City University of Hong Kong

Curriculum Information Record for a Master's Programme

Department of Materials Science and Engineering
Effective from Semester A 2025/26
For Students Admitted with Catalogue Term
Semester A 2025/26 and thereafter

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#	(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

	Years (full-time)	**Years (part-time/combined mode)**
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 (30 CUs)
理學碩士 (材料工程及納米科技)

Postgraduate Diploma in Materials Engineering and Nanotechnology (24 CUs)
深造文憑 (材料工程及納米科技)

Postgraduate Certificate in Materials Engineering and Nanotechnology (12 CUs)
深造證書 (材料工程及納米科技)

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 technical 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	
MSE6265	Quantum Theory of Semiconductors	P6	3	

2. Electives (21 credit units)

Course Code[1]	Course Title	Level	Credit Units	Remarks (e.g. College Accreditation, or Exemption Requirements, etc.)
MSE5304	Thermodynamics of Materials	P5	3	
MSE6121	Thin Film Technology and Nanocrystalline Coatings	P6	3	
MSE6176	Nanomaterials Design for Energy 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	
MSE6266	Semiconductor Materials and Devices	P6	3	
MSE6303	Corrosion and Surface Engineering	P6	3	
MSE6307	Building Materials	P6	3	
MSE6309	Advanced Research	P6	9	
MSE6814	Reliability Engineering in Electronics Industry	P6	3	
MSE8015	Theory and Practice of Transmission Electron Microscopy and Related Spectroscopy	R8	3	
MSE8020	Structural Properties of Materials	R8	3	
MSE8021	Kinetic and Thermodynamic Properties of Materials	R8	3	
EE6614	Reliability Engineering in Electronics Industry	P6	3	

Remarks:

[1]: 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**
Core Courses											
MSE5301	Instrumentation for Materials Characterization	3			√	√				√	√
MSE5303	Structure and Deformation of Materials	3	√	√	√	√		√	√	√	√
MSE6265	Quantum Theory of Semiconductors	3	√	√	√				√	√	√
Electives											
MSE5304	Thermodynamics of Materials	3	√	√	√	√	√			√	
MSE6121	Thin Film Technology and Nanocrystalline Coatings	3	√	√		√	√	√	√	√	√
MSE6176	Nanomaterials Design for Energy 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	√	√	√	√	√	√	√	√	√
MSE6266	Semiconductor Materials and Devices	3	√	√	√		√	√	√	√	
MSE6303	Corrosion and Surface Engineering	3	√	√	√	√	√	√	√	√	√
MSE6307	Building Materials	3	√	√	√	√			√	√	
MSE6309	Advanced Research	9	√	√	√	√	√	√	√	√	√
MSE6814	Reliability Engineering in Electronics Industry	3	√				√		√	√	√
MSE8015	Theory and Practice of Transmission Electron Microscopy and Related Spectroscopy	3	√	√	√		√	√	√	√	√
MSE8020	Structural Properties of Materials	3	√	√	√		√	√	√	√	
MSE8021	Kinetic and Thermodynamic Properties of Materials	3	√		√	√	√	√	√	√	√
EE6614	Reliability Engineering in Electronics Industry	3	√				√		√	√	√

Remarks:

[1]: Starting from Semester A, 2019/20, all course code will be changed from "AP" to "MSE".

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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 core courses MSE5301 and MSE5303, and in elective courses MSE5304 and MSE6309.

More descriptions on the learning activities on individual course will follow

Core Courses

Course Code	Course Title	Level	Credit Units	*Information on research elements in the course design**
MSE5301	Instrumentation for Materials Characterization	P5	3	Laboratory activities - conduct relevant experiments to receive research training on advanced scientific instruments.
MSE5303	Structure and Deformation of Materials	P5	3	Laboratory activities - conduct relevant experiments to understand the structure and mechanical properties of materials

Elective Courses

Course Code	Course Title	Level	Credit Units	*Information on research elements in the course design**
MSE5304	Thermodynamics of Materials	P5	3	Report/essay – analyse creative works, including original research publications, and generate work with new concepts
MSE6309	Advanced Research	P6	9	Project style research work. Students' works are expected to lead to referred conference or journal publications.

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