



Curriculum Information Record for a Research Degree Programme

Department of Physics Effective from Semester A 2025/26 For Students Admitted with Catalogue Term Semester A 2019 /20 and thereafter

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.

Part I

Programme Title (in English) : *Master of Philosophy*

(in Chinese) : 哲學碩士

Award Title (in English) : *Master of Philosophy*

(in Chinese) : 哲學碩士

Programme Aims

This programme aims to train and produce graduates who can contribute to the extension of knowledge in their chosen subject areas, preparing them for advanced research at the PhD level or professional careers in science and engineering.

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. master the content and methods of their chosen subject areas;
2. apply research methodology/tools to conduct independent research for discoveries;
3. formulate and carry out research in their chosen subject areas for discoveries;
4. communicate effectively with the learned community about the research process and discoveries;
5. contribute to knowledge and discoveries through the process of research;

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:

{e.g. Applied Mathematics, Electronic Engineering}

- Theoretical and Computational Physics
- Spectroscopy and Imaging
- Atomic, Molecular and Optical Physics
- Soft Matter and Biophysics
- Quantum Materials
- Astrophysics and Particle Physics

2. Programme Core Courses: (- credits)

Course Code	Course Title	Level	Units Worth	Remarks
N/A	N/A	--	--	

3. Research Methodology and Ethics Course(s): (5 credits)

Course Code	Course Title	Level	Units Worth	Remarks
PHY8001	Survival Skills for Research Scientists	R8	3	
PHY8004	Postgraduate Seminar	R8	2	

4. Programme Electives: (2 credits)

Please provide a general description *OR* fill in the following table, as appropriate.

Course Code	Course Title	Level	Units Worth	Remarks
PHY8002	Directed Study in Advanced Research Fields	R8	1	
PHY8003	Directed Advanced Studies for Postgraduate Students	R8	3	
PHY8180	Modern Scattering Methods in Materials Science	R8	3	

PHY8251	Advanced Quantum Mechanics	R8	3	Students taking this course should have acquired some basic knowledge of quantum physics, e.g., have taken the course <i>PHY3251 Quantum Physics</i> or equivalent courses.
PHY8252	Statistical Mechanics	R8	3	
PHY8253	Introduction to Biophysics	R8	3	
PHY8255	Introduction to Quantum Optics	R8	3	Students taking this course should have acquired some basic knowledge of quantum physics, e.g., have taken the course <i>PHY3251 Quantum Physics</i> and <i>PHY3205 Electrodynamics</i> or equivalent courses.
PHY8273	Special Topics in Physics	R8	3	
PHY8401	Advanced Instrumentation and Measurement Methods for Experimental Physics	R8	3	
PHY8501	Modern Characterization Techniques for Materials Physics	R8	3	
PHY8502	Advanced Computational Methods for Simulation and Modelling	R8	3	
PHY8503	Mathematical Methods for Scientists and Engineers	R8	3	
PHY8504	Physics at Nanoscale	R8	3	
PHY8505	Modern Topics in Physics	R8	3	
PHY8506	Advanced Electrodynamics	R8	3	
PHY8513	Introduction to Quantum Technology	R8	3	
PHY8514	Data Acquisition and Processing Skills for Physicists I	R8	3	
PHY8516	Data Analysis and Modelling in Physics	R8	3	
PHY8521	Advanced Solid State Physics	R8	3	
PHY8526	Energy Materials: Physics and Applications	R8	3	

PHY8603	Introduction to Quantum Information	R8	3	Students taking this course should have acquired some basic knowledge of quantum physics, e.g., have taken the course <i>PHY3251 Quantum Physics</i> and <i>PHY3205 Electrodynamics</i> or equivalent courses.
PHY8604	Machine Learning in Physics	R8	3	Student should learn Python programming before taking the course. One way to achieve this is to take PHY 8514 Data Acquisition and Processing Skills for Physicists I.

5. Other Requirements:

Please provide a general description *OR* fill in additional rows in the following table, as appropriate.

Course Code	Course Title	Level	Units Worth	Remarks
SG8001	Teaching Students: First Steps	R8	1	
--	Collaborative Institutional Training Initiative (CITI) programme	n/a	n/a	An online training course on research integrity. Compulsory for RPg students who admitted in 2018/19 and thereafter. To be completed in the first year of study. Details are available in SGS website.

6. Qualifying Examination (for PhD only):

7. Qualifying/Annual Report Submission:

Students are required to submit qualifying report and annual report in compliance with the University regulations or guidelines. Such regulations and guidelines are accessible via the Guidebook for Research Degree Studies located at School of Graduate Studies (SGS) website.

8. Thesis:

The thesis is the most important part of the MPhil study. The thesis demonstrates the student's research capacity and independent research work, and shows his/her ability to design and conduct experiments, analyze and formulate physical and engineering problems, correlate and verify data, explain problems lucidly and reach sound conclusions. The output of the thesis is based on the student's original ideas. The MPhil thesis has to represent evident contribution to the field of study.

Students are required to submit their thesis in compliance with the University regulations or guidelines. Such regulations and guidelines are accessible via the Guidebook for Research Degree Studies located at School of Graduate Studies (SGS) website.

9. Additional Notes:

Other regulations and guidelines can be found in the Guidebook for Research Degree Studies located at School of Graduate Studies (SGS) website.

Prepared / Last Updated by

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Date: 4 Mar 2025

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 which is defined by the name of the Department/School.

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>Coursework Structure applying to 2019/20 intake cohort and thereafter</i>
Core Courses	N/A
Elective Courses	At least 2 CUs of research methodology [#] and ethics course at postgraduate level and other postgraduate courses so as to satisfy the minimum coursework requirement of 7 CUs
Total	7 CUs
Other Requirement <i>(not counted towards the University's coursework requirement)</i>	Teaching Students: First Steps (SG8001) (1 CU)

CU = credit unit

PhD

<i>Coursework Structure applying to 2019/20 intake cohort and thereafter</i>	
Core Courses	At least 9 CUs at research level [@]
Elective Courses	At least 2 CUs of research methodology [#] and ethics course at postgraduate level and other postgraduate courses so as to satisfy the minimum coursework requirement of 14 CUs
Total	14 CUs
Other Requirement <i>(not counted towards the University's coursework requirement)</i>	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.

@ All core courses should be assessed in gradable mode (A+, A, ...F), instead of pass-fail mode.

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. Qualifying Examination

- a) The objective of PhD Qualifying Examination (QE) is to ascertain the breadth of the student's knowledge relating to the major subject areas of the research disciplines, and determine whether the student has the ability to apply their knowledge to solve theoretical and the practical problems in research.
- b) The PhD qualifying examination shall consist of written examination only.
- c) A common (set of) written qualifying examination paper(s) be applicable to all PhD students of the same academic unit. Individual academic units may determine the format and content of the examination paper. In view that students within the same academic unit will have different research disciplines, academic units may either design one set of written examination paper providing choices of questions covering different areas/fields, or several sets of qualifying examination papers each covering a specific area/field.
- d) Schools/Departments may engage academic advisors to review the examination paper to ensure the standard is comparable with their counterparts in the international arena, if necessary.
- e) Individual Schools/Departments will have discretion to determine the number of QE(s) to be offered in an academic year.

f) Additional Notes

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

g) 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.