CIR-RPG

香港城市大學
City University of Hong Kong

Curriculum Information Record for a Research Degree Programme

College/School/Academy/Department of Physics
Effective from Semester A 2026/27
For Students Admitted with Catalogue Term
Semester A 2019/20 and thereafter

This form is for completion by the College/School/Academy/Department for research degree programme. The information provided on this form is the official record of the Programme. It will be used for City University of Hong Kong's database, various City University of Hong Kong 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:
{*e.g. Applied Mathematics, Electrical 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: (9 credits)

Course Code	Course Title	Level	Units Worth	Remarks
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 *PHY3251 Quantum Physics* or equivalent courses.
PHY8252#	Statistical Mechanics	R8	3	
PHY8501#	Modern Characterization Techniques for Experimental Physics	R8	3	
PHY8502#	Advanced Computational Methods for Simulation and Modelling	R8	3	
PHY8506#	Advanced Electrodynamics	R8	3	
PHY8521#	Advanced Solid State Physics	R8	3	

#These six courses can also be used as electives but students cannot select the same course as a core course and an elective.

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: (Optional)

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	R8	3	
PHY8180	Modern Scattering Methods in Materials	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 *PHY3251 Quantum Physics* 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 PHY3251 Quantum Physics and PHY3205 Electrodynamics 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 Experimental 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 *PHY3251 Quantum Physics* and *PHY3205 Electrodynamics* 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.

#These six courses can also be used as electives but students cannot select the same course as a core course and an elective.

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):

The aim of the Qualifying Examination are to test students' knowledge of major subject areas of their research disciplines and assess their readiness to conduct research in their specific research discipline.

Students are required to take a written qualifying examination in compliance to the regulations or guidelines as set by the School of Graduate Studies (SGS).

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 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.

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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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 CityUHK's research degree graduates provided below, etc.

Graduate Outcomes of CityUHK's Research Degree Graduates:

On graduation, City University of Hong Kong's research degree graduates will be able to achieve the following:

- *Become an independent scholar;*
- *Conceptualise methodically;*
- *Strategise competitively;*
- *Apply results beneficially;*
- *Communicate professionally.*

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: 7 credit units (including at least 2 credit units of research methodology and ethics course at postgraduate level);
AND a compulsory 1 credit unit course: Teaching Students: First Steps (SG8001)

PhD: 14 credit units (including at least 9 credit units of core courses and at least 2 credit units of research methodology and ethics course at postgraduate level)
AND a compulsory 1 credit unit course: Teaching Students: First Steps (SG8001)

[#] 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.