



Curriculum Information Record for a Research Degree Programme

Department of Materials Science and Engineering

Effective from Semester B 2019/20

For Students Admitted with Catalogue Term

from Semester A 2013/14 to Summer 2019

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

Please refer to the Explanatory Notes attached to this form on the various items of information required.

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Part I

Programme Title (in English) : Doctor of Philosophy

(in Chinese) : 哲學博士

Award Title (in English) : Doctor of Philosophy

(in Chinese) : 哲學博士

Programme Aims

This programme aims to train and produce independent researchers with state-of-the-art expertise who can create original knowledge through innovative research.

Programme Intended Learning Outcomes (PILOs)

(state what the student is expected to be able to do at the end of the programme according to a given standard of performance)

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

1. achieve general intellectual proficiency and specialization in their chosen subject areas;
2. apply appropriate research methodology/tools to conduct independent research for discoveries;
3. formulate and derive effective, innovative and original solutions to fundamental problems in their chosen subject areas for discoveries;
4. communicate effectively with the learned community about the research process and findings for discoveries;
5. discover through in-depth investigation of the chosen subject areas;
6. build up ethical and social responsibilities;

7. perform multi-disciplinary research with new ideas;
8. strengthen independent learning and researching abilities to suit future versatile employment requirements;
9. enhance proficiencies in scientific language and skills in numerical and IT solutions;
10. collaborate effectively and healthily with colleagues.

Part II Programme of Study

1. Research Area(s) in which research students will be admitted to:

- Devices and Systems
- Laser/Opto-electronics/Condensed Matter Physics
- Materials Science and Engineering
- Nanomaterials and Nanotechnology
- Biomedical Physics and Engineering.

2. Programme Core Courses: (4 credits)

Course Code	Course Title	Level	Units Worth	Remarks
AP8001/ MSE8001	Survival Skills for Research Scientists	R8	2	
AP8004/ MSE8004	Postgraduate Seminar	R8	2	

3. Programme Electives: (10 credits)

Course Code	Course Title	Level	Units Worth	Remarks
MSE6182	Polymers and Composites and Nano-applications	P6	3	
MSE6183	Computational Methods for Materials Science	P6	3	
MSE6265	Quantum Theory of Semiconductors	P6	3	
MSE8011	Thermodynamics of Materials	R8	3	
MSE8012	Physics of Materials	R8	3	
MSE8013	Symmetry and Structure of Materials	R8	3	
MSE8014	Phase Transformations and Kinetics	R8	3	

MSE8015	Theory and Practice of Transmission Electron Microscopy and Related Spectroscopy	R8	3	Newly added
AP8002	Directed Study in Advanced Research Fields	R8	1	
AP8003	Directed Advanced Studies for Postgraduate Students	R8	3	
AP8114	Stress Analysis	R8	3	
AP8118	Composite Materials- with An Introduction to Nanocomposites	R8	3	
AP8120	Microelectronic Materials and Processing	R8	3	
AP8121	Thin Film Technology and Nanocrystalline Coatings	R8	3	
AP8124	Failure Analysis and Case Studies	R8	3	
AP8126	Functional Ceramics	R8	3	
AP8170	Environmental Degradation	R8	3	
AP8171	Electronic Packaging and Materials	R8	3	
AP8172	Simulation and Modelling in Multidisciplinary Sciences	R8	3	
AP8173	Biomedical Materials and Devices: From Engineering to Clinical Applications	R8	3	
AP8174	Topics in Polymer Science	R8	3	
AP8175	Advanced Technology in Biomedical Devices	R8	3	
AP8176	Energy Materials Design for the Current Century	R8	3	
AP8177	Smart and Functional Materials for Advanced Students	R8	3	
AP8178	Nanostructures and Nanotechnology	R8	3	
AP8179	Nanotechnology for Biological and Medical Applications	R8	3	
AP8180	Modern Scattering Methods in Materials Science	R8	3	
AP8181	Photonics in Nanomaterial Systems and Devices	R8	3	
AP8182	Polymer and Composites-with an Introduction to their Nano-applications	R8	3	

AP8197	Nuclear Tracks in Solids	R8	3	
AP8254	Fundamentals of Laser Optics	R8	3	
AP8255	Optoelectronic Devices and Systems	R8	3	
AP8265	Emerging Semiconductor Devices in 21st Century	R8	3	
AP8268	Environmental Modelling	R8	3	
AP8271	Environmental Radiation	R8	3	
AP8272	Environmental Radiation Measurements	R8	3	
AP8273	Special Topics in Physics	R8	3	
AP8274	Radiation Biophysics	R8	3	
AP8275	Radiological Physics and Dosimetry	R8	3	
AP8280	Advanced Optics Laboratory	R8	3	
AP8282	Physical Optics	R8	3	
AP8283	Medical Physics I	R8	3	
AP8284	Medical Physics II	R8	3	
AP8301	Instrumental Methods of Analysis and Laboratory	R8	3	
AP8302	Nanomaterials	R8	3	
AP8303	Corrosion and Surface Engineering	R8	3	
AP8307	Building Materials	R8	3	
AP8308	Advanced Smart Sensors: From Engineering to Applications	R8	3	
AP8714	Special Topics in Materials Science and Engineering	R8	3	

4. Qualifying Examination:

The Qualifying Panel will assess the student's suitability to continue his or her studies on the basis of the qualifying report, coursework results and any other assessment as considered appropriate by the Panel. The Panel's recommendations will be forwarded to the Department/School for approval.

5. Qualifying/Annual Report Submission:

Students must submit a qualifying report (typed in English) within the specified qualifying period as follows:

- Full-time: Within 6–12 months from start of study

- Part-time: Within 9–18 months from start of study

A qualifying report should include a survey of the relevant literature, an identification of a specific research topic, the research methodology and a discussion on possible outcomes.

After the qualifying period, students must submit progress reports (typed in English) on an annual basis until they have submitted the final version of their thesis for oral examination and completed any other academic requirements.

6. Thesis:

The thesis at the core of the PhD study enables a student to demonstrate his/her independent research work, design and conduct experiments, analyze and formulate physical and engineering problems, correlate and verify data, explain problems lucidly and reach sound conclusions. The data obtained and conclusions reached are placed in logical context substantiated by physics and mathematics. The output of the PhD thesis results from the student's creativity and original ideas. It represents a tangible contribution to science and engineering. The PhD thesis is unique and represents evident contribution to science and /or engineering in the field of study. It contains experimental and/or theoretical output supported by theoretical physics and practical implications.

Normally, students are expected to submit their thesis not earlier than six months before the end of the (normal) study period. Early submission of a thesis requires special approval from the College/School.

Students must submit a thesis for examination by the end of their maximum study period or the stipulated study period.

7. Additional Notes:

Students are also required to complete a compulsory 1 credit unit course "Teaching Students: First Steps" (SG8001). The credit unit earned from SG8001 will not be counted towards the minimum coursework requirement.

The student's research project is normally supported by RGC projects or other projects acquired by the supervisor. Therefore the research interest of the student is aligned with the research project of the supervisor. In accordance with the topic of the thesis, a qualifying panel (supervisor and two other experts in the field) prescribes the courses taken by the student. The qualifying panel monitors the research progress and annually evaluates it based on a written progress report, an oral presentation and an oral examination. As coordinated by the SGS, the final research output presented in the form of thesis is assessed by two internal examiners, one of whom is also the panel chair, and two external examiners who may recommend the thesis for oral examination if it meets the standard required for PhD theses. Other details can be found in the Guidebook for Research Degree Studies published by the SGS.

Prepared / Last Updated by

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Date: 30 April 2019

Explanatory Notes for Completing CIR-RPG

1. Research Area

This refers to the research area(s) in which the University offers MPhil and PhD studies.

2. Programme Title

This is the full title of the programme in both English and Chinese. One copy of CIR-RPG should be filled in for each research degree programme (i.e. MPhil or PhD) in each research area.

3. Award Title

This is the title in both English and Chinese granted by the University upon successful completion of the programme.

4. Number of Credit Units Required for the Award

This specifies the number of credit units required to obtain an award. Students will need to accumulate credit units at or more than this level in order to gain an award.

5. Programme Aims

This is a brief description of what the programme is about and what it intends to achieve.

6. Programme Intended Learning Outcomes (PILOs)

PILOs state what the student is expected to be able to do at the end of a programme according to a given standard of performance. The outcomes statements should be written in a manner which is clearly understood both by students and staff. The outcomes should be achievable and assessable. PILOs should address a number of areas, e.g. subject area, requirements of professional bodies, if any, graduate outcomes of CityU's research degree graduates provided below, etc.

Graduate Outcomes of CityU's Research Degree Graduates:

On graduation, City University research degree graduates will be able to:

- *Apply a thorough understanding of the fundamental concepts of their research areas;*
- *Adopt excellent methodological, and relevant ethical principles in the generation of independent and innovative research;*
- *Generate strategies to develop internationally competitive research in their fields of expertise;*
- *Apply effective communication skills in relation to research.*

7. Programme of Study

This consists of three main parts – Programme Core Courses, Programme Electives and Thesis. Students are required to fulfil the criteria stipulated in each part so as to obtain an award.

Please refer to the following programme structure for research degree programmes for filling in this section:

MPhil

	<i>Existing Coursework Structure</i>	<i>Proposed Coursework Structure</i>
Core Courses	0 CU	At least 2 CUs (#research methodology or foundation course)
Elective Courses	7 CUs	Other courses so as to satisfy the minimum coursework requirement of 7 CUs
Total	7 CUs	7 CUs
Other Requirement (not counted towards the University's coursework requirement)	Teaching Students: First Steps (SG8001) (1 CU)	Teaching Students: First Steps (SG8001) (1 CU)

CU = credit unit

PhD

	<i>Existing Coursework Structure</i>	<i>Proposed Coursework Structure</i>
Core Courses	0 CU	At least 4 CUs (including [#] research methodology or foundation course (at least 2CUs))
Elective Courses	14 CUs	Other courses so as to satisfy the minimum coursework requirement of 14 CUs
Total	14 CUs	14 CUs
Other Requirement (not counted towards the University's coursework requirement)	Teaching Students: First Steps (SG8001) (1 CU)	Teaching Students: First Steps (SG8001) (1 CU)

CU = credit unit

- [#] College, school or departmental seminars related to research methodology are not considered as equivalent to the Research Methodology course if they consist of student presentations only, without a teaching component.

8. Programme Core Courses

These are the compulsory courses as required by the relevant faculty or school.

9. Programme Electives

These are courses from which students select courses based on their interests.

10. Additional Notes

This may consist of information on any special features of the programme.

11. Amendments/Revisions to CIR-RPG

Amendment or revisions to the information provided in CIR-RPG are subject to the procedures outlined in the University's guidelines on approval authorities for academic and research matters. College and School Boards should consider delegation of authority to C/SGSC as necessary to facilitate innovation and change as appropriate.