

REGULATIONS FOR THE DEGREE OF BACHELOR OF ENGINEERING (BENG)

These regulations apply to students admitted to the BEng curriculum in the academic year 2010-11 and thereafter.

(See also General Regulations and Regulations for First Degree Curricula)

EN 1 Admission to the Degree

To be eligible for admission to the degree of BEng, a candidate shall

- (a) comply with the General Regulations;
 - (b) comply with the Regulations for First Degree Curricula;
 - (c) satisfy all the requirements of the curriculum in accordance with these regulations and the syllabuses.
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EN 2 Period of Study

The curriculum for the BEng degree shall normally require six semesters of full-time study, extending over not fewer than three academic years, and shall include any assessment to be held during and/or at the end of each semester. Candidates shall not in any case be permitted to extend their studies beyond the maximum period of registration of five academic years.

EN 3 Curriculum Requirements

To complete the curriculum, a candidate shall

- (a) satisfy the requirements prescribed in UG 5 of the Regulations for the First Degree Curricula;
 - (b) take not fewer than 180 credits of courses, in the manner specified in these regulations and syllabuses; candidates are also required to pass all core courses as specified in the syllabuses and satisfactorily complete prerequisite courses in order to enrol in a succeeding course;
 - (c) satisfy all the requirements prescribed for the minor programme option, if he/she pursues the minor programme; and
 - (d) satisfy all the requirements prescribed for the double-degree curriculum option, if he/she pursues the double-degree curriculum.
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EN 4 Candidates shall normally select not fewer than 24 and not more than 30 credits of courses in any one semester (except the summer semester), unless otherwise permitted or required by the Board of the Faculty, or except in the last semester of study when the number of credits required to satisfy the outstanding curriculum requirements is fewer than 24 credits. Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, and/or further credits during the summer semester, accumulating up to a maximum of 72 credits in one academic year. Candidates may, with the approval of the Board of the Faculty, exceed 72 credits in an academic year provided that the total number of credits taken shall not exceed 216 credits. Students making up for failed credits can be permitted by the Faculty to take up to 360 credits.

EN 5 Candidates with unsatisfactory academic progress may be required by the Board of the Faculty to take a reduced study load.

EN 6 Selection of Courses

Candidates shall select their courses in accordance with these regulations and the guidelines specified in the syllabuses before the beginning of each academic year. Changes to the selection of courses may be made only during the add/drop period of the semester in which the course begins, and such changes shall not be reflected in the transcript of the candidate. Requests for changes after the designated add/drop period of the semester shall be subject to the approval of the Board of the Faculty. Withdrawal from courses beyond the designated add/drop period will be subject to the approval of the Board of the Faculty.

EN 7 Assessment and Grades

Candidates shall be assessed for each of the courses which they have registered for, and assessment may be conducted in any one or any combination of the following manners: written examinations or tests, continuous assessment, laboratory work, field work, project reports, or in any other manner as specified in the syllabuses. Grades shall be awarded in accordance with UG8(a) of the Regulations for the First Degree Curricula.

EN 8 Written examinations or tests shall normally be held at the end of each semester unless otherwise specified in the syllabuses.

EN 9 Candidates are required to make up for failed courses in the following manner:

- i) undergoing re-assessment/re-examination in the failed course to be held no later than the end of the following semester (not including the summer semester); or
 - ii) re-submitting failed coursework, without having to repeat the same course of instruction; or
 - iii) repeating the failed course by undergoing instruction and satisfying the assessments; or
 - iv) for elective courses, taking another course in lieu and satisfying the assessment requirements.
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EN 10 Candidates shall not be permitted to repeat a course for which they have received a grade D or above for the purpose of upgrading.

EN 11 Unless otherwise permitted by the Board of the Faculty, a candidate will be recommended for discontinuation if

- (a) he/she fails to complete successfully 36 or more credits in two consecutive semesters (not including the summer semester) for one academic year, except where they are not required to take 36 credits in the two given semesters;
 - (b) he/she fails to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters; or
 - (c) he/she has exceeded the maximum period of registration specified in EN2.
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EN 12 Absence from Examination

Candidates who are unable, because of illness, to be present at the written examination of any course may apply for permission to present themselves at a supplementary examination of the same course to be held before the beginning of the First Semester of the following academic year. Any such application shall be made on the form prescribed within two weeks of the first day of the candidate's

absence from any examination. Any supplementary examination shall be part of that academic year's examinations, and the provisions made in the regulations for failure at the first attempt shall apply accordingly.

EN 13 Advanced Standing

Advanced standing may be granted to candidates in recognition of studies completed successfully in an approved institution of higher education elsewhere in accordance with UG2 of the Regulations for First Degree Curricula. The amount of advanced credits to be granted shall be determined by the Board of the Faculty, in accordance with the following principles:

- (a) a minimum of two years of study at this University shall be required before the candidate is considered for the award of the degree; and
- (b) a minimum of 120 credits shall be accumulated through study in this University, or from transfer of credits for courses completed at other institutions in accordance with UG4(d) of the Regulations for the First Degree Curricula.

Advanced credits granted shall not be included in the calculation of the GPA but will be recorded on the transcript of the candidate..

EN 14 Degree Classification

To be eligible for the award of the BEng degree, candidates shall have:

- a) satisfied all the requirements in the UG5 of the Regulations for First Degree Curricula;
 - b) passed not fewer than 180 credits, comprising
 - i) introductory courses;
 - ii) advanced courses;
 - iii) project courses;
 - iv) training courses;
 - v) internship courses;
 - vi) Chinese and English language enhancement courses;
 - vii) Common Core courses;
 - viii) all required courses as prescribed in respective curriculum; and
 - ix) Faculty elective courses.
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EN 15 The degree of Bachelor of Engineering shall be awarded in five divisions:

First Class Honours
 Second Class Honours Division One
 Second Class Honours Division Two
 Third Class Honours
 Pass

A pass list of successful candidates shall be posted on Faculty notice boards.

EN 16 The classification of honours shall be determined by the Board of the Faculty at its full discretion by taking into consideration the overall performance of candidates, or specifications in the syllabuses of respective programmes, and other relevant factors as appropriate.

SYLLABUSES FOR THE DEGREE OF BACHELOR OF ENGINEERING (BENG)

General Engineering courses (applicable to candidates admitted in the academic year 2010-2011 and thereafter)

General Engineering courses include

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)
ENGG1016	Computer programming and applications I (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:

ENGG1002 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

ENGG1003 Mathematics I (6 credits)

Linear algebra, advanced calculus, vector analysis, ordinary differential equations, Laplace transforms.
Prerequisite : HKALE Pure Mathematics

Assessment: 10% continuous assessment, 90% examination

ENGG1004 Mathematics IA (3 credits)

Linear algebra, advanced calculus, ordinary differential equations.

Assessment: 10% continuous assessment, 90% examination

ENGG1005 Mathematics IB (3 credits)

Vector spaces, vector analysis, Laplace transforms.

Assessment: 10% continuous assessment, 90% examination

ENGG1006 Engineering for sustainable development (6 credits)

Natural and human-made environment; urban resource consumption and environmental pollution; past and present civil engineering wonders; modern engineering systems; role of civil engineers in a changing world; sustainable cities and the future.

Assessment: 50% continuous assessment, 50% examination

ENGG1007 Foundations of computer science (6 credits)

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.

Assessment: 50% continuous assessment, 50% examination.

ENGG1009 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: 100% continuous assessment

ENGG1010 Foundations of engineering mechanics (6 credits)

Force systems and equilibrium; first and second moments of mass and area; introduction to stress and strain; torsion of circular shafts; introduction to mechanisms and kinematics; rigid body dynamics; hydrostatics; fluid in motion.

Assessment: 10% continuous assessment, 90% examination

ENGG1011 Introduction to biomedical engineering (6 credits)

This course is an overview of the essential areas in biomedical engineering including technologies and application in life sciences and medicine. The course is broadly divided into 4 areas: biomechanics and biomaterial; cell and tissue engineering; biomedical instrumentations and sensors; 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: 20% practical work, 40% continuous assessment, 40% examination

ENGG1015 Introduction to electrical and electronic engineering (6 credits)

[for students admitted in 2010-11 and thereafter]

This course provides an overview of the general 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. Finally, the socio-economical impact of electrical and electronic technologies will be introduced."

Assessment: 40% practical work, 20% continuous assessment, 40% examination

ENGG1016 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.

University Language Enhancement Courses

All the students admitted to the Bachelor of Engineering curriculum under common code admission are required to take the following two language enhancement courses in their first year of study:

CAES1515 Professional and technical oral communication for engineers

CENG1001 Practical Chinese language course for engineering students¹

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

This course focuses on students developing technical and professional spoken English skills. Throughout the course, the students will give a series of presentations which will help them to improve skills such as accessing, abstracting, analyzing, organizing and summarizing information; asking questions and negotiating meanings; making effective grammatical and lexical choices and using visual aids to ensure meaning is clear. The presentations give the students an opportunity to develop the skills to talk about general issues in Engineering in the Hong Kong context, engineering theories and their practical applications and also requires them to present a detailed exploration of one aspect of engineering related to their chosen major.

Assessment: 100% continuous assessment

¹ 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 CENG1004 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.

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

The course is designed to introduce practical Chinese writing skills; letter-writing; official, business and personal; office documents: notices, announcements, proposals, minutes and reports; technical writing skills; characteristics of the written language used in China, Hong Kong, Taiwan and Singapore; the art of public speaking; different scripts of Chinese characters; the engineering profession and Chinese culture.

Assessment: 50% continuous assessment, 50% examination.

Minor Option (applicable to candidates admitted in the academic year 2005-2006 and thereafter)

Candidates are given an option to pursue a minor in a discipline outside their own degree curriculum, subject to approval of the Head of Department concerned. 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 complementary studies and elective requirements of the BEng curriculum, subject to the approval of the Board of the Faculty of Engineering.

Double-Degrees in BEng/BBA Option (applicable to candidates admitted in the academic year 2007-2008 and thereafter)

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-degree curriculum requirements may also be considered as equivalent courses that satisfy the complementary studies and 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 4th year, candidates must (1) fulfil the requirements of the BEng curriculum; and (2) pass the 54 credits of courses, as listed below, as required by the Faculty of Business and Economics during their study for BEng²:

² Students pursuing double-degrees in BEng/BBA are required to take “CAES1907 Business Communication” in lieu of the following English enhancement courses during their first year of study as required by respective BEng curricula: CAES1503, CAES1505, CAES1507, CAES1509, CAES1511 or CAES1513.

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
	Electives (Any 2 courses in Finance, HRM or Marketing major as specified below)	12
	Total	54

Elective courses for BEng/BBA (Finance)

Course Code	Course	Credits
FINA0301	Derivatives	6
FINA2802	Investments and portfolio analysis	6
FINA0303	Case studies in corporate finance	6

Elective courses for BEng/BBA (Human Resource Management)

Course Code	Course	Credits
BUSI0026	Employment and labour relations	6
BUSI0029	Human resource management and business strategy	6
BUSI0034	Human resource: theory and practice	6
BUSI1005	Organizational behaviour	6

Elective courses for BEng/BBA (Marketing)

Course Code	Course	Credits
BUSI0004	Advertising management	6
BUSI0031	Marketing research	6
BUSI0050	Consumer behaviour	6
BUSI0038	Services marketing	6
BUSI0071	Strategic marketing management	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 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 4th year in accordance with the Regulations and Syllabuses for the Degree of BBA in Conjunction with the Degree of BEng.

Note: Further details about the length and content of the courses listed may be obtained on application to the department concerned.

MECHANICAL ENGINEERING (BUILDING SERVICES 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 Mechanical 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.

A *Discipline Core Course* is a compulsory course which a candidate must pass in the manner provided in the Regulations. A *Project Course* is also a compulsory course which a candidate must pass. A *Breadth* course is a Level 1 or Level 2 course that is offered as an optional course for the curriculum. A *Depth* course is a Level 3 course offered as an optional course for the curriculum. An *Elective course* is a course offered by the Department of Mechanical Engineering, other departments under the Faculty of Engineering, or by other faculties.

The Curriculum

The curriculum comprises 180 credits of courses as follows:

- (a) 24 credits from General Engineering courses, including:
 - (i) either ENGG1002 Computer programming and applications (6 credits) or ENGG1016 Computer programming and applications I (6 credits); AND
 - (ii) either ENGG1003 Mathematics I (6 credits) or ENGG1004 Mathematics IA (3 credits) and ENGG1005 Mathematics IB (3 credits); AND
 - (iii) ENGG1010 Foundations of engineering mechanics; AND
 - (iv) ENGG1006 Engineering for sustainable development; OR an equivalent course ENGG10XX
- (b) 90 credits of Discipline Core courses
- (c) 18 credits of Project courses
- (d) 9 credits of Complementary Studies courses
- (e) 18 credits of Discipline Elective courses
- (f) UG5 requirements (21 credits), including:
 - (i) CAES1513 Professional and technical written communication for engineers (3 credits)¹
 - (ii) CAES1515 Professional and technical oral communication for engineers (3 credits)
 - (iii) CENG1001 Practical Chinese language course for engineering students (3 credits)²
 - (iv) 12 credits of courses from the University Common Core Curriculum, selecting no more than one course from each Area of Inquiry

To complete the degree curriculum, a candidate must pass all the courses listed under (a) to (f) for a combination totaling to at least 180 credits, and satisfy any other requirements as stipulated in the University or Faculty of Engineering regulations.

¹ Students pursuing the double-degrees in BEng/BBA should take CAES1907 in lieu of CAES1513

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.

Degree Classification

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

Order of Study

There are no course prerequisites but lower level courses should preferably be taken before higher level courses.

First Year

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

General Engineering Courses (Total 24 credits)

Either

ENGG1002 Computer programming and applications (6 credits); or
ENGG1016 Computer programming and applications I; AND

Either

ENGG1003 Mathematics I (6 credits) or
both ENGG1004 Mathematics IA (3 credits) and ENGG1005 Mathematics IB (3 credits); AND

ENGG1010 Foundations of engineering mechanics (6 credits); AND
ENGG1006 Engineering for sustainable development (6 credits); OR
an equivalent course ENGG10xx (6 credits)

Discipline Core Courses (Total 27 credits)

MECH1004 Drawing and elements of design and manufacture (6 credits)
MECH1005 Fundamentals of electrical and electronic engineering (6 credits)
MECH1009 Properties of materials I (3 credits)
MECH1013 Engineering mechanics (6 credits)
MECH1014 Thermofluids (6 credits)

UG5 requirements (Total 9 credits)

CAES1513 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)

Discipline Elective Course (Total 6 credits)

BBSE1012 Engineering training (6 credits) (Summer semester)¹

¹ BBSE1012 can be used to fulfill the requirement of 18 credits of Discipline Elective courses

Second Year

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

Discipline Core Courses (Total 45 credits)

- BBSE2001 Utility services (6 credits)
- BBSE2002 Electrical power supply and lighting engineering (3 credits)
- BBSE2005 Air conditioning and refrigeration I (3 credits)
- MECH2001 Applied dynamics (3 credits)
- MECH2002 Engineering thermodynamics (6 credits)
- MECH2004 Control (3 credits)
- MECH2006 Electrical and electronic engineering (6 credits)
- MECH2007 Mathematics II (6 credits)
- MECH2008 Mechanics of fluids (6 credits)
- MECH2010 Properties of materials II (3 credits)

Complementary Studies Course (Total 3 credits)

- MECH2011 Engineering economics (3 credits)

UG5 requirements (Total 12 credits)

- 2 University Common Core Courses (12 credits)

Discipline Elective Course (Total 6 credits)

- BBSE2006 Industrial training (6 credits) (Summer semester)¹

Third Year

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

Project Courses (Total 18 credits)

- BBSE3002 Applied research project (12 credits)
- BBSE3005 Inter-disciplinary building services design (6 credits)

Complementary Studies Course (Total 6 credits)

- MECH3010 Engineering and technology management (6 credits)

Discipline Core Courses (Total 18 credits)

- BBSE3003 Fire protection engineering (6 credits)
- BBSE3006 Air conditioning and refrigeration II (3 credits)
- BBSE3007 Project and contract management (3 credits)
- MECH3023 Building energy management and control systems (6 credits)

Discipline Elective Courses (Total 18 credits)

Students are required to complete 18 credits of Discipline Elective courses in the following manner:

¹ BBSE2006 can be used to fulfill the requirement of 18 credits of Discipline Elective courses

- (i) Elective Breadth/Depth Courses (up to 18 credits)
- (ii) Elective MSc(Eng) courses (up to 6 credits)
- (iii) Elective Course (up to 6 credits)

Elective Breadth/Depth Courses (up to 18 credits)

MECH2016	Fundamentals of aeronautical engineering (6 credits)
MECH3001	Acoustics (3 credits)
MECH3002	Air pollution control (6 credits)
MECH3004	Automatic control (6 credits)
MECH3006	Case studies of failure investigations (6 credits)
MECH3007	Computer-aided design and manufacture (CAD/CAM) (6 credits)
MECH3009	Energy conversion systems (6 credits)
MECH3011	Heat transfer (6 credits)
MECH3012	Product design and development (6 credits)
MECH3014	Materials for engineering applications (6 credits)
MECH3020	Vibration (6 credits)
MECH3021	Viscous flow (6 credits)

Elective MSc(Eng) courses (up to 6 credits)

MECH6024	Applied mathematics for engineers (3 credits)
MECH6028	Processing and properties of engineering plastics (3 credits)
MECH6040	Foundations of nanotechnology (3 credits)

Elective Course (up to 6 credits)

Any other elective course as approved by the department (6 credits)

Minor Programmes

From 2010-11 academic year, candidates from other than the Department of Mechanical Engineering may pursue a Minor in Mechanical Engineering or Minor in Mechanical Engineering – Building Services Engineering. Candidates who are interested in pursuing minor in Mechanical Engineering must satisfy the following prerequisites:

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

Minor in Mechanical Engineering

Candidates are required to complete a total of 36 credits of courses comprising:

- (a) Introductory courses (12 credits)

Students are required to complete:

ENGG1010	Foundations of engineering mechanics (6 credits)*
MECH1014	Thermofluids (6 credits)

(b) Advanced Elective courses (24 credits)

Students must complete 24 credits of advanced elective courses to be chosen from the following list:

MECH1004	Drawing and elements of design and manufacture (6 credits)
MECH1013	Engineering mechanics (6 credits)
MECH2001	Applied dynamics (3 credits)
MECH2002	Engineering thermodynamics (6 credits)
MECH2004	Control (3 credits)
MECH2005	Design and manufacture (6 credits)
MECH2008	Mechanics of fluids (6 credits)
MECH2009	Mechanics of solids (6 credits)

Minor in Mechanical Engineering – Building Services Engineering

Candidates are required to complete a total of 36 credits of courses comprising:

(a) Introductory courses (12 credits)

Students are required to complete:

ENGG1010	Foundations of engineering mechanics (6 credits)*
MECH1014	Thermofluids (6 credits)

(b) Advanced Elective courses (24 credits)

Students must complete 24 credits of advanced elective courses to be chosen from the following list with at least 9 credits of courses selected from those with course code BBSExxx:

MECH1004	Drawing and elements of design and manufacture (6 credits)
MECH1013	Engineering mechanics (6 credits)
MECH2002	Engineering thermodynamics (6 credits)
MECH2008	Mechanics of fluids (6 credits)
BBSE2001	Utility services (6 credits)
BBSE2002	Electrical power supply and lighting engineering (3 credits)
BBSE2005	Air conditioning and refrigeration I (3 credits)
BBSE3006	Air conditioning and refrigeration II (6 credits)

*Students opting for the Minor cannot use the course “ENGG1010 Foundations of engineering mechanics” 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

Candidates pursuing studies for the double-degrees in BEng/BBA curriculum are granted exemptions from the following courses:

Courses in the BEng curriculum to be exempted	Corresponding Business courses completed
CAES1513 Professional and technical written communication for engineers (3 credits)	CAES1907 Business communication (3 credits)
MECH2011 Engineering economics (3 credits) MECH3010 Engineering and technology management (6 credits) BBSE3007 Project and contract management (3 credits) One Elective Course (6 credits)	ECON1001 Introduction to Economics I (6 credits) BUSI1003 Introduction to management information system (6 credits) BUSI1007 Principles of management (6 credits)

COURSE DESCRIPTIONS

Level One

BBSE1012. Engineering training (6 credits)

Knowledge and use of hand and machine tools; sheet metal work; welding; fixing and jointing of cables and pipes; construction, assembly and appreciation of electrical and mechanical systems; properties of metals and other building materials.

Assessment: 100% practical work

MECH1004. Drawing and elements of design and manufacture (6 credits)

Engineering drawing techniques; orthographic and pictorial projections; dimensioning and tolerancing, limits and fits, screw fasteners; cam; gears; computer aided drafting, with 3D CAD modeling; manufacturing processes, process selection, design for manufacturability.

Assessment: 100% continuous assessment

MECH1005. Fundamentals of electrical and electronic engineering (6 credits)

Basic circuit principles; steady-state A.C. circuit theory; magnetic circuits; transformers; bipolar junction transistors; field effect transistors; direct-current motors; solid-state controller for D.C. motors; combinational logic circuits.

Assessment: 15% practical work; 85% examination

MECH1009. Properties of materials I (3 credits)

Elements of atomic structure and bonding; crystal structure; defect theory; solidification; plastic deformation; recrystallization; phase diagrams; alloy properties; TTT diagrams; heat treatment.

Assessment: 15% practical work; 85% examination

MECH1013. Engineering Mechanics (6 credits)

Stress and strain; bending of beams; deflection of beams; thin-walled pressure vessels; kinematics of particles with different forms of accelerations; momentum and energy conservation; applications of kinetic principles to particles and vehicles with mass variation; velocity-dependent resistance and the action of central forces; undamped and damped free vibration; simple and epicyclic gear trains.

Assessment: 10% practical work; 10% continuous assessment; 80% examination

MECH1014. Thermofluids (6 credits)

Concepts and definitions; properties of pure substance; heat and work; first law of thermodynamics; second law of thermodynamics; entropy; basic concepts on fluids and flows; dimensional analysis, similarity and modelling; momentum theorems and pipe flow analysis.

Assessment: 10% practical work; 90% examination

- 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)**
- ENGG1010. Foundations of engineering mechanics (6 credits)**
- ENGG1016. Computer programming and applications I (6 credits)**

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

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.

CAES1513. 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)

This course focuses on students developing technical and professional spoken English skills. Throughout the course, the students will give a series of presentations which will help them to improve skills such as accessing, abstracting, analyzing, organizing and summarizing information; asking questions and negotiating meanings; making effective grammatical and lexical choices and using visual aids to ensure meaning is clear. The presentations give the students an opportunity to develop the skills to talk about general issues in Engineering in the Hong Kong context, engineering theories and their practical applications and also requires them to present a detailed exploration of one aspect of engineering related to their chosen major.

Assessment: 100% continuous assessment

CCXXxxxx University Common Core course (6 credits)**CCXXxxxx University Common Core course (6 credits)****Level Two****BBSE2001. Utility services (6 credits)**

Characteristics and design of different service installations: cold, hot and flushing water supply systems; steam supply, sanitary and stormwater; drainage systems; vertical transportation system; L.V. electrical system; communication systems; security and alarm systems.

Assessment: 20% continuous assessment; 80% examination

BBSE2002. Electrical power supply and lighting engineering (3 credits)

Design of electricity distribution in buildings; earthing and bonding requirements; protective devices; standby generators and power supplies; lightning protection; I.E.E. regulations and codes of practice; light production and measurement; photometry and colorimetry; human perception; artificial lighting and daylighting; lighting design for interior and exterior lighting.

Assessment: 20% continuous assessment; 80% examination

BBSE2005. Air conditioning and refrigeration I (3 credits)

Air conditioning systems; psychrometry; thermal comfort criteria; fresh air requirement; indoor air quality and pollutants; heating and cooling load estimation; energy consumption estimation; air conditioning processes and systems; refrigerants and refrigeration systems; refrigeration cycles and components.

Assessment: 10% practical work; 10% continuous assessment; 80% examination

BBSE2006. Industrial training (6 credits)

Training in industry for a nominal period of at least six weeks during the summer vacation of the Second Year of Study

Assessment: 100% practical work

MECH2001. Applied dynamics (3 credits)

Advanced rotational motion; balancing of rotating and reciprocating masses; vibration isolation and control; vibration of multi degree-of-freedom in-line systems; free transverse vibration of beams.

Assessment: 10% practical work; 10% continuous assessment; 80% examination

MECH2002. Engineering thermodynamics (6 credits)

Steam and gas power plant; refrigeration; jet propulsion and turbomachinery; gas mixture; psychrometry and air-conditioning, introduction to heat transfer.

Assessment: 10% practical work; 10% continuous assessment; 80% examination

MECH2004. Control (3 credits)

Modelling of physical systems; time response analysis of dynamical systems; feedback control systems; control system design and applications; stability; root locus method; analogue computer programming

Assessment: 20% continuous assessment; 80% examination

MECH2006. Electrical and electronic engineering (6 credits)

Analog electronics; sequential logic circuits; digital-to-analog and analog-to-digital converters; introduction to microcontrollers; three-phase power systems; induction motors; synchronous motors; step motors; solid-state controllers for A.C. motors.

Assessment: 10% practical work; 90% examination

MECH2007. Mathematics II (6 credits)

Complex variables; Fourier series and Fourier transforms; partial differential equations; introduction to probability and statistics, elementary numerical analysis.

Assessment: 20% continuous assessment; 80% examination

MECH2008. Mechanics of fluids (6 credits)

Navier-Stokes equations; pipe and channel viscous flows; lubrication; boundary layer flows; two-dimensional potential flows; open-channel flows; fluid machines.

Assessment: 10% practical work; 10% continuous assessment; 80% examination

MECH2010. Properties of materials II (3 credits)

Testing and service behaviour of materials; metallurgy of fatigue; theory of creep resistant alloys; the ductile/brittle transition; corrosion resistance; surface treatment; selection criteria for common alloys; structure of polymers; properties of compounded plastics; service behaviour of plastics.

Assessment: 10% practical work; 10% continuous assessment; 80% examination

MECH2011. Engineering economics (3 credits)

Time value of money; interest and interest formulas; equivalent analysis; bases for comparison of alternatives; present worth analysis; annual equivalent worth analysis; rate of return analysis; project cash flow analysis; decision making among alternatives; applications to real-world economy.

Assessment: 10% continuous assessment; 90% examination

MECH2016. Fundamentals of aeronautical engineering (6 credits)

History of aeronautical science; wing aerodynamics; propulsion; flight mechanics; systems and airframe structures; lightweight materials, failure modes, high-temperature materials, creep damage; maintenance.

Assessment: 10% practical work; 10% continuous assessment; 80% examination

Level Three**BBSE3002. Applied research project (12 credits)**

The project aims at the application of knowledge acquired during the course of the programme to a research investigation in building services systems targeted at achieving a novel design or an improvement in functionality, performance or cost savings.

Assessment: 100% continuous assessment

BBSE3003. Fire protection engineering (6 credits)

Fire behaviour and characteristics; compartment fires; fire hazards; automatic fire detection and alarm systems; automatic fixed water-based and gas-based fire extinguishing systems; special fire extinguishing systems; portable fire extinguishers; smoke production; smoke management and control systems; staircase pressurization systems; building evacuation; LPC/FOC rules; FSD and NFPA codes; prescriptive and performance-based approaches; fire risk management.

Assessment: 10% practical work; 10% continuous assessment; 80% examination

BBSE3005. Inter-disciplinary building services design (6 credits)

Inter-disciplinary building services design; design rationales; conceptual design of air conditioning, plumbing and drainage, fire services, electrical power supply, vertical transportation, and lighting systems; detailed design; requirements for teamwork and integration; tectonics considerations.

Assessment: 50% practical work ; 50% continuous assessment

BBSE3006. Air conditioning and refrigeration II (3 credits)

Air-side systems; fan design and control; major components and equipment; air duct design; space air diffusion; water-side systems; piping system design; pump design and operation; flow rate

measurements; analysis of thermal load and energy consumption; mechanical and natural ventilation; ventilation efficiency; design of refrigeration systems; refrigeration system components and performance.

Assessment: 10% practical work; 10% continuous assessment; 80% examination

BBSE3007. Project and contract management (3 credits)

Characteristics of building services projects and contracts; role of architect, consultants, quantity surveyor, builder and subcontractors; statutory requirements; project planning, scheduling and control; contract documentation and contractual arrangement; estimating and tendering; site organization and supervision; measurement and valuation of work; claim management and settlement; alternative dispute resolution.

Assessment: 20% continuous assessment; 80% examination

MECH3001. Acoustics (3 credits)

Human hearing; environmental noise measurement and legislation; source mechanisms; duct acoustics; sound reverberation in rooms; noise transmission through walls and windows; active and passive noise control.

Assessment: 10% practical work; 90% examination

MECH3002. Air pollution control (6 credits)

Particulate and aerosol abatement technology; gas absorption - plate and packed columns; adsorption for the removal of odours and trace gases; combustion fundamentals and abatement of volatile organic compounds using incineration techniques.

Assessment: 10% continuous assessment; 90% examination

MECH3004. Automatic control (6 credits)

Control of mechanical, hydraulic and pneumatic systems; frequency domain analysis, Nyquist stability criterion; linear control system design; computer control systems, state-space analysis of multivariable linear system, controllability and observability, stability analysis; state feedback.

Assessment: 10% practical work; 90% examination

MECH3006. Case studies of failure investigations (3 credits)

General introduction to failure investigation procedures, purpose, scope, and limitation; failure mode detected from component examination; cause of failure determination through system case studies; design codes for large structures; fracture mechanics techniques; legislation affecting safety of equipment; roles of a mechanical engineer as an expert witness.

Assessment: 20% practical work; 30% continuous assessment; 50% examination

MECH3007. Computer-aided design and manufacture (CAD/CAM) (6 credits)

Basic data structuring techniques; transformation techniques; mathematical bases for surface modeling; principles of solid modeling and applications; numerical control; computer-aided production technologies; computer-integrated manufacturing.

Assessment: 30% continuous assessment; 70% examination

MECH3009. Energy conversion systems (6 credits)

Energy calculations; solar thermal power plant; energy storage; solar photovoltaic systems; wind energy systems; nuclear energy and power plants; nuclear waste management; urban waste.

Assessment: 10% continuous assessment; 90% examination

MECH3010. Engineering and technology management (6 credits)

Quantitative methods for engineering and technology management; managing technology through the product life cycle; planning; organizing; staffing; leading; controlling, quantitative methods for analyzing / solving decision making involving engineering and technology management problems; quantitative methods for forecasting; resource allocations subject to constraints; linear programming and simplex method; decision theory with the application of decision trees; inventory control models; queuing theory; transportation and resource allocation for business operations.

Assessment: 20% continuous assessment; 80% examination

MECH3011. Heat transfer (6 credits)

Fourier's law; heat-conduction equation; steady and unsteady conduction; basic convection principles; laminar and turbulent heat transfer in tubes and over plates; Reynolds analogy; log mean temperature difference; effectiveness-NTU method; heat exchanger design; exergy analysis; optimisation of heat transfer process and system.

Assessment: 10% continuous assessment; 90% examination

MECH3014. Materials for engineering applications (6 credits)

Materials for high strength/weight ratio; high and low temperature service; resistance to corrosion resistance and protection; residual stresses; composite and ceramic materials; manufacturing properties; problem based learning module; introduction to materials classification.

Assessment: 10% practical work; 10% continuous assessment; 80% examination

MECH3020. Vibration (6 credits)

Vibration measurement; single- and two-plane balancing of rotors in situ, machinery condition monitoring; random vibration; digital signal analysis; matrix analysis of free and forced vibrations of multi-degree-of-freedom systems; classical analysis of beam vibration; energy methods for approximate vibration analysis.

Assessment: 10% practical work; 10% continuous assessment; 80% examination

MECH3021. Viscous flow (6 credits)

Eulerian and Lagrangian descriptions; Navier-Stokes equations; low-Reynolds-number flows; laminar boundary layers; laminar stability theory; turbulent flows.

Assessment: 10% practical work; 10% continuous assessment; 80% examination

MECH3023. Building energy management and control systems (6 credits)

Concepts of distributed computer-based monitoring and control; hardware and software development; communication protocols; application to maintenance, energy management and control; system design and performance evaluation; computer simulation and emulation techniques; analysis of dynamic building services systems.

Assessment: 10% practical work; 10% continuous assessment; 80% examination

MECH6024. Applied mathematics for engineers (3 credits)

Statistical and numerical methods in engineering; hypothesis testing; estimation of parameters and confidence intervals; correlation coefficient; direct and iterative methods for systems of equations; numerical analysis; finite difference and finite element schemes; wave propagation and vibration; normal modes.

Assessment: 100% examination

MECH6028. Processing and properties of engineering plastics (3 credits)

Viscosity of polymer melts; extrusion; injection moulding; blow moulding; joining; plating; yield criteria; environmental stress cracking; UV degradation; flame retardation; biodegradable polymers; viscoelastic behaviour of plastics; dynamic behaviour; design methods for plastics based on creep data.

Assessment: 100% examination

MECH6040. Foundations of nanotechnology (3 credits)

Characteristic length scales, nanomaterials, nanostructures, physical properties of nanostructures, deposition techniques of nanofabrication, high resolution analysis and characterization, scanning probe methods, nanoindentation, deformation of nanostructures, mechanical behaviours of nanocrystalline solids, ultra-high strength of nanostructures, sensors, actuators, MEMS, NEMS, functional nanomaterials, nano-scale devices, modelling and computer-aided designs, bio-nanotechnology.

Assessment: 100% examination