THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

Department of
Electrical and Electronic Engineering
電機及電子工程學系

BEng (Hons) Degree Programme in Electronic and Information Engineering

Code: 46402; Full-time, Credit-based

Study Planner

Introduction

This small booklet is designed to help you as a student of the *BEng(Hons) in Electronic and Information Engineering* (46402) to plan your 4-year study or 2-year study (for senior intake) so that you can:

(i) identify your educational goal,

(ii) select the subjects you like best, and

(iii) prepare yourself sufficiently for your chosen career pathway and future professional development.

This booklet should be read together with the programme document of the *BEng(Hons) in Electronic and Information Engineering* (46402).

Road to Professional Development

The programme you are currently enrolled in is *BEng(Hons) in Electronic and Information Engineering*. Our programme is designed to equip you with the necessary skills and up-to-date knowledge in areas of Information and Communication Technology (ICT). It is *accredited* by the Hong Kong Institution of Engineers (HKIE) (www.hkie.org.hk). On graduation, you will obtain the award "BEng(Hons) Degree in Electronic and Information Engineering" and you will also satisfy the education requirement of the HKIE for the full membership. With suitable training and working experience obtained, you may apply for full membership of HKIE. Hence by studying this programme, you are already on the road to the professional development of the ICT profession.

Subjects in the Programme

Engineering is a vast and rapidly changing field, so is the field of ICT. To provide students with sufficient opportunity to acquire a sound foundation and to specialize in a particular area, our programme is designed with compulsory and elective subjects. *Compulsory* subjects are fundamental and core subjects that provide you the basis of EIE. You must study and pass all the compulsory subjects in the programme. Different students might have different interests or abilities in different areas. There are *Elective* subjects that students may choose to study in order to develop their specialization according to their own interests. The elective subjects in this programme can be categorized into different areas such as *circuits and systems*, *telecommunication and*

mobile communication, information security, information technology and multimedia. By choosing the set of elective subjects, you engage in a particular study pathway characterized as a *stream*.

Streams

A *stream* is characterized by the set of elective subjects you shall choose to study. The stream you have chosen would represent your area of specialization. You will have more competitive edge when you look for jobs in areas relevant to your stream. Hence you should decide on the stream carefully to make sure that (*i*) you are interested in the areas corresponding to that stream, (*ii*) you will master the subjects in that stream thoroughly, and (*iii*) you are prepared to pursue your future career in these areas on graduation. The followings are the streams that you may choose in this programme:

Stream Code	**Stream Title**
CS	Circuits and Systems
TMC	Telecommunication and Mobile Communication
INS	Information Security
ITM	Information Technology and Multimedia

You may find the full list of elective subjects that define these streams in Appendix I of this booklet. **You should take at least 3 EIE technical electives belonging to a stream in order to specialise in that particular stream. Subjects with credit transferred will not be counted.**

(1) Circuits and Systems Stream

Stream Specialization

By studying this stream, you will specialize in the electronic circuits and systems area. You will learn in-depth knowledge about analogue digital circuits and their modern design methods. You will also learn various applications in energy conversion and aviation. Moreover, you will study the process of designing and making Very Large Scale Integration (VLSI) ICs.

Prospect

If you have taken this stream, a career that requires application of electronic circuits skills and knowledge will be highly appropriate for you. You will also have a competitive edge in jobs calling for the knowledge of VLSI design on graduation. There are various job opportunities in this area, such as consumer electronic products design and manufacturing; integrated circuits design and fabrication. Relevant job positions include Electronic Engineer, Design Engineer, IC Design Engineer, etc. Companies that have recruited our graduates or had openings in these areas in the past include Soloman Systech, ASTRI, ASM, AML, Fujitsu, Vanguard Business Services, SAE Magnetics, IC 3E, etc. If you like to make use of your knowledge of electronic circuits to design something new and useful to solve some problems, this stream will be suitable for you.

(2) Telecommunication and Mobile Communication Stream

Stream Specialization

Nowadays, you will find telecommunication and mobile communication almost everywhere anytime. You will use your smartphone to browse the Internet through the 3G or 4G data services while travelling on the MTR or bus. You may use your notebook computer or tablet PC to connect to the Internet through the Wi-Fi connection at your school or home. Optical communication has become a very popular broadband access method in Hong Kong recently. Many households have the “Fibre-To-The-Home” facility, while the bulk of Internet data travels

from Hong Kong to foreign countries over the optical fibre network. Besides, the Internet has become an indispensable part of our daily lives due to the rapid development of technologies in platforms such as smartphones and tablets, and proliferation of services such as social networking, instant messaging, and cloud computing.

If you study this stream, you will learn the solid foundation of telecommunication and mobile communication. You will acquire solid foundation knowledge of communication, mobile networks, Internet technologies, optical communication systems and networks, wireless systems, Internet Protocol (IP) network technology, mobile computer system architecture, mobile radio communications, etc. You will be competent to take popular examinations in the network area such as the CCNA (Cisco Certified Network Association) examination.

Prospect

If you study this stream, you will have a competitive edge in job openings from mobile phone and smartphone companies, large banks, telecommunication service providers, etc. in areas related to mobile technology in iOS, Android platforms, mobile communication, optical communication, computer networks, protocols, network performance evaluation. Companies that have openings in these areas include PCCW, ASTRI, G4S International, SmarTone, HSBC, Hutchison Telecommunications (HK) Ltd., Hong Kong Jockey Club, Hong Kong Broadband Network, AML Group Holdings Ltd., New World Telecommunication Ltd., other IT service providers, etc. You will engage in jobs that require application of skills and knowledge in Local Area Networks, Wide Area Networks, Wi-Fi, RF design, broadband wireless, system planning, network planning and design.

(3) Information Security Stream

Stream Specialization

Nowadays, our cyber world is highly-interconnected. The impacts of security attacks and misuses are far-reaching. It is thus crucial to protect data security and privacy and to safeguard against the risk of potentially devastating security attacks and misuses for all countries and organizations. If you study this stream, you will be equipped with knowledge about wireless and mobile systems, network management and security, digital forensics, intrusion detection and penetration test, surveillance technologies, etc.

Prospect

If you specialise in this stream, you can pursue a career that requires fundamental knowledge and skills in network management, network security, digital forensics, intrusion detection, and surveillance technologies. Relevant job openings in these areas include IT Security Specialist, IT Security Analyst, IT Security Engineer, Cyber Security Consultant, Network Security Analyst, Information Security Officer, Information Security Engineer, etc.

(4) Information Technology and Multimedia Stream

Stream Specialization

This stream is characterized by the elective subjects such as:

- EIE3109 Mobile Systems and Application Development,
- EIE3112 Database System,
- EIE3320 Object-Oriented Design and Programming,
- EIE4100 Computer Vision and Pattern Recognition,
- EIE4105 Multimodal Human Computer Interaction Technology,
- EIE4108 Distributed Systems and Cloud Computing,
- EIE4119 Mobile Device System Architecture,
- EIE4122 Deep Learning and Deep Neural Networks,
- EIE4413 Digital Signal Processing

- EIE4228 Multimedia Communications
- EIE4432 Web Systems and Technologies,
- EIE4435 Image and Audio Processing,
- EIE515 Advanced Optical Communication Systems,
- EIE522 Pattern Recognition: Theory & Applications,
- EIE529 Digital Image Processing,
- EIE546 Video Technology,
- EIE557 Computational Intelligence and its Applications,
- EIE558 Speech Processing and Recognition,
- EIE563 Digital Audio Processing,
- EIE568 IoT – Tools and Applications
- EIE572 Information Photonics, and
- EIE573 Mobile Edge Computing

If you study for this stream, you will specialize in IT-related areas such as database, networking, cloud programming, IT management, signals and systems and related applications in multimedia.

Prospect

With the growing popularity of the Internet applications, graduates from this stream will have a competitive edge over jobs related to IT, networking, database, programming, signals and systems and related applications in multimedia. They will take up posts such as Data Analyst, IT Officer, Network Administrator, Analyst Programmer, System Engineers, etc. in companies, enterprises, banks, education institutes and government departments. They can also start their career as Multimedia Designer, Web Designer, Software Engineer, Game Designer, Engineer for Audio and Video products, Multimedia Production Officer, Programmer, and Game Designer.

Appendix 1

Streams and Constituent Subjects

Subject Code	Subject Title	CR	Category	Streams*			
				CS	TMC	INS	ITM
EIE3109	Mobile Systems and Application Development	3	ELE				X
EIE3112	Database System	3	ELE	X	X	X	X
EIE3305	Integrated Analogue and Digital Circuits	3	ELE	X			
EIE3320	Object-Oriented Design and Programming	3	ELE				X
EIE4100	Computer Vision and Pattern Recognition	3	ELE				X
EIE4102	IP Networks	3	ELE		X		
EIE4104	Mobile Networking	3	ELE		X		
EIE4105	Multimodal Human Computer Interaction Technology	3	ELE				X
EIE4106	Network Management and Security	3	ELE			X	
EIE4108	Distributed Systems and Cloud Computing	3	ELE				X
EIE4110	Introduction to VLSI and Computer-Aided Circuit Design	3	ELE	X			
EIE4113	Wireless and Mobile Systems	3	ELE			X	
EIE4114	Digital Forensics for Crime Investigation	3	ELE			X	
EIE4116	Surveillance Studies and Technologies	3	ELE			X	
EIE4118	Intrusion Detection and Penetration Test	3	ELE			X	
EIE4119	Mobile Device System Architecture	3	ELE		X		X
EIE4122	Deep Learning and Deep Neural Networks	3	ELE				X
EIE4402	Power Electronics	3	ELE	X			
EIE4413	Digital Signal Processing	3	ELE				X
EIE4428	Multimedia Communications	3	ELE		X		X
EIE4432	Web Systems and Technologies	3	ELE				X
EIE4435	Image and Audio Processing	3	ELE				X
EIE4449	Optical Communication Systems and Networks	3	ELE		X		
EIE509	Satellite Communications – Technology and Applications	3	ELE		X		
EIE511	VLSI System Design	3	ELE	X			
EIE515	Advanced Optical Communication Systems	3	ELE		X		X
EIE522	Pattern Recognition: Theory & Applications	3	ELE				X
EIE529	Digital Image Processing	3	ELE				X
EIE546	Video Technology	3	ELE				X
EIE553	Security in Data Communication	3	ELE			X	
EIE557	Computational Intelligence and its Applications	3	ELE			X	X
EIE558	Speech Processing and Recognition	3	ELE				X
EIE560	Microelectronics Processing and Techonologies	3	ELE	X			
EIE563	Digital Audio Processing	3	ELE	X			X

Subject Code	Subject Title	CR	Category	Streams*			
				CS	TMC	INS	ITM
EIE566	Wireless Communications	3	ELE		X		
EIE567	Wireless Power Transfer Technologies	3	ELE	X			
EIE568	IoT – Tools and Applications	3	ELE		X		X
EIE569	Sensor Networks	3	ELE		X		
EIE570	Deep Learning with Photonics	3	ELE	X			
EIE571	Photonic System Analysis	3	EIE	X			
EIE572	Information Photonics	3	EIE				X
EIE573	Mobile Edge Computing	3	ELE		X		X
EIE575	Vehicular Communications and Inter-Networking Technologies	3	ELE		X		
EIE577	Optoelectronic Devices	3	ELE	X			
EIE579	Advanced Telecommunication Systems	3	ELE		X		
EIE580	RF and Microwave Integrated Circuits for Communication System Applications	3	ELE	X	X		
EIE587	Channel Coding	3	ELE		X		
EIE589	Wireless Data Network	3	ELE		X		

Stream Code	Stream Title
CS	Circuits and Systems
TMC	Telecommunication and Mobile Communication
INS	Information Security
ITM	Information Technology and Multimedia

* Study at least 3 EIE technical electives belonging to a stream in order to specialise in that particular stream. Subjects with credit transferred will not be counted.