

City University of Hong Kong

Curriculum Information Sheet for a Major/Degree Department of Materials Science and Engineering Effective from Catalogue Term of Semester A 2014 / 2015

The information provided on this form is the official record of the Major/Degree. It will be used for City University's database, publication in various City University publications including Blackboard, and documentation for students and others as required.

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Part I

Major (in English) : Materials Engineering
(in Chinese) : 材料工程學

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

Award Title (in English) : Bachelor of Engineering (Hons) in Materials Engineering
(in Chinese) : 材料工程學榮譽工學士

(According to the approved structure of 4-year undergraduate degrees, the award title to be shown on a student's diploma will be the degree and the major.)

Maximum Period of Study: 8 years (for normative 4-year degree)
6 years (for Advanced Standing I (Note 1))
5 years (for Advanced Standing II (Note 2))

Minimum Number of Credit Units (CU) Required for the Award

Normative 4-year degree <i>(Minimum credit units for graduation: 120; Maximum credit units permitted for students: 144)</i>	Advanced Standing I (Note 1) <i>(Minimum credit units for graduation: 90; Maximum credit units permitted for students: 114)</i>	Advanced Standing II (Senior-year Entry) (Note 2) <i>(Minimum credit units for graduation: 60; Maximum credit units permitted for students: 84)</i>
120 CUs Gateway Education: 30 College Requirements: 15 Major Requirements (Core + Elective): 72 (45+27/48+24) Free Elective:3	93 CUs Gateway Education: 21 College Requirements: waived Major Requirements (Core + Elective): 72 (45+27/48+24) Free Elective: 0	78 CUs Gateway Education: 12 College Requirements: waived Major Requirements (Core + Elective): 66 (39+27/42+24) Free Elective: 0

Aims of Major

This major aims to educate and produce graduates who will be:

- *equipped with working knowledge of the production, characterization, and service performance of engineering materials;*
- *proficient communicators equipped with a range of disciplines and skills, computer literacy, language proficiency, and the ability to think quantitatively and analyse problems critically;*
- *able to contribute their specialist skills, alongside other engineering specialists, to the design, manufacture, maintenance, testing and safety of engineering components, devices, structures and process plants;*
- *able to demonstrate an awareness of the context within which they work, and take responsibility for their own personal and professional development;*
- *demonstrate the ability to integrate knowledge learned in the major to support in at least an original discovery or creative design relevant to materials engineering.*

Intended Learning Outcomes of Major (MILOs)

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

Upon successful completion of the materials engineering major, students should be able to:

1. apply knowledge of mathematics, science, and engineering appropriate to the materials engineering discipline.
2. design and conduct experiments, as well as to analyze and interpret data.
3. design a system, component, or process to meet the desired needs within realistic constraints, such as economic, environmental, social, political and ethical expectations, health and safety, manufacturability and sustainability.
4. function in multi-disciplinary teams.
5. identify, formulate, and solve engineering problems.
6. recognize professional and ethical responsibility.
7. communicate effectively.
8. recognize the impact of engineering solutions in a global and societal context, especially the importance of health, safety and environmental considerations for both workers and the general public.
9. recognize the need for, and to engage in life-long learning.
10. stay abreast of contemporary issues.
11. use the techniques, skills, and modern engineering tools necessary for engineering practice appropriate to the materials engineering discipline.
12. use computers and IT relevant to the materials discipline along with understanding of their processes and limitations.
13. create an original design, or explore the materials engineering area for discovery of new knowledge.

Part II Degree Requirement

1. Gateway Education

	Normative 4-year Degree	Advanced Standing I (Note 1)	Advanced Standing II (Senior-year Entry) (Note 2)
English	6 credit units <ul style="list-style-type: none"> • GE1401 University English (3 CUs); and • Discipline-specific English (3 CUs) 	6 credit units <ul style="list-style-type: none"> • GE1401 University English (3 CUs); and • Discipline-specific English (3 CUs) 	3 credit units <ul style="list-style-type: none"> • Discipline-specific English (3 CUs)
GE1501 Chinese Civilisation – History and Philosophy	3 credit units	3 credit units	Not compulsory requirement
Area requirements: Area 1: Arts and Humanities Area 2: Study of Societies, Social and Business Organisations Area 3: Science and Technology	21 credit units (A minimum of 3 credit units from each of the three areas)	6 credit units	3 credit units
College/School-specified Courses	N/A	6 credit units [^]	6 credit units [Any courses not within the Major Requirements (including core courses and electives)]

[^]College-specified courses for Advanced Standing I Students

Course Code	Course Title	Credit Units	Remarks
CS1102 / CS1302 /	Introduction to Computer Studies / Introduction to Computer Programming /	3	Students taking Major elective AP3114 <i>Computational Methods for Physicist and Materials Engineers</i> or AP4172 <i>Simulation and Modelling in Multidisciplinary Sciences</i> may apply for exemption. They are required to complete any course of 3 credits (NOT within the major requirements including core courses and electives) to replace the exempted credits.
MA1201/ MA1301	Calculus and Basic Linear Algebra II/ Enhanced Calculus and Linear Algebra II	3	

2. Chinese Language Requirement

From 2012 cohort onwards, students are required to satisfy the Chinese Language Requirement as follows:

(i)	Students with an HKDSE score below 4 in Chinese, or an HKALE AS Chinese Language and Culture score below D	CHIN1001 University Chinese I*
(ii)	Students with an HKDSE score of 4 or above in Chinese or an HKALE AS Chinese Language and Culture score D or above, or those who have successfully completed CHIN1001 University Chinese I	No requirement
(iii)	Students whose qualifications do not fall within (i) and (ii) above	No requirement

*The 3 credit units of CHIN1001 University Chinese I will NOT be counted towards the minimum credit units required for graduation and will NOT be included in the calculation of CGPA.

3. College/School Requirement, if any

Normative 4-year degree students of the College of Science and Engineering are required to earn 15 CUs in fulfilment of the College requirements.

Course Code	Course Title	Level	Credit Units	Remarks
Normative 4-year Degree				
Mathematics (6 credit units)				
MA1200 / MA1300	Calculus and Basic Linear Algebra I / Enhanced Calculus and Linear Algebra I	B1	3	
MA1201 / MA1301	Calculus and Basic Linear Algebra II / Enhanced Calculus and Linear Algebra II	B1	3	
Computing (3 credit units)				
CS1102 / CS1302	Introduction to Computer Studies / Introduction to Computer Programming	B1	3	
Science (6 credit units) <i>Choose two from the following three subject areas:</i>				
<i>Physics</i>				
AP1201	General Physics I	B1	3	
<i>Chemistry</i>				
BCH1100	Chemistry	B1	3	
<i>Biology</i>				
BCH1200	Discovery in Biology	B1	3	

Advanced Standing I (Note 1)			
College Requirement waived.			
Advanced Standing II (Senior-year Entry) (Note 2)			
College Requirement waived			

Part III Major Requirement (72 credit units for Normative 4-year degree students; 72 credit units for Advanced Standing I students; 66 credit units for Advanced Standing II students)

1. Core Courses

- Normative 4-year degree students (45 or 48 credit units);
- Advanced Standing I students (45 or 48 credit units);
- Advanced Standing II students (39 or 42 credit units).

Course Code	Course Title	Level	Credit Units	Remarks
AP1202	General Physics II	B1	3	Students with Grade D or above in HKAL Physics OR students with equivalent qualification may apply for exemption. They are required to complete any course of 3 credits to replace the exempted credits. Advanced Standing II students are not required to take this course
AP1203	General Physics III	B1	3	Advanced Standing II students are not required to take this course.
AP2102	Introduction to Materials Engineering	B2	3	
AP2104	Mechanics of Solids	B2	3	
AP2243	Workshop Practice	B2	3	
AP3109	Kinetic Processes in Engineering Materials	B3	3	
AP3169	Materials Testing Techniques	B3	3	
AP3171	Materials Characterization Techniques	B3	3	
AP3172	Electronic Properties of Solids	B3	3	
AP3190	Thermodynamics of Materials	B3	3	
AP3244	Design Laboratory	B3	3	
AP4116 / FS4003 / FS4004	Dissertation CES Placement Project Overseas Research Internship Scheme	B4	6/ 6/ 9*	*Students who completed <i>FS4004 Overseas Research Internship Scheme</i> can take 3 credit units elective less to fulfill the major requirement.
EE3013 / AP3101	Engineers in Society / Materials Engineers in Society	B3	0	

MA2158 /	Linear Algebra and Calculus			
MA2001 /	Multi-variable Calculus and Linear Algebra			
MA2172 /	Applied Statistics for Sciences and Engineering	B2	3	
MA2177 /	Engineering Mathematics and Statistics			
MA2181	Mathematical Methods for Engineering			
MBE2016	Engineering Graphics	B2	3	

2. Electives

- Normative 4-year degree students (24 or 27 credit units);

- Advanced Standing I students (24 or 27 credit units);

- Advanced Standing II students (24 or 27 credit units).

Course Code	Course Title	Level	Credit Units	Remarks
Group A (Fundamental Electives): at least 12 credit units from this group of courses				
AP2105	Engineering Mechanics: Dynamics	B2	3	
AP3110	Deformation and Fracture	B3	3	
AP3111	Ceramic Processing and Microstructure Development	B3	3	
AP3113	Polymer Engineering	B3	3	
AP3114	Computational Methods for Physicist and Materials Engineers	B3	3	
AP3130	Biomaterials	B3	3	
AP4170	Environmental Degradation	B4	3	
Group B (Specialized Electives)				
AP4114	Stress Analysis	B4	3	
AP4118	Composite Materials – with An Introduction to Nanocomposites	B4	3	
AP4121	Thin Film Technology and Nanocrystalline Coatings	B4	3	
AP4124	Failure Analysis and Case Studies	B4	3	
AP4126	Electroceramics	B4	3	
AP4127	Smart Sensors: From Engineering to Applications	B4	3	
AP4171	Electronic Packaging and Materials	B4	3	
AP4172	Simulation and Modelling in Multidisciplinary Sciences	B4	3	
AP4175	Advanced Technology in Biomedical Devices	B4	3	
AP4176	Energy Materials for the Current Century	B4	3	
AP4177	Smart and Functional Materials: Selection and Application	B4	3	

AP4178	Nanostructures & Nanotechnology	B4	3	
AP4253	Photonic Materials Physics	B4	3	
AP4280	Advanced Optics Laboratory	B4	3	
AP4307	Building Materials	B4	3	
AP4714	Special Topics in Materials Science and Engineering	B4	3	
FS4002	Industrial Attachment Scheme	B3	3	

Remarks: Course(s) under the major requirements may be waived for students of Advanced Standing I/II, depending on their academic qualifications.

Part IV Admission Requirements for Entry to the Major, if any (Department can state the prerequisites required for admission to the Major.)

Nil

Part V Additional Information (e.g. Accreditation by professional and statutory bodies, etc.)

The BEng (Hons) degree in Materials Engineering has been accredited by the Hong Kong Institution of Engineers (HKIE) as an award satisfying the academic requirements for its Corporate Membership.

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

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

Returned by

Name: Dr Johnny HO

Department: MSE

Tel: 34424897

Date: 1 July 2017