the University of Exeter and will only be charged the normative HKUST tuition fee payable to HKUST.
For Local Applicants with HKDSE Results

Engineering (School-based admission)
BSc in Integrative Systems and Design

JUPAS No.: JS5200
JUPAS No.: JS5211

Applicants with Hong Kong Diploma of Secondary Education (HKDSE) results must meet (i) General requirements, and (ii) School-specific Subject requirements*:

**General Requirements**

4 CORES

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<th>Subject</th>
<th>Level</th>
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<td>Chinese Language</td>
<td>3</td>
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<tr>
<td>English Language</td>
<td>3</td>
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<tr>
<td>Maths (Compulsory Module)</td>
<td>3</td>
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<tr>
<td>Liberal Studies</td>
<td>2</td>
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Notes:
M1: Mathematics Extended Module 1 (Calculus & Statistics)
M2: Mathematics Extended Module 2 (Algebra & Calculus)

**Electives**

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<th>Elective 1</th>
<th>Level 3</th>
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<td>Elective 2 or M1 / M2</td>
<td>Level 3</td>
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School-specific Subject Requirements*
One of: Biology / Chemistry / Physics / Combined Science / ICT

For Applicants with International Qualifications

HKUST recognizes various international qualifications for admissions. The following list shows some of the examples and is by no means exhaustive.

**General Admission Requirements**

1. American Patterned System (SAT/AP)
2. British Patterned System (GCE A/L/IAL)
3. Canadian Curriculum
4. Indian Curriculum
5. Indonesian Curriculum
6. International Baccalaureate
7. Malaysian Curriculum (STPM or UEC)

**Others**

Many more qualifications recognized by HKUST for admission can be found at http://join.ust.hk

**School-Specific Subject Requirements**

Senior High School Mathematics **AND**
One Senior High School subject from Physics, Chemistry, Biology, Computer Studies, Statistics

(other relevant subjects may also be considered.)

*Design related subjects will also be considered by the BSc in Integrative Systems and Design Program, e.g. Design & Applied Technology in HKDSE.
ENRICH YOUR LEARNING EXPERIENCE
Learning outside the classroom is an important part of education. At HKUST SENG you can participate in different co-curricular programs, which offer an inspiring whole-person education.

**Local, National, and International Competitions**

Participating in competitions is the best way for you to express your creativity and develop your problem-solving skills. In addition, you also learn teamwork, management and leadership skills, and enhance your communication and interpersonal skills. HKUST’s engineering students are experienced and formidable competitors in robotics, underwater robots, smart cars and solar cars, powered wheelchairs and aeronautics, to mention but a few categories.
Nga Lee (Sally) NG
2002 BEng (Chemical and Environmental Engineering)
2004 and 2007 MS and PhD (Chemical Engineering), California Institute of Technology, USA
Associate Professor, School of Chemical & Biomolecular Engineering, School of Earth & Atmospheric Sciences, Georgia Institute of Technology, USA
2019 Conference Chair, American Association for Aerosol Research (AAAR)
Vice-Chair, Environmental Division, American Institute of Chemical Engineers (AIChE)

The education I received at HKUST is instrumental for the development of my academic career. In addition to a rigorous course curriculum which provided me with fundamental knowledge in Chemical and Environmental Engineering, I was fortunate to have the opportunity to conduct research when I was an undergraduate. I was introduced to the fascinating world of research and how chemical engineers can play a role in mitigating particulate matter pollution. The undergraduate research experience and mentoring I received at HKUST prepared me well for graduate studies at Caltech. In addition, I benefited tremendously from HKUST’s extensive exchange program. I went on exchange at the University of Minnesota in the US, which was truly an eye-opening experience. I learned about different cultures, was exposed to different ways of thinking, and grew to be independent. All these wonderful opportunities and experience provided by HKUST are invaluable and have contributed greatly to my career today.”

Student-driven Practicum Ignites Creativity

In our fast-changing world, creativity and problem-solving are the most important attributes a graduate can have. To nurture students’ creativity, SENG provides the Undergraduate Student-initiated Experiential Learning (USEL) program to all its undergraduates, encouraging them to initiate projects and carry them out under the guidance of faculty members. To facilitate your work, SENG established an experiential learning lab that allows 24-hour access. With another maker space that opened shortly afterwards, you will have plenty of space, facilities and equipment applicable to a wide range of disciplines to develop your creativity while realizing your dreams.
Undergraduate Research Opportunities

The HKUST’s signature Undergraduate Research Opportunities program (UROP) provides a unique opportunity for undergraduate students to engage in academic research under guidance and supervision by professors.

Research at Princeton is an invaluable opportunity exclusively for SENG students. During the eight-week Summer program offered by SENG, you will be able to conduct research with Princeton’s faculty members on designated research projects. Conducting research in an international setting, interacting with people of different backgrounds and staying overseas help you develop an international outlook and global mindset.

“Jungsun KIM
BEng (Civil and Environmental Engineering)
Participated in Princeton UG Summer Research Program, Summer 2014

The Princeton exchange was a great experience. Applying for this program was one of the best decisions I have ever made. If anyone is seeking great research and outreach experiences, I would definitely recommend Princeton Summer Research Exchange without any hesitation. Do not be nervous or overly worried. Keep calm and go to Princeton!”
Design Experience Across Two Continents

The Harvard-HKUST International Engineering Design Experience Program adds a global dimension to engineering students’ design education. Through the program, SENG students team up with their counterparts from Harvard to work on a design project of a selected theme. During the 8 weeks in summer, you will spend half of your time at Harvard and HKUST respectively, thus enabling you to be immersed in the local culture and foster life-long friendships with your Harvard teammates alongside the inspiring design experience that you reap from the program.
Internship

Students’ early exposure to professional work experience and learning about different industries is an important part of a whole-person education. At SENG, the Center for Industry Engagement and Internship serves as an interface between industry and the School to set up valuable internship engagements for students that help you identify your passion and interest in career choices and build your career path early, while still at university.

Mick TSE
2016 BEng (Mechanical Engineering)
Engineer Trainee, Swire Properties Limited

SENG offers a lot of courses and activities that not only focus on the students’ academic, but also all-round development. These include summer camps, experiential learning courses and exchange programs, to name but a few. These, together with the practical experience acquired from the Co-op program held by the Department of Mechanical and Aerospace Engineering, prepared me to gladly take up the job duties at a leading property developer in Hong Kong.”
Peer Mentoring Guides Freshmen
Learning to Teach, Teaching to Learn

Our senior year engineering students are “Learning to Teach, Teaching to Learn”. Having gone through coaching in well-designed workshops, they provide peer mentoring support to freshmen. The Peer Mentoring Program helps senior students to reflect on their experiences and convert them to useful advice and guidance to freshmen, assisting them in their transition to university life.

Engineering Student Ambassador

SENG chooses the best students for the Engineering Student Ambassador Program to represent the School and promote engineering to prospective students. This future-defining program provides the opportunity of a lifetime for you to learn social and leadership skills and become a future leader.

Benny CHEUNG
2007 BEng (Chemical and Biomolecular Engineering)
Business Engineer 1, CLP Power Hong Kong Limited

“Back at the time when I won the HKUST President’s Cup in 2007, SENG prepared me to pursue innovation and creativity to make our community better. Equipped with the unique chemical engineering knowledge, I realized that electricity generation can power up everyone’s life reliably but at the same time it is eco-friendly. I am proud to be a graduate of HKUST and the connection with HKUST will always be my greatest support in my whole life.”
Parry CHAN
2016 BEng (Industrial Engineering and Engineering Management)
Graduate Trainee, The Hong Kong and China Gas Company Limited

“I am glad to be an alumnus of HKUST School of Engineering. Industrial engineering taught me how to make smart decisions by using different engineering and mathematical tools and the understanding of the business world. Today, I am happy to be a member of Towngas, where I can contribute together with my colleagues to providing our customers with a safe and reliable supply of energy and the caring, competent and efficient service they expect, while working to preserve, protect and improve our environment.”

Sze Lok CHAN
2010 BEng (Computer Science)
Startup Business Development Manager, Hong Kong & Taiwan, Amazon Web Services Hong Kong Limited

“Learn how to learn” is the most valuable lesson I learnt at HKUST. SENG is not just a school that equips you with all the essential skills that you need as an engineer. In addition, you will be also taught and trained to be a good learner. I have answered questions without having the right answers, explored ideas they didn’t teach in class and was inspired by classmates, an inspiration that keeps growing in every aspect through a wide variety of courses, tutorials, industrial training and projects. I was also grateful to be supported by the School to join LIBRA [a two-week study tour] and an exchange program in the summer that have strengthened my language foundations. All of these have paved the way for me to pursue further studies and work in one of the most reputable tech companies today.”