

Department of Building Environment and Energy Engineering

建築環境及能源工程學系



THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學

Department of
Building Environment and Energy Engineering
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The Department of **Building Environment and Energy Engineering (BEEE)**, formerly named Building Services Engineering (BSE), was officially established in 1981 and is a leading academic department in Hong Kong focusing specifically on the teaching, research and development of building services engineering, including Building Environment, Electrical Services and Lighting, HVACR, Building Energy Studies and Facility Engineering and Management as well as Fire and safety Engineering. BEEE offers a full range of taught and research based study programmes leading to awards from Bachelor of Engineering (BEng) to Masters (MSc and MEng) right up to Doctor of Philosophy (PhD).

About The Department

We believe that today's engineering graduates need to be flexible, adaptable and able to respond rapidly to change.

The Department is internationally recognized as a centre of excellence in Building Sciences and Engineering, offering high quality academic programmes and undertaking significant research and consultancy projects.



Our Academic Programmes

- providing good employment prospects for graduates
- providing internationally recognized qualifications
- are professionally accredited
- are interesting and challenging
- provide an opportunity to acquire lifelong learning skills – including communication, leadership and self-study

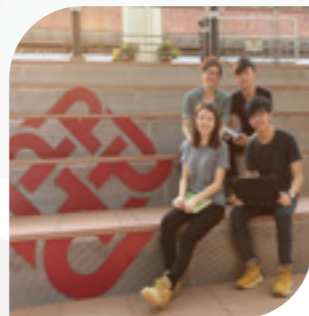
Learning In BEEE

BEEE provides education and training to our students to exploit wealth of data in designing high performance buildings and building systems, such as applying AI techniques, big data programming and using BIM and digital twin systems.



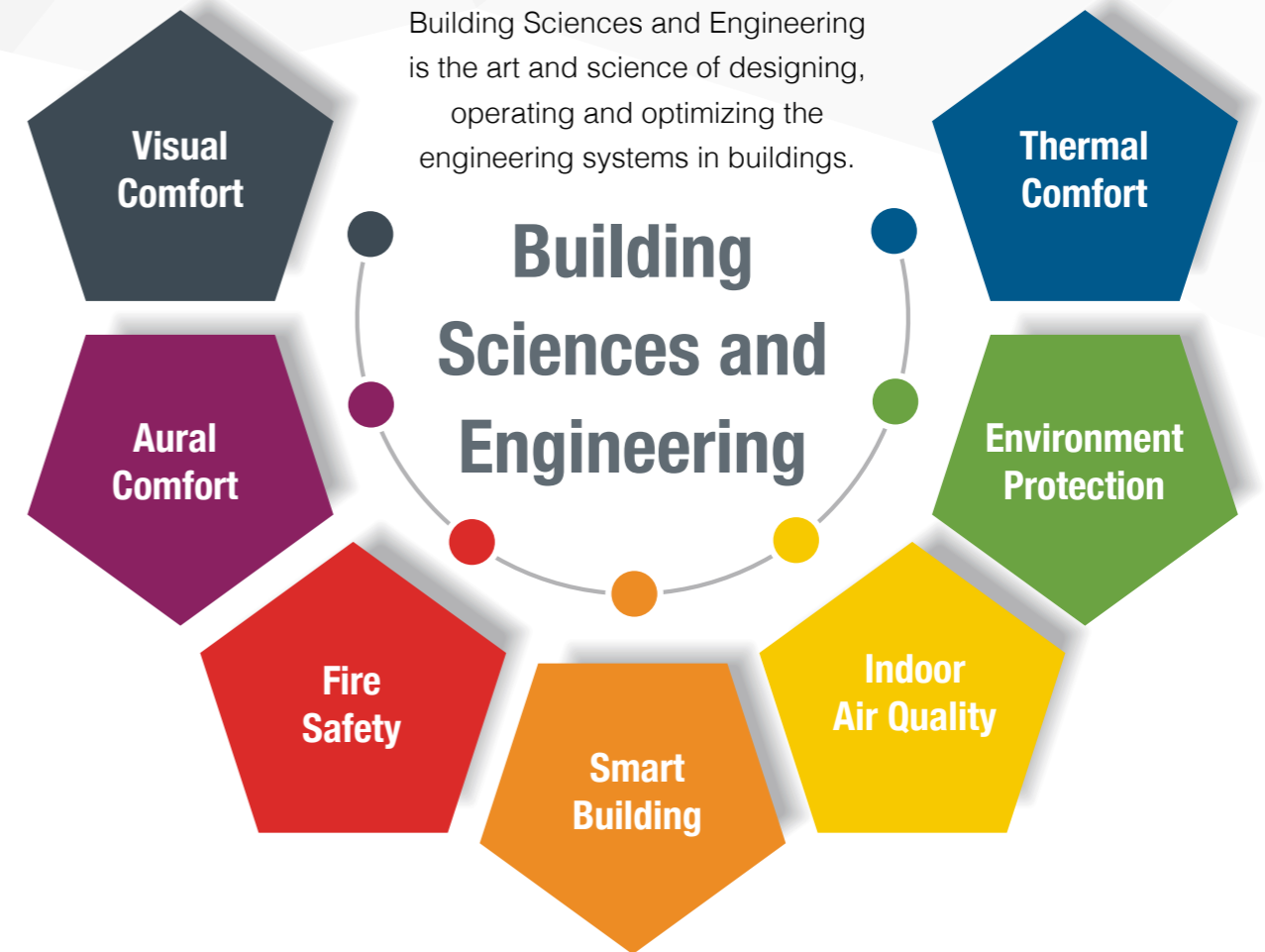
Our Programmes Offer

- 21st century relevance
- broad based coverage of engineering & design
- stimulating learning environment
- flexible study pattern under a credit-based system
- exchange opportunities overseas or in the Mainland
- opportunity to progress to MSc/ MEng level and beyond

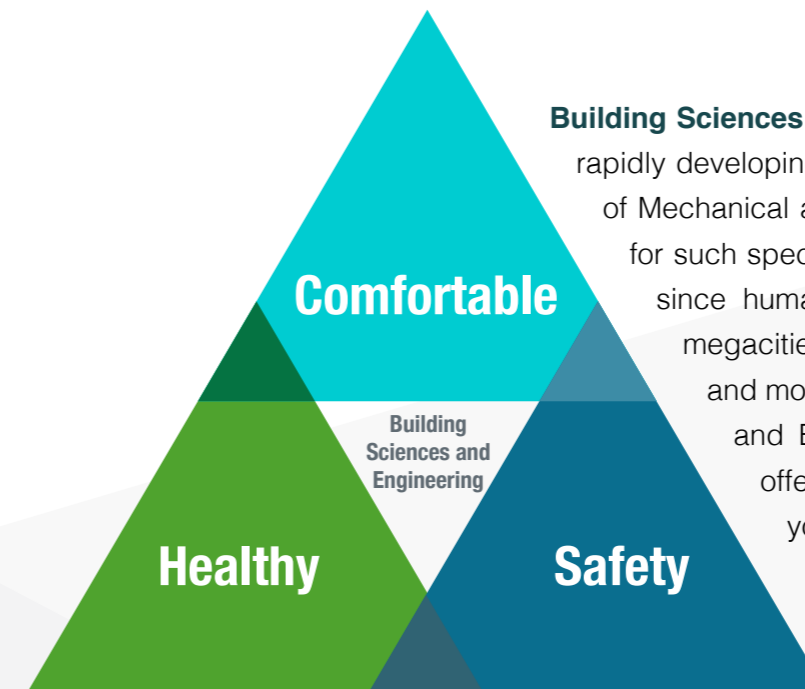


Building Sciences and Engineering is a professional engineering discipline dedicated to facilitate comfortable, efficient and safe indoor environments whilst minimizing the environmental impact of buildings.

Building Sciences and Engineering is the art and science of designing, operating and optimizing the engineering systems in buildings.



Building Sciences and Engineering is a relatively emerging and rapidly developing discipline compared to its parent disciplines of Mechanical and Electrical Engineering. However, the need for such specialist knowledge has grown exponentially ever since human populations have become urbanised and megacities and conurbations are growing ever larger and more complex. The demand for Building Sciences and Engineering training is set to grow and grow offering excellent lifelong career opportunities for young people worldwide. HK PolyU is a globally leading engineering institution providing such training in Hong Kong.



BEng (Hons) Scheme in Building Sciences and Engineering

建築科學及工程學(榮譽)工學士組合課程

Full-time 4-year Government-funded Programme

JUPAS code: JS3110

BEng (Hons) in Building Sciences and Engineering [建築科學及工程學(榮譽)工學士]

BEng (Hons) in Building Sciences and Engineering [建築科學及工程學(榮譽)工學士]
with the specialism of Building Services Engineering [屋宇設備工程學]

Among the many challenges confronting the world, perhaps the most critical is to provide quality living environments to rapidly urbanising and ageing populations under the impending threat of a worsening climate and increasing environmental pollution. The UN has forecasted that the world's population will reach 9.7 billion by 2050. 70% of the people are projected to live in urban areas, placing enormous strain on cities and the environment. To deal effectively with these challenges, future building engineers will have to work in interdisciplinary teams to deliver smart optimal solutions enabling vertical farms; renewable energy driven integrated buildings and transport systems; citywide recycling and so on for a sustainable planet as well as a smart and resilient built environment. In keeping with the times, BEEE has made appropriate changes to be better able to meet the aforementioned challenges. By embracing future trends, BEEE ensures its graduates are prepared to deal with a rapidly changing world. It is inevitable that conventional engineering systems for managing the built environment will progressively be replaced by cyber-physical systems that respond to the changing demands of the environment in real time and deliver optimal performance through increasingly pervasive technologies such as sensing & monitoring, communications, AI, AIoT, data science etc.

- ▶ **Without being subject to further assessment, students are allowed to enrol on a major of Building Sciences and Engineering with/without the specialism of Building Services Engineering depending on the student's choices of elective subjects.**
- ▶ **The options of Secondary Major in Innovation and Entrepreneurship and AI and Data Analytics are available to the students of BEng (Hons) in Building Sciences and Engineering. Admission to the Secondary Major is on competitive basis and subject to a different credit requirement for graduation. Please see "Secondary Major Details" section.**

Programme Aims & Learning Outcomes

- ▶ To produce graduates who are technically and academically competent to excel in building sciences and engineering/building services engineering.
- ▶ To meet the demand for locally trained building/ building services engineers with expertise in the fields of consultancy, contracting, building management, research and development.
- ▶ To ensure our graduates have a broad range of personal skills, such as the ability to communicate effectively, think critically, learn independently, and address new problems innovatively.

Programme Characteristics

- ▶ Students learn the art and science of providing safe, healthy, and energy-efficient built environments with minimal adverse environmental impacts. They also have the chance to tackle intellectual challenges that prepare them to become future managers in the industry.
- ▶ Students have the opportunity to work in teams, lead small projects, work independently and interact with highly qualified and professional staff. They also have access to a variety of design software and laboratory facilities for the latest building sciences and engineering applications, such as artificial intelligence and big data for smart buildings.
- ▶ Local and offshore summer placement opportunities are offered.
- ▶ Students who join the Student Exchange Programme can study at universities in the United States, Europe, Australia, Russia, Southeast Asia, or the Chinese mainland for a semester.
- ▶ Students are regularly awarded scholarships by professional bodies and major organisations in Hong Kong.

Programme Structures

- ▶ Students begin by learning the fundamentals of indoor built environments, building information modelling and programming, data science, architecture and buildings, thermal science, fluid and electrical engineering, and mathematics.
- ▶ In Year 3, students apply their foundational knowledge to the design and operation of major building service engineering systems.
- ▶ In the final year, students opt for electives from a pool addressing the latest developments and technology in the fields of building sciences and engineering, and undertake a major project.

The Programme in Numbers

- ▶ 1st BEEE undergraduate programme in Hong Kong;
- ▶ 15th in Architecture and Built Environment QS World University Ranking by Subject 2022;
- ▶ 182 internship partners to programme summer trainings;
- ▶ 100% Employment rate for both local and non-local graduates; and
- ▶ 3700+ BEng alumni to become the strongest industry network.



Professional Recognition

The Hong Kong Institution of Engineers (HKIE) has extended full accreditation to the BEng (Hons) Degree in Building Sciences and Engineering (including the programme BEng (Hons) Degree in Building Sciences and Engineering (Building Services Engineering)).

Graduates of this programme may then be qualified for Scheme A training of HKIE in the following disciplines (i) Building Services, (ii) Fire*, (iii) Environmental* and (iv) Energy*. Academic programmes in the building services discipline that are accredited by the HKIE are reciprocally recognised by the UK's Chartered Institution of Building Services Engineers (CIBSE).

The professional accreditation of the programme for 2023 intake onwards is subject to approval.

* upon completion of specific elective subjects.

Entrance Requirements

Hong Kong sub-degrees

- ▶ Holders of Higher Diploma or Associate Degree in Engineering or equivalent from a recognized institution in Hong Kong can apply through the Direct Admissions Scheme for Senior Year Place.

Overseas or other qualifications

- ▶ Applicants can apply through the International Admission Scheme / Non-JUPAS Admission Scheme on the strength of qualifications other than HKDSE or Mainland China's National Joint College Entrance Examination (NJCEE/Gao Kao), regardless of whether you are studying in Hong Kong or overseas.

For Entry with HKDSE qualifications

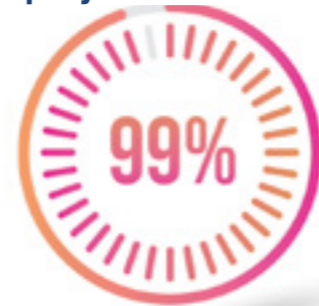
- ▶ Level 3 in English Language and Chinese Language, and Level 2 in Mathematics and Liberal Studies, plus two other elective subjects at Level 3.
- ▶ Specific subject requirement: preferably Physics/Combined Science (with Physics component).
- ▶ Relevant Applied Learning subject(s) that can be considered for meeting the University entrance requirement and admission score calculation: Building Facilities Engineering and Environmental Engineering.

Career Prospectus

- ▶ BEng(Hons) graduates have good career prospects in the building construction and real estate sectors.
- ▶ The rapid construction of new and state-of-the-art buildings in Hong Kong provides numerous attractive local employment opportunities. As the programme is widely recognised, these opportunities also extend to the Chinese mainland and overseas.
- ▶ Our graduates often begin their careers as trainee engineers in government departments, consulting firms, contracting companies, property management companies, or utility companies.
- ▶ First Class Honours graduates may consider research an attractive alternative, especially because building development in Hong Kong embraces advanced technology.

Graduate Employment Statistics 2020

Employment Overview



99% of BSE graduate found employment within 6 months of graduation



HK\$20,178

Average monthly salary of BEng(Hons) in BSE

MEng in Building Services Engineering

Programme code: 33082

The MEng in Building Services Engineering is an integrated master degree programme that covers a study of The MEng in Building Services Engineering is an integrated Master's degree programme that covers a study of engineering and related knowledge which is both deeper and broader than a conventional BEng(Hons) in Building Sciences and Engineering. The broadened and deepened knowledge and skill enable graduates to handle and manage engineering projects that are large in scale (both in the size of project and the investment involved) and complex and varied in nature, which require more effective collaboration amongst professionals from various disciplines, and may have significant social, economical and environmental impacts.

Characteristics

The programme provides a means for a limited number of the most able graduates from the BEng(Hons) in Building Sciences and Engineering programme or other equivalently qualified students to develop towards leadership roles in the building services engineering profession by completing a Dissertation, studying additional enhanced and extended technical, management and environmental subjects, and receiving extra training in language skills.



Recognition & Prospects

Accreditation by the Chartered Institution of Building Services Engineers (CIBSE) as suitable further learning in addition to an accredited BEng(Hons) degree to meet the academic requirement for CEng registration for intake year 2000 onwards has been sought.

Entrance Requirements

Graduating students from BEng programmes in building science engineering, building services engineering, building environmental and equipment engineering, mechanical engineering, electrical engineering, thermal engineering, as well as energy and power engineering. Applicants with equivalent qualifications may also apply for admission and will be considered on individual merit.



Our Taught Postgraduate Programmes

Our academic programmes are well known for preparing students for professional careers and leadership positions in a range of disciplines. We take pride in the thousands of graduates who have established themselves in various sectors of the construction professions and industry in Hong Kong and beyond. Through their passion and commitment to their professions, they have inspired others with their contributions to society based on their knowledge and skills.

Our taught postgraduate programmes provide flexibility for either full-time study or part-time study, the latter of which can be undertaken outside normal office hours to allow for concurrent employment.

Five Taught Postgraduate Programmes

Master of Science in Building Services Engineering (Programme Code: 33084)

Master of Science in Facility Management (Programme Code: 33085)

Master of Science in Fire and Safety Engineering (Programme Code: 33086)

Master of Science in High Performance Buildings (Programme Code: 33087)

Master of Science in Sustainable Urban Development (Programme Code: 33088)



General Entrance Requirements

For admission to a Doctoral degree programme, you must possess a Master's degree. As for the Master's degree or Postgraduate Diploma, the basic requirement is a Bachelor's degree from an institution that is recognised by PolyU. In addition, you must meet the entrance requirements that are specified by individual programmes. PolyU may accept equivalent qualifications. The decision is made on an individual basis.

Prospective applications can obtain application materials and submit applications via the Study@PolyU website at <https://www51.polyu.edu.hk/eprospectus/>.

English Language Requirement

If you are not a native speaker of English, or your Bachelor's degree or equivalent qualification is awarded by institutions where the medium of instruction is not English, you are expected to fulfil the following minimum English language requirement for admission purpose, unless otherwise specified by individual programmes concerned:

- A Test of English as a Foreign Language (TOEFL) score of 80 for the Internet-based test, or 550 for the paper-based test; OR
- An overall Band Score of at least 6 in the International English Language Testing System (IELTS)

Our Laboratories

A full range of facilities and equipment are available in the Department of Building Environment and Energy Engineering (BEEE) to support teaching, research and high-level consultancy work. The specialist laboratories include:

- ◆ Acoustics Lab
- ◆ Built Environment Simulation Lab
- ◆ Colour and Illumination Lab
- ◆ Design & Development Centre
- ◆ Electrical Services Lab
- ◆ Fire Engineering Lab
- ◆ Heating, Ventilation Air-Conditioning and Refrigeration (HVACR) Lab
- ◆ Indoor Air Quality (Bioaerosal) Lab
- ◆ Intelligent Building (IB) Lab
- ◆ Indoor Environment Quality (IEQ) Lab
- ◆ Lighting Lab
- ◆ Lightning Physics and Protection Lab
- ◆ Low-carbon Building Technology Lab
- ◆ Multi-Function Chamber Lab
- ◆ Piped Services Lab
- ◆ Renewable Energy Lab
- ◆ Solar Simulation Lab



Student Exchange Programme

Exchanging at the partnering universities, our students could

- treasure the opportunity to enhance their Building Sciences and Engineering knowledge;
- broaden their horizons in the discipline; and
- appreciate different cultures.

15 (11%)

No. of Applications

10 (8%)

No. of Outbound Students

Annually, we receive a number of inbound international students from the Student Exchange Programme. This offers our BEEE students plenty of chances to meet people from other parts of the world to widen their international outlook during their daily university lives. Students find the Programme fascinating and very useful to their all-round development in global outlook.

Partnering universities in recent years

- USA:** Georgia Institute of Technology
Global Engineering Education Exchange (GE3)
University of Central Florida
University of Cincinnati
University of Maryland at College Park
- UK:** The University of Leeds
- Australia:** Queensland University of Technology
Royal Melbourne Institute of Technology
Swinburne University of Technology
University of New South Wales
University of Technology Sydney

- Finland:** South-Eastern Finland University of Applied Sciences
- Sweden:** KTH Royal Institute of Technology in Stockholm
Mälardalen University
- The Netherlands:** Hanze University of Applied Sciences Groningen
NHTV Breda University of Applied Sciences
- Singapore:** National University of Singapore
- Russia:** Peter the Great St. Petersburg Polytechnic University
- Taiwan:** National Cheng Kung University
- China:** Tongji University
Tsinghua University

Our Students' Sharing

WANG Siyan

Georgia Institute of Technology, USA

I think the exchange experience helped me to grow open-minded, confident and embrace diversity, or in a modern way, to train my global competences. I experienced wonderful international friendship with my fellow program members from other universities and diverse races, and though we have different backgrounds in culture and ways of thinking, we learnt to be more considerate and got closer to each other gradually. Besides, encouraging differing viewpoints among a team can inspire the project and create important breakthroughs, in an aspect of teamwork in one's career life. Also, I find the professors are helpful and welcoming. Whenever I had a problem with the coursework, they would break it down with patient explanation.

NG Sze Chit, Michael

Tsinghua University, China

It was a memorable experience to join the exchange programme to Tsinghua University, one of the topmost Universities in China. Joining the exchange programme to this University gave me a platform to have a close relationship with the local classmates who helped broaden both my academic knowledge and horizons. Besides the local students, I had also made friends with other overseas students, who brought me a different view of the world.



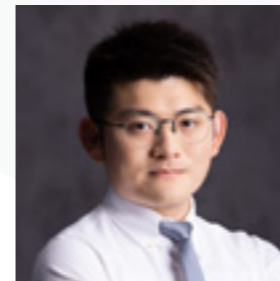
Messages from Our Graduates



Mr WAN Cheung Chun

2020 Graduate, BEng (Hons) in BSE with 1st Class Honours

The BEEE Department offers lots of technical and financial support for students. The programme provides numerous opportunities for summer internships and scholarships, which promote students' well-rounded development and exploration. The skills and technical knowledge I acquired at PolyU are invaluable, reflecting the University's motto: "To learn and to apply, for the benefit of mankind."



Mr LAW Tin Chung

2020 Graduate, BEng (Hons) in BSE with 1st Class Honours

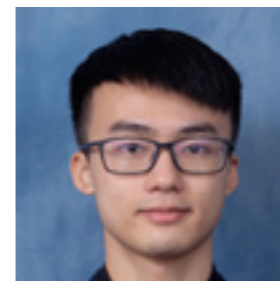
Studying at PolyU exceeded my expectations. During my 4 years at PolyU, I acquired knowledge not only of mainstream building services systems, but also of new technologies, particularly renewable energies. I had the chance not only to acquire knowledge and skills, but also to explore the latest Nordic technologies through an exchange programme in Finland. This programme enabled me to develop a global outlook and deepen my knowledge of building sciences and engineering.



梁健婷同學

2021年畢業生, 屋宇設備工程學(榮譽)工學士

廣泛及實用的課程內容讓我學習到專業知識及技能, 暑假的實習機會令我確定自己的方向和目標, 為未來投身工作作好準備。此外, 到澳洲新南威爾斯大學的海外交流讓我體驗外國的生活並豐富了我的閱歷。老師們非常友善和有耐心, 樂於解答疑問, 也就我們升學及就業問題上提供不少輔導及協助。



Mr LI Ming (Mainland student)

2021 Graduate, BEng (Hons) in BSE with 1st Class Honours

During the four-year programme, there were plenty of opportunities for me to participate in extra-curricular activities, join an international exchange programme, conduct an internship, receive various scholarships, and develop my research interest. The opportunities had encouraged me to excel myself and constantly strive for excellence. I am grateful for the opportunities and support offered by the department, and I truly appreciate the journey at PolyU.



Miss ALDAN Gulzhan (International student – Kazakhstan)

2022 Graduate, BEng (Hons) in BSE with 1st Class Honours

Building sciences and engineering is exceptionally important to the sustainable development of the construction industry. As cities around the globe become more densely populated, the demand for high-rise buildings with good building performance is increasing dramatically. I enjoy studying BSE at PolyU because I value the holistic teaching approach the course adopts. The professors are responsive and welcoming in helping students to acquire and accumulate professional knowledge.



Enquiries on Application and Admission



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