SYLLABUSES FOR THE DEGREE OF BACHELOR OF ENGINEERING (BENG)

General Engineering courses (applicable to candidates admitted to the four-year curriculum in the academic year 2014-15 and thereafter)

General Engineering courses include:

Computer Programming Courses
    ENGG1111   Computer programming and applications (6 credits)
    ENGG1112   Computer programming and applications I (6 credits)

Mathematics and Physics Courses
    MATH1011   University Mathematics I (6 credits)
    MATH1851   Calculus and ordinary differential equations (6 credits)
    MATH1853   Linear algebra, probability and statistics (6 credits)
    MECH2407   Multivariable calculus & partial differential equations (6 credits)
    PHYS1050   Physics for Engineering Students (6 credits)

Disciplinary Specific Courses
    ENGG1201   Engineering for sustainable development (6 credits)
    ENGG1202   Introduction to computer science (6 credits)
    ENGG1203   Introduction to electrical and electronic engineering (6 credits)
    ENGG1204   Industrial management and logistics (6 credits)
    ENGG1205   Introduction to mechanical engineering (6 credits)
    ENGG1206   Introduction to biomedical engineering (6 credits)
    ENGG1207   Foundations of biochemistry for medical engineering (6 credits)

Candidates are required to satisfactorily complete General Engineering courses as specified in the syllabus of the programme concerned.

The course descriptions of the General Engineering courses are as follows:

ENGG1111   Computer programming and applications (6 credits)

This course covers both the basic and advanced features of the C/C++ programming languages, including syntax, identifiers, data types, control statements, functions, arrays, file access, objects and classes, class string, structures and pointers. It introduces programming techniques such as recursion, linked lists and dynamic data structures. The concept and skills of program design, implementation and debugging, with emphasis on problem-solving, will also be covered.

Target students are those who wish to complete the programming course in a more intensive mode in 1 semester. Students with some programming knowledge are encouraged to take this course.

Assessment: 50% continuous assessment, 50% examination

ENGG1112   Computer programming and applications I (6 credits)

This course covers both the basic and advanced features of the C/C++ programming languages, including syntax, identifiers, data types, control statements, functions, arrays, file access, objects and classes, class string, structures and pointers. It introduces programming techniques such as recursion, linked lists and dynamic data structures. The concept and skills of program design, implementation and debugging, with emphasis on problem-solving, will also be covered.

Target students are those who wish to complete the programming course in a slower pace covering 2 semesters.

Assessment: 50% continuous assessment, 50% examination

MATH1011 University Mathematics I (6 credits)

This course aims at students with only HKDSE Mathematics (or equivalent) background and provides them with basic knowledge of mathematics that serves as essential foundation in various disciplines. It is expected to be followed by MATH1013 University mathematics II.

Assessment: 50% continuous assessment, 50% examination

MATH1851 Calculus and ordinary differential equations (6 credits)

In this course, students will be introduced to some important topics of mathematics commonly used in many engineering fields. A concrete foundation of engineering mathematics that underpins the various engineering subjects will be built. Mathematical concepts and principles, as well as some typical engineering applications, would be emphasized so that students could enhance their mathematical skills in solving engineering problems, and be well prepared in learning a higher level of applied mathematics required in different engineering disciplines.

This course is exclusively for Engineering students.

Pre-requisite: Mathematics (Extended Part Module 1 or 2) of the HKDSE Examination or equivalent, or a pass in "MATH1011 University Mathematics I"

Assessment: 20% continuous assessment, 80% examination

MATH1853 Linear algebra, probability and statistics (6 credits)

As the consecutive course of MATH1851, students will be introduced to more topics of mathematics commonly applied in engineering so that students could be further enhanced with a concrete skill in mathematics underpinned for different engineering subjects. The course emphasizes mathematical concepts, principles, analysis, and their relationship to the modelling of engineering systems. Students could be furnished with the essential mathematical skill to analytically tackle some typical engineering problems to prepare for all the engineering subjects.

This course is exclusively for Engineering students.

Pre-requisite: Mathematics (Extended Part Module 1 or 2) of the HKDSE Examination or equivalent, or a pass in "MATH1011 University Mathematics I"

Assessment: 20% continuous assessment, 80% examination

MECH2407. Multivariable calculus & partial differential equations (6 credits)

This course aims to further develop the foundation of mathematics used in engineering discipline. Students will be introduced and explored to: (1) the ideas of periodic functions and their Fourier series representations; (2) the concepts of differentiation and integration of multivariable functions, and their extensions to vector analysis; and (3) the methods for solving elementary partial differential equations. Through the development of solution methods, students will enrich their experience in critical analysis and problem solving.

Topics include: Fourier series; advanced calculus; vector analysis; elementary partial differential equations.

Assessment: 20% continuous assessment, 80% examination

PHYS1050   Physics for Engineering Students (6 credits)

This one-semester course offers a comprehensive training of physics for engineering students. It covers the major physical laws on mechanics, electricity and magnetism. Specifically, it will introduce and discuss the motion of a particle in one and higher dimensions, Newton's laws of motion, friction, curvilinear and circular motion on a plane, forces, impulse and momentum, force polygon and static equilibrium, work and energy, system of particles, moment of inertia and rotation of a rigid body, angular momentum, simple harmonic motion and pendulum; electrostatic fields and potential, Gauss's law, DC circuits, magnetic field due to moving charges, force on a moving charge in magnetic field, Biot-Savart law, Ampere's law, electromagnetic induction, Faraday's law, Eddy currents, AC circuits, phases in capacitive and inductive circuits, power, DC and AC generators, and transformer.

Assessment: 30% continuous assessment, 70% examination

ENGG1201   Engineering for sustainable development (6 credits)

This course is an introduction to the broad disciplines of civil, environmental and mechanical engineering and is presented in the context of sustainable development of the built environment. At the end of this course, students should gain an informed understanding of the central issues associated with sustainable development of the built environment. They should also gain an understanding of the roles engineering professionals have played, as well as the ethical and professional responsibilities of engineers, in response to these issues throughout history and the present day. Students will also develop the ability to formulate clear strategies by drawing upon relevant best practices and technologies.
Assessment: 50% continuous assessment, 50% examination

ENGG1202   Introduction to computer science (6 credits)

This course introduces a number of real-world computational problems taken from different areas of computer science (e.g. security and cryptography, artificial intelligence, database, web and networking). Through these problems and some hands-on exercises, students are exposed to the mathematics, data structures and algorithms that form the foundations of computer science and see how these elements integrated together to solve those problems.

Assessment: 100% continuous assessment

ENGG1203   Introduction to electrical and electronic engineering (6 credits)

This course provides an overview of the field of electrical and electronic engineering and its role in the modern world. The function of different electronic engineering disciplines in modern electronic system designs will be introduced, including signal processing, system-level design, digital logic design, circuits design, as well as electronic devices design. The role of electrical systems and their impact on the environment will also be discussed. The design and implementation of an open-ended group project bring these topics into practice.

Assessment: 30% practical work, 30% continuous assessment, 40% examination

ENGG1204   Industrial management and logistics (6 credits)

The fundamental role of logistics and supply chain management in the economy and organisation; contribution of logistics and supply chain management to value creation; introduction to logistics industry in Hong Kong; contemporary topics in logistics and supply chain management.

Essential management and business skills for engineers; introduction to project management; global manufacturing; applications of industrial engineering principles in different sectors and industries; quality functions; performance improvement; basics of problem solving and decision making.

Assessment: 50% continuous assessment, 50% examination

ENGG1205   Introduction to Mechanical Engineering (6 credits)

This is one of the common engineering courses offered to BEng students in their first year of study. Students who choose to study BEng in Mechanical Engineering must study this course either in their first year or second year. This course aims to provide students with a comprehensive knowledge in the nature of mechanical engineering by studying some important applications including robots, aircrafts and strong materials.

Topics include: modelling of mechanical systems; working principles of robots; mechanics and propulsion of aircrafts; strong materials; hands-on projects.
Assessment: 30% practical work, 20% continuous assessment, 50% examination

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ENGG1206   Introduction to biomedical engineering (6 credits)

This course is an overview of the essential areas in biomedical engineering, including technologies and applications in life sciences and medicine. The course is broadly divided into 4 areas: biomechanics and biomaterial; cell and tissue engineering; biomedical instrumentations and signals, and medical imaging. The global development and other issues, such as safety, ethics and industry will also be addressed. The course has a laboratory component to provide the students with some hands-on experience in the subject.

Assessment: 60% continuous assessment, 40% examination

ENGG1207   Foundations of biochemistry for medical engineering (6 credits)

The course is comprised of four areas of fundamentals, namely:

A. Chemistry for Biochemistry

The elements and bonding (from carbon to Coenzyme A); Resonance and orbital theory (a focus on the electron); Structure and conformation (thinking in 3 dimensions); Isomerism (from mirrors to thalidomide); Water (the universal biochemical solvent) & buffer; Quantitation in chemistry (who was Avogadro anyway?)

B. Biology for Biochemistry

The basic building blocks of life (proteins, DNA, lipids, carbohydrate); The Central Dogma of Molecular Biology; Evolution (considering molecular evolution); Origins of life (the chicken-egg paradox of proteins and DNA)

C. Physics and Mathematics for Biochemistry

Thermodynamics from a Biological Perspective; Introduction to molecular recognition and binding

(DNA melting); Statistics for biochemistry (applied statistics for what you really need to know); Thinking numbers (exponentials, logs and the limits of life).

D. Inspiring Biochemistry

The protein (from Perutz to the frontier of proteomics); The gene (from the double helix to the human genome project and how it failed to live up to its expectations); Vitamins and disease (stories of scientific discovery motivated by human suffering); Synthetic biology (a cure to the world's energy problems or misplaced trust in dangerous technology); The challenges of modern-day genetics (will we ever really understand individuality; Drugs-successes, failures, and perhaps the most challenging business on earth.

Assessment: 70% continuous assessment, 30% examination

University Language Enhancement Courses

All the students admitted to the Bachelor of Engineering curriculum under common code admission are required to take two English language enhancement courses and one Chinese language enhancement course in the study year as specified in the syllabuses of respective BEng curriculum:

CAES1000   **Core University English**
CAES95##   **English in the Discipline course for respective BEng curriculum**
CENG9001   **Practical Chinese for engineering students[1]**

COURSE DESCRIPTIONS

CAES1000   Core University English (6 credits)

The Core University English (CUE) aims to enhance first-year students' academic English language proficiency in the university context. CUE focuses on developing students' academic English language skills for the Common Core Curriculum. These include the language skills needed to understand and produce spoken and written academic texts, express academic ideas and concepts clearly and in a well-structured manner and search for and use academic sources of information in their writing and speaking. Students will also complete our online-learning modules through the Moodle platform on academic grammar, academic vocabulary, citation and referencing skills and understanding and avoiding plagiarism. This course will help students to participate more effectively in their first-year university studies in English, thereby enriching their first-year experience.

Assessment: 65% continuous assessment, 35% examination.

CENG9001   Practical Chinese for engineering students (6 credits)
                          (normally to be taken at the first semester of third year of study)

The course is designed to enable students to gain a mastery of the varieties of the Chinese language as used in the field of Engineering. It introduces students to various techniques for the effective use of practical Chinese. The course will familiarize students with traditional Chinese characters, simplified Chinese characters, modern Chinese grammar and rhetoric through outcomes-based assignments. Special training that is intended to sharpen students' presentation skills in Cantonese and Putonghua will also be provided.

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[1] Putonghua-speaking students should take CUND9002 or CUND9003. 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 CENG9001 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.

Assessment: 50% continuous assessment, 50% examination.

CAES95##   **English in the Discipline course for respective BEng curriculum (6 credits)**
[to be taken in the study year as specified in the syllabuses of respective BEng curriculum]

Apart from "CAES1000 Core University English", BEng students must complete a 6-credit English in the Discipline (ED) course as specified in the syllabuses of respective BEng curriculum, with the summary of the list of ED courses as follows:

Course Code	Course Title	BEng Curriculum	Year/Semester (normally to be taken)
CAES9520	Technical English for Industrial and Manufacturing Systems Engineering	BEng(IETM) BEng(LESCM)	Semester 2, Year 2
CAES9543	Technical English for Mechanical and Building Services Engineering	BEng(ME) BEng(ME-BSE)	Semester 2, Year 4
CAES9531	Technical English for Medical Engineering	BEng(MedE)	Semester 1, Year 3
CAES9540	Technical English for Civil Engineering	BEng(CivE) BEng(Civ-EnvE)	Semester 1, Year 4
CAES9541	Technical English for Electrical and Electronic Engineering	BEng(CE) BEng(ElecE) BEng(EE)	Semester 2, Year 4
CAES9542	Technical English for Computer Science	BEng(CompSc)	Semester 1, Year 4

Minor Option

Candidates are given an option to pursue a minor in a discipline outside their own degree curriculum. Candidates who wish to have their minor recorded on the transcript must take and pass all the required courses in the selected minor as specified by the offering Department/Faculty in addition to the graduation requirements of their own degree curriculum. For the descriptions of the course under minor options, candidates should refer to the syllabuses of the relevant degree.

Courses taken to fulfil the Minor Option requirements may also be considered as equivalent courses that satisfy the elective requirements of the BEng curriculum, subject to the approval of the Board of the Faculty of Engineering.

Double-Degrees in BEng/BBA Option

Candidates are given an option to pursue the double-degrees in BEng/BBA, subject to the approval of the Boards of the Faculty of Engineering and Faculty of Business and Economics upon their meeting the prescribed admission requirements as laid down by both the Faculty of Engineering and the Faculty of Business and Economics.

Courses taken to fulfil the double-degrees curriculum requirements may also be considered as equivalent courses that satisfy the elective requirements of the BEng curriculum, subject to the approval of the Board of the Faculty of Engineering.

Candidates who have satisfied all the requirements of the BEng curriculum will be awarded the degree of Bachelor of Engineering. To be eligible for proceeding to the BBA programme in the 5th year, candidates must:

(1) fulfil the requirements of the BEng curriculum;
(2) hold a degree of BEng with Second Class Honours from The University of Hong Kong; and
(3) pass the 54 credits of courses, as listed below, as required by the Faculty of Business and Economics during their study for BEng:

Course Code	Course	Credits
ACCT1101	Introduction to financial accounting	6
IIMT2601	Management information systems	6
MKGT2501	Introduction to marketing	6
MGMT2401	Principles of management	6
ECON1210	Introduction to economics I	6
FINA1310	Corporate finance	6
ACCT2105	Introduction to management accounting	6
	Electives (Any 2 courses in HRM, Marketing or Wealth Management major as specified below)	12
	Total	*54*

Elective courses for BEng/BBA (Human Resource Management, HRM)

Course Code	Course	Credits
MGMT3403	Leadership	6
MGMT3405	Organizational behaviour	6
MGMT3415	Principles of entrepreneurship	6
MGMT3429	Human resource management and business strategy	6
MGMT3434	Human resource: theory and practice	6
MGMT3475	Current topics in human resource management	6

Elective courses for BEng/BBA (Marketing)

Course Code	Course	Credits
MKTG3501	Consumer behaviour	6
MKTG3502	Marketing research	6
MKTG3525	Services marketing	6
MKTG3531	Strategic marketing management	6

Elective courses for BEng/BBA (Wealth Management)

Course Code	Course	Credits
ACCT3107	Hong Kong taxation	6
FINA2320	Investment and portfolio analysis	6
FINA2322	Derivatives	6
FINA2325	Alternative investments	6
FINA2342	Insurance: theory and practice	6

Subject to approval of the Board of the Faculty of Engineering, candidates who have completed the requirements of BEng and decide not to proceed to the study for BBA may be awarded with a minor as specified by the Faculty of Business and Economics, if they have completed not less than 36 to 48 credits of courses in compliance with the syllabuses for the minor programme.

To obtain the degree of BBA, candidates must satisfactorily complete 114 credits of courses, 54 of which shall be completed during the study for BEng and 60 of which shall be completed during the 5th

year in accordance with the Regulations and Syllabuses for the Degree of BBA in Conjunction with the Degree of BEng.

Note: Candidates may refer to the Regulations for the Degree of Bachelor of Business Administration (BBA) in conjunction with the Degree of Bachelor of Engineering (BEng)" and Syllabuses for the Degree of Bachelor of Business Administration (BBA) in conjunction with the Degree of Bachelor of Engineering (BEng)"for the regulations, length and contents of courses for the double-degrees in BEng/BBA option.