CIR-MAJ

香港城市大學
City University of Hong Kong

REVISED on

1 July 2017

wef Sem A 2017/18

Curriculum Information Record for a Major/Degree

Department of Materials Science and Engineering
Effective from Semester A 2017 / 2018
For Students Admitted/Changed to the Major with Catalogue Term Semester A 2016/2017 and 2017 /2018

The information provided on this form is the official record of the major/degree. It will be used for City University's database, various City University publications (including websites) and documentation for students and others as required.

In specifying the curriculum for a major/degree, "catalogue term" is used to determine the set of curriculum requirements that a student is following. By mapping the student record and the version of curriculum rules applicable, the graduation requirements of individual students will be evaluated accordingly. The catalogue terms of curriculum requirements that students will follow are summarized below (BUS/04/A5R):

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

Prepared / Last Updated by

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City University of Hong Kong

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Department of Materials Science and Engineering
Effective from Semester A 2017 / 2018
For Students Admitted/Changed to the Major with Catalogue Term Semester A 2016 / 2017 and thereafter

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Part I Major/Degree Overview

Major

(in English) : Materials Engineering

(in Chinese) : 材料工程學

Degree

(For students admitted to the University in 2015/16 and thereafter)

(in English) : Bachelor of Engineering

(in Chinese) : 工學士

(For students admitted to the University in 2014/15 and before)

(in English) : Bachelor of Engineering (Honours)

(in Chinese) : 榮譽工學士

Award Title[#]

(For students admitted to the University in 2015/16 and thereafter)

(in English) : Bachelor of Engineering in Materials Engineering

(in Chinese) : 工學士 (材料工程學)

(For students admitted to the University in 2014/15 and before)

(in English) : Bachelor of Engineering (Honours) in Materials Engineering

(in Chinese) : 材料工程學榮譽工學士

 # Please make reference to the "Guidelines on Award Titles" approved by the Senate when proposing new award titles or changes to existing award titles (Senate/86/A5R).

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1. Normal and Maximum Period of Study

	Normative 4-year Degree	Advanced Standing I (Note 1)	Advanced Standing II (Senior-year Entry) (Note 2)
Normal period of study	4 years	3 years	2 years
Maximum period of study	8 years	6 years	5 years

2. Minimum Number of Credit Units Required for the Award and Maximum Number of Credit Units Permitted

Degree Requirements	Normative 4-year Degree	Advanced Standing I	Advanced Standing II (Senior-year Entry)
Gateway Education requirement *	30 credit units	21 credit units	12 credit units
College/School requirement *	6 credit units	waived	waived
Major requirement	75 credit units (Core: 51 Elective: 24)	75credit units (Core: 51 Elective: 24)	69 credit units (Core: 45 Elective: 24)
Free electives / Minor (if applicable)	9 credit units	0 credit unit	0 credit unit
Minimum number of credit units required for the award	**120 credit units**	**96 credit units**	**81 credit units**
Maximum number of credit units permitted	**144 credit units**	**114 credit units**	**84 credit units**

** For details, please refer to the Curriculum Information Record for Common Requirements.*

3. Aims of Major

The 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.*

4. Intended Learning Outcomes of Major (MILOs)

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

Upon successful completion of this major, students should be able to:

No.	*MILOs*	*Discovery-enriched curriculum related learning outcomes (please tick where appropriate)*		
		A1	*A2*	*A3*
1.	apply knowledge of mathematics, science, and engineering appropriate to the materials engineering discipline.		√	√
2.	design and conduct experiments, as well as 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.	√	√	√

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishments of discovery/innovation/creativity through producing/constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Part II Major Requirement

(The catalogue term of the major requirement that students will follow will be the effective term of the declared/allocated major.

For normative 4-year degree students who will join the majors allocation exercise, the catalogue term of major requirement will be one year after admission.

For advanced standing students and 4-year degree students who already have a major at the time of admission, the catalogue term of major requirement will be the same as their admission term.)

1. Core Courses

Normative 4-year degree: 51 credit units
Advanced Standing I: 51 credit units
Advanced Standing II: 45 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	
AP3110	Deformation and Fracture	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	Dissertation CES Placement Project	B4	6	
AP4101	Materials Engineers in Society	B3	3	

MA2001 / MA2158 / MA2172 / MA2177 / MA2181	Multi-variable Calculus and Linear Algebra Linear Algebra and Calculus Applied Statistics for Sciences and Engineering Engineering Mathematics and Statistics Mathematical Methods for Engineering	B2	3	Advanced Standing students may be required to complete MA1200 Calculus and Basic Linear Algebra I and MA1201 Calculus and Basic Linear Algebra II (the pre-requisite courses) before they are allowed to enroll MA2001/ MA2158/ MA2177/ MA2181. They are advised to apply and sit for the placement test * organized by MA department before the commencement of Semester A of their admitted academic year. * Placement Test for MA1200 – ASI student Combined Placement test for MA1200 & MA1201 – ASII students
MBE2016	Engineering Graphics	B2	3	

2. Electives (24 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	
AP3111	Ceramic Processing and Microstructure Development	B3	3	
AP3113	Polymer Engineering	B3	3	
AP3114	Computational Methods for Physicists 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	
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 III Admission Requirements for Entry to the Major, if any

(Admission requirements here refers to specific requirements for students already admitted to the College/School/Department with an undeclared major. Academic units can state the prerequisites required for admission to the major.)

Nil

Part IV Accreditation by Professional / Statutory Bodies

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

Part V Additional Information

Nil

Part VI Curriculum Map

Course			MILOs													DEC		
Code	**Title**	**Credit**	**M1**	**M 2**	**M 3**	**M 4**	**M 5**	**M 6**	**M 7**	**M 8**	**M 9**	**M 10**	**M 11**	**M 12**	**M 13**	**A1**	**A2**	**A3**
Core Courses																		
AP1202	General Physics II	3	**TP**							**T**			**T**		**T**	√	√	√
AP1203	General Physics III	3	**TP**				**T**			**T**			**T**		**T**	√	√	√
AP2102	Introduction to Materials Engineering	3	**TP**			**M**				**TM**	**M**		**T**		**T**		√	
AP2104	Mechanics of Solids	3	**TP**	**P**	**M**		**PM**		**P**						**TPM**	√	√	
AP2243	Workshop Practice	3	**TP**	**TP**			**TP**	**PM**	**PM**				**TPM**	**TPM**	**TPM**		√	√
AP3109	Kinetic Processes in Engineering Materials	3	**TPM**	**P**					**P**		**P**				**T**	√	√	√
AP3110	Deformation and Fracture	3	**TPM**	**TP**	**T**		**T**			**T**					**T**		√	
AP3169	Materials Testing Techniques	3	**T**	**TM**			**T**		**M**			**M**	**TM**		**TP**	√	√	√
AP3171	Materials Characterization Techniques	3	**TP**	**TPM**			**T**		**M**		**T**	**M**	**TM**		**TP**	√	√	√
AP3172	Electronic Properties of Solids	3	**TPM**										**T**		**T**	√	√	√
AP3190	Thermodynamics of Materials	3	**TPM**	**P**					**P**		**P**				**T**	√	√	
AP3244	Design Laboratory	3	**TP**	**TP**	**TPM**	**PM**	**TPM**	**M**	**PM**	**PM**	**P**	**P**	**PM**	**PM**	**TPM**		√	
AP4116	Dissertation	6	**P**	**PM**	**M**	**PM**	**PM**	**M**	**PM**	**M**	**PM**	**PM**	**PM**	**PM**	**TPM**	√	√	√
FS4003	CES Placement Project	6	**P**	**P**		**P**	**P**		**P**		**P**	**P**	**P**	**P**	**TP**	√	√	√
AP4101	Materials Engineers in Society	3						**TPM**	**TPM**	**TPM**	**TPM**	**TPM**			**PM**	√		
MA2001	Multi-variable Calculus and Linear Algebra	3	**TP**	**T**			**T**						**T**			√	√	√
MA2158	Linear Algebra and Calculus	3	**TP**	**T**			**T**						**T**			√	√	√
MA2172	Applied Statistics for Sciences and Engineering	3	**TP**	**T**			**T**						**T**			√	√	√
MA2177	Engineering Mathematics and Statistics	3	**TP**	**T**			**T**						**T**			√	√	√
MA2181	Mathematical Methods for Engineering	3	**TP**	**T**			**T**						**T**			√	√	√
MBE2016	Engineering Graphics	3	**TP**		**TP**	**T**			**TP**				**TP**	**TP**			√	
Electives																		
Group A (Fundamental Electives): at least 12 credit units from this group of courses																		
AP2105	Engineering Mechanics: Dynamics	3	**TPM**	**T**	**T**		**T**						**T**			√	√	√
AP3111	Ceramic Processing and Microstructure Development	3	**TP**	**TPM**			**T**			**T**		**T**	**TP**		**TP**	√	√	√
AP3113	Polymer Engineering	3	**TPM**	**P**			**TPM**			**T**			**T**		**T**		√	
AP3114	Computational Methods for Physicists and Materials	3	**TP**	**TP**		**T**					**M**			**TPM**	**TP**	√	√	√

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	Engineers																	
AP3130	Biomaterials	3	TP				TP			TM	M	TM	T		T	√	√	
AP4170	Environmental Degradation	3	TP	T	T		TP M			T		T	T		T	√	√	√
Group B (Specialized Electives)																		
AP4114	Stress Analysis	3	TP	TP			TP							M	T	√	√	√
AP4118	Composite Materials – with An Introduction to Nanocomposites	3	TP	T			TP				M	T	T		T	√	√	√
AP4121	Thin Film Technology and Nanocrystalline Coatings	3	TP	TP M			T				T	T	TP		T	√	√	√
AP4124	Failure Analysis and Case Studies	3	TP	TP	TP M	T	TP	TP M	TP M	TP M	T	TP	TP M		TP M	√	√	√
AP4126	Electroceramics	3	TP	TP M			T					T	T		TP	√	√	√
AP4127	Smart Sensors: From Engineering to Applications	3			TM		TM				T	T					√	
AP4171	Electronic Packaging and Materials	3	T		T		P				T	T	TP M		T	√	√	√
AP4172	Simulation and Modelling in Multidisciplinary Sciences	3	TP	TP	P	PM	P	P	P	P	T	T	TP	TP M	TP M	√	√	√
AP4175	Advanced Technology in Biomedical Devices	3	T				TP		P			TP M	T		T	√	√	√
AP4176	Energy Materials for the Current Century	3	T						P	T	TP M	TP	T		T		√	√
AP4177	Smart and Functional Materials: Selection and Application	3	TP	TP	T		T		P		M	P	T		T	√	√	√
AP4178	Nanostructures & Nanotechnology	3	T	T						T	T	TM	TP		T	√	√	√
AP4280	Advanced Optics Laboratory	3	TP	TP	TP		T		P				TP		TP	√	√	√
AP4307	Building Materials	3	TP	P	T	M	T	T		TM			T		T	√	√	
AP4714	Special Topics in Materials Science and Engineering	3	TP	TP						T	T	TP M	T		T	√	√	√
FS4002	Industrial Attachment Scheme	3	P	P	PM	PM	P	PM	PM	PM	P	P	P	P	PM	√	√	√

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishments of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

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