



Department of Electrical and Electronic Engineering

Bachelor of Engineering (Honours) / Bachelor of Science (Honours) Scheme in Information and Artificial Intelligence Engineering

資訊及人工智能工程學(榮譽)工學士 /

理學士組合課程 JUPAS code: JS3180

 Bachelor of Engineering (Honours) in Electronic Systems and Internet-of-Things 電子系統及物聯網(榮譽)工學士

- Bachelor of Science (Honours) in Artificial Intelligence and Information Engineering 人工智能及資訊工程學(榮譽)理學士
- Bachelor of Science (Honours) in Information Security 資訊安全(榮譽)理學士

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BEng(Hons) / BSc(Hons) Scheme in Information and Artificial Intelligence Engineering 資訊及人工智能工程學(榮譽)工學士 / 理學士組合課程

We are living in a smart era in which many of our daily decision-making processes are based on the collection, processing, analysis, and interpretation of a large amount of **data and information**. The availability of Internet-of-Things technologies **enables us to collect virtually any data that are useful to our decision making** from virtually anywhere, while artificial intelligence and information engineering **provide the powerful computational tools for analysing the collected data intelligently** and efficiently to provide us with firmly grounded rationale for decision making. To take advantage of these technologies, various hardware and software systems are required to be closely interconnected through very complex information networks, thus posing security risks when a massive amount of data and information flows through these networks. It is therefore vitally important to **protect and safeguard them against**

various forms of cyber attack. The Scheme encompasses the following three programmes that are aimed at training professionals who are interested to work in the three closely related and mutually supporting technological areas mentioned above. Depending on their own areas of interest, students admitted into the Scheme are allowed to choose to specialize in one of these three areas.

- BEng(Hons) in Electronic Systems and Internet-of-Things 電子系統及物聯網(榮譽)工學士
- BSc(Hons) in Artificial Intelligence and Information Engineering 人工智能及資訊工程學(榮譽)理學士
- BSc(Hons) in Information Security 資訊安全(榮譽)理學士

Students admitted to the Bachelor of Engineering (Honours)/ Bachelor of Science (Honours) Scheme in Information and Artificial Intelligence Engineering study together during the first year and then complete their preferred programme (one of the above three programmes), normally within three years. Under this arrangement, students can make their choice of study after they have obtained a better understanding of the programmes. To expand area of studies, the option of Secondary Major in Artificial Intelligence and Data Analytics is available to the students of BEng(Hons) in Internet-of-Things (a variant of BEng(Hons) in Electronic Systems and Internet-of-Things).

A main feature of our programmes is their **application-oriented** curricula. They enable students to have a wide exposure to the relevant fields of study through hands-on experience, active participation, linkage to real-life scenarios and applications, and effective and meaningful learning and teaching activities.

BEng(Hons) in Electronic Systems and Internet-of-Things 電子系統及物聯網 (榮譽)工學士

Programme Aims

Electronic Systems and Internet-of-Things (IoT) are among the key technologies that play important roles in modern-day living. Various sectors, including business, commerce, communication, education, entertainment, healthcare and transportation, require Electronic Systems and IoT for efficient operation. Thus, it is envisioned that there is a great need of professionals who exercise knowledge and leadership in the areas of Electronic Systems and IoT, as well as generic skills of problem solving, innovation, analysis and adaptability to contribute to the technological and economic development in the region and in the world.

In particular, IoT is a fast-developing field throughout the world. According to Fortune Business Insights, the global IoT market was valued at US\$190 billion in 2018 and is projected to reach US\$1,102.6 billion by 2026. However, Immersat Research finds that around 47% of organisations surveyed do not possess sufficient IoT skills and are outsourcing such work. Gartner Research predicts that around 75 % of IoT projects may take twice as long as they should because of the shortage of IoT talent. In 2020, the Government of the Hong Kong Special Administrative Region published the Hong Kong Smart City Blueprint 2.0, in which the Government put forward over 130 initiatives, many of them related to IoT. This Programme aims at training IoT professionals who will meet Hong Kong's pressing manpower need in the emerging IoT area.

Career Choices

Due to the flourishing of Internet applications, cloud computing, mobile communications, smart wearable devices, and social networking in recent years, graduates from this programme is expected to be trained as IoT professionals who will meet the pressing manpower need of Hong Kong in the emerging IoT area. Students will acquire the necessary professional skills that enable them to contribute to the IoT development in Hong Kong and overseas by participating in various IoT projects in both public sectors and private companies. There are ample career choices in areas such as:

internet programming

mobile communication

• power electronics

telecommunications

multimedia signal processing

software design and development

- apps programming
- computers
- electronic circuit design
- embedded systems
- information engineering
- integrated circuit (IC) design

Professional Recognition

Full accreditation from the Hong Kong Institution of Engineers (HKIE) for the programme will be sought.

Curriculum

The programme curriculum has integrated the following elements which will develop students' hands-on experience and further broaden their professional development:

- theory and fundamental knowledge
- projects
- practical training
- internship
- minor programme with extra elective subjects



BSc(Hons) in Artificial Intelligence and Information Engineering 人工智能及資訊工程學(榮譽)理學士

Programme Aims

Artificial Intelligence and Information engineering encompass vital technologies that support worldwide economic growth. With the increasing popularity of and technological advancement of artificial intelligence, products and services embedded with intelligent features are in great demand. It is envisioned that there is a great need for professionals who possess professional knowledge and skills relevant to information engineering and artificial intelligence, with a particular focus on machine perception and data science; as well as generic skills of problem-solving, creativity, innovation and adaptability to changing technology and society.

In 2020, LinkedIn publishes a report that ranks 15 emerging jobs; among them, AI is ranked the top. Demands on AI talents indeed spread across a wide range of industries, and the market for highly skilled AI workers is outpacing the supply. As published in Hong Kong Economic Journal in 2020, the sales value of AI business worthwhile was expected to be around US\$60 million in 2021 and steadily rise to US\$110 million in 2024, which is an average of 20% annual growth. Such growth obviously will introduce a big demand for talent in the area. This Programme aims at training professionals in this emerging area to fulfill the needs of society.

Curriculum

The programme curriculum has the following features which will develop students' hands-on experience and further broaden their professional development:

BSc(Hons) in Information Security 資訊安全(榮譽)理學士

Programme Aims

The recent advance in information and communication technologies (ICT) has brought people great convenience in their daily life. Information has become one of the most valuable assets to any country and any business which requires careful protection. To protect data security and privacy and to safeguard against the risk of potentially devastating security attacks and misuses have thus become a vital concern to all countries and organizations. With the cross-border, open-platform, highly-interconnected nature of the cyberworld, the impacts of security attacks and misuses are far-reaching, and would require integral effort from all parties involved in order to effectively combat these attacks.

In Hong Kong, since the pace of globalization continues to accelerate, supported by domestic consumption as well as the *Mainland and Hong Kong Closer Economic Partnership Arrangement (CEPA)*, the manpower requirement in ICT will follow a growing trend in the long run. However, the further transition to knowledge society and the shifting of the ICT sector towards Cloud Computing and mobile communications requires ICT employees to acquire new skills and knowledge particularly in the area of information security. There is a need to launch relevant degree programmes to satisfy the urgent needs of the society. This programme will thus cover both large-scale and small-scale information security issues which are

facing by individuals, organizations, and the society, and provide the necessary training to students so that they will be capable of preventing security threats and solving security problems in different settings.



- integration of both theory and applications
- Al technologies with engineering applications
- emphasis on engineering mind for problem solving via software development
- projects
- practical training
- Work-Integrated Education (WIE)
- minor programme with extra elective subjects

Career Choices

Information engineering encompasses vital technologies that support worldwide economic growth. With the increasing popularity and technological advancement of artificial intelligence, products and services with intelligent features are in great demand, and new models and apps are being developed every day. Upon graduation, students will acquire sufficient knowledge to commence careers in the following areas:

- Smart mobile communications services
- Software / Mobile apps developments
- Internet-related business
- Cloud Technologies and Data Analytics
- Data centres
- Al and Machine Learning

Professional Recognition

Full accreditation from the Hong Kong Institution of Engineers (HKIE) for the programme will be sought.

Curriculum

The curriculum includes the following major subject areas:

- Authentication Systems
- Cryptography
- Penetration Testing
- Security Architecture and Design
- Software Development Security
- Telecommunications and Network Security

Career Prospects

The field of ICT offers enormous opportunities in Hong Kong and worldwide, particularly in information security. Corporations recruit ICT professionals to support their businesses by deploying new technologies. Further transition toward a knowledge society and the shifting of the ICT sector toward Cloud Computing and mobile communications will require ICT employees to acquire new skills and knowledge, particularly in the area of information security. Graduates of the information security discipline can expect very promising career prospects both locally and globally.

- Information and Communication Technologies (ICT)
- Cloud Computing
- Mobile Communications
- Software/Application Development
- Data/Database Management
- Security Service / Operation
- Security Audit and Penetration Test
- IT Auditors

Professional Recognition

Full accreditation from the Hong Kong Institution of Engineers (HKIE) for the programme will be sought.

Excellent Job Prospects

Currently, opportunities in the relevant fields of electronic and information engineering are enormous in Hong Kong and worldwide. Corporations have been recruiting engineering and ICT graduates in order to support their business by deploying new technologies and developing innovative products and services. Our graduates are welcomed by many employers due to their good professional skills and all-rounded abilities.

Career Paths of our Graduates

Our graduates are employed in different sectors, including the government, public utilities and private corporations. Their working areas and typical job titles include:

Professional Working Areas

- Apps and games development
- Internet-related business and services
- Electronics
- Telecommunication
- **Typical Job Titles**
- Application Analysts
- Mobile System Developers
- IT Professionals

- Software
- Information Security • Digital entertainment

- - - Information Security Officers
- Our graduates are very well-received by employers, and many of them are employed by renowned organizations and corporations in recent years, such as:
- Apple Inc.
- IBM
- Hong Kong Applied Science and Technology Research Institute (ASTRI)
- Huawei

• HSBC

- HKSAR Government (e.g. OGCIO, EMSD) Microsoft • MTR
- China Mobile
 - PCCW/HKT
 - Solomon Systech

• Artificial Intelligence

Engineering

• Design Engineers

Programmers

Mobile communication and services

Why PolyU EEE?

Professionally-accredited Programmes

· All existing undergraduate degree programmes have been granted full accreditation from The Hong Kong Institution of Engineers (HKIE). The three programmes under the Scheme will also seek full accreditation from the HKIE

Balanced, Energetic and Fruitful Study Life

• Multifarious intra- and extra-curricular activities to enrich students' learning experience, such as Student Exchange Programme, One-year Internship Scheme, Overseas Service Learning, Work-Integrated Education, Study Tours, Microcontroller Application Design Contest, Integrated Project and Dragon Boat Team, etc.

World-class Professors

 50+ academic staff members are IEEE/OSA Members/Senior Members/Fellows, IET/HKIE Corporate Members/Fellows, Chartered Engineers and/or other professions in Engineering

Strong Alumni Network

• Out of our 10,000+ EEE alumni, many of them are working in ICT-related fields at senior managerial positions like CEO, Chairman, Managing Director, Vice President, General Manager in corporations such as China Mobile, Cyberport, Deloitte (HK), HKT, Kolinker Group, Li & Fung Ltd., Solomon Systech, Sony (HK), etc.

Innovative Research with Impact

 Produce cutting-edge research output which has significant impact on society. Recent research breakthroughs include the achievement of the world's fastest optical communications speed for data centre, the application of specialty optical fibers in vital signs monitoring, etc.

Superb Teaching and Learning Facilities

• From the state-of-the-art facilities at EEE laboratories to a wide range of complementary facilities and services in PolyU campus

International Collaboration

PolyU has 280+ student exchange partners and collaborators, including Yale University, USA, University of Cambridge, UK, McGill University, Canada, etc.

Application-oriented Curricula

• Enable students to have a wide exposure to the relevant fields of study through hands-on experience, active participation, linkage to real-life scenarios and applications, and effective and meaningful learning and teaching activities



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