# Curriculum Information Record for a Major/Degree

## Department of Electrical Engineering
### Effective from Summer Term, 2020/21
### For Students Admitted/Changed to the Major with Catalogue Term
### Semester A 2018/2019

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):

| Requirements | Catalogue Term |
|---|---|
| a) Common Requirements<br>• Gateway Education<br>• University Language<br>• College/School requirement | The same as student's admission term |
| b) Major<br>• For normative 4-year degree students who will join the majors allocation exercise | Effective term of the declared major |
| • For advanced standing students and 4-year degree students who already have a major at the time of admission | The same as student's admission term |
| • For students who have changed major | Effective term of the changed major |
| c) Stream | Follow the effective term of the associated major |

## *Prepared / Last Updated by*

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CSL/sh 30-Jun-15, 15-Jul-16, Updating curriculum map 15-Aug-16, 8-Sep-16, WHL/sh 23-Nov-16, DP/sh 19-Jan-17, DP/sh 17-May-17, JC/sh 6-Jun-18, HMC/sh 19-Nov-18, HMC/sh 15-May-19, sh Dept Name Change 31-May-19, HMC/sh 17-Jun-19, YNS/sh 16-Nov-20, YNS/sh 18-Jan-21
*Curriculum Information Record for a Major/Degree*
*Dec 2014*

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**City University of Hong Kong**

**Curriculum Information Record for a Major/Degree**

**Department of Electrical Engineering**
**Effective from Summer Term, 2020/21**
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**Part I   Major/Degree Overview**

| **Major** | (in English) | : | Computer and Data Engineering |
|---|---|---|---|
| | (in Chinese) | : | 電子計算機及數據工程學 |

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

| **Award Title[#]** | (in English) | : | Bachelor of Engineering in Computer and Data Engineering |
|---|---|---|---|
| | (in Chinese) | : | 工學士(電子計算機及數據工程學) |

*# 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: 69 Elective: 15) | 75 credit units (Core: 60 Elective: 15) | 60-72 credit units (Core: 45-57 Elective: 15) |
| Free electives / Minor (if applicable) | Optional | Optional | N.A. |
| **Minimum number of credit units required for the award** | **120 credit units** | **96 credit units** | **72 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**

We aim to provide students with a strong foundation and broad skills in the computer and data technologies. Students will be equipped with the theoretical and practical aspects of computer systems The curriculum encompasses hardware and software design, multimedia technologies, data analytics and security, cloud computing systems, and artificial intelligence. Upon completion of the major, students will be sufficiently prepared for employment, and to pursue postgraduate studies and engage in life-long learning.

## 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 that conforms to a given specification within realistic constraints. | | | √ |
| 4. | function on multi-disciplinary teams. | √ | | |
| 5. | identify, evaluate, 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 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 majors 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: 69 credit units**
    **Advanced Standing I: 60 credit units**
    **Advanced Standing II: 45-57credit units**

| Course Code | Course Title | Level | Credit Units | Remarks |
|---|---|---|---|---|
| EE1001 | Foundations of Digital Techniques | B1 | 3 | Advanced Standing I/II: Not required |
| EE1002 | Principles of Electronic Engineering | 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 |
| MA2001 | Multi-variable Calculus & Linear Algebra | B2 | 3 | |
| EE2000 | Logic Circuit Design | B2 | 3 | See remark # |
| EE2004 | Microcomputer Systems | B2 | 3 | See remark # |
| EE2203 | Modelling Techniques | B2 | 3 | |
| EE2301 | Basic Electronic Circuits | B2 | 3 | See remark # |
| EE3206 | Java Programming and Applications | B3 | 3 | |
| EE2331 | Data Structures and Algorithms | B2 | 3 | See remark # |
| CS3103 | Operating Systems | B3 | 3 | |
| CS3402 | Database Systems | B3 | 3 | |
| EE3001 | Foundations  of Data Engineering | B3 | 3 | |
| EE3009 | Data Communications and Networking | B3 | 3 | |

| Course Code | Course Title | Level | Credit Units | Remarks |
|---|---|---|---|---|
| EE3012 | Engineers in Society | B3 | 3 | Students having completed EE4081 Professional Internship Program (6CU) are not required to take this course and one other elective. For those who have completed 12-month internship in EE4081 are not required to take EE4291 Engineering Training II for Computer and Data Engineering. |
| EE3209 | Data Management Techniques | B3 | 3 | |
| EE3210 | Signals and Systems | B3 | 3 | |
| EE3220 | System-on-Chip Design | B3 | 3 | |
| EE3070 | Design Project | B3 | 3 | Two semesters |
| EE3315 | Internet Technology | B3 | 3 | |
| EE4080 | Project | B4 | 6 | |
| EE4290 | Engineering Training I for Computer and Data Engineering | B4 | 0 | Students who have not completed both courses in the training pair EE4290 and EE4291 should take EE4090 Engineering Training as a replacement. |
| EE4291 | Engineering Training II for Computer and Data Engineering | B4 | 0 | |

# 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 (15 credit units)**

Students are required to take at least FIVE electives of which TWO must be from each group.

**Group A**

| Course Code | Course Title | Level | Credit Units | Remarks |
|---|---|---|---|---|
| EE4014 | Business Data Communication Networks | B4 | 3 | |
| EE4016 | Engineering Applications of Artificial Intelligence | B4 | 3 | |

| EE4017 | Internet Finance | B4 | 3 | |
|--------|------------------|----|----|---|
| EE4146 | Data Engineering and Learning Systems | B4 | 3 | |
| EE4212 | Cryptography and Information Theory | B4 | 3 | |
| EE4215 | Cybersecurity Technology | B4 | 3 | |
| EE4216 | Modern Web Applications | B4 | 3 | |
| EE4221 | Cloud Computing Systems | B4 | 3 | |
| EE4222 | Digital Forensics | B4 | 3 | |
| EE4316 | Mobile Data Networks | B4 | 3 | |

**Group B**

| Course Code | Course Title | Level | Credit Units | Remarks |
|-------------|--------------|-------|--------------|---------|
| CS3391 or CS4335 | Advanced Programming or Design and Analysis of Algorithms | B3 B4 | 3 3 | Students can only take either one to fulfill the curriculum requirement. |
| EE3301 | Optimization Methods for Engineering | B3 | 3 | Approved implementation date: Sem A 2021/2022 |
| EE4015 | Digital Signal Processing | B4 | 3 | |
| EE4208 | Computer Graphics for Engineers | B4 | 3 | |
| EE4209 | Digital Audio Technology | B4 | 3 | |
| EE4213 | Human-Computer Interaction | B4 | 3 | |
| EE4218 | Computer Architecture | B4 | 3 | |
| EE4211 | Computer Vision | B4 | 3 | |
| EE4304 | iOS Mobile App Development and Networking | B4 | 3 | |

3. **Optional One-year Internship**

| Course Code | Course Title | Level | Credit Units | Remarks |
|-------------|--------------|-------|--------------|---------|
| EE4081 | Professional Internship Program | B4 | 6 | Students having completed EE4081 Professional Internship Program (6CU) will take one less elective (3CU) and are not required to take EE3012 Engineers in Society (3CU). For those who have completed 12-month internship in EE4081 are not required to take EE4291 Engineering Training II for Computer and Data Engineering. |

**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 accredited by the Hong Kong Institution of Engineers (HKIE).


**Part V    Additional Information**
Nil

## Part VI  Curriculum Map

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

| 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 | | | | | | | | | | | | | | | |
| EE1001 | Foundations of Digital Techniques | 3 | T/P | T/P | T/P | | T/P | | T/P | | | P | ✓ | ✓ | |
| EE1002 | Principles of Electronic Engineering | 3 | T/P | | | | T/P | | T/P | P | 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 | ✓ | ✓ | |
| MA2001 | Multi-variable Calculus & Linear Algebra | 3 | T/P | | | | | | | | | | ✓ | ✓ | ✓ |
| EE2004 | Microcomputer Systems | 3 | T/P | T/P/M | T/P/M | P/M | T/P | | P/M | | | T/P/M | ✓ | ✓ | ✓ |
| EE2203 | Modeling Techniques | 3 | T/P/M | T/P | T/P | | T/P | T/P | | | | T/P/M | ✓ | ✓ | ✓ |
| EE2301 | Basic Electronic Circuits | 3 | T/P | T/P/M | | | T | | T | | | T | ✓ | ✓ | |
| EE3206 | Java Programming and Applications | 3 | T/P | | T/P | | T/P | | | | | P | ✓ | ✓ | ✓ |
| EE2331 | Data Structures and Algorithms | 3 | T/P | | T/P | | T/P/M | | | | | P | ✓ | ✓ | ✓ |
| CS3103 | Operating Systems | 3 | T/P | T | T/P | | T | | | | | T/P | ✓ | ✓ | |
| CS3402 | Database Systems | 3 | T/P | | T/P | | T/P | | | | | P | ✓ | ✓ | |
| EE3001 | Foundations of Data Engineering | 3 | T/P/M | T/P | | | | | | | | T/P | ✓ | ✓ | |
| EE3009 | Data Communications and Networking | 3 | T/P | | | | T/P | | | | | T/P/M | ✓ | ✓ | |
| EE3012 | Engineers in Society | 3 | | | | | | T/P/M | | T/P/M | | | ✓ | ✓ | |
| EE3209 | Data Management Techniques | 3 | T/P | | T/P | | T/P | | | | | T/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 | P | T/P | P | T/P | | P | | | P | ✓ | ✓ | |
| 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 | ✓ | ✓ | ✓ |
| EE3315 | Internet Technology | 3 | T/P/M | T/P | | P | T/P | | P | | | P | ✓ | ✓ | |
| EE4080 | Project | 6 | P/M | P | P | | P/M | P/M | P/M | P/M | P/M | P | ✓ | ✓ | ✓ |
| EE4290 | Engineering Training I for Computer and Data Engineering | 0 | T/P | P | T/P | | P | T/P | | P | P | P | ✓ | ✓ | |
| EE4291 | Engineering Training II for Computer and Data Engineering | 0 | P | T/P/M | T/P/M | T/P/M | P | P/M | P | P | P/M | T/P/M | ✓ | ✓ | ✓ |

| 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 |
| **Electives (choose 15 credits)** | | | | | | | | | | | | | | | |
| *Students are required to take at least FIVE electives of which TWO must be from each group.* **Group A** | | | | | | | | | | | | | | | |
| EE4014 | Business Data Communication Networks | 3 | T/P | | T/P | | T/P | | | | | P | ✓ | ✓ | |
| EE4016 | Engineering Applications of Artificial | 3 | T/P | | T/P | | T/P | | | | | | ✓ | ✓ | |
| EE4017 | Internet Finance | 3 | T/P | | T/P | | T/P | | | | T/P | | ✓ | ✓ | |
| EE4146 | Data Engineering and Learning Systems | 3 | T/P/M | | T/P/M | | T/P | | | | | | ✓ | ✓ | |
| EE4212 | Cryptography and Information Theory | 3 | T/P | | | | T/P | | | | | | ✓ | ✓ | |
| EE4215 | Cybersecurity Technology | 3 | T/P | T/P | T/P | T/P | T/P | | P | | | P | ✓ | ✓ | ✓ |
| EE4216 | Modern Web Applications | 3 | T/P | | T/P | | T/P | | | | P | P | ✓ | ✓ | |
| EE4221 | Cloud Computing Systems | 3 | T/P | | T/P/M | | T/P | | | | | T/P | ✓ | ✓ | |
| EE4222 | Digital Forensics | 3 | T/P | T/P | T/P | | T/P | T/P/M | | | | T/P | ✓ | ✓ | |
| EE4316 | Mobile Data Networks | 3 | T/P | T/P | T/P | T/P | T/P | | | | | | ✓ | ✓ | |
| **Group B** | | | | | | | | | | | | | | | |
| CS3391 or | Advanced Programming or | 3 | T/P | | T/P | | T/P | | | | | P | ✓ | ✓ | |
| CS4335 | Design and Analysis of Algorithms | 3 | T/P | | T/P | | T/P | | | | | P | ✓ | ✓ | |
| EE3301 | Optimization Methods for Engineering | 3 | T/P/M | | | | T/P | | | | | T/P/M | ✓ | ✓ | |
| EE4015 | Digital Signal Processing | 3 | T/P | | T/P | | T/P | | | | | | ✓ | ✓ | |
| EE4208 | Computer Graphics for Engineers | 3 | T/P | | T/P | | T/P | | | | | P | ✓ | ✓ | |
| EE4209 | Digital Audio Technology | 3 | T/P | T/P | T/P | | T/P | | | | | | ✓ | ✓ | |
| EE4211 | Computer Vision | 3 | T/P | | T/P | | T/P | | | | | T/P | ✓ | ✓ | |
| EE4213 | Human-Computer Interaction | 3 | T/P | | T/P | | T/P | | | | | P | ✓ | ✓ | ✓ |
| EE4218 | Computer Architecture | 3 | T/P | | T/P | | T/P | | | T | | | ✓ | ✓ | |
| EE4304 | iOS Mobile App Development and Networking | 3 | T/P | | T/P | T/P | T/P | | | | | P | ✓ | ✓ | |
| **Optional One-year Internship** | | | | | | | | | | | | | | | |

| EE4081 | Professional Internship Program | 6 | | | | P | P | T/P/M | P | T/P/M | | | ✓ | ✓ | ✓ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

Remark: Students having completed EE4081 Professional Internship Program (6CU) will take one less elective (3CU) and are not required to take EE3012 Engineers in Society (3CU).

For those who have completed 12-month internship in EE4081 are not required to take EE4291 Engineering Training II for Computer and Data Engineering.

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.