



THE HONG KONG  
POLYTECHNIC UNIVERSITY  
香港理工大學



Department of  
Building Environment and Energy Engineering  
建築環境及能源工程學系

## Department of Building Environment and Energy Engineering

### *Our Mission*

*To imagine,  
engineer and promote sustainable,  
salutogenic and safe environments for human habitation*

### *General Enquiries*

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# Introduction to BEEE

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. It is also uniquely placed as a leading Department offering academic programmes focused on Building Sciences and Engineering in the World in terms of teaching and research. 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.

## Learning In BEEE

BEEE provides education and training to our students to exploit the 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 Academic Programmes

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

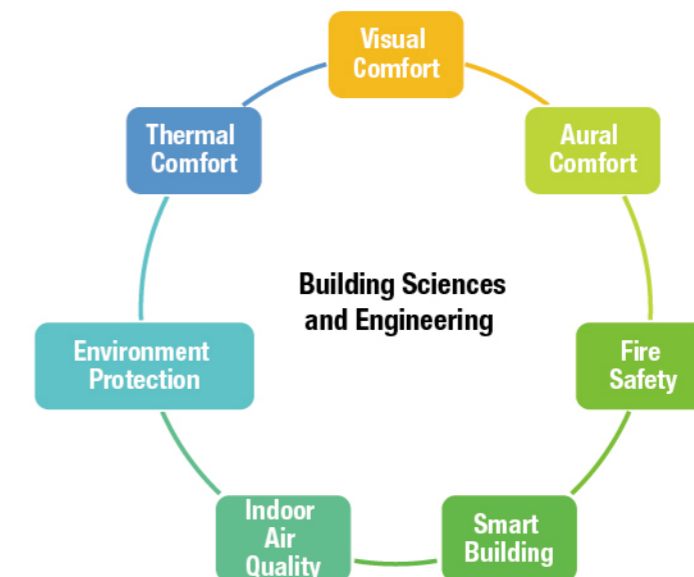
## Our Programmes Offer

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

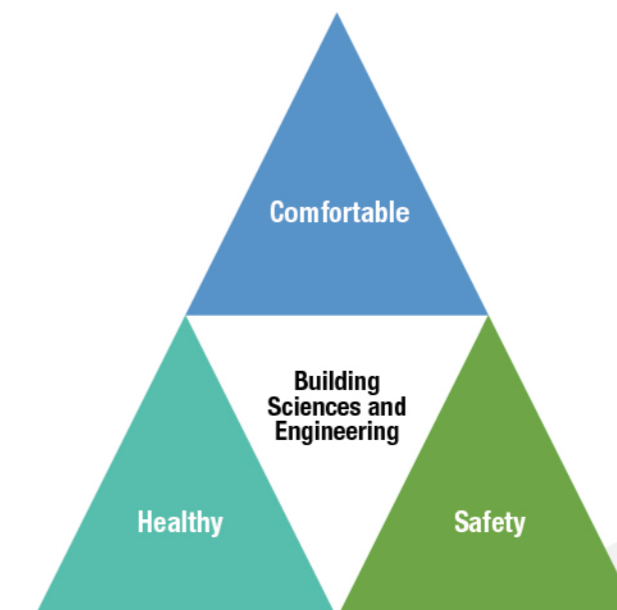


# What is Building Sciences and Engineering (BSE)?

**Building Sciences and Engineering (BSE)** is a professional engineering discipline dedicated to facilitate comfortable, efficient and safe indoor environments whilst minimizing the environmental impact of buildings. It is the art and science of designing, operating and optimizing the engineering systems in buildings.



**BSE** 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.



# Bachelor of Engineering (Honours) 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

Programme Code : JS3110



For more information

The Scheme comprises the following awards:

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

### Programme Aims & Learning Outcomes

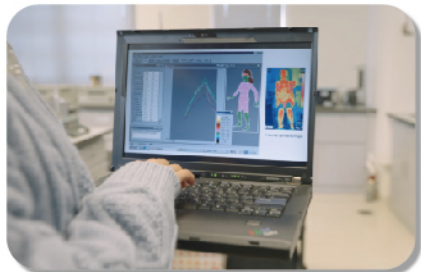
We nurture graduates with the technical and academic competence needed to excel in building sciences and engineering/building services engineering.

This programme meets the demand for locally trained building/building services engineers with expertise in the fields of consultancy, contracting, building management, and research and development.

Our graduates also 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.



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.



Opportunities to work in teams, lead small projects, work independently and interact with highly qualified and professional staff.



Opportunities to **exchange** in the United States, Europe, Australia, Russia, Southeast Asia, or the Chinese mainland for a semester.



Opportunities to local and offshore **summer placement**.



Opportunities to progress to **MSc / MEng level and beyond**.



Opportunities to be awarded **scholarships** offered by professional bodies and major organisations in Hong Kong.

### 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\*.

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

\* Upon completion of specific elective subjects. The Discipline matching for the HKIE Scheme A training of the programme for 2023 intake onwards is subject to approval.

### Career Prospects

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.

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.

### Curriculum

**Students begin by**, learning the fundamentals of indoor built environments, building information modelling and programming, data science, architecture and buildings, thermalscience, 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.

### Entrance Requirements and Subject Weightings

- Satisfy the University's General Entrance Requirements.
- There is no compulsory subject requirement. Preferred subject(s) with the highest weighting for admission score calculation include(s):
  - English Language
  - Mathematics
  - Physics
  - Combined Science: Biology + Physics
  - Combined Science: Physics + Chemistry
- Relevant Applied Learning subject(s) that can be considered for meeting the University entrance requirement and admission score calculation is/are:
  - Building Facilities Engineering
  - Environmental Engineering

## Secondary Major

### • Introduction

A Secondary Major features an expanded area of studies in addition to an existing Major, forming an additional award option of "Your Major (Block X) plus a Secondary Major". Admission to the Second Major is on a competitive basis and subject to a different credit requirement for graduation. Students are expected to complete their Major (Block X) plus a Secondary Major within the normal duration of the Primary Major. The option of a Secondary Major in **Innovation and Entrepreneurship (IE)** or in **Artificial Intelligence and Data Analytics (AIDA)** is available to the students of BEng (Hons) in Building Sciences and Engineering.

### • Why are AIDA and IE important to me?

Given the emergence of Industry 4.0 as a key trend that is shaping the future, you not only need to gain solid academic knowledge, but also master the skills on innovation and technology and possess an entrepreneurial spirit in order to be highly competitive in the contemporary society.

### • Upon completion of the Secondary Major, students are expected to be able to:

AIDA	✓ Skilled with AI computational thinking and data analytics acumen
	✓ Make use of AIDA techniques to solve contemporary problems
IE	✓ Critically assess business environments
	✓ Understand the implications of the latest technologies to support entrepreneurship and innovation

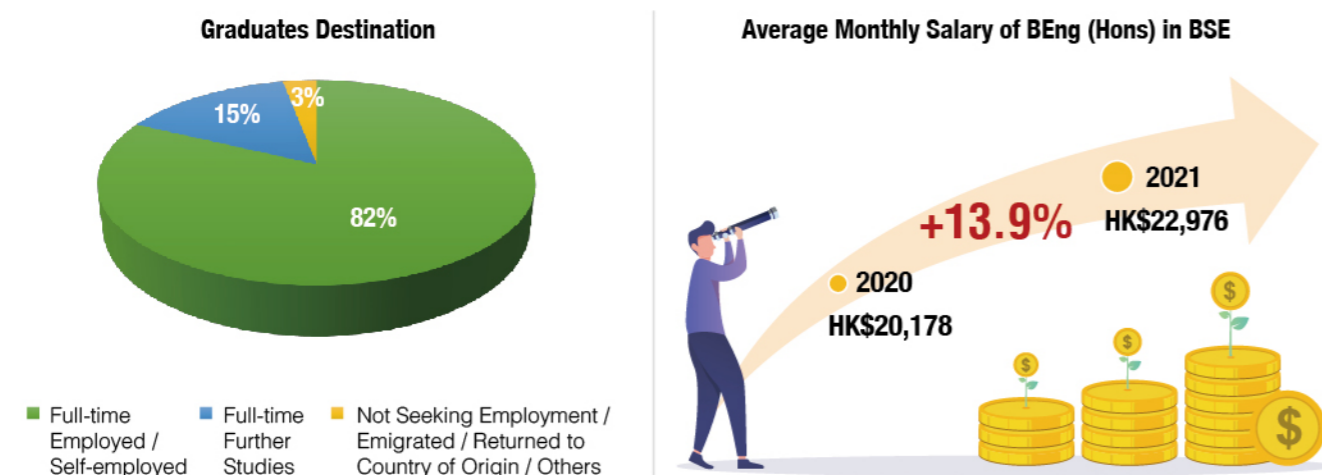
### • To learn more about AIDA and IE, watch the Introduction video now!



## The Programme in Numbers

- **1<sup>st</sup>** BEEE undergraduate programme in Hong Kong;
- **15<sup>th</sup>** in Architecture and Built Environment QS World University Ranking by Subject 2022;
- **192** internship partners to programme summer trainings; and
- **Countless** BEng alumni to become the strongest industry network.

## Graduate Employment Statistics 2021



# Master of Engineering in Building Services Engineering

## 屋宇設備工程學工學碩士學位

Programme Code : 33082



For more information

## Programme Aims

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 the BEng (Hons) in Building Sciences and Engineering (formerly known as the BEng (Hons) in Building Services 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 (formerly known as the BEng (Hons) in Building Services 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

This programme is accredited by the Chartered Institution of Building Services Engineers (CIBSE) as suitable further learning to meet the academic requirement for CEng registration.

## Entrance Requirements

Graduating students from BEng programmes in 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.



# Master of Science in Building Services Engineering

屋宇設備工程學理學碩士學位

Programme Code : 33084



For more information

## Programme Aims

- To position PolyU as the primary provider of high level building services engineering education, training, research and consultancy services in both private and public sectors in Hong Kong and the Pearl River Delta;
- To continue to meet the market demand for professional education and training in the field of building services engineering on the basis of continuous research and development and to maintain strong links with industry and professional institutions in Hong Kong and around the world;
- To enhance the specialist skills of graduates and professionals in the building services engineering sector, and to meet the need for locally-trained professionals and innovative building services engineers in consultancy, contracting, building management, research and development; and
- To facilitate students' development for leadership roles in the building services engineering profession.

## Characteristics

The multidisciplinary nature of this programme not only offers students advanced knowledge in their specialist areas, but also expands their perspective of the broader field of building services engineering. Students can take a combination of subjects to suit their careers and specialism developments, and they can also choose an appropriate dissertation project.

## Recognition & Prospects

This programme is accredited by the Chartered Institution of Building Services Engineers (CIBSE) as suitable further learning to meet the academic requirement for CEng registration.

## Entrance Requirements

- A Bachelor's degree with Honours in building services engineering, mechanical or electrical engineering, or the equivalent;

OR

A professional qualification, e.g. full membership of the HKIE or the CIBSE, plus work experience in any branch of building services engineering, such as design and consulting, contracting, building operation and maintenance, property development and management or research.

- Evidence of an employer's support or sponsorship is advantageous, and relevant work experience in a building services engineering-related role is preferred.



# Master of Science in Facility Management

設施管理理學碩士學位

Programme Code : 33085



For more information

## Programme Aims

Facility management has developed rapidly over the past few decades, initially in North America and the UK, and more recently in Europe, Australia and Asia. The development of facility management education and training has been driven primarily by demand at the postgraduate level, drawing from a broad base of existing professional disciplines ranging from those involved with engineering-based building services to those related to property management and space planning. Facility management as a discipline is grounded in the field of management, with a clear understanding of the nature and demands of an organisation's core business requirements.

The role of the facility manager is increasingly recognised as critical in supporting the realisation of business plans through the careful alignment of an organisation's physical asset with the appropriate sourcing of facility support services. To be effective, a facility manager must have broad knowledge of all of the elements that affect the efficient performance of buildings, appropriate policies, management processes and the people who work in them.

## Characteristics

This programme is structured with a view to achieving a balance between theory and practice:

- To provide facility management professionals with opportunities to critically review and update their knowledge and skills in the management of people, property and technology;
- To integrate facility management practice with the efficient and effective management of business resources;
- To apply innovative methods and procedures in the practice of facility management; and
- To bring into focus and develop appropriate action plans for the managers and operators of facilities to deal with workplace issues in a dynamic business environment.

## Recognition & Prospects

This programme is recognised by the Royal Institution of Chartered Surveyors (RICS) and accredited by the Chartered Institution of Building Services Engineers (CIBSE) as suitable further learning to meet the academic requirement for CEng registration.

The professional accreditation of the programme by the Hong Kong Institute of Facility Management (HKIFM) is subject to approval.

## Entrance Requirements

- A Bachelor's degree with Honours in architecture, interior design, construction, building surveying, estate management, property/facility management, building services engineering, business or the equivalent;

OR

A professional qualification, plus relevant professional experience that is related to the building industry or property/facility management, e.g. full membership of the HKIE, HKIS, HKIA, CIBSE, CIOB, RICS, CIH or HKIFM.

- Candidates who have substantial experience in facility management-related areas, but who lack formal academic qualifications, may be admitted to the programme subject to an interview and/or a review of their experience. In considering such candidates, PolyU will decide whether their experience can be deemed equivalent to an Honours degree awarded by a recognised university.

# Master of Science in Fire and Safety Engineering

消防及安全工程學理學碩士學位

Programme Code : 33086



For more information

## Programme Aims

We enhance the professional knowledge and skills of students in fire and safety engineering, and develop their learning attitudes, study skills and intellectual and imaginative powers. This programme concentrates on fundamental analysis and development of fire and safety science and engineering concepts. It also advances quality teaching in the new topic of engineering performance-based fire codes. In safety engineering, the focus is on improving the safety of buildings. Accident prevention, hazard assessment, risk analysis, safety management and auditing, and safety in construction sites are also covered. The programme caters not only for graduates and professionals in building services engineering, fire and safety engineering, but also for those in the broader industries of construction, architecture, surveying and applied sciences.

## Characteristics

We offer in-depth knowledge of fire and safety engineering. Students take subjects that are related to general building services engineering practices and come to appreciate how fire and safety designs are integrated into buildings. This programme also helps students to develop research techniques and critical thinking skills.

## Recognition & Prospects

This programme is accredited by the Chartered Institution of Building Services Engineers (CIBSE) as suitable further learning to meet the academic requirement for CEng registration.

## Entrance Requirements

A Bachelor's degree with Honours in fire engineering, safety engineering, building services engineering, building sciences and engineering, construction, architecture, building surveying, building technology, applied science, engineering, physics or chemistry; or the equivalent (including recognised professional qualifications).



# Master of Science in High Performance Buildings

高效能建築理學碩士學位

Programme Code : 33087



For more information

## Programme Aims

The mission of the High Performance Buildings (HPB) programme is to engage in education and research for the advancement of high performance buildings. In particular, the HPB programme provides an opportunity for students to broaden and deepen their knowledge on assessment of High Performance Buildings, which impose minimal impacts on global carbon footprints (global impacts), and facilitate optimised performance of building systems (building impacts), as well as the best indoor environments for the health and well-being of occupants.

To fulfil this mission, the High Performance Buildings programme adopts an interdisciplinary approach by linking sustainable development and high-rise building construction together with socio-economic development, focusing on climate changes, carbon footprint assessment, building services system management and optimisation, and indoor environmental quality evaluation. It is designed to cut across traditional boundaries of management, engineering and environmental sciences to take a broad view of sustainability issues. Integrating knowledge of high performance buildings and urban construction, this programme provides the most up-to-date knowledge based upon contemporary research findings.

## Characteristics

The multidisciplinary nature of the programme not only offers students advanced knowledge in their specialist areas, but also expands their perspective of the broader field of building services engineering. Students can take a combination of subjects to suit their careers, and can also choose an appropriate dissertation project.

## Recognition & Prospects

This programme is recognised by the Royal Institution of Chartered Surveyors (RICS) and accredited by the Chartered Institution of Building Services Engineers (CIBSE) as suitable further learning to meet the academic requirement for CEng registration.

## Entrance Requirements

A Bachelor's Degree with Honours relevant to architecture, construction and real estate industry, or the equivalent (including recognised professional qualifications).



# Master of Science in Sustainable Urban Development

可持續城市發展學理學碩士學位

Programme Code : 33088



For more information

## Programme Aims

This postgraduate programme is designed to cut across the traditional boundaries among management, surveying, engineering and environmental sciences to take a broad view of the subject. The primary aim of this programme is to provide an opportunity for students to broaden and deepen their knowledge of sustainable urban development.

## Characteristics

This programme provides up-to-date knowledge in sustainable urban development based on contemporary research findings. It is suitable for local, Chinese mainland and international planners, surveyors, environmental practitioners, consultancy professionals, engineers, government officers, business managers and graduates from relevant courses.

## Recognition & Prospects

The programme has been accredited by the Royal Institution of Chartered Surveyors (RICS).

## Entrance Requirements

A Bachelor's degree with Honours relevant to construction, real estate, urban planning, architecture, environmental science or equivalent qualifications (including recognised professional qualifications).



## BEEE Laboratories

The Department specialist teaching space, comprising laboratories and design office facilities, occupy around 1300 m<sup>2</sup>. A full range of facilities and equipment are available to support undergraduate and postgraduate teaching programmes, specialist courses, research and consultancy work.



Acoustics Lab



Built Environment Simulation Laboratory



Colour and Illumination Laboratory

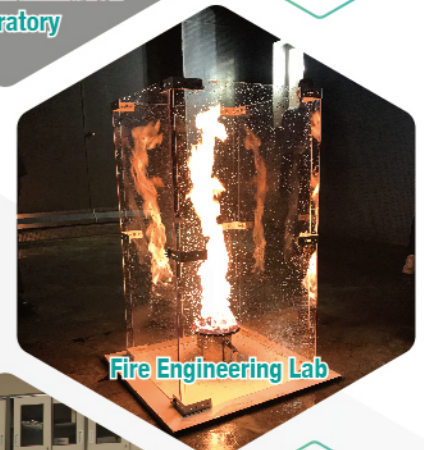
Indoor Air Quality (Bioaerosol) Lab



Design & Development Centre



Electrical Services Lab



Fire Engineering Lab



Heating, Ventilation Air-Conditioning and Refrigeration (HVACR) Lab

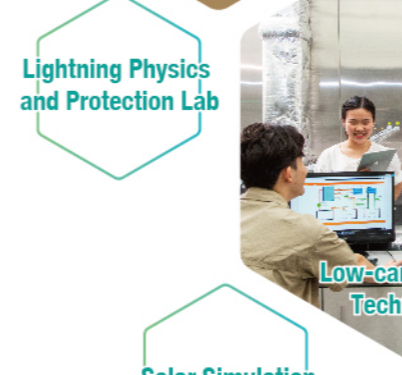


Intelligent Building (IB) Lab



Indoor Environment Quality (IEQ) Lab

Multi-Function Chamber Lab



Lighting Physics and Protection Lab



Low-carbon Building Technology Lab



Piped Services Lab



Lighting Lab

Solar Simulation Lab

Renewable Energy Lab

# Student Exchange Programme

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.

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.

## Statistics 2021

No. of Applications: 15 (11%)

No. of Outbound Students: 10 (8%)

## 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

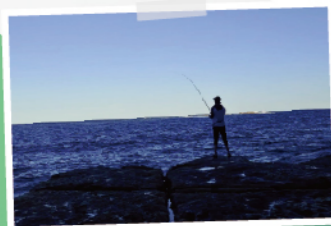
- Peter the Great St. Petersburg Polytechnic University

### Taiwan

- National Cheng Kung University

### China

- Tongji University
- Tsinghua University



**LEUNG Jin Hei**  
University of Technology Sydney,  
Australia



**WANG Siyan**  
Georgia Institute of Technology, USA  
"I experienced wonderful international friendship with my fellow program members from other universities and diverse races."



**LAM Ying Tung**  
The University of Leeds, UK



**LI Ming**  
National University of Singapore, Singapore

"It is my pleasure to meet so many nice people overseas, to build connections and to be enlightened. There is no doubt that the exchange experience will be one of the remarkable highlights in my university life."



**CHAN Chiu**  
Hanze University of Applied Sciences  
Groningen, Netherlands



**LEE Yun Ping**  
Tsinghua University, China



**WONG Xiao Jun**  
South-Eastern Finland University  
of Applied Sciences, Finland



**TAM Man Hin**  
KTH Royal Institute of Technology  
in Stockholm, Sweden

# Messages from BEEE Graduates



Find out more sharing  
by BEEE students here!

## Gulzhan ALDAN (International student – Kazakhstan)

2022 Graduate, BEng (Hons) in Building Services Engineering with 1st Class Honours

In addition to the well-thought-out academic program that equips future engineers with up-to-date knowledge and necessary practical skills, BEEE offers a lot of opportunities where the students can explore themselves outside the classroom. In these four years, I had a chance to become a committee member in professional bodies, attend an overseas technical study tour, engage in undergraduate research as well as win several scholarships. These experiences allowed me to become more informed about the industry, meet people who share similar professional interests as me and develop my future career path.



CIBSE Hong Kong Region  
Student Awards 2020-2021



Malaysia Technical  
Study Tour 2019

## CHEUNG Wai Kit

2022 Graduate, BEng (Hons) in Building Services Engineering with 1st Class Honours

PolyU offers me many opportunities to pursue my career goals. I learnt more about the building services industry during the WIE programme. The capstone research project not only enhanced my problem solving, self-learning and research skills, but also stimulated my interest in the selected division. After graduation, I will pursue postgraduate study at PolyU to further enhance my fire safety knowledge and competitiveness.



Conducting experiment  
in Fire Engineering  
Laboratory

Internship at WSP



## 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。



Participated in the  
Student Exchange Programme at  
University of New South Wales, Australia



## LI Ming (Mainland student)

2021 Graduate, BEng (Hons) in Building Services Engineering 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.

