

COMPUTER ENGINEERING

SYLLABUS

This syllabus applies to students admitted in the academic year 2010-11 and thereafter.

Definitions and Terminology:

Each course offered by the Department of Electrical and Electronic Engineering shall be classified as either introductory level course or advanced level course, and be assigned a Level --- One, Two or Three, in which Level One courses are introductory courses whereas advanced courses includes Level Two and Three courses.

All courses are grouped into the following 8 Subject Groups:

- A. Hardware and digital technology
- B. Computer architecture and systems
- C. System software and programming
- D. Computer applications
- E. Mathematics
- F. General engineering
- G. Complementary studies
- H. Others

A Discipline Core course is a compulsory course which a candidate must pass in the manner provided for in the Regulations. A Breadth Course is a Level 1 or Level 2 course that is offered in one of the subject groups as an optional course for the curriculum. A Depth Course is a Level 3 course offered in one of the subject groups as an optional course for the curriculum. Level 1 courses are Introductory Courses, while Level 2 and Level 3 courses are Advanced Courses.

Subject Elective refers to any **technical** (i.e., non-complementary studies) course offered to ANY degree curriculum by the Department of Electrical and Electronic Engineering and the Department of Computer Science, provided that it does not overlap significantly with other courses that the student has already enrolled. Courses offered by other Departments *will not* be accepted as Subject Elective unless special prior approval from the Department of Electrical and Electronic Engineering has been obtained before enrolment. Courses listed in Group F (General Engineering Courses) *will not* be accepted as Subject Elective.

The Curriculum

The curriculum comprises 180 credits of courses as follows:

- (a) 24 credits from General Engineering courses, including:
 - (i) ENGG1002 Computer programming and applications; AND
 - (ii) ENGG1003 Mathematics I or both ENGG1004 Mathematics IA and ENGG1005 Mathematics IB; AND
 - (iii) ENGG1015 Introduction to electrical and electronic engineering; AND
 - (iv) ENGG1007 Foundations of computer science
- (b) 60 credits of Discipline Core Courses from Groups A-E
- (c) 30 credits of Breadth/Depth Courses comprising
 - (i) 0 to 6 credits of Breadth Course selected from Group F; *and*
 - (ii) at least 6 credits of Depth Course(s) selected from Groups A-D; *and*
 - (iii) the remaining are Breadth or Depth Courses selected from Groups A-E
- (d) 6 credits of Subject Elective course(s)
- (e) Complementary Studies courses comprising (Total 9 credits):
 - (i) ELEC2802 Engineering organization and management (3 credits)

- (ii) ELEC2803 Engineering and society (3 credits)
- (iii) ELEC2804 Engineering economics and finance (3 credits)
- (f) ELEC2813 Integrated project (6 credits)
- (g) ELEC3802 Technical project (12 credits)
- (h) ELEC1810 Workshop training (6 credits)
- (i) ELEC1811 Industrial training (6 credits)
- (j) UG5 requirements (21 credits):
 - (i) CAES1507 Professional and technical written communication for engineers¹ (3 credits)
 - (ii) CAES1515 Professional and technical oral communication for engineers (3 credits)
 - (iii) CENG1001 Practical Chinese language course for engineering students² (3 credits)
 - (iv) 12 credits of courses in the Common Core Curriculum, selecting no more than one course from each Area of Inquiry

To complete the degree requirement, a candidate must pass all the courses specified in the Curriculum and satisfy any other requirements as stipulated in the University or Faculty of Engineering regulations.

Degree Classification

The best 180 credits satisfying the Curriculum described above shall be taken into account for degree classification.

Order of Study

Order of study is dictated by prerequisite and co-requisite requirements. Generally, Level 1 courses should be taken before Level 2 courses, Level 2 courses should be taken before Level 3 courses and core courses should be taken before breadth courses. Courses in Complementary Studies and UG5 Requirements can be taken in any order.

First Year

The first-year syllabus shall include the following courses:

General Engineering Courses (Total 24 credits)

Either

ENGG1003 Mathematics I (6 credits)

or

ENGG1004 Mathematics IA (3 credits) *and* ENGG1005 Mathematics IB (3 credits)

ENGG1002 Computer programming and applications (6 credits)

ENGG1007 Foundations of computer science (6 credits)

(can be replaced by CSIS1118 Foundations of computer science (6 credits))

(mutually exclusive with: ELEC1807, CSIS1118)

¹ Students pursuing the double-degrees in BEng/BBA should take CAES1907 in lieu of CAES1507

² Putonghua-speaking students should take CUND0002 or CUND0003. Students who have not studied Chinese language during their secondary education / who have not attained the requisite level of competence in the Chinese language to take CENG1001 can apply (i) to take credit-bearing Cantonese or Putonghua language courses offered by the School of Chinese especially for international and exchange students; OR (ii) to be exempted from the Chinese language requirement and take an elective course in lieu.

ENGG1015 Introduction to electrical and electronic engineering (6 credits)

Discipline Core Courses (Total 24 credits)

CSIS1119 Introduction to data structures and algorithms (6 credits)
 CSIS1122 Computer programming II (6 credits)
 ELEC1401 Computer organization and microprocessors (6 credits)
 ELEC1306 Electric and electronic circuits (6 credits)

UG5 Requirements (Total 9 credits)

CAES1507 Professional and technical written communication for engineers (3 credits)¹
 CAES1515 Professional and technical oral communication for engineers (3 credits)
 CENG1001 Practical Chinese language course for engineering students (3 credits)²

Training (Total 6 credits)

ELEC1810 Workshop training (6 credits)

Second Year

The second-year syllabus shall normally include the following courses:

Discipline Core Courses (Total 36 credits)

CSIS0230 Principles of operating systems (6 credits)
 CSIS0234 Computer and communication networks (6 credits)
 CSIS0297 Introduction to software engineering (6 credits)
 ELEC1802 Engineering mathematics II (6 credits)
 ELEC2302 Digital system design (6 credits)
 ELEC2401 Computer architecture (6 credits)

Complementary Studies (Total 6 credits)

ELEC2802 Engineering organization and management (3 credits)
 ELEC2803 Engineering and society (3 credits)

UG5 Requirements (Total 12 credits)

Two Common Core Courses (12 credits)

Project (Total 6 credits)

ELEC2813 Integrated project (6 credits)

Training (Total 6 credits)

ELEC1811 Industrial training (6 credits)

¹ Students pursuing the double-degrees in BEng/BBA should take CAES1907 in lieu of CAES1507

² Putonghua-speaking students should take CUND0002 or CUND0003. Students who have not studied Chinese language during their secondary education / who have not attained the requisite level of competence in the Chinese language to take CENG1001 can apply (i) to take credit-bearing Cantonese or Putonghua language courses offered by the School of Chinese especially for international and exchange students; OR (ii) to be exempted from the Chinese language requirement and take an elective course in lieu.

Third Year

The third-year syllabus shall normally include the following courses:

Breadth/Depth Courses (Total 30 credits)

30 credits of Breadth/Depth Courses selected according to item (c) of the curriculum.

Subject Elective (Total 6 credits)

6 credits of Subject Elective

Complementary Studies: (Total 3 credits)

ELEC2804 Engineering economics and finance (3 credits)

Project (Total 12 credits)

ELEC3802 Technical project (12 credits)

List of Courses by Subject Groups

Note:

- (1) Courses with similar contents are flagged as "mutually exclusive". For each set of mutually exclusive courses, students are not allowed to take more than one course.
- (2) Besides undergraduate courses, some MSc courses may also be taken as *Subject Elective*. Each MSc course is counted as 3 credits. The list of permissible MSc courses is available from the Department.

Group A: Hardware and Digital Technology

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credit</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
			<u>S</u>		
1	ELEC1304	Electronic devices	3	-	-
1	ELEC1306	Electric and electronic circuits (core)	6	-	-
2	ELEC2201	Signals and linear systems	6	-	-
2	ELEC2202	Communications engineering	6	-	ELEC2201
2	ELEC2204	Digital signal processing	6	ELEC2201	-
2	ELEC2205	Control and instrumentation	6	-	ELEC2201
2	ELEC2302	Digital system design (core)	6	ELEC1611 or ENGG1015	-
2	ELEC2303	Design of digital integrated circuits	6	-	-
2	ELEC2304	Electronic materials and devices	3	ELEC1304 or ELEC1614	-
3	ELEC3201	Communication systems	6	ELEC2202	-
3	ELEC3203	Cellular radio and personal communication systems (mutually exclusive with CSIS0328, ELEC6071)	6	ELEC2202	-

3	ELEC3204	Information theory and coding	6	-	-
3	ELEC3220	Speech processing	3	ELEC2201	-
3	ELEC3505	Image and video processing	6	ELEC2201	-
3	ELEC3612	VLSI design principles	6	-	-

Group B: Computer Architecture and Systems

<u>Level</u>	<u>Code</u>	<u>Course title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ELEC1401	Computer organization & microprocessors (core)	6	-	-
2	CSIS0234	Computer and communication networks (core)	6	CSIS1120 or ELEC1401	-
2	ELEC2401	Computer architecture (core)	6	ELEC1401	-
3	CSIS0328	Wireless and mobile computing (mutually exclusive with ELEC3203, ELEC6071)	6	CSIS0234 & CSIS0396	-
3	ELEC3401	Advanced internet technologies	6	CSIS0234 or ELEC2701	-
3	ELEC3621	Introduction to parallel programming	3	ELEC2401	-
3	ELEC3622	Distributed computing systems	3	(ELEC2501 or CSIS0230) & (ELEC2402 or CSIS0234)	-
3	ELEC3626	Computer network security (mutually exclusive with CSIS0327)	3	ELEC2402 or CSIS0234	-

Group C: System Software & Programming

<u>Level</u>	<u>Code</u>	<u>Course title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	CSIS1119	Introduction to data structures and algorithms (core)	6	CSIS1117 or ELEC1501 or ENGG1002	CSIS1122 (Computer Programming II) (Pre- or Co-requisites)
1	CSIS1122	Computer programming II (core)	6	CSIS1117 or ELEC1501 or ENGG1002	-
2	CSIS0230	Principles of operating systems (core)	6	CSIS1122 & (CSIS1120 or ELEC1401)	-
2	CSIS0259	Principles of programming languages	6	CSIS1119 & (CSIS1120 or ELEC1401)	-
2	CSIS0278	Introduction to database management systems	6	CSIS1119 or ELEC1501 or ELEC1502	-
2	CSIS0297	Introduction to software	6	CSIS1122	-

2	CSIS0396	engineering (core) Object-oriented programming and Java (mutually exclusive with ELEC1502)	6	CSIS1117 or ELEC1501 or ENGG1002	-
2	ELEC2601	Human computer interaction	6	ELEC1501 or ELEC1502 or CSIS0396	-
2	ELEC2603	Systems and network programming (mutually exclusive with ELEC3628, CSIS0402)	6	ELEC1501 or ELEC1502 or (CSIS1119 & CSIS 0396)	-
3	CSIS0218	Discrete event simulation	6	CSIS1119 or CSIS1122 or ELEC1501 or ELEC1502	-
3	CSIS0235	Compiling techniques	6	CSIS0259	-
3	CSIS0250	Design and analysis of algorithms	6	CSIS1119 or ELEC1501 or ELEC1502 (Pre- or Co-requisites)	-
3	CSIS0323	Advanced database systems	6	CSIS0278	-
3	CSIS0403	Implementation, testing and maintenance of software systems	6	CSIS0396 (Pre- or Co-requisite)	-

Group D: Computer Applications

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
3	CSIS0270	Artificial intelligence	6	CSIS1119 or CSIS1122	-
3	CSIS0271	Computer graphics	6	CSIS1119 or CSIS1122	-
3	CSIS0314	Pattern classification and machine learning	6	CSIS1119 or ELEC1501 or ELEC1502	-
3	CSIS0315	Multimedia computing and applications	6	CSIS1119	-
3	CSIS0317	Computer vision	6	CSIS1119 or ELEC1501 or ELEC1502	-
3	CSIS0320	Electronic commerce technology	6	CSIS0278	-
3	CSIS0322	Internet and the World Wide Web (mutually exclusive with CSIS0325)	6	CSIS1117 or ELEC1501 or ENGG1002	-
3	CSIS0325	Topics in Web technologies (mutually exclusive with CSIS0322)	6	CSIS0322 or CSIS0234	-
3	CSIS0326	Computational molecular biology	6	CSIS0250; or BIOC2808	-
3	CSIS0329	Computer game design and programming	6	CSIS0271	-
3	ELEC3216	Robotics	3	ELEC2205	-
3	ELEC3503	Fuzzy systems and neural networks	6	-	-

Group E: Mathematics

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ELEC1802	Engineering mathematics II (core)	6	-	-
2	ELEC2808	Differential equations	3	-	-
2	ELEC2809	Numerical methods	3	-	-
2	ELEC2810	Optimization methods	3	-	-
2	ELEC2811	Probability and statistics	3	-	-
3	ELEC3703	Queuing theory	3	ELEC2811	-
3	ELEC3704	System modeling and performance analysis	3	ELEC3703	-

Group F: General Engineering Courses

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ENGG1002	Computer programming and applications	6	-	-
1	ENGG1003	Mathematics I	6	-	-
1	ENGG1004	Mathematics IA (mutually exclusive with ENGG1003)	3	-	-
1	ENGG1005	Mathematics IB (mutually exclusive with ENGG1003)	3	-	-
1	ENGG1006	Engineering for sustainable development	6	-	-
1	ENGG1007	Foundations of computer science (can be replaced by CSIS1118 Foundations of computer science) (mutually exclusive with: ELEC1807, CSIS1118)	6	-	-
1	ENGG1009	Industrial management and logistics	6	-	-
1	ENGG1010	Foundations of engineering mechanics	6	-	-
1	ENGG1011	Introduction to biomedical engineering	6	-	-
1	ENGG1015	Introduction to electrical and electronic engineering	6	-	-

Group G: Complementary Studies

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
2	ELEC2802	Engineering organization and management	3	-	-
2	ELEC2803	Engineering and society	3	-	-
2	ELEC2804	Engineering economics and finance	3	-	-

Group H: Others

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ELEC1810	Workshop training	6	-	-
1	ELEC1811	Industrial training	6	-	-
2	ELEC2813	Integrated project	6	-	-
3	ELEC3802	Technical project	12	-	-

Descriptions of each course are available in the section following the syllabus of INFORMATION ENGINEERING

ELECTRICAL ENGINEERING

SYLLABUS

This syllabus applies to students admitted in the academic year 2010-11 and thereafter.

Definitions and Terminology:

Each course offered by the Department of Electrical and Electronic Engineering shall be classified as either introductory level course or advanced level course, and be assigned a Level --- One, Two or Three, in which Level One courses are introductory courses whereas advanced courses includes Level Two and Three courses.

All courses are grouped into the following 9 Subject Groups:

- A. Electrical Energy
- B. Signals, Communications & Systems
- C. Circuits & Electronics
- D. Computer Systems
- E. Software & IT Applications
- F. Mathematics
- G. General Engineering
- H. Complementary Studies
- I. Others

A Discipline Core course is a compulsory course which a candidate must pass in the manner provided for in the Regulations. A Breadth course is a Level 1 or Level 2 course which is offered in one of the subject groups as an optional course for the curriculum. A Depth course is a Level 3 course offered in one of the subject groups as an optional course for the curriculum. Level 1 courses are Introductory Courses, while Level 2 and Level 3 courses are Advanced Courses.

Subject Elective refers to any **technical** (i.e., non-complementary studies) course offered to ANY degree curriculum by the Department of Electrical and Electronic Engineering, provided that it does not overlap significantly with other courses that the student has already enrolled. Courses offered by other Departments *will not* be accepted as Subject Elective unless special prior approval from the Department of Electrical and Electronic Engineering has been obtained before enrolment. Courses listed in Group G (General Engineering Courses) *will not* be accepted as Subject Elective.

The Curriculum

The curriculum comprises 180 credits of courses as follows:

- (a) 24 credits from General Engineering courses, including:
 - (i) ENGG1002 Computer programming and applications; AND
 - (ii) ENGG1003 Mathematics I or both ENGG1004 Mathematics IA and ENGG1005 Mathematics IB; AND
 - (iii) ENGG1015 Introduction to electrical and electronic engineering; AND
 - (iv) An additional 6-credit General Engineering course from Group G
- (b) 51 credits of Discipline Core Courses from Groups A-F
- (c) 39 credits of Breadth/Depth Courses comprising:
 - (i) 21 credits of Breadth Courses from Groups B-F, of which 15 credits are chosen from Groups B-E and 6 credits from Group F
 - (ii) 18 credits of Depth Courses from Groups A-E, of which at least 12 credits are chosen from Group A
- (d) 6 credits in Subject Elective
- (e) 9 credits of Complementary Studies courses comprising:
 - (i) ELEC2802 Engineering organization and management (3 credits)
 - (ii) ELEC2803 Engineering and society (3 credits)
 - (iii) ELEC2804 Engineering economics and finance (3 credits)
- (f) ELEC2805 Integrated project (6 credits)
- (g) ELEC3801 Technical project (12 credits)
- (h) ELEC1810 Workshop training (6 credits)
- (i) ELEC1811 Industrial training (6 credits)
- (j) UG5 requirements (21 credits):
 - (i) CAES1507 Professional and technical written communication for engineers¹ (3 credits)
 - (ii) CAES1515 Professional and technical oral communication for engineers (3 credits)
 - (iii) CENG1001 Practical Chinese language course for engineering students² (3 credits)
 - (iv) 12 credits of courses in the Common Core Curriculum, selecting no more than one course from each Area of Inquiry

To complete the degree requirement, a candidate must pass all the courses specified in the Curriculum and satisfy any other requirements as stipulated in the University or Faculty of Engineering regulations.

Degree Classification

The best 180 credits satisfying the Curriculum described above shall be taken into account for degree classification.

Order of Study

Order of study is dictated by prerequisite and co-requisite requirements. Generally, Level 1 courses should be taken before Level 2 courses, Level 2 courses should be taken before Level 3 courses and

¹ Students pursuing double-degrees in BEng/BBA should take CAES1907 in lieu of CAES1507

² Putonghua-speaking students should take CUND0002 or CUND0003. Students who have not studied Chinese language during their secondary education / who have not attained the requisite level of competence in the Chinese language to take CENG1001 can apply (i) to take credit-bearing Cantonese or Putonghua language courses offered by the School of Chinese especially for international and exchange students; OR (ii) to be exempted from the Chinese language requirement and take an elective course in lieu.

core courses should be taken before breadth courses. Courses in Complementary Studies and UG 5 Requirements can be taken in any order.

First Year

The first-year syllabus shall normally include the following courses:

General Engineering Courses (Total 24 credits)

Either

ENGG1003 Mathematics I (6 credits)

or

ENGG1004 Mathematics IA (3 credits) *and* ENGG1005 Mathematics IB (3 credits)

ENGG1002 Computer programming and applications (6 credits)

ENGG1015 Introduction to electrical and electronic engineering (6 credits)

Additional 6 credits of General Engineering course from Group G

Discipline Core Courses (Total 27 credits)

ELEC1103 Electrical technology (3 credits)

ELEC1104 Electrical energy supply (3 credits)

ELEC1106 Electric power source (3 credits)

ELEC1401 Computer organization and microprocessors (6 credits)

ELEC1802 Engineering mathematics II (6 credits)

ELEC1306 Electric and electronic circuits (6 credits)

UG5 Requirements (Total 9 credits)

CAES1507 Professional and technical written communication for engineers (3 credits)

CAES1515 Professional and technical oral communication for engineers (3 credits)

CENG1001 Practical Chinese language course for engineering students (3 credits)

Training (6 credits)

ELEC1810 Workshop training (6 credits)

Second Year

The second-year syllabus shall normally include the following courses:

Discipline Core Courses (Total 24 credits)

ELEC2101 Power transmission and distribution (6 credits)

ELEC2102 Electric energy conversion (6 credits)

ELEC2103 Power electronics (6 credits)

ELEC2201 Signals and linear systems (6 credits)

Breadth Courses (Total 9 credits)

9 credits of Breadth Courses from Groups B-E

Complementary Studies (Total 6 credits)

- ELEC2802 Engineering organization and management (3 credits)
- ELEC2803 Engineering and society (3 credits)

UG5 Requirements (Total 12 credits)

Two Common Core Courses (12 credits)

Project (Total 6 credits)

- ELEC2805 Integrated project (EE) (6 credits)

Training (6 credits)

- ELEC1811 Industrial training (6 credits)
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Third Year

The third-year syllabus shall normally include the following courses:

Breadth Courses (Total 12 credits)

- 6 credits of Breadth Courses from Groups B-E
- 6 credits of Breadth Courses from Group F

Depth Courses (Total 18 credits)

- 18 credits of Depth Courses from Groups A-E, with at least 12 credits from Group A

Subject Elective (Total 6 credits)

- 6 credits of Subject Elective

Complementary Studies (Total 3 credits)

- ELEC2804 Engineering economics and finance (3 credits)

Project (Total 12 credits)

- ELEC3801 Technical project (12 credits)
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List of Courses by Subject Groups

Note:

- (1) Courses with similar contents are flagged as “mutually exclusive”. For each set of mutually exclusive courses, students are not allowed to take more than one course.
- (2) Besides undergraduate courses, some MSc courses may also be taken as *Subject Elective*. Each MSc course is counted as 3 credits. The list of permissible MSc courses is available from the Department.

Group A Electrical Energy

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ELEC1103	Electrical technology (core)	3	-	-
1	ELEC1104	Electrical energy supply (core)	3	-	-
1	ELEC1106	Electric power source (core) (mutually exclusive with ELEC1105 Electric power plant)	3	-	-
2	ELEC2101	Power transmission and distribution (core)	6	-	ELEC1104 (or ELEC1101)
2	ELEC2102	Electric energy conversion (core)	6	-	ELEC1103 (or ELEC1101)
2	ELEC2103	Power electronics (core)	6	-	-
3	ELEC3104	Electric vehicle technology	6	-	-
3	ELEC3105	Building services - electrical services	6	-	-
3	ELEC3106	Building services - electrical installations	6	-	-
3	ELEC3107	Power system analysis and control	6	ELEC2101	-
3	ELEC3108	Power system protection	3	ELEC2101	-
3	ELEC3109	Electric drives	3	ELEC1103 (or ELEC1101)	-
3	ELEC3110	Electric traction	3	ELEC1103 (or ELEC1101)	-

Group B Signals, Communications and Systems

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ELEC1201	Fundamental electromagnetic theory	3	-	-
2	ELEC2201	Signals and linear systems (core)	6	-	-
2	ELEC2202	Communications engineering	6	-	ELEC2201
2	ELEC2204	Digital signal processing	6	ELEC2201	-
2	ELEC2205	Control and instrumentation	6	-	ELEC2201
2	ELEC2206	Electromagnetic waves	3	ELEC1201	-
3	ELEC3201	Communication systems	6	ELEC2202	-
3	ELEC3203	Cellular radio and personal communication systems	6	ELEC2202	-
3	ELEC3204	Information theory and coding	6	-	-
3	ELEC3206	Control systems	6	ELEC2205	-
3	ELEC3216	Robotics	3	ELEC2205	-
3	ELEC3217	Mechatronics	3	-	-
3	ELEC3218	Communication signal processing	3	ELEC2201	-
3	ELEC3220	Speech processing	3	ELEC2201	-
3	ELEC3505	Image and video processing	6	ELEC2201	-

Group C Circuits and Electronics

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ELEC1304	Electronic devices	3	-	-
1	ELEC1306	Electric and electronic circuits (core)	6	-	-
2	ELEC2301	Analogue electronics	6	ELEC1305 or ELEC1306 or ELEC1614	-
2	ELEC2302	Digital system design	6	ELEC1611 or ENGG1015	-
2	ELEC2303	Design of digital integrated circuits	6	-	-
2	ELEC2304	Electronic materials and devices	3	ELEC1304 or ELEC1614	-

Group D Computer Systems

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ELEC1401	Computer organization and Microprocessors (core)	6	-	-
2	ELEC2401	Computer architecture	6	ELEC1401	-
2	ELEC2402	Computer communications	6	-	-
2	ELEC2701	Internet technologies and applications	6	ELEC2402	-
3	ELEC3401	Advanced internet technologies	6	CSIS0234 or ELEC2701	-

Group E Software and Information Technology Applications

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ELEC1502	Object oriented programming and data structures (mutually exclusive with CSIS1119, CSIS0396)	3	-	-
2	CSIS0278	Introduction to database management systems	6	CSIS1119 or ELEC1501 or ELEC1502	-
2	ELEC2501	Software engineering and operating systems	6	-	-
2	ELEC2603	Systems and network programming (mutually exclusive with ELEC3628, CSIS0402)	6	ELEC1501 or ELEC1502 or (CSIS1119 & CSIS 0396)	-
3	ELEC3503	Fuzzy systems and neural networks	6	-	-

Group F Mathematics

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ELEC1802	Engineering mathematics II (core)	6	-	-
1	ELEC1807	Discrete mathematics (mutually exclusive with: ENGG1007, CSIS1118)	3	-	-
2	ELEC2808	Differential equations	3	-	-
2	ELEC2809	Numerical methods	3	-	-
2	ELEC2810	Optimization methods	3	-	-
2	ELEC2811	Probability and statistics	3	-	-

Group G General Engineering

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ENGG1002	Computer programming and applications	6	-	-
1	ENGG1003	Mathematics I	6	-	-
1	ENGG1004	Mathematics IA (mutually exclusive with ENGG1003)	3	-	-
1	ENGG1005	Mathematics IB (mutually exclusive with ENGG1003)	3	-	-
1	ENGG1006	Engineering for sustainable development	6	-	-
1	ENGG1007	Foundations of computer science (mutually exclusive with: ELEC1807, CSIS1118)	6	-	-
1	ENGG1009	Industrial management and logistics	6	-	-
1	ENGG1010	Foundations of engineering mechanics	6	-	-
1	ENGG1011	Introduction to biomedical engineering	6	-	-
1	ENGG1015	Introduction to electrical and electronic engineering	6	-	-

Group H Complementary Studies

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
2	ELEC2802	Engineering organization and management	3	-	-
2	ELEC2803	Engineering and society	3	-	-
2	ELEC2804	Engineering economics and finance	3	-	-

Group I Others

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ELEC1810	Workshop training	6	-	-
1	ELEC1811	Industrial training	6	-	-
2	ELEC2805	Integrated project (EE)	6	-	-

3	ELEC3801	Technical project	12	-	-
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Descriptions of each course are available in the section following the syllabus of INFORMATION ENGINEERING

ELECTRONIC AND COMMUNICATIONS ENGINEERING

SYLLABUS

This syllabus applies to students admitted in the academic year 2010-11 and thereafter.

Definitions and Terminology

Each course offered by the Department of Electrical and Electronic Engineering shall be classified as either introductory level course or advanced level course, and be assigned a Level --- One, Two or Three, in which Level One courses are introductory courses whereas advanced courses includes Level Two and Three courses.

All courses are grouped into the following 7 Subject Groups:

- A. Electronics and Communications
- B. Signal Processing and Systems
- C. Computer Systems, Software & IT Applications
- D. Mathematics
- E. General Engineering
- F. Complementary Studies
- G. Others

A Discipline Core course is a compulsory course which a candidate must pass in the manner provided for in the Regulations. A Breadth Course is a Level 1 or Level 2 course which is offered in one of the subject groups as an optional course for the curriculum. A Depth course is a Level 3 course offered in one of the subject groups as an optional course for the curriculum. Level 1 courses are Introductory Courses, while Level 2 and Level 3 courses are Advanced Courses.

Subject Elective refers to any **technical** (i.e., non-complimentary studies) course offered to ANY degree curriculum by the Department of Electrical and Electronic Engineering, provided that it does not overlap significantly with other courses that the student has already enrolled. Courses offered by other Departments *will not* be accepted as Subject Elective unless special prior approval from the Department of Electrical and Electronic Engineering has been obtained before enrolment. Courses listed in Group E (General Engineering Courses) *will not* be accepted as Subject Elective.

The Curriculum

The curriculum comprises 180 credits of courses as follows:

- (a) 24 credits from General Engineering courses, including:
 - (i) ENGG1002 Computer programming and applications; AND
 - (ii) ENGG1003 Mathematics I or both ENGG1004 Mathematics IA and ENGG1005 Mathematics IB; AND
 - (iii) ENGG1015 Introduction to electrical and electronic engineering; AND
 - (iv) An additional 6-credit General Engineering course from Group E
- (b) 45 credits of Discipline Core Courses from Groups A-D

- (c) 45 credits of Breadth and Depth Courses comprising:
 - (i) 15 credits of Breadth Courses selected from Groups A-C
 - (ii) 6 credits of Breadth Courses from Group D
 - (iii) 18 credits of Depth Courses selected from Groups A-C with at least 12 credits selected from Group A and/or Group B
 - (iv) 6 credits of Breadth or Depth Course(s) selected from Groups A-C and G
- (d) 9 credits of complementary studies courses comprising:
 - (i) ELEC2802 Engineering organization and management (3 credits)
 - (ii) ELEC2803 Engineering and society (3 credits)
 - (iii) ELEC2804 Engineering economics and finance (3 credits)
- (e) 6 credits in Subject Electives (6 credits)
- (f) ELEC2812 Integrated project (6 credits)
- (g) ELEC3801 Technical project (12 credits)
- (h) ELEC1810 Workshop training (6 credits)
- (i) ELEC1811 Industrial training (6 credits)
- (j) UG5 requirements (21 credits):
 - (i) CAES1507 Professional and technical written communication for engineers¹ (3 credits)
 - (ii) CAES1515 Professional and technical oral communication for engineers (3 credits)
 - (iii) CENG1001 Practical Chinese language course for engineering students² (3 credits)
 - (iv) 12 credits of courses in the Common Core Curriculum, selecting no more than one course from each Area of Inquiry

To complete the degree requirement, a candidate must pass all the courses specified in the Curriculum and satisfy any other requirements as stipulated in the University or Faculty of Engineering regulations.

Degree Classification

The best 180 credits satisfying the Curriculum described above shall be taken into account for degree classification.

Order of Study

Order of study is dictated by prerequisite and co-requisite requirements. Generally, Level 1 courses should be taken before Level 2 courses, Level 2 courses should be taken before Level 3 courses and core courses should be taken before breadth courses. Courses in Complementary Studies and UG5 Requirements can be taken in any order.

First Year

The first-year syllabus shall include the following courses:

¹ Students pursuing double-degrees in BEng/BBA should take CAES1907 in lieu of CAES1507

² Putonghua-speaking students should take CUND0002 or CUND0003. Students who have not studied Chinese language during their secondary education / who have not attained the requisite level of competence in the Chinese language to take CENG1001 can apply (i) to take credit-bearing Cantonese or Putonghua language courses offered by the School of Chinese especially for international and exchange students; OR (ii) to be exempted from the Chinese language requirement and take an elective course in lieu.

General Engineering Courses (Total 24 credits)

Either

ENGG1003 Mathematics I (6 credits)

or

ENGG1004 Mathematics IA (3 credits) *and* ENGG1005 Mathematics IB (3 credits)

ENGG1002 Computer programming and applications (6 credits)

ENGG1015 Introduction to electrical and electronic engineering (6 credits)

Additional 6 credits of General Engineering course from Group E

Discipline Core Courses (Total 27 credits)

ELEC1201 Fundamental electromagnetic theory (3 credits)

ELEC1401 Computer organization and microprocessors (6 credits)

ELEC1502 Object oriented programming and data structures (3 credits)

ELEC1306 Electric and electronic circuits (6 credits)

ELEC1304 Electronic devices (3 credits)

ELEC1802 Engineering mathematics II (6 credits)

UG5 Requirements (Total 9 credits)

CAES1507 Professional and technical written communication for engineers (3 credits)¹

CAES1515 Professional and technical oral communication for engineers (3 credits)

CENG1001 Practical Chinese language course for engineering students (3 credits)²

Training (Total 6 credits)

ELEC1810 Workshop training (6 credits)

Second Year

The second-year syllabus shall normally include the following courses:

Discipline Core Courses (Total 18 credits)

ELEC2201 Signals and linear systems (6 credits)

ELEC2202 Communications engineering (6 credits)

ELEC2501 Software engineering and operating systems (6 credits)

Breadth Courses (Total 15 credits)

15 credits of Breadth Courses from Groups A-C

Complementary Studies (Total 6 credits)

ELEC2802 Engineering organization and management (3 credits)

ELEC2803 Engineering and society (3 credits)

¹ Students pursuing double-degrees in BEng/BBA should take CAES1907 in lieu of CAES1507² Putonghua-speaking students should take CUND0002 or CUND0003. Students who have not studied Chinese language during their secondary education / who have not attained the requisite level of competence in the Chinese language to take CENG1001 can apply (i) to take credit-bearing Cantonese or Putonghua language courses offered by the School of Chinese especially for international and exchange students; OR (ii) to be exempted from the Chinese language requirement and take an elective course in lieu.

UG5 Requirements (Total 12 credits)

Two Common Core Courses (12 credits)

Project (Total 6 credits)

ELEC2812 Integrated project (EComE) (6 credits)

Training (Total 6 credits)

ELEC1811 Industrial training (6 credits)

Third Year

The third-year syllabus shall normally include the following courses:

Breadth/Depth Courses (Total 30 credits)

6 credits of Breadth Courses from Group D
 6 credits of Breadth/Depth course in Groups A-C and G (6 credits)
 18 credits of Depth courses in Groups A-C (18 credits)
 (with at least 12 credits chosen from Group A and/or Group B)

Subject Elective (Total 6 credits)

6 credits of Subject Elective

Complementary Studies (Total 3 credits)

ELEC2804 Engineering economics and finance (3 credits)

Project (Total 12 credits)

ELEC3801 Technical project (12 credits)

List of Courses by Subject Groups

Note:

- (1) Courses with similar contents are flagged as "mutually exclusive". For each set of mutually exclusive courses, students are not allowed to take more than one course.
- (2) Besides undergraduate courses, some MSc courses may also be taken as *Subject Elective*. Each MSc course is counted as 3 credits. The list of permissible MSc courses is available from the Department.

Group A Electronics and Communications

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ELEC1201	Fundamental electromagnetic theory (core)	3	-	-
1	ELEC1304	Electronic devices (core)	3	-	-

1	ELEC1306	Electric and electronic circuits (core)	6	-	-
2	ELEC2103	Power Electronics	6	-	-
2	ELEC2202	Communications engineering (core)	6	-	ELEC2201
2	ELEC2206	Electromagnetic waves	3	ELEC1201	-
2	ELEC2301	Analogue electronics	6	ELEC1306 or ELEC1305 or ELEC1614	-
2	ELEC2302	Digital system design	6	ELEC1611 or ENGG1015	-
2	ELEC2303	Design of digital integrated circuits	6	-	-
2	ELEC2304	Electronic materials and devices	3	ELEC1304 or ELEC1614	-
3	ELEC3201	Communication systems	6	ELEC2202	-
3	ELEC3203	Cellular radio and personal communication systems	6	ELEC2202	-
3	ELEC3204	Information theory and coding	6	-	-
3	ELEC3214	Microwave engineering	3	ELEC2203 or ELEC2206	-
3	ELEC3215	Fibre optics	3	ELEC2203 or ELEC2206	-
3	ELEC3612	VLSI design principles	6	-	-

Group B Signal Processing and Systems

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
2	ELEC2201	Signals and linear systems (core)	6	-	-
2	ELEC2204	Digital signal processing	6	ELEC2201	-
2	ELEC2205	Control and instrumentation	6	-	ELEC2201
3	ELEC3206	Control systems	6	ELEC2205	-
3	ELEC3216	Robotics	3	ELEC2205	-
3	ELEC3217	Mechatronics	3	-	-
3	ELEC3218	Communication signal processing	3	ELEC2201	-
3	ELEC3220	Speech processing	3	ELEC2201	-
3	ELEC3505	Image and video processing	6	ELEC2201	-

Group C Computer Systems, Software and IT applications

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ELEC1401	Computer organization and microprocessors (core)	6	-	-
1	ELEC1502	Object oriented programming and data structures (mutually exclusive with CSIS1119, CSIS0396) (core)	3	-	-
2	CSIS0278	Introduction to database management systems	6	CSIS1119 or ELEC1501 or	-

2	ELEC2401	Computer architecture	6	ELEC1502 ELEC1401	-
2	ELEC2402	Computer communications	6	-	-
2	ELEC2501	Software engineering and operating systems (core)	6	-	-
2	ELEC2603	Systems and network programming (mutually exclusive with ELEC3628, CSIS0402)	6	ELEC1501 or ELEC1502 or (CSIS1119 & CSIS 0396)	-
2	ELEC2701	Internet technologies and applications	6	ELEC2402	-
3	ELEC3401	Advanced internet technologies	6	CSIS0234 or ELEC2701	-
3	ELEC3503	Fuzzy systems and neural networks	6	-	-

Group D Mathematics

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ELEC1802	Engineering mathematics II (core)	6	-	-
1	ELEC1807	Discrete mathematics (mutually exclusive with: ENGG1007, CSIS1118)	3	-	-
2	ELEC2808	Differential equations	3	-	-
2	ELEC2809	Numerical methods	3	-	-
2	ELEC2810	Optimization methods	3	-	-
2	ELEC2811	Probability and statistics	3	-	-

Group E General Engineering

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ENGG1002	Computer programming and applications	6	-	-
1	ENGG1003	Mathematics I	6	-	-
1	ENGG1004	Mathematics IA (mutually exclusive with ENGG1003)	3	-	-
1	ENGG1005	Mathematics IB (mutually exclusive with ENGG1003)	3	-	-
1	ENGG1006	Engineering for sustainable development	6	-	-
1	ENGG1007	Foundation of computer science (mutually exclusive with: ELEC1807, CSIS1118)	6	-	-
1	ENGG1009	Industrial management and logistics	6	-	-
1	ENGG1010	Foundations of engineering mechanics	6	-	-
1	ENGG1011	Introduction to biomedical engineering	6	-	-

1	ENGG1015	Introduction to electrical and electronic engineering	6	-	-
<hr/>					
Group F		Complementary studies			
<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
2	ELEC2802	Engineering organization and management	3	-	-
2	ELEC2803	Engineering and society	3	-	-
2	ELEC2804	Engineering economics and finance	3	-	-
<hr/>					
Group G		Others			
<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ELEC1103	Electrical technology	3	-	-
1	ELEC1104	Electrical energy supply	3	-	-
1	ELEC1106	Electric power source (mutually exclusive with ELEC1105 Electric power plant)	3	-	-
1	ELEC1810	Workshop training	6	-	-
1	ELEC1811	Industrial training	6	-	-
2	ELEC2812	Integrated project (EComE)	6	-	-
3	ELEC3801	Technical project	12	-	-

Descriptions of each course are available in the section following the syllabus of INFORMATION ENGINEERING

INFORMATION ENGINEERING

SYLLABUS

This syllabus applies to students admitted in the academic year 2010-11 and thereafter.

Definitions and Terminology:

Each course offered by the Department of Electrical and Electronic Engineering shall be classified as either introductory level course or advanced level course, and be assigned a Level --- One, Two or Three, in which Level One courses are introductory courses whereas advanced courses includes Level Two and Three courses.

All subject-related courses are grouped into the following 9 Subject Groups:

- A. Communications Systems
- B. Signal Processing and Systems
- C. Circuits & Electronics
- D. Computer Systems, Software & IT Applications
- E. Business and Management in IT Industry
- F. Mathematics
- G. General Engineering

- H. Complementary Studies
- I. Others

A Discipline Core course is a compulsory course that a candidate must pass in the manner provided for in the Regulations. A Breadth Course is a Level 1 or Level 2 course which is offered in one of the subject groups as an optional course for the curriculum. A Depth course is a Level 3 course offered in one of the subject groups as an optional course for the curriculum. Level 1 courses are Introductory Courses, while Level 2 and Level 3 courses are Advanced Courses.

Subject Elective refers to any **technical** (i.e., non-complimentary studies) course offered to ANY degree curriculum by the Department of Electrical and Electronic Engineering, provided that it does not overlap significantly with other courses that the student has already enrolled. Courses offered by other Departments *will not* be accepted as Subject Elective unless special prior approval from the Department of Electrical and Electronic Engineering has been obtained before enrolment. Courses listed in Group G (General Engineering Courses) *will not* be accepted as Subject Elective.

The Curriculum

The curriculum comprises of 180 credits of courses as follows:

- (a) 24 credits from General Engineering courses, including:
 - (i) ENGG1002 Computer programming and applications; AND
 - (ii) ENGG1003 Mathematics I or
both ENGG1004 Mathematics IA and ENGG1005 Mathematics IB; AND
 - (iii) ENGG1015 Introduction to electrical and electronic engineering; AND
 - (iv) An additional 6-credits of General Engineering course from Group G
- (b) 63 credits of Discipline Core Courses from Groups A-F
- (c) Additional 6 credits from Group E
- (d) 6 credits in Subject Elective
- (e) 27 credits of Breadth and Depth Courses comprising:
 - (i) 12 credits of Depth Courses from Groups A-D; *and*
 - (ii) 15 credits of Breadth or Depth Courses from Groups A,B,C,D and F, of which no more than 6 credits from Group F.
- (f) The Complementary Studies course ELEC2803 Engineering and society (3 credits)
- (g) ELEC2807 Integrated project (6 credits)
- (h) ELEC3801 Technical project (12 credits)
- (i) ELEC1810 Workshop training (6 credits)
- (j) ELEC1811 Industrial training (6 credits)
- (k) UG5 requirements (21 credits):
 - (i) CAES1507 Professional and technical written communication for engineers¹ (3 credits)
 - (ii) CAES1515 Professional and technical oral communication for engineers (3 credits)
 - (iii) CENG1001 Practical Chinese language course for engineering students² (3 credits)
 - (iv) 12 credits of courses in the Common Core Curriculum, selecting no more than one course from each Area of Inquiry

¹ Students pursuing double-degrees in BEng/BBA should take CAES1907 in lieu of CAES1507

² Putonghua-speaking students should take CUND0002 or CUND0003. Students who have not studied Chinese language during their secondary education / who have not attained the requisite level of competence in the Chinese language to take CENG1001 can apply (i) to take credit-bearing Cantonese or Putonghua language courses offered by the School of Chinese especially for international and exchange students; OR (ii) to be exempted from the Chinese language requirement and take an elective course in lieu.

To complete the degree requirement, a candidate must pass all the courses specified in the Curriculum and satisfy any other requirements as stipulated in the University or Faculty of Engineering regulations.

Degree Classification

The best 180 credits satisfying the Curriculum described above shall be taken into account for degree classification.

Order of Study

Order of study is dictated by prerequisite and co-requisite requirements. Generally, Level 1 courses should be taken before Level 2 courses, Level 2 courses should be taken before Level 3 courses and core courses should be taken before breadth courses. Courses in Complementary Studies and UG5 Requirements can be taken in any order.

First Year

The first-year syllabus shall include the following courses:

General Engineering Courses (Total 24 credits)

Either

ENGG1003 Mathematics I (6 credits)

or

ENGG1004 Mathematics IA (3 credits) *and* ENGG1005 Mathematics IB (3 credits)

ENGG1002 Computer programming and applications (6 credits)

ENGG1015 Introduction to electrical and electronic engineering (6 credits)

Additional 6 credits of General Engineering course from Group G

Discipline Core Courses (Total 27 credits)

ELEC1306 Electric and electronic circuits (6 credits)

ELEC1401 Computer organization and microprocessors (6 credits)

ELEC1502 Object oriented programming and data structures (3 credits)

ELEC1802 Engineering mathematics II (6 credits)

BUSI1007 Principles of management (6 credits)

UG5 Requirements (Total 9 credits)

CAES1507 Professional and technical written communication for engineers (3 credits)¹

CAES1515 Professional and technical oral communication for engineers (3 credits)

CENG1001 Practical Chinese language course for engineering students (3 credits)²

¹ Students pursuing double-degrees in BEng/BBA should take CAES1907 in lieu of CAES1507

² Putonghua-speaking students should take CUND0002 or CUND0003. Students who have not studied Chinese language during their secondary education / who have not attained the requisite level of competence in the Chinese language to take CENG1001 can apply (i) to take credit-bearing Cantonese or Putonghua language courses offered by the School of Chinese especially for international and exchange students; OR (ii) to be exempted from the Chinese language requirement and take an elective course in lieu.

Training (Total 6 credits)

ELEC1810 Workshop training (6 credits)

Second Year

The second-year syllabus shall normally include the following courses:

Discipline Core Courses (Total 36 credits)

ELEC2201 Signals and linear systems (6 credits)
ELEC2202 Communications engineering (6 credits)
ELEC2402 Computer communications (6 credits)
ELEC2501 Software engineering and operating systems (6 credits)
ELEC2701 Internet technologies and applications (6 credits)
ELEC2811 Probability and statistics (3 credits)

Choose one out of the following:

ELEC1807 Discrete mathematics (3 credits)
ELEC2808 Differential equations (3 credits)
ELEC2809 Numerical methods (3 credits)
ELEC2810 Optimization methods (3 credits)

UG5 Requirements (Total 12 credits)

Two Common Core Courses (12 credits)

Complementary Studies (Total 3 credits)

ELEC2803 Engineering and society (3 credits)

Project (Total 6 credits)

ELEC2807 Integrated project (InfoE) (6 credits)

Training (Total 6 credits)

ELEC1811 Industrial training (6 credits)

Third Year

The third-year syllabus shall normally include the following courses:

Breadth/Depth Courses (Total 27 credits)

27 credits of breadth/depth courses selected according to item (e) of the curriculum.

Business and Related Studies (Total 6 credits)

6 credits of course from Group E

Subject Elective (Total 6 credits)

6 credits in Subject Elective

Project (Total 12 credits)

ELEC3801 Technical project (12 credits)

List of Courses by Subject Groups

Note:

- (1) Courses with similar contents are flagged as "mutually exclusive". For each set of mutually exclusive courses, students are not allowed to take more than one course.
- (2) Besides undergraduate courses, some MSc courses may also be taken as Subject Elective. Each MSc course is counted as 3 credits. The list of permissible MSc courses is available from the Department.

Group A Communications Systems

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ELEC1201	Fundamental electromagnetic theory	3	-	-
2	ELEC2202	Communications engineering (core)	6	-	ELEC2201
3	ELEC3201	Communication systems	6	ELEC2202	-
3	ELEC3203	Cellular radio and personal communication systems	6	ELEC2202	-
3	ELEC3204	Information theory and coding	6	-	-

Group B Signal Processing and Systems

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
2	ELEC2201	Signals and linear systems (core)	6	-	-
2	ELEC2204	Digital signal processing	6	ELEC2201	-
3	ELEC3212	Speech recognition	6	ELEC2204	-
3	ELEC3218	Communication signal processing	3	ELEC2201	-
3	ELEC3220	Speech processing	3	ELEC2201	-
3	ELEC3505	Image and video processing	6	ELEC2201	-

Group C Circuits and Electronics

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ELEC1304	Electronic devices	3	-	-
1	ELEC1306	Electric and electronic circuits (core)	6	-	-

2	ELEC2301	Analogue electronics	6	ELEC1306 or ELEC1305 or ELEC1614	-
2	ELEC2302	Digital system design	6	ELEC1611 or ENGG1015	-
2	ELEC2303	Design of digital integrated circuits	6	-	-
3	ELEC3612	VLSI design principles	6	-	-

Group D Computer Systems, Software and IT Applications

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ELEC1401	Computer organization and microprocessor (core)	6	-	-
1	ELEC1502	Object oriented and data structures (core) (mutually exclusive with CSIS1119, CSIS0396)	3	-	-
2	CSIS0278	Introduction to database management systems	6	CSIS1119 or ELEC1501 or ELEC1502	-
2	ELEC2401	Computer architecture	6	ELEC1401	-
2	ELEC2402	Computer communications (core)	6	-	-
2	ELEC2501	Software engineering and operating systems (core)	6	-	-
2	ELEC2601	Human computer interaction	6		-
2	ELEC2603	Systems and network programming (mutually exclusive with ELEC3628, CSIS0402)	6	ELEC1501 or ELEC1502 or (CSIS1119 & CSIS 0396)	-
2	ELEC2701	Internet technologies and applications (core)	6	ELEC2402	-
3	CSIS0250	Design and analysis of algorithms	6	CSIS1119 or ELEC1501 or ELEC1502 (Pre- or Co-requisites)	
3	CSIS0323	Advanced database Systems	6	CSIS0278	-
3	ELEC3401	Advanced internet technologies	6	CSIS0234 or ELEC2701	-
3	ELEC3503	Fuzzy systems and neural networks	6	-	-
3	ELEC3621	Introduction to parallel programming	3	ELEC2401	-
3	ELEC3622	Distributed computing systems	3	(ELEC2501 or CSIS0230) & (ELEC2402 or CSIS0234)	-
3	ELEC3626	Computer network security (mutually exclusive with CSIS0327)	3	ELEC2402 or CSIS0234	-

Group E Business and Management in IT-Industry

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	BUSI1007	Principles of management (core)	6	-	-
2	FINA1003	Corporate finance	6	-	-
2	BUSI0023	Operations and quality management	6	-	-
2	BUSI1001	Business law	6	-	-

Group F Mathematics

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ELEC1802	Engineering mathematics II (core)	6	-	-
1	ELEC1807	Discrete mathematics (mutually exclusive with: ENGG1007, CSIS1118)	3	-	-
2	ELEC2808	Differential equations	3	-	-
2	ELEC2809	Numerical methods	3	-	-
2	ELEC2810	Optimization methods	3	-	-
2	ELEC2811	Probability and statistics (core)	3	-	-
3	ELEC3703	Queuing theory	3	ELEC2811	-
3	ELEC3704	System modeling and performance analysis	3	ELEC3703	-

Group G: General Engineering

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ENGG1002	Computer programming and applications	6	-	-
1	ENGG1003	Mathematics I	6	-	-
1	ENGG1004	Mathematics IA (mutually exclusive with ENGG1003)	3	-	-
1	ENGG1005	Mathematics IB (mutually exclusive with ENGG1003)	3	-	-
1	ENGG1006	Engineering for sustainable development	6	-	-
1	ENGG1007	Foundations of computer science (mutually exclusive with: ELEC1807, CSIS1118)	6	-	-
1	ENGG1009	Industrial management and logistics	6	-	-
1	ENGG1010	Foundations of engineering mechanics	6	-	-
1	ENGG1011	Introduction to biomedical engineering	6	-	-
1	ENGG1015	Introduction to Electrical and	6	-	-

Electronic Engineering (core)

Group H Complementary studies

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
2	ELEC2803	Engineering and society	3	-	-

Group I Others

<u>Level</u>	<u>Code</u>	<u>Course Title</u>	<u>Credits</u>	<u>Prerequisite</u>	<u>Co-requisite</u>
1	ELEC1810	Workshop training	6	-	-
1	ELEC1811	Industrial training	6	-	-
2	ELEC2807	Integrated project (InfoE)	6	-	-
3	ELEC3801	Technical project	12	-	-

Minor in Electrical and Electronic Engineering

Candidates who are interested in pursuing minor in Electrical and Electronic Engineering must satisfy the following prerequisites:

- Passed in HKALE Pure Mathematics and
- Passed in HKAL/AS Physics/Engineering Science

Candidates are required to complete a total of 36 credits of courses in the following manner:

<u>Code</u>	<u>Course Name</u>	<u>Credits</u>
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(i) 12 credits of core courses

ELEC1306	Electric and Electronic circuits	6
ENGG1015	Introduction to electrical and electronic engineering*	6

(ii) 24 credits of discipline elective courses selected from the following:

ELEC1103	Electrical technology	3
ELEC1104	Electrical energy supply	3
ELEC1106	Electric power source	3
ELEC1201	Fundamental EM theory	3
ELEC1304	Electronic devices	3
ELEC1401	Computer organization and microprocessors	6
ELEC1502	Object oriented programming and data structures	3
ELEC2101	Power transmission and distribution	6
ELEC2102	Electric energy conversion	6
ELEC2103	Power electronics	6
ELEC2201	Signals and linear systems	6
ELEC2202	Communications Engineering	6
ELEC2204	Digital signal processing	6
ELEC2205	Control and instrumentation	6
ELEC2206	Electromagnetic waves	3

ELEC2301	Analog electronics	6
ELEC2302	Digital system design	6
ELEC2303	Design of digital integrated circuits	6
ELEC2304	Electronic materials and devices	3
ELEC2401	Computer architecture	6
ELEC2402	Computer communications	6
ELEC2501	Software engineering & operating systems	6
ELEC2601	Human computer interaction	6
ELEC2603	Systems and network programming	6
ELEC2701	Internet technologies and applications	6

*Students opting for the Minor cannot use the course “ENGG1015 Introduction to electrical and electronic engineering” as satisfying the requirements of the General Engineering Course.

Double-Degrees in BEng/BBA

Candidates pursuing studies for the double-degrees in BEng/BBA curriculum are required to satisfy all the requirement of the above BEng curriculum and pass 54 credits of courses as listed below:

Course Code	Course	Credits
BUSI1002	Introduction to accounting	6
BUSI1003	Introduction to management information system	6
BUSI1004	Marketing	6
BUSI1007	Principles of management	6
ECON1001	Introduction to economics I	6
FINA1003	Corporate finance	6
BUSI0027	Management accounting I	6
	Business Electives (Any 2 courses in Finance, HRM or Marketing major)	12
	Total	54

Exemption rule for the curricula of BEng in Computer Engineering (CE), Electronic and Communications Engineering (EComE) and Electrical Engineering (EE)

For students pursuing the BEng/BBA double-degrees option, they are deemed to have satisfied 6 credits of Complementary Studies (ELEC2802 Engineering organization and management and ELEC2804 Engineering economics and finance), 6 credits of Workshop Training (ELEC1810), 6 credits of Breadth Courses and 6 credits of Subject Elective after they have successfully completed 24 credits of courses from the following list. The students are also exempted from taking “CAES1507 Professional and technical written communication for engineers” after they have successfully completed the course “CAES1907 Business communication”.

Course Code	Course	Credits
BUSI1002	Introduction to accounting	6
BUSI1003	Introduction to management information systems	6
BUSI1004	Marketing	6
BUSI1007	Principles of management	6
ECON1001	Introduction to economics I	6
FINA1003	Corporate finance	6
BUSI0027	Management accounting I	6

Exemption rule for the curriculum of BEng in Information Engineering (InfoE)

For students pursuing the BEng/BBA double-degrees option, they are deemed to have satisfied 12 credits of Group E courses, 6 credits of Workshop Training (ELEC1810), and 6 credits of Subject Elective after they have successfully completed 24 credits of courses from the following list. The students are also exempted from taking “CAES1507 Professional and technical written communication for engineers” after they have successfully completed the course “CAES1907 Business communication”.

Course Code	Course	Credits
BUSI1002	Introduction to accounting	6
BUSI1003	Introduction to management information systems	6
BUSI1004	Marketing	6
BUSI1007	Principles of management	6
ECON1001	Introduction to economics I	6
FINA1003	Corporate finance	6
BUSI0027	Management accounting I	6

For descriptions of each course, please see below.

Descriptions of the courses offered by the Department of Electrical and Electronic Engineering for the four specialisms: Computer Engineering, Electrical Engineering, Electronic and Communications Engineering, and Information Engineering.

Level One

ELEC1101. Fundamentals of electrical engineering (6 credits)

Electrostatic and magnetostatic fields, magnetic properties of materials and magnetic circuits, electromagnetic induction, electromagnetic radiation, electrical energy transmission, power transformer, basic electrical instrumentation.

Assessment: 20% continuous assessment, 80% examination

ELEC1103. Electrical technology (3 credits)

Single-phase and three-phase systems, transformers, rotating machines, analogue and digital instruments and measurement, application of electrical technology.

Assessment: 10% practical work, 90% examination

ELEC1104. Electrical energy supply (3 credits)

Energy perspectives, transmission and distribution of electrical energy, energy management, the local industry.

Assessment: 10% practical work, 90% examination

ELEC1106. Electric power source (3 credits)

Thermal power, nuclear power, hydro power, wind power, solar energy, other renewable energy sources, distributed generation.

(mutually exclusive with ELEC1105 Electric power plant)

Assessment: 100% examination

ELEC1201. Fundamental electromagnetic theory (3 credits)

Electrostatic and magnetostatic fields; capacitance and inductance; magnetic and dielectric materials; simple magnetic circuits, introduction of Maxwell's equations.

Assessment: 25% continuous assessment, 75% examination

ELEC1304. Electronic devices (3 credits)

Quantum theory; solid-state theory; PN junction theory; bipolar junction transistor; field-effect devices including JFET, MESFET and MOSFET.

Assessment: 10% practical work, 20% continuous assessment, 70% examination

ELEC1306. Electric and electronic circuits (6 credits)

Electronic circuits: Kirchhoff's laws, Thevenin and Norton theorems, superposition, mesh and nodal analyses; ideal operational amplifiers; d.c. circuit analysis; a.c. circuit analysis.

Electronic circuits: diode circuits; analyses of BJT and FET amplifiers; digital circuits.

Combinational logic elements and design; sequential circuits; application examples of digital circuits.

Assessment: 20% practical work, 20% continuous assessment, 60% examination

ELEC1401. Computer organization and microprocessors (6 credits)

Integer and floating point number representations; brief introduction to digital circuits; memory cells and systems; basic computer building blocks; register transfers and phases of instruction execution; micro-computer system organization - bus signals, timing, and address decoding; study of a simple model microprocessor: signals, instruction set and addressing modes; subroutines; reentrancy; context switching; I/O programming; interrupt I/O and DMA; exception handling; assembler, linker and loader.

Assessment: 10% practical work, 20% continuous assessment, 70% examination

ELEC1502. Object oriented programming and data structures (3 credits)

This course aims to provide students with solid background on Java software development. The course covers basic concepts of object oriented programming including inheritance, polymorphism, exception handling, multithreading, data structures in object oriented system implementations.

(Mutually exclusive with CSIS1119 Introduction to data structures and algorithms, CSIS0396 Object-oriented programming and Java)

Assessment: 40% continuous assessment, 60% examination

ELEC1802. Engineering mathematics II (6 credits)

Complex variables, Fourier series and transforms, numerical methods, probability and statistics.

Assessment: 20% continuous assessment, 80% examination

ELEC1807. Discrete mathematics (3 credits)

Basic concepts, algorithms, recurrence relations, relations, graphs and trees.
(mutually exclusive with: ENGG1007, CSIS1118)

Assessment: 60% continuous assessment, 40% examination

ELEC1810. Workshop training (6 credits)

Assessment: 100% continuous assessment

ELEC1811. Industrial training (6 credits)

Assessment: 100% continuous assessment

Level Two**ELEC2101. Power transmission and distribution (6 credits)**

Overhead lines and underground cables; transformers; generators and excitation systems; transmission system steady-state operation; control of power and frequency; control of voltage and reactive power; power system faults analysis; fundamentals of power system stability; substations and protection; power system economics and management.

Co-requisite: ELEC1101 Fundamentals of electrical engineering or ELEC1104 Electrical power plants

Assessment: 10% practical work, 90% examination

ELEC2102. Electric energy conversion (6 credits)

Electric machines: synchronous machines; induction machines; dc machines; special machines. Electric heating: resistive heating; induction heating; dielectric heating. Lighting: incandescent lamps; discharge lamps. Electrochemistry: batteries; fuel cells.

Co-requisite: ELEC1101 Fundamentals of electrical engineering or ELEC1103 Electrical technology

Assessment: 15% practical work, 10% continuous assessment, 75% examination

ELEC2103. Power electronics (6 credits)

Power Semiconductor Devices, AC to DC conversion, AC to AC conversion, DC to DC conversion, DC to AC conversion, computer simulations, practical converter design.

Assessment: 20% continuous assessment, 80% examination

ELEC2201. Signals and linear systems (6 credits)

Linear time-invariant systems; continuous-time signals; convolution; frequency response; time-domain and frequency-domain representation of discrete-time signals and systems; continuous and discrete Fourier transform; z-transform; A/D and D/A conversion; sampling and reconstruction; digital filters.

Assessment: 20% practical work, 10% continuous assessment, 70% examination

ELEC2202. Communications engineering (6 credits)

Communications system models, properties of signals, baseband transmission, analogue signal transmission, digital transmissions of analogue signals, digital and analogue communications systems, transmission line theory.

Co-requisite: ELEC2201 Signals and linear systems

Assessment: 20% practical work, 20% continuous assessment, 60% examination

ELEC2204. Digital signal processing (6 credits)

Applications of digital signal processing, discrete-time signal and system, design of digital filters, DFT and fast algorithms, digital signal processing using Matlab, fundamentals of random signals, spectral estimation, adaptive signal processing, digital signal processors.

Prerequisite: ELEC2201 Signals and linear systems

Assessment: 20% practical work, 20% continuous assessment, 60% examination

ELEC2205. Control and instrumentation (6 credits)

Introduction to control systems; principles of feedback; root-locus method; frequency-response design methods; state-space methods; control system software; digital control; measurement systems; electromagnetic compatibility; data acquisition.

Co-requisite: ELEC2201 Signals and linear systems

Assessment: 15% practical work, 85% examination

ELEC2206. Electromagnetic waves (3 credits)

Review of time harmonic vectors and fields; Maxwell's equations; uniform plane waves; reflection and transmission of waves, introduction to waveguides and antennas.

Prerequisite: ELEC1201 Fundamental electromagnetic theory

Assessment: 10% practical work, 40% continuous assessment, 50% examination

ELEC2301. Analogue electronics (6 credits)

FET amplifiers; frequency responses of amplifiers; differential and multistage amplifiers; feedback amplifiers; active filters and tuned amplifiers; oscillators; regulators; A/D and D/A converters.

Prerequisite: ELEC1306 Electric and electronic circuits or ELEC1305 Electronic circuits or ELEC1614 Electronic devices and circuits

Assessment: 10% practical work, 20% continuous assessment, 70% examination

ELEC2302. Digital system design (6 credits)

Digital system concepts and digital components; digital design using discrete and programmable devices; high speed digital system design considerations; Hardware Description Language (HDL); digital system structures; digital logic and memory testing; fault detection analysis and design; Design for Test (DFT) techniques.

Prerequisites: ELEC1611 Circuit theory and digital logic or ELEC1015 Introduction of electrical and electronic engineering

Assessment: 15% practical work, 85% examination

ELEC2303. Design of digital integrated circuits (6 credits)

IC processing, MOSFET, NMOS logic, Layout design, Design rules, Extraction of device parameters, Isolation concerns, Design of memory circuits, CMOS processing and problems, SOI, analysis and layout design CMOS circuits, Effects of scaling on circuit performance, Bipolar junction transistor, BiCMOS circuits.

Assessment: 50% continuous assessment, 50% examination

ELEC2304. Electronic materials and devices (3 credits)

Dielectric, optical and magnetic properties of materials; optoelectronics; bipolar junction transistor; field-effect devices: MOS capacitor, and MOSFET.

Prerequisite: ELEC1614 Electronic devices and circuits.

Assessment: 20% practical work, 80% examination

ELEC2401. Computer architecture (6 credits)

Design and performance issues of a computer system; RISC vs CISC; design of control unit; design of ALU; instruction pipeline; memory system; input/output system; parallel processors

Prerequisite: ELEC1401 Computer organization and microprocessors

Assessment: 40% continuous assessment, 60% examination

ELEC2402. Computer communications (6 credits)

Data communication networks and facilities; network structures; protocols; local area networks; wide area networks; network trends; data security.

Assessment: 20% continuous assessment, 80% examination

ELEC2501. Software engineering and operating systems (6 credits)

Fundamentals of Software Engineering: software life cycle and software engineering process; planning and requirements definition; software design concepts; software architectural and detail design methodologies; software testing strategies; software maintenance; software quality and metrics; software documentation.

Fundamentals of operating systems: basic operating system and process concepts; concurrent processes and programming; processor management; primary and secondary memory management; file and database systems.

Assessment: 15% practical work, 85% examination

ELEC2601. Human computer interaction (6 credits)

Human factors of interactive systems, design principles of user-interface, user conceptual models and interface metaphors, information and interactivity structures, interaction devices, presentation styles, information visualization. General features and components of window programming toolkits, event handling and layout management. Strategies for effective human-computer interaction, managing design process, evaluation of human-computer interaction.

Prerequisite: ELEC1501 Computer programming and data structures, or ELEC1502 Object oriented programming and data structures, or CSIS0396 Object-oriented programming and Java.

Assessment: 40% continuous assessment, 60% examination

ELEC2603. Systems and Network Programming (6 credits)

This course aims to provide students with solid background on systems programming, in particular, UNIX system programming, and working level network software development using Java or Unix system facilities. The course covers both classical UNIX multiprogramming software development and object oriented system implementations for networked applications.

Prerequisite: ELEC1501 Computer programming and data structures or ELEC1502 Object oriented programming and data structures, or CSIS1119 Introduction to data structures and algorithms and CSIS0396 Object-oriented programming and Java

(Mutually exclusive with ELEC3628 Network programming, CSIS0402 System architecture and distributed computing)

Assessment: 40% continuous assessment, 60% examination

ELEC2701. Internet technologies and applications (6 credits)

Internet architecture overview. IP addressing, internetworking concepts, routing in the internet. TCP, UDP and Sockets. Conventional Internet application protocols. Multimedia network applications: data-compression, audio/video streaming, real-time support. Quality-of-service support for the Internet.

Prerequisite: ELEC2402 Computer communications

Assessment: 40% continuous assessment, 60% examination

ELEC2802. Engineering organization and management (3 credits)

Management concepts, decision making processes, project management, leadership, management control, marketing.

Assessment: 30% continuous assessment, 70% examination

ELEC2803. Engineering and society (3 credits)

Interaction between engineers and society; impact of technologies on society; environmental and safety issues; professional conduct and responsibility; contract law; law of tort; professional negligence and intellectual property law.

Assessment: 100% continuous assessment

ELEC2804. Engineering economics and finance (3 credits)

Principles of Economics, Macroeconomics; Microeconomics, Introduction to Financial Management; Accounting concepts and financial statements; cost and profit.

Assessment: 30% continuous assessment, 70% examination

ELEC2805. Integrated project (EE) (6 credits)

A group project consisting of guided design and implementation of an engineering product. This project offers students in small teams an opportunity to apply their knowledge in electronics, electrical machines, computer hardware and software as well as project management, following a disciplined engineering process, to achieve the final goal.

Assessment: 100% continuous assessment

ELEC2807. Integrated project (InfoE) (6 credits)

A group project consisting of guided design and implementation of an engineering product. This project offers students in small teams an opportunity to apply their knowledge in electronics, electrical machines, computer hardware and software as well as project management, following a disciplined engineering process, to achieve the final goal.

Assessment: 100% continuous assessment

ELEC2808. Differential equations (3 credits)

Ordinary differential equations, partial differential equations, and boundary value problems.

Assessment: 20% continuous assessment, 80% examination

ELEC2809. Numerical methods (3 credits)

Initial value problems, numerical methods in linear algebra.

Assessment: 25% continuous assessment, 75% examination

ELEC2810. Optimization methods (3 credits)

Unconstrained optimization, Linear programming, Nonlinear constrained optimization.

Assessment: 20% continuous assessment, 80% examination

ELEC2811. Probability and statistics (3 credits)

Estimations, Testing hypothesis, Correlation and regression, Curve fitting, Non-parametric methods, Analysis of variance, and Markov process.

Assessment: 25% continuous assessment, 75% examination

ELEC2812. Integrated project (EComE) (6 credits)

A group project consisting of guided design and implementation of an engineering product. This project offers students in small teams an opportunity to apply their knowledge in electronics, electrical machines, computer hardware and software as well as project management, following a disciplined engineering process, to achieve the final goal.

Assessment: 100% continuous assessment

ELEC2813. Integrated project (6 credits)

A group project consisting of guided design and implementation of an engineering product. This project offers students in small teams an opportunity to apply their knowledge in electronics, electrical machines, computer hardware and software as well as project management, following a disciplined engineering process, to achieve the final goal.

Assessment: 100% practical work

Level Three**ELEC3104. Electric vehicle technology (6 credits)**

Electric Vehicle (EV) development; EV systems; electric propulsion; energy sources; EV auxiliaries; EV infrastructure; impacts.

Assessment: 20% continuous assessment, 80% examination

ELEC3105. Building services - electrical services (6 credits)

Design and installation criteria of lighting systems, vertical transportation systems, building automation systems, energy management, communication systems, ventilation systems, fire services, security and alarm systems of buildings.

Assessment: 20% continuous assessment, 80% examination

ELEC3106. Building services - electrical installations (6 credits)

Design and installation criteria: electricity distribution in buildings; protection against direct and indirect contacts, earthing and bonding; protective devices; cable management; lightning protection; standby power supplies.

Assessment: 20% continuous assessment, 80% examination

ELEC3107. Power system analysis and control (6 credits)

Load flow analysis, fault analysis, power system components modeling, small and large disturbance synchronous stability, voltage stability, economic operation, HVDC systems.

Prerequisite: ELEC2101 Power transmission and distribution

Assessment: 10% continuous assessment, 90% examination

ELEC3108. Power system protection (3 credits)

Protective relays; protection transformers; protection of transmission lines, rotating machines, transformers and busbars.

Prerequisite: ELEC2101 Power transmission and distribution

Assessment: 10% practical work, 90% examination

ELEC3109. Electric drives (3 credits)

Introduction to motor drives; dc motor drives; induction motor drives; synchronous motor drives; special motor drives.

Prerequisite: ELEC1101 Fundamentals of electrical engineering or ELEC1103 Electrical technology

Assessment: 20% continuous assessment, 80% examination

ELEC3110. Electric traction (3 credits)

DC/AC electrification systems; control and protection systems; speed control; electromechanical subsystems; magnetic levitation systems.

Prerequisite: ELEC1101 Fundamentals of electrical engineering or ELEC1103 Electrical technology

Assessment: 30% continuous assessment, 70% examination

ELEC3201. Communication systems (6 credits)

Spectral analysis; random signal theory; information theory; noise in analogue systems; digital transmission through AWGN channels; digital carrier-modulation schemes; error control coding.

Prerequisite: ELEC2202 Communications engineering

Assessment: 10% practical work, 90% examination

ELEC3203. Cellular radio and personal communications systems (6 credits)

Cellular radio and mobile communications systems; FDMA; TDMA; CDMA..

Prerequisite: ELEC2202 Communications engineering

Assessment: 30% practical work, 70% examination

ELEC3204. Information theory and coding (6 credits)

Measure of information, source entropy, Shannon's theorems, channel capacity. Noiseless source coding, error control coding, linear block codes, cyclic codes, convolution code, data encryption.

Assessment: 30% continuous assessment, 70% examination

ELEC3206. Control systems (6 credits)

State-space theory for dynamic systems; linear quadratic optimal control; nonlinear systems; digital systems and computer control; system identification; Kalman filtering; fuzzy control.

Prerequisite: ELEC2205 Control and instrumentation

Assessment: 15% practical work, 15% continuous assessment, 70% examination

ELEC3212. Speech recognition (6 credits)

An introduction to the technologies of speech recognition (e.g. voice recognition). Theoretical background and real-life practical systems will be introduced. It serves as an entry-level course to those interested in advance studies in the area. Introduction to speech models, introduction to voice recognition, interactive voice response systems.

Prerequisite: ELEC2204 Digital signal processing

Assessment: 20% continuous assessment, 80% examination

ELEC3214. Microwave engineering (3 credits)

Guided wave transmission; waveguides; microwave circuits; scattering matrix formulation; passive and active microwave components; atmospheric propagation and microwave antennas.

Prerequisite: ELEC2203 Electromagnetic theory or ELEC2206 Electromagnetic waves

Assessment: 10% practical work, 90% examination

ELEC3215. Fibre optics (3 credits)

Principles of optical fibre waveguides; light sources and detectors; optical transmitters and receivers designs; optical system designs; optical passive devices and sensor technologies.

Prerequisite: ELEC2203 Electromagnetic theory or ELEC2206 Electromagnetic waves

Assessment: 20% continuous assessment, 80% examination

ELEC3216. Robotics (3 credits)

Introduction to robot configurations; robot kinematics; robot dynamics and control; robot programming and applications.

Prerequisite: ELEC2205 Control and instrumentation

Assessment: 20% continuous assessment, 80% examination

ELEC3217. Mechatronics (3 credits)

Introduction to mechatronics; various types of sensors, actuators and controllers in mechatronic systems.

Assessment: 20% continuous assessment, 80% examination

ELEC3218. Communication signal processing (3 credits)

Basic probability and stochastic processes, linear estimation and prediction; adaptive filters: least mean squares and recursive least squares algorithms. Structures of digital transmitters and receivers, channel models, Nyquist channel and pulse shaping; channel coding; equalization techniques; other applications.

Prerequisite: ELEC2201 Signals and linear systems

Assessment: 20% continuous assessment, 80% examination

ELEC3220. Speech processing (3 credits)

Models for speech signals, digital representation of speech waveforms, speech processing and analysis methods. Pattern recognition techniques, hidden Markov models, speech recognition systems and applications. Audio and speech coding.

Prerequisite: ELEC2201 Signals and linear systems

Assessment: 20% continuous assessment, 80% examination

ELEC3401. Advanced internet technologies (6 credits)

Fiber-optic transmission and wavelength division multiplexing, optical switching technologies, survivable optical networks, high performance switches and routers, traffic management, multimedia networking.

Prerequisite: CSIS0234 Computer and communication networks or ELEC2701 Internet technologies and applications

Assessment: 35% continuous assessment, 65% examination

ELEC3503. Fuzzy systems and neural networks (6 credits)

The mathematics of fuzzy systems; linguistic variables; fuzzy rules; fuzzy inference; fuzzifiers and defuzzifiers; approximation properties of fuzzy systems; design of fuzzy systems; design of fuzzy systems; artificial neural networks; learning procedures of adaptive networks; supervised learning; unsupervised learning; fuzzy-neuro modeling; applications to control problems.

Assessment: 30% continuous assessment, 70% examination

ELEC3505. Image and video processing (6 credits)

Image acquisition and imaging systems, 2D continuous-time and discrete-time signals and systems, time and frequency representations, sampling and quantization issues; image filtering and convolution, enhancement and restoration; colorimetry; image quality evaluation; image transform and compression; motion and video compression; deinterlacing and super-resolution; applications and computer implementations.

Prerequisite: ELEC2201 Signals and linear systems

Assessment: 40% continuous assessment, 60% examination

ELEC3612. VLSI design principles (6 credits)

Technology issues, custom and semi-custom design, gate array and standard cell approach, programmable logic arrays, hierarchical design methodologies, design verification, automatic circuit/system synthesis, silicon compilation, design for testability.

Assessment: 50% continuous assessment, 50% examination

ELEC3621. Introduction to parallel programming (3 credits)

Overview of parallel architectures; parallel programming paradigms; parallel programming languages and libraries; parallel computing models; parallel algorithms; performance analysis.

Prerequisite: ELEC2401 Computer architecture

Assessment: 40% continuous assessment, 60% examination

ELEC3622. Distributed computing systems (3 credits)

Network architecture based on the ISO reference model; general theory of distributed computing systems; modeling of distributed computing systems; distributed operating systems; distributed database systems.

Prerequisite: (ELEC2501 Software engineering and operating systems or CSIS0230 Principles of operating systems) and (ELEC2402 Computer communications or CSIS0234 Computer and communication networks)

Assessment: 40% continuous assessment, 60% examination

ELEC3626. Computer network security (3 credits)

This course focuses on state-of-the-art computer network security technologies, which are crucial to the success of any electronic commerce systems. The course covers fundamental techniques of cryptography, security threats and their possible countermeasures, secure protocols, and other network security schemes (authentication, key management, firewalls, intrusion detection, etc.).

Prerequisite: ELEC2402 Computer communications or CSIS0234 Computer and communication networks

(Mutually exclusive with CSIS0327 Computer and network security)

Assessment: 40% continuous assessment, 60% examination

ELEC3701. Telecommunication policy and regulations (6 credits)

An introduction to the characteristics and operation of the telecommunication industry worldwide. History of telecommunication, monopolies in telecommunications, competition, general model for telecommunication industry, International standardization organizations (ITU, ISO, ANSI, ETSI), regulatory bodies in various countries (FCC for US, OFTEL for HK), telecom industry in the US, telecom industry in Europe, telecom industry in Japan, telecom industry in HK.

Assessment: 20% continuous assessment, 80% examination

ELEC3703. Queuing theory (3 credits)

Basic notation, discrete and continuous time Markov chains, birth-death processes, elementary queuing systems (M/M/m/A/B queuing systems), Erlangian distribution.

Prerequisite: ELEC2811 Probability and statistics

Assessment: 30% continuous assessment, 70% examination

ELEC3704. System modeling and performance analysis (3 credits)

Queuing networks, M/G/1, G/M/m and G/G/1 queues, priority queuing, time-sharing systems, multi-access systems, event-driven simulation.

Prerequisite: ELEC3703 Queuing theory

Assessment: 30% continuous assessment, 70% examination

ELEC3801. Technical project (12 credits)

Assessment: 100% continuous assessment

ELEC3802. Technical project (12 credits)

Assessment: 100% continuous assessment

General Engineering Courses

- ENGG1002. Computer programming and applications (6 credits)**
ENGG1003. Mathematics I (6 credits)
ENGG1004. Mathematics IA (3 credits)
ENGG1005. Mathematics IB (3 credits)
ENGG1006. Engineering for sustainable development (6 credits)
ENGG1007. Foundations of computer science (6 credits)
ENGG1009. Industrial management and logistics (6 credits)
ENGG1010. Foundations of engineering mechanics (6 credits)
ENGG1011. Introduction to biomedical engineering (6 credits)
ENGG1015. Introduction to electrical and electronic engineering (6 credits)

Please refer to the General Engineering courses in the syllabus for the degree of BEng for details.

Syllabuses for the courses offered by other departments for the specialisms: Computer Engineering, Electrical Engineering, Electronic and Communications Engineering, and Information Engineering.

FINA1003. Corporate finance (6 credits)

This is an introductory course that develops the basic concepts and tools applicable to corporate financial decisions. Three main tasks of financial managers are studied: (i) investment evaluation, (ii) financing decisions, and (iii) payout decisions. Specific topics include present value calculation, valuation of stocks and bonds, investment criteria and capital budgeting, risk and return, cost of capital, capital structure, raising capital, dividend policy, and working capital management.

Mutually exclusive courses: BUSI0016/FINA1002 Introduction to finance and STAT2807 Corporate finance for actuarial science

Assessment: Please refer to the relevant syllabuses as announced by the School of Business

Prerequisite: BUSI1002 Introduction to Accounting

BUSI0023. Operations and quality management (6 credits)

A general introduction to the basic concepts and principles of management of manufacturing and service operations. Emphasis will be on both the quantitative and qualitative aspects of operations management and the intention is to give students moderate exposure to the major topics in operations management.

Assessment: 100% continuous assessment

BUSI1001. Business law (6 credits)

An introduction to the Hong Kong legal system, the fundamentals and general principles of Hong Kong law. Other legal concepts which a manager may be expected to encounter in the business environment.

Assessment: 50% continuous assessment, 50% examination

BUSI1007. Principles of management (6 credits)

This introductory course traces back to how the study and practice of management evolved over this past century, with particular focus on the landmark discoveries and lessons learned. Students are also exposed to the essence of managerial work and the changing face of workplace management. The programme's pedagogical design combines the ingredients of theoretical conceptualization and emphasizes interactive discussions, skill-building experiential exercises and students' presentation.

Exclusion: Students having completed BUSI1007 Principles of management (3 credits) offered in the academic year 2002-2003 or earlier are not allowed to take this course.

Assessment: 80% continuous assessment, 20% examination

CENG1001. Practical Chinese language course for engineering students (3 credits)

Please refer to the University Language Enhancement Courses in the syllabus for the degree of BEng for details.

CSIS0218. Discrete event simulation (6 credits)

Topics include: Monte Carlo methods, discrete event simulation, elements of simulation models, data collection and analysis, simulation language for modelling, random number generation, queuing models, and output analysis.

Prerequisite: CSIS1119 or CSIS1122 or ELEC1501 or ELEC1502

Assessment: 40% continuous assessment, 60% examination

CSIS0230. Principles of operating systems (6 credits)

Operating system structures, process and thread, CPU scheduling, process synchronization, deadlocks, memory management, file systems, I/O systems and device driver, mass-storage structure and disk scheduling, case studies.

Prerequisites: CSIS1119 (for intake of 2007 and before) or CSIS1122 (for intake of 2008 and thereafter); and CSIS1120 or ELEC1401

Assessment: 50% continuous assessment, 50% examination

CSIS0234. Computer and communication networks (6 credits)

Network structure and architecture; reference models; stop and wait protocol; sliding window protocols; character and bit oriented protocols; virtual circuits and datagrams; routing; flow control; congestion control; local area networks; issues and principles of network interconnection; transport protocols and application layer; and examples of network protocols.

Prerequisite: CSIS1120 or ELEC1401

Assessment: 50% continuous assessment, 50% examination

CSIS0235. Compiling techniques (6 credits)

Lexical analysis; symbol table management; parsing techniques; error detection; error recovery; error diagnostics; run-time memory management; optimization; code generation.

Prerequisite: CSIS0259

Assessment: 50% continuous assessment, 50% examination

CSIS0250. Design and analysis of algorithms (6 credits)

The course studies various algorithm design techniques, such as divide and conquer, and dynamic programming. These techniques are applied to design highly non-trivial algorithms from various areas of computer science. Topics include: advanced data structures; graph algorithms; searching algorithms; geometric algorithms; overview of NP-complete problems.

Pre/Co-requisite: CSIS1119 or ELEC1501 or ELEC1502

Assessment: 50% continuous assessment, 50% examination

CSIS0259. Principles of programming languages (6 credits)

Syntax and semantics specification; data types; data control and memory management; expressions, precedence and associativity of operators; control structures; comparative study of existing programming languages; advanced topics such as polymorphism, programming paradigms, exception handling and concurrency.

Prerequisites: CSIS1119; and CSIS1120 or ELEC1401

Assessment: 40% continuous assessment, 60% examination

CSIS0270. Artificial intelligence (6 credits)

This is an introduction course on the subject of artificial intelligence. Topics include: intelligent agents; search techniques for problem solving; knowledge representation; logical inference; reasoning under uncertainty; statistical models and machine learning. This course may not be taken with BUSI0088.

Prerequisite: CSIS1119 or CSIS1122

Assessment: 50% continuous assessment, 50% examination

CSIS0271. Computer graphics (6 credits)

Overview of graphics hardware, basic drawing algorithms, 2-D transformations, windowing and clipping, interactive input devices, curves and surfaces, 3-D transformations and viewing, hidden-surface and hidden-line removal, shading and colour models, modelling, illumination models, image synthesis, computer animation.

Prerequisite: CSIS1119 or CSIS1122

Assessment: 50% continuous assessment, 50% examination

CSIS0278. Introduction to database management systems (6 credits)

This course studies the principles, design, administration, and implementation of database management systems. Topics include: entity-relationship model, relational model, relational algebra and calculus, database design and normalization, database query languages, indexing schemes, integrity, concurrency control, and query processing. This course may not be taken with BUSI0052. Prerequisite: CSIS1119 or ELEC1501 or ELEC1502

Assessment: 50% continuous assessment, 50% examination

CSIS0297. Introduction to software engineering (6 credits)

This course introduces the fundamental principles and methodologies of software engineering. It covers the software process and methods and tools employed in the development of modern systems. The use of CASE tools and the UML are emphasized. The course includes a team-based project in which students apply their new knowledge to a full development lifecycle, including maintenance.

Prerequisite: CSIS1117 or CSIS0396 or ELEC1501 (for intake of 2005 or before)

Prerequisite: CSIS1122 (for intake of 2006 and thereafter)

Assessment: 50% continuous assessment, 50% examination

CSIS0314. Pattern classification and machine learning (6 credits)

This is an introduction course on the subjects of statistical pattern classification and machine learning. Topics include: introduction to pattern classification problems; performance evaluation; Bayesian decision theory; feature extraction techniques; parametric models; maximum-likelihood parameter estimation; maximum-discriminant decision rules; minimum classification error training; clustering techniques; decision trees and their learning techniques.

Prerequisite: CSIS1119 or ELEC1501 or ELEC1502

Assessment: 50% continuous assessment, 50% examination

CSIS0315. Multimedia computing and applications (6 credits)

This course introduces various aspects of the interdisciplinary and multidisciplinary field of multimedia computing. Current developments of technologies and techniques in multimedia will also be covered. Applications of multimedia techniques are also highlighted through a media production course project. Major topics include: what are media, audio, acoustics and psychoacoustics, MIDI, basic compression techniques, video compression techniques, standards, and current multimedia technologies. This course may not be taken with BUSI0068.

Prerequisite: CSIS1119

Assessment: 50% continuous assessment, 50% examination

CSIS0317. Computer vision (6 credits)

This course introduces the principles, mathematical models and applications of computer vision. Topics include: image processing techniques, feature extraction techniques, imaging models and camera calibration techniques, stereo vision, and motion analysis.

Prerequisite: CSIS1119 or ELEC1501 or ELEC1502

Assessment: 50% continuous assessment, 50% examination

CSIS0320. Electronic commerce technology (6 credits)

This course aims to help students to understand the technical and managerial challenges they will face as electronic commerce becomes a new locus of economics activities. Topics include Internet and WWW technology, information security technologies, public-key crypto-systems, public-key infrastructure, electronic payment systems, and electronic commerce activities in different sectors.

Prerequisite: CSIS0278

Assessment: 30% continuous assessment, 70% examination

CSIS0322. Internet and the World Wide Web (6 credits)

Introduction and history; networks, internetworking, and network protocols; TCP/IP and related protocols; client-server model and programming; distributed applications; Domain Name System; Internet applications: TELNET, mail, FTP, etc.; Internet security; intranet and extranet; virtual private networks; World Wide Web; Web addressing; HTTP; HTML, XML, style sheets, etc.; programming the Web: CGI, Java, JavaScript, etc.; Web servers; Web security; Web searching; push technology; other topics of current interest.

This course may not be taken with BUSI0063.

Prerequisite: CSIS1117 or ELEC1501 or ENGG1002

Assessment: 50% continuous assessment, 50% examination

CSIS0323. Advanced database systems (6 credits)

The course will study some advanced topics and techniques in database systems, with a focus on the system and algorithmic aspects. It will also survey the recent development and progress in selected areas. Topics include: query optimization, spatial-spatiotemporal data management, multimedia and time-series data management, information retrieval and XML, data mining.

Prerequisite: CSIS0278

Assessment: 50% continuous assessment, 50% examination

CSIS0325. Topics in Web technologies (6 credits)

This course presents selected topics that are essential in our understanding and appreciation of the latest advances in technologies related to the World Wide Web. Possible topics include XML, RDF and metadata, style languages, Web graphics and synchronized multimedia, privacy, content selection, accessibility, Web server architecture, mobile access, distributed authoring and versioning, and internationalization.

Prerequisite: CSIS0234 or CSIS0322

Assessment: 50% continuous assessment, 50% examination

CSIS0326. Computational molecular biology (6 credits)

The novel and specialised algorithms needed to solve computational problems related to the vast amounts of data generated by modern molecular biology techniques will be examined in detail.

Prerequisites: CSIS0250 or BIOC2808

Assessment: 40% continuous assessment, 60% examination

CSIS0328. Wireless and mobile computing (6 credits)

This course introduces the basic principles and technologies in various mobile and wireless communication systems. Topics include mobile communication environment; digital modulation; channel coding; medium access technologies; cellular mobile radio systems; wireless LANs; security in wireless systems; internetworking in wireless systems; mobility applications.

Prerequisite: CSIS0234 and CSIS0396

Assessment: 50% continuous assessment, 50% examination

CSIS0329. Computer game design and programming (6 credits)

The course will study practical topics in game design. Topics includes: types of game, 3D model and kinematics, rendering techniques, collision detection, project management, AI, UI, sound effects, and networking.

Pre-requisite: CSIS0271

Assessment: 50% continuous assessment, 50% examination

CSIS0396. Object-oriented programming and Java (6 credits)

Introduction to object-oriented programming; abstract data types and classes; inheritance and polymorphism; object-oriented program design; Java language and its program development environment; user interfaces and GUI programming; collection class and iteration protocol; program documentation.

Pre-requisite: CSIS1117 or ELEC1501 or ENGG1002

Assessment: 50% continuous assessment, 50% examination

CSIS0403. Implementation, testing and maintenance of software systems (6 credits)

This course examines the theory and practice of software implementation, testing and maintenance. Topics in implementation include: detailed design issues and implementation strategies; coding style and standards; the review process; individual software process and metrics; and reuse. Also examined are the implementation aspects of contemporary approaches such as generic programming, design patterns, and design by contract. Testing covers unit and component testing; integration testing; system, performance and acceptance testing; and test documentation. Testing techniques for OO software are examined in detail. Topics in maintenance include maintenance techniques, tools and metrics; software rejuvenation; and refactoring.

Pre/Co-requisite: CSIS0396

Assessment: 50% continuous assessment, 50% examination

CSIS1118. Foundations of computer science (6 credits) [for intake of 2009 or later]

This course provides students a solid background on discrete mathematics and structures pertinent to computer science. Topics include logic; set theory; mathematical reasoning; counting techniques; discrete probability; trees, graphs, and related algorithms; modeling computation.

(mutually exclusive with: ELEC1807, ENGG1007)

Assessment: 50% continuous assessment, 50% examination

CSIS1119. Introduction to data structures and algorithms (6 credits)

Arrays, linked lists, trees and graphs; stacks and queues; symbol tables; priority queues, balanced trees; sorting algorithms; complexity analysis.

Prerequisite: CSIS1117 or ELEC1501 or ENGG1002

Pre-/Co-requisite: CSIS1122

Assessment: 40% continuous assessment, 60% examination

CSIS1122. Computer programming II (6 credits) [for intake of 2006 and thereafter]

This is the second programming course following ENGG1002/CSIS1117. The goal of this course is to strengthen students' programming skills, in particular, on implementing basic data structures and algorithms. Students will also learn various tools for developing programs in the UNIX/Linux environment.

Prerequisite: CSIS1117 or ELEC1501 or ENGG1002

Assessment: 50% continuous assessment, 50% examination

CAES1507. Professional and technical written communication for engineers (3 credits)

The focus of this course is the function and importance of professional and technical communication in English and specifically understanding and using written English. Topics include accessing, abstracting, analysing, organizing and summarizing information; making effective grammatical and lexical choices; technical report writing; small-scale project design and implementation.

Assessment: 100% continuous assessment

CAES1515. Professional and technical oral communication for engineers (3 credits)

Please refer to the University Language Enhancement Courses in the syllabus for the degree of BEng for details.