

# City University of Hong Kong

## Curriculum Information Record for a Taught Postgraduate Programme

### Department of Materials Science and Engineering Effective from Semester A 2022/23 For Students Admitted with Catalogue Term Semester A 2021/22 and thereafter

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#### Part I Programme Overview

**Programme Title** (in English) : **Master of Science in Materials Engineering and Nanotechnology**  
(in Chinese) : 理學碩士 (材料工程及納米科技)

**Award Title<sup>#</sup>** (in English) : **Master of Science in Materials Engineering and Nanotechnology**  
(in Chinese) : 理學碩士 (材料工程及納米科技)

**Intermediate and other awards:** (in English) : **Postgraduate Diploma in Materials Engineering and Nanotechnology**  
(in Chinese) : 深造文憑 (材料工程及納米科技)  
(in English) : **Postgraduate Certificate in Materials Engineering and Nanotechnology**  
(in Chinese) : 深造證書 (材料工程及納米科技)

*# 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).*

#### 1. Normal and Maximum Period of Study

	<b>Years (full-time)</b>	<b>Years (part-time/combined mode)</b>
Normal period of study	1 year	2 years
Maximum period of study	2.5 years	5 years

#### 2. Number of Credit Units Required for the Award:

Master of Science in Materials Engineering and Nanotechnology 理學碩士 (材料工程及納米科技)	(30 CUs)
Postgraduate Diploma in Materials Engineering and Nanotechnology 深造文憑 (材料工程及納米科技)	(24 CUs)
Postgraduate Certificate in Materials Engineering and Nanotechnology 深造證書 (材料工程及納米科技)	(12 CUs)

For the Postgraduate Diploma award, students are required to complete the three required courses (9 CUs) and 15 CUs electives to make up the total of 24 CUs.

Entrance requirement: same as Master of Science in Materials Engineering and Nanotechnology

For the Postgraduate Certificate award, students are required to complete the three required courses (9 CUs) and 3 CUs electives to make up the total of 12 CUs.

Entrance requirement: same as Master of Science in Materials Engineering and Nanotechnology

### 3. Programme Aims

*The programme aims to provide an opportunity for the university graduates in physical science or engineering to obtain specialized knowledge in materials engineering and nanotechnology. It also provides an opportunity for applied scientists and engineers in industry to pursue in-depth studies in various aspects of materials engineering and nanotechnology.*

### 4. Programme Intended Learning Outcomes (PILOs)

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

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

No.	PILOs	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
		A1	A2	A3
1.	Have extensive knowledge of and possess analytical ability in the field of materials engineering and nanotechnology.	✓		
2.	Have the ability to apply the knowledge of materials engineering and nanotechnology to generate creative ethical solutions in the working environment.			✓
3.	Capable of communicating effectively in materials related professions.			
4.	Design and conduct experiments, as well as to analyze and interpret data.		✓	
5.	Identify, formulate, solve engineering problems and generate new ideas in materials engineering and nanotechnology.		✓	
6.	Recognize the need for, and an ability to engage in life-long learning.			✓

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 Programme Requirement

### 1. Core Courses ( 9 credit units)

Course Code	Course Title	Level	Credit Units	Remarks (e.g. College Accreditation, or Exemption Requirements, etc.)
MSE5301	Instrumentation for Materials Characterization	P5	3	
MSE5303	Structure and Deformation of Materials	P5	3	
MSE5304	Thermodynamics of Materials	P5	3	

### 2. Electives ( 21 credit units)

Course Code <sup>1</sup>	Course Title	Level	Credit Units	Remarks (e.g. College Accreditation, or Exemption Requirements, etc.)
MSE6118	Composite Materials – with An Introduction to Nanocomposites	P6	3	
MSE6120	Microelectronic Materials and Processing	P6	3	
MSE6121	Thin Film Technology and Nanocrystalline Coatings	P6	3	
MSE6126	Functional Ceramics	P6	3	
MSE6171	Electronic Packaging and Materials	P6	3	
MSE6174	Topics in Polymer Science	P6	3	
MSE6175	Advanced Technology in Biomedical Devices	P6	3	
MSE6176	Nanomaterials Design for Energy Applications	P6	3	
MSE6178	Nanostructures and Nanotechnology	P6	3	
MSE6179	Nanotechnology for Biological and Medical Applications	P6	3	
MSE6181	Photonics in Nanomaterial Systems and Devices	P6	3	
MSE6182	Polymers and Composites and Nano-applications	P6	3	
MSE6183	Computational Methods for Materials Science	P6	3	
MSE6184	Biomedical Materials and Devices with Nano-applications	P6	3	
MSE6185	Advanced Structural Materials	P6	3	
MSE6265	Quantum Theory of Semiconductors	P6	3	
MSE6303	Corrosion and Surface Engineering	P6	3	
MSE6305	Forensic Engineering and Case Studies	P6	3	
MSE6306	Dissertation	P6	6	
MSE6307	Building Materials	P6	3	
MSE6309	Advanced Research	P6	12	
MSE6714	Special Topics in Materials Science and Engineering	P6	3	
EE6614	Reliability Engineering in Electronics Industry	P6	3	

MSE6814	Reliability Engineering in Electronics Industry	P6	3	
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Remarks:

<sup>1</sup>: Starting from Semester A, 2019/20, all course code will be changed from “AP” to “MSE”.

### **Part III Accreditation by Professional / Statutory Bodies**

N/A

### **Part IV Additional Information**

N/A

## Part V Curriculum Map

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

Course			PILOs						DEC		
Code	Title	Credit	P1	P2	P3	P4	P5	P6	A1	A2	A3
<b>Core Courses</b>											
MSE5301	Instrumentation for Materials Characterization	3			√	√				√	√
MSE5303	Structure and Deformation of Materials	3	√	√	√	√		√	√	√	√
MSE5304	Thermodynamics of Materials	3	√	√	√	√	√			√	
<b>Electives</b>											
MSE6118	Composite Materials – with An Introduction to Nanocomposites	3	√	√	√	√	√	√	√	√	√
MSE6120	Microelectronic Materials and Processing	3	√	√	√	√	√		√	√	√
MSE6121	Thin Film Technology and Nanocrystalline Coatings	3	√	√		√	√	√	√	√	√
MSE6126	Functional Ceramics	3	√	√	√	√	√	√	√	√	√
MSE6171	Electronic Packaging and Materials	3	√	√		√	√	√	√	√	√
MSE6174	Topics in Polymer Science	3	√	√	√	√	√	√		√	
MSE6175	Advanced Technology in Biomedical Devices	3	√				√	√	√	√	√
MSE6176	Nanomaterials Design for Energy Applications	3	√	√			√	√		√	√
MSE6178	Nanostructures and Nanotechnology	3	√	√	√			√	√	√	√
MSE6179	Nanotechnology for Biological and Medical Applications	3	√	√			√	√	√	√	√
MSE6181	Photonics in Nanomaterial Systems and Devices	3	√		√	√		√	√	√	√
MSE6182	Polymers and Composites and Nano-applications	3	√	√	√	√	√		√	√	√
MSE6183	Computational Methods for Materials Science	3	√	√	√	√	√	√	√	√	√
MSE6184	Biomedical Materials and Devices with Nano-applications	3	√	√			√	√	√	√	√
MSE6185	Advanced Structural Materials	3	√	√	√	√	√	√	√	√	√
MSE6265	Quantum Theory of Semiconductors	3	√	√	√				√	√	√
MSE6303	Corrosion and Surface Engineering	3	√	√	√	√	√	√	√	√	√
MSE6305	Forensic Engineering and Case Studies	3	√	√	√	√	√	√	√	√	√
MSE6306	Dissertation	6	√	√	√	√	√	√	√	√	√
MSE6307	Building Materials	3	√	√	√	√			√	√	
MSE6309	Advanced Research	12	√	√	√	√	√	√	√	√	√
MSE6714	Special Topics in Materials Science and Engineering	3	√	√	√	√	√	√	√	√	√
EE6614	Reliability Engineering in Electronics Industry	3	√				√		√	√	√
MSE6814	Reliability Engineering in Electronics Industry	3	√				√		√	√	√
Remarks:											
1: Starting from Semester A, 2019/20, all course code will be changed from “AP” to “MSE”.											

- 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 VI Research Elements in Programme Design

(A description on how research elements are embedded in the proposed programme design for ALL students as guided by the 2016-19 Academic Development Proposal (ADP) should be included. Research elements need to be incorporated into core or compulsory course(s) in order that all students can be benefited from the learning experience.)

### Description on how research elements are embedded in the programme design:

Research elements are embedded in a required course MSE5304 (see below), and in elective courses MSE6306 and MSE6309.

More descriptions on the learning activities on individual course will follow

### Core/Compulsory Courses

Course Code	Course Title	Level	Credit Units	Information on research elements in the course design*
MSE5304	Thermodynamics of Materials	5	3	Report/essay – analyse creative works, including original research publications, and generate work with new concepts

### Elective Course

Course Code	Course Title	Level	Credit Units	Information on research elements in the course design*
MSE6306	Dissertation	6	6	Project style applied research work.
MSE6309	Advanced Research	6	12	Project style research work. Students' works are expected to lead to referred conference or journal publications.

*\*indicative of planned teaching and learning activities / assessment tasks incorporating research elements*