

Curriculum Information Record for a Major/Degree

Department of Electrical Engineering Effective from Semester A, 2024/2025 For Students Admitted/Changed to the Major with Catalogue Term Semester A 2023/2024 and thereafter

The information provided on this form is the official record of the major/degree. It will be used for City University’s database, various City University publications (including websites) and documentation for students and others as required.

In specifying the curriculum for a major/degree, “catalogue term” is used to determine the set of curriculum requirements that a student is following. By mapping the student record and the version of curriculum rules applicable, the graduation requirements of individual students will be evaluated accordingly. The catalogue terms of curriculum requirements that students will follow are summarized below (BUS/04/A5R):

<u>Requirements</u>	<u>Catalogue Term</u>
a) Common Requirements <ul style="list-style-type: none"> • Gateway Education • University Requirements • College/School requirement 	The same as student’s admission term
<hr/>	
b) Major <ul style="list-style-type: none"> • For normative 4-year degree students who will join the majors allocation exercise • For advanced standing students and 4-year degree students who already have a major at the time of admission • For students who have changed major 	Effective term of the declared major The same as student’s admission term Effective term of the changed major
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c) Stream	Follow the effective term of the associated major

Prepared / Last Updated by

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City University of Hong Kong

Curriculum Information Record for a Major/Degree

Department of Electrical Engineering

Effective from Semester A, 2024/2025

For Students Admitted/Changed to the Major with Catalogue Term

Semester A 2023/2024 and thereafter

Part I Major/Degree Overview

Major (in English) : Microelectronics Engineering
(in Chinese) : 微電子工程學

Degree (in English) : Bachelor of Engineering
(in Chinese) : 工學士

Award Title[#] (in English) : Bachelor of Engineering in Microelectronics Engineering
(in Chinese) : 工學士(微電子工程學)

Please make reference to the "Guidelines on Award Titles" approved by the Senate when proposing new award titles or changes to existing award titles (Senate/86/A5R).

1. Normal and Maximum Period of Study

	Normative 4-year Degree	Advanced Standing I (Note 1)	Advanced Standing II (Senior-year Entry) (Note 2)
Normal period of study	4 years	3 years	2.5 years
Maximum period of study	8 years	6 years	5 years

Note 1: For students with recognised Advanced Level Examination or equivalent qualifications.

Note 2: For Associate Degree/Higher Diploma graduates admitted to the senior year.

2. Minimum Number of Credit Units Required for the Award and Maximum Number of Credit Units Permitted

Degree Requirements	Normative 4-year Degree	Advanced Standing I	Advanced Standing II (Senior-year Entry)
Gateway Education requirement *	30 credit units	21 credit units	12 credit units
College/School requirement *	6 credit units	Not required	Not required
Major requirement	84 credit units (Core: 66 Elective: 18)	75 credit units (Core: 57 Elective: 18)	63-72 credit units (Core: 45-54 Elective: 18)
Free electives / Minor (if applicable)	Optional	Optional	N.A.
Minimum number of credit units required for the award	120 credit units	96 credit units	75 credit units
Maximum number of credit units permitted	144 credit units	114 credit units	84 credit units

* For details, please refer to the Curriculum Information Record for Common Requirements.

3. Aims of Major

The aims of this major are to provide students with an education in microelectronics technologies, and to prepare graduates to have the necessary knowledge, skills and understanding to pursue a career as professional engineers. The contents covered aim to have breadth to allow graduates to work across boundaries, as well as depth to equip and prepare them to meet the demands of employers as well as the demands for pursuing postgraduate studies. Through this experience, our graduates will also have the ability and vision that will enable them to become independent life-long learners in this rapidly changing high-tech industry.

4. Intended Learning Outcomes of Major (MILOs)

(Please state what the student is expected to be able to do on completion of the major according to a given standard of performance.)

Upon successful completion of this major, students should be able to:

No.	MILOs	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
		A1	A2	A3
1.	apply knowledge of mathematics, science and engineering.		√	
2.	design and conduct experiments as well as to analyze and interpret data.			√

3.	design a system, component, or process to meet desired needs within realistic constraints.			√
4.	function on multi-disciplinary teams.	√		
5.	identify, formulate and solve engineering problems.		√	√
6.	be aware of professional and ethical responsibilities.	√		
7.	communicate effectively.		√	√
8.	have knowledge in contemporary issues and an awareness of the impact of engineering solutions in a broad, global and societal context.	√		
9.	recognise the need for life-long learning.	√		
10.	use necessary engineering/IT tools.		√	

A1: *Attitude*

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: *Ability*

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: *Accomplishments*

Demonstrate accomplishments of discovery/innovation/creativity through producing/constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Part II Major Requirement

(The catalogue term of the major requirement that students will follow will be the effective term of the declared/allocated major.

For normative 4-year degree students who will join the major allocation exercise, the catalogue term of major requirement will be one year after admission.

For advanced standing students and 4-year degree students who already have a major at the time of admission, the catalogue term of major requirement will be the same as their admission term.)

1. Core Courses

Normative 4-year Degree: 66 credit units

Advanced Standing I: 57 credit units

Advanced Standing II: 45-54 credit units

Course Code	Course Title	Level	Credit Units	Remarks
EE1000	Programme Induction	B1	0	
EE1001	Foundations of Digital Techniques	B1	3	Advanced Standing I/II: Not required
EE1002	Principles of Electrical Engineering	B1	3	Advanced Standing I/II: Not required
EE1004	Foundations of Information Systems and Data Analysis	B1	3	Advanced Standing I/II: Not required
GE1354	Introduction to Electronic Design	B1	3	Advanced Standing I/II: Not required

CS2311	Computer Programming	B2	3	Advanced Standing II: Not required
EE2000	Logic Circuit Design	B2	3	See remark #
EE2004	Microcomputer Systems	B2	3	See remark #
EE2005	Electronic Devices and Circuits	B2	3	See remark #
EE2066	Engineers in Society	B2	3	Counted as “College-specified GE Course” for 4-year degree students. Counted as “Major Requirement” for Advanced Standing I/II students. Students successfully completed EE4085 are not required to take this course.
EE2104	Introduction to Electromagnetics	B2	3	
EE2800	Semiconductor Physics for Engineers	B2	3	
MA2001	Multi-variable Calculus & Linear Algebra	B2	3	
EE3008	Principles of Communications	B3	3	
EE3070	Design Project	B3	3	
EE3115	Applied Optoelectronic Devices	B3	3	
EE3121	Differential Equations for Electrical Engineering	B3	3	
EE3122	Analogue Circuit Fundamentals	B3	3	
EE3210	Signals and Systems	B3	3	
EE3220	System-on-Chip Design	B3	3	
EE3800	Semiconductor Materials and Devices	B3	3	
EE3801	Microsystems and Nanotechnology	B3	3	
EE4080	Project	B4	6	Students successfully completed EE4087 are not required to take this course. A course to fulfill the internship/consultancy project/research project requirement for normative 4-year degree students.
EE4090	Engineering Training	B4	0	Students successfully completed EE4085 are not required to take this course.

Upon admission, Advanced Standing II students will be reviewed on their qualifications and backgrounds to see if these courses are required for their major requirements.

2. Electives (18 credit units)

Students are required to take at least 6 electives from the elective list.

Elective List (choose 6 electives (18 credit units))

Course Code	Course Title	Level	Credit Units	Remarks
SYE4006	Semiconductor Manufacturing and Process Control	B3	3	
EE3009	Data Communications and Networking	B3	3	
EE3109	Applied Electromagnetics	B3	3	
EE3114	Systems and Control	B3	3	
EE4015	Digital Signal Processing	B4	3	
EE4035	Optical Fibre Communications	B4	3	
EE4036	Wireless Communications	B4	3	
EE4101	Sustainable Energy Systems	B4	3	
EE4105	Principles of Lasers	B4	3	
EE4107	5G Circuit Design	B4	3	
EE4108	Antennas for Wireless Communications and Sensing Connectivity	B4	3	
EE4142	Introduction to Integrated Photonics	B4	3	
EE4146	Data Engineering and Machine Learning	B4	3	
EE4316	Mobile Data Networks	B4	3	
EE4802	VLSI Circuit Design	B4	3	
EE4803	Analogue IC Design	B4	3	
EE4804	Antenna design for IC	B4	3	
MSE4171	Electronic Packaging and Materials	B4	3	

Note: Students successfully completed **EE4086** can take one less elective course. See below.

3. Optional Internship Courses

Course Code	Course Title	Level	Credit Units	Remarks
EE4085	Internship: Engineering Practice	B4	3	This internship course of 3CU can be used to fulfill EE2066 Engineers in Society and EE4090 Engineering Training . A course to fulfill the internship/consultancy project/research project requirement for normative 4-year degree students.
EE4086	Internship: Advanced Topics in Electrical Engineering	B4	3	This internship course of 3CU can be used to

				fulfill one elective . A course to fulfill the internship/consultancy project/research project requirement for normative 4-year degree students.
EE4087	Internship: Industrial Project	B4	6	This internship course of 6CU can be used to fulfill EE4080 Project . A course to fulfill the internship/consultancy project/research project requirement for normative 4-year degree students.

Note: Students interested in internship can opt to take EE4085 only, OR EE4086/EE4087 in addition to successful completion of EE4085.

4. Graduate Level Courses (electives for Undergraduate plus Master's Degree Programme)

- Serving as electives for students enrolling in Undergraduate plus Master's Degree Programme.
- Students are expected to complete their **BEng degree requirements in their first 3.5 years of studies, out of which a maximum of 9CUs of MSc courses are taken as electives**, which will be transferred to fulfill the MSc degree requirements.

Course Code	Course Title	Level	Credit Units	Remarks
EE5410	Signal Processing	P5	3	
EE5412	Telecommunication Networks	P5	3	
EE5425	Fundamentals of Radio Frequency Circuit Engineering	P5	3	
EE5435	Advanced Topics in Applied Electromagnetics	P5	3	
EE5436	Fundamentals and Applications of Photonics	P5	3	
EE5437	Internet of Things Technologies for Future City Applications	P5	3	
EE5815	Topics in Security Technology	P5	3	
EE6426	Radio Frequency (RF) Circuit Engineering	P6	3	
EE6428	Optical Communications	P6	3	
EE6603	Wireless Communication Technologies	P6	3	
EE6615	Nanotechnology for Devices and Microsystems	P6	3	
EE6617	Detection and Estimation – Theory and Applications in Communications	P6	3	
EE6618	Three Dimensional (3D) Video Display Technology	P6	3	
EE6619	Antenna Design for Wireless Communications	P6	3	

EE6620	Linear Systems Theory and Design	P6	3	
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Part III Admission Requirements for Entry to the Major, if any

(Admission requirements here refers to specific requirements for students already admitted to the College/School/Department with an undeclared major. Academic units can state the prerequisites required for admission to the major.)

Nil

Part IV Accreditation by Professional / Statutory Bodies

The major is designed to meet the accreditation requirement of the Hong Kong Institution of Engineers (HKIE). Accreditation from HKIE will be sought.

Part V Additional Information

Nil

Part VI

1. Curriculum Map (Undergraduate courses)

(The curriculum map shows the mapping between courses and the MILOs. It should cover all courses designed specifically for the major.)

			MILOs												
			M1	M2	M3	M4	M5	M6	M7	M8	M9	M10			
City University Ideal Graduate Outcomes			G02	G02	G02	G03	G02	G01,5	G03	G01,4,5	G04	G02			
Discovery-enriched Curriculum (DEC) elements*			A2	A3	A3	A1	A2,3	A1	A2,3	A1	A1	A2			
Graduate Attributes (Professional bodies) (Optional) (Professional Body: HKIE)			a	b, l	c	d	e	f	g, l	j, i	j	k, l			
Course			MILOs (HKIE Required Outcomes)										DEC		
Code	Title	Credit	M1 (a)	M2 (b, l)	M3 (c)	M4 (d)	M5 (e)	M6 (f)	M7 (g, l)	M8 (h, i)	M9 (j)	M10 (k, l)	A1	A2	A3
Core Courses															
EE1000	Programme Induction	0							P	P	P		✓	✓	✓
EE1001	Foundations of Digital Techniques	3	T/P	T/P	T/P		T/P		T/P			P	✓	✓	
EE1002	Principles of Electrical Engineering	3	T/P				T/P		T/P	P	P		✓	✓	
EE1004	Foundations of Information Systems and Data Analysis	3	T/P		T/P		T/P						✓	✓	
GE1354	Introduction to Electronic Design	3	T/P	T/P	T/P	P	T/P		T/P			P	✓	✓	✓
CS2311	Computer Programming	3	T/P		T/P		T/P					T/P	✓	✓	
EE2000	Logic Circuit Design	3	T/P	P	T/P/M		P		P/M			P	✓	✓	
EE2004	Microcomputer Systems	3	T/P	T/P/M	T/P/M	P/M	T/P		P/M			T/P/M	✓	✓	✓
EE2005	Electronic Devices and Circuits	3	T/P	T/P/M			T/P		T/P/M			P	✓	✓	
EE2066	Engineers in Society	3						T/P/M		T/P/M			✓	✓	
EE2104	Introduction to Electromagnetics	3	T/P				T/P						✓	✓	
EE2800	Semiconductor Physics for Engineers	3	T/P	T/P									✓	✓	
MA2001	Multi-variable Calculus & Linear Algebra	3	T/P										✓	✓	✓
EE3008	Principles of Communications	3	T/P	T/P			T/P			T		T	✓	✓	
EE3070	Design Project	3	T/P	P/M	T/P/M	P/M	P/M	T/P/M	P	T/P/M	P/M	T/P/M	✓	✓	✓
EE3115	Applied Optoelectronic Devices	3	T		T		T						✓	✓	
EE3121	Differential Equations for Electrical Engineering	3	T/P				T						✓	✓	✓
EE3122	Analogue Circuit Fundamentals	3	T/P	T/P/M			T/P/M		P			P	✓	✓	
EE3210	Signals and Systems	3	T/P/M	T/P	T/P		T/P/M	T		T/M	T/M	P	✓	✓	
EE3220	System-on-Chip Design	3	T/P/M	P	T/P	P	T/P		P			P	✓	✓	
EE3800	Semiconductor Materials and Devices	3	T/P		T/P		T/P		P/M				✓	✓	
EE3801	Microsystems and Nanotechnology	3	T/P/M		T/P		T/P		P/M			T/P/M	✓	✓	✓
EE4080	Project	6	P/M	P	P		P/M	P/M	P/M	P/M	P/M	P	✓	✓	✓

Course		Credit	MILOs (HKIE Required Outcomes)										DEC		
Code	Title		M1 (a)	M2 (b, l)	M3 (c)	M4 (d)	M5 (e)	M6 (f)	M7 (g, l)	M8 (h, i)	M9 (j)	M10 (k, l)	A1	A2	A3
EE4090	Engineering Training	0	P	T/P/M	T/P/M	T/P/M	P	P/M	P	P	T/P/M	P/M	✓	✓	
Electives (choose 18 credits)															
Students are required to take at least 6 electives from the elective list.															
SYE4006	Semiconductor Manufacturing and Process Control	3	T/P		T/P		T/P						✓	✓	✓
EE3009	Data Communications and Networking	3	T/P				T/P				T/P		✓	✓	
EE3109	Applied Electromagnetics	3	T/M	T		T/M	T/M		T		T/M		✓	✓	
EE3114	Systems & Control	3	T/P	T		T	T/P		T/P/M		T		✓	✓	
EE4015	Digital Signal Processing	3	T/P		T/P		T/P						✓	✓	
EE4035	Optical Fibre Communications	3	T/P	T/P	T/P	T	T/P	T	T/P		P		✓	✓	
EE4036	Wireless Communications	3	T/P		T/P		T/P						✓	✓	
EE4101	Sustainable Energy Systems	3	T/P		T/P	P	T/P		P	P	P		✓	✓	
EE4105	Principles of Lasers	3	T/P		T/P		T/P						✓	✓	
EE4107	5G Circuit Design	3	T/P	T/P	T/P		T/P						✓	✓	
EE4108	Antennas for Wireless Communications for Sensing Connectivity	3	T/P		T/P		T/P						✓	✓	
EE4142	Introduction to Integrated Photonics	3	T/P	T/P	T/P		T/P						✓	✓	
EE4146	Data Engineering and Machine Learning	3	T/P		T/P		T/P						✓	✓	
EE4316	Mobile Data Networks	3	T/P	T/P	T/P	T/P	T/P						✓	✓	
EE4802	VLSI Circuit Design	3	T/P		T/P		T/P						✓	✓	✓
EE4803	Analogue IC Design	3	T/P		T/P		T/P						✓	✓	✓
EE4804	Antenna design for IC	3	T/P		T/P		T/P						✓	✓	✓
MSE4171	Electronic Packaging and Materials	3	T/P		T/P		T/P						✓	✓	✓
Optional Internship Courses															
EE4085	Internship: Engineering Practice	3	P	T/P/M	T/P/M	T/P/M	P	T/P/M	P	T/P/M	T/P/M	P/M	✓	✓	✓
EE4086	Internship: Advanced Topics in Electrical Engineering	3	P		T/P/M		P					P/M	✓	✓	
EE4087	Internship: Industrial Project	6	P/M	T/P/M	T/P/M	P	P/M	P/M	P/M	P/M	T/P/M	P/M	✓	✓	✓
T-taught, P-practiced, M-measured															

2. Curriculum Map (Postgraduate courses)

(The curriculum map shows the mapping between courses and the MILOs. It should cover all courses designed specifically for the major.)

Course Code & Title	MILOs (HKIE Required Outcomes)										DEC		
	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	A1	A2	A3

	(a)	(b, l)	(c)	(d)	(e)	(f)	(g, l)	(h, i)	(j)	(k, l)			
EE5410 Signal Processing	T/P		T/P		T/P					P	✓	✓	
EE5412 Telecommunication Networks	T/P									T/P	✓		
EE5425 Fundamentals of Radio Frequency Circuit Engineering	T/P	T/P	T/P		T/P					T/P	✓	✓	
EE5435 Advanced Topics in Applied Electromagnetics	T/P	T/P	T/P		T/P					T/P	✓		
EE5436 Fundamentals and Applications of Photonics	T/P	T/P	T/P		T/P						✓	✓	
EE5437 Internet of Things Technologies for Future City Applications	T/P	T/P	T/P		T/P					T/P	✓	✓	✓
EE5815 Topics in Security Technology	T/P	T/P	T/P	T/P	T/P		P			P	✓	✓	
EE6426 Radio Frequency (RF) Circuit Engineering	T/P	T/P	T/P		T/P					T/P	✓	✓	
EE6428 Optical Communications	T/P	T/P			T/P					P	✓	✓	
EE6603 Wireless Communication Technologies	T/P		T/P		T/P						✓	✓	
EE6615 Nanotechnology for Devices and Microsystems	T/P	T/P			T/P		P			P	✓	✓	
EE6617 Detection and Estimation – Theory and Applications in Communications	T/P		T/P		T/P					P	✓	✓	
EE6618 Three Dimensional (3D) Video Display Technology	T/P	T/P	T/P		T/P						✓	✓	
EE6619 Antenna Design for Wireless Communications	T/P	T/P	T/P		T/P					T/P	✓	✓	
EE6620 Linear Systems Theory and Design	T/P		T/P		T/P		P		P		✓	✓	

T-taught, P-practiced, M-measured

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishments of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

HKIE Programme outcomes that describe what students are expected to know and to do by the time of graduation. These must include (Note 1):

- an ability to apply knowledge of mathematics, science, and engineering appropriate to the degree discipline
- an ability to design and conduct experiments, as well as to analyse and interpret data
- an ability to design a system, component or process to meet desired needs within realistic constraints, such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability
- an ability to function on multi-disciplinary teams
- an ability to identify, formulate and solve engineering problems
- an ability to understand professional and ethical responsibility
- an ability to communicate effectively
- an ability to understand the impact of engineering solutions in a global and societal context, especially the importance of health, safety and environmental considerations to both workers and the general public
- an ability to stay abreast of contemporary issues
- an ability to recognise the need for, and to engage in life-long learning

AB/sh 11-Sep-23, AB/sh 15 Jan 2024, AB/hl 11-Jun-24

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- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice appropriate to the degree discipline
- (l) an ability to use the computer/IT tools relevant to the discipline along with an understanding of their processes and limitations

Note 1: The graduate attributes are reproduced from the HKIE accreditation criteria for engineering degrees. The interpretation of these graduate attributes should be consistent with the requirements of the Washington Accord. **City University Ideal Graduate Outcomes**

- G01: Globally minded professional
- G02: Innovative and critical thinker
- G03: Effective communicator
- G04: Lifelong learner
- G05: Civically-oriented individual