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Academic Program: Master of Philosophy in Physics
Academic Year: 2022
Language: English

Learning Outcomes

Study Scheme

Postgraduate Student Handbook 2022-23 (PHY-I)

FACULTY OF SCIENCE

Physics

Study Scheme

M.Phil.-Ph.D. Programme in Physics (Full-time and Part-time)

Applicable to students admitted in 2022-23 and thereafter

A. M.Phil. Student

1. Coursework Requirement

(a) Total number of units required for graduation within the normative study period for:

(i) Full-time students:

First to Second Year of Attendance

PHYS8006 in each term:	**24 units**
Lecture courses (at PHYS5000-level):	**12 units**
	Total: 36 units

(ii) Part-time students:

First to Third Year of Attendance

PHYS8003 in each term:	**18 units**
Lecture courses (at PHYS5000-level):	**12 units**
	Total: 30 units

(b) Thesis research/monitoring courses:
PHYS8003, 8006

2. Other Requirements

(a) Students must fulfill the Term Assessment Requirement of the Graduate School. For details,

please refer to Section 13.0 “Unsatisfactory Performance and Discontinuation of Studies” of the General Regulations Governing Postgraduate Studies which can be accessed from the Graduate School Homepage: http://www.gs.cuhk.edu.hk.

(b) Students in experimental research projects are required to take PHYS5330.

(c) Students in theoretical research projects are required to take at least 2 courses from the following list:
  (i) PHYS5410
  (ii) PHYS5420
  (iii) PHYS5430
  (iv) Either PHYS5510 or 5520 or 5540
  (v) PHYS5570

(d) Students are required to submit a research thesis and pass an oral examination for graduation.

(e) Complete an Improving Postgraduate Learning (IPL) module on “Observing Intellectual Property and Copyright Law during Research”. This will be an online module and relevant information can be accessed from the website: http://www.cuhk.edu.hk/clear/prodev/ipl.html.

(f) Students are also required to attend IPL modules on “General Safety”, “Biological Safety”, and “Chemical Safety” courses, and other required laboratory safety courses, depending on the nature of the research project. Students who are prescribed laboratory safety training shall take the courses and, where appropriate, examinations in their first year of study, with effect from the 2022-23 intake. Students should consult Division for details.

(g) Complete an IPL module on “Research Data Management Training”. This is an online module and relevant information can be accessed from the website: https://www.cuhk.edu.hk/clear/download/IPL-Researchskills.pdf. Students are required to complete and pass the module in their first year of studies, with effect from the 2022-23 intake.

(h) Students are required to complete an online Research Ethics Training (RET) module on “Publication Ethics” offered by the Office of Research and Knowledge Transfer Services (ORKTS) and obtain a valid Publication Ethics Certificate for graduation. Relevant information can be accessed from the RET website at https://www.research-ethics.cuhk.edu.hk/web/.

3. Remarks

(a) Students may take at most one course in MSEG, CHEM, ELEG, CSCI, MATH at 5000-level to replace one PHYS course at 5000-level, subject to Division’s approval.

(b) Course exemptions may be granted on the basis of graduate level courses already taken.

(c) Students may take either PHYS5710 or 5720 to replace at most one PHYS lecture course at 5000-level subject to Division’s approval.

(d) Continuing students must register for PHYS8003 in each term.

B. Ph.D. Student (Pre-candidacy)

The “candidacy requirement” composes of three major parts, namely coursework requirement, candidacy examination, and thesis proposal (and oral defence). Students must complete and fulfill all three parts within the “maximum period for fulfilling candidacy requirements”. Details of the requirement are listed below:

1. Coursework Requirement

(a) A student with/without a research Master’s degree has to complete the followings within the normative study period:

(i) Full-time students:
PHYS8006 and 7210 in each term
A minimum of 12 units from lecture courses list at PHYS 5000-level.

(ii) Part-time students:
PHYS8003 and 7210 in each term
A minimum of 12 units from lecture courses list at PHYS 5000-level.

(b) Thesis research/monitoring courses:
PHYS8003, 8006

2. Candidacy Examination

(a) Students are required to take a written examination by the end of the first year from first entry. A second attempt is allowed, but it must be taken before the end of the second year from first entry. If the students fail two times, they shall be required to discontinue studies in the Graduate School.
(b) Part of the written examination can be replaced by passing some 5000-level courses at good grades, subject to Division's approval.

3. Thesis Proposal and Oral Defence

An oral presentation of the research plan, which should be passed by the end of the second year from first entry. A second attempt is allowed, but it must be taken within six months from the first attempt.

4. Remarks

(a) Students in experimental research projects are required to take PHYS5330.
(b) Students in theoretical research projects are required to take at least 2 courses from the following list:
(i) PHYS5410
(ii) PHYS5420
(iii) PHYS5430
(iv) Either PHYS5510 or 5520 or 5540
(v) PHYS5570
(c) Students may take at most one course in MSEG, CHEM, ELEG, CSCI, MATH at 5000-level to replace one PHYS course at 5000-level, subject to Division's approval.
(d) Students may take either PHYS5710 or 5720 to replace at most one PHYS lecture course at 5000-level subject to Division's approval.
(e) Course exemptions may be granted on the basis of graduate level courses already taken.

C. Ph.D. Student (Post-candidacy)

1. Coursework Requirement

(a) A student with/without a research Master's degree has to complete the followings within the normative study period:

(i) Full-time students:
PHYS8012 and 7210 in each term

(ii) Part-time students:
PHYS8006 and 7210 in each term

(b) Thesis research/monitoring courses:
PHYS8003, 8006, 8012

2. Other Requirements

(a) Students must fulfill the Term Assessment Requirement of the Graduate School. For details, please refer to Section 13.0 "Unsatisfactory Performance and Discontinuation of Studies" of the General Regulations Governing Postgraduate Studies which can be accessed from the Graduate School Homepage: http://www.gs.cuhk.edu.hk.
(b) Continuing students must register for PHYS8003 in each term.
(c) Students are required to submit a research thesis and pass an oral examination for graduation.
(d) Complete an Improving Postgraduate Learning (IPL) module on "Observing Intellectual Property and Copyright Law during Research". This will be an online module and relevant information can be accessed from the website: http://www.cuhk.edu.hk/clear/prodev/ipl.html.
(e) Students are also required to attend IPL modules on "General Safety", "Biological Safety", and "Chemical Safety" courses, and other required laboratory safety courses, depending on the nature of the research project. Students who are prescribed laboratory safety training shall take the courses and, where appropriate, examinations in their first year of study, with effect from the 2022-23 intake. Students should consult Division for details.
(f) Complete an IPL module on "Research Data Management Training". This is an online module and relevant information can be accessed from the website: https://www.cuhk.edu.hk/clear/download/IPL-Researchskills.pdf. Students are required to complete and pass the module in their first year of studies, with effect from the 2022-23 intake.
(g) Students are required to complete an online Research Ethics Training (RET) module on "Publication Ethics" offered by the Office of Research and Knowledge Transfer Services (ORKTS) and obtain a valid Publication Ethics Certificate for graduation. Relevant information can be accessed from the RET website at https://www.research-ethics.cuhk.edu.hk/web/.

Applicable to students admitted in 2017-18 to 2021-22

A. M.Phil. Student

1. Coursework Requirement

(a) Total number of units required for graduation within the normative study period for:
(i) Full-time students:
First to Second Year of Attendance

PHYS8006 in each term:	**24 units**
Lecture courses (at PHYS5000-level):	**12 units**
	Total: 36 units

(ii) Part-time students:

First to Third Year of Attendance

PHYS8003 in each term:	**18 units**
Lecture courses (at PHYS5000-level):	**12 units**
	Total: 30 units

(b) Thesis research/monitoring courses:
PHYS8003, 8006

2. Other Requirements

(a) Students must fulfill the Term Assessment Requirement of the Graduate School. For details, please refer to Section 13.0 "Unsatisfactory Performance and Discontinuation of Studies" of the General Regulations Governing Postgraduate Studies which can be accessed from the Graduate School Homepage: http://www.gs.cuhk.edu.hk.

(b) Students in experimental research projects are required to take PHYS5330.

(c) Students in theoretical research projects are required to take at least 2 courses from the following list:
(i) PHYS5410
(ii) PHYS5420
(iii) PHYS5430
(iv) Either PHYS5510 or 5520 or 5540
(v) PHYS5570

(d) Students are required to submit a research thesis and pass an oral examination for graduation.

(e) Complete an Improving Postgraduate Learning (IPL) module on "Observing Intellectual Property and Copyright Law during Research". This will be an online module and relevant information can be accessed from the website: http://www.cuhk.edu.hk/clear/prodev/ipl.html.

(f) Students are also required to attend IPL modules on "General Safety", "Biological Safety", and "Chemical Safety" courses, and other required laboratory safety courses, depending on the nature of the research project. Students should consult Division for details.

(g) Students are required to complete an online Research Ethics Training (RET) module on "Publication Ethics" offered by the Office of Research and Knowledge Transfer Services (ORKTS) and obtain a valid Publication Ethics Certificate for graduation. Relevant information can be accessed from the RET website at https://www.research-ethics.cuhk.edu.hk/web/.

3. Remarks

(a) Students may take at most one course in MSEG, CHEM, ELEG, CSCI, MATH at 5000-level to replace one PHYS course at 5000-level, subject to Division's approval.

(b) Course exemptions may be granted on the basis of graduate level courses already taken.

(c) Students may take either PHYS5710 or 5720 to replace at most one PHYS lecture course at 5000-level subject to Division's approval.

(d) Continuing students must register for PHYS8003 in each term.

B. Ph.D. Student (Pre-candidacy)

The "candidacy requirement" composes of three major parts, namely coursework requirement, candidacy examination, and thesis proposal (and oral defence). Students must complete and fulfill all three parts within the "maximum period for fulfilling candidacy requirements". Details of the requirement are listed below:

1. Coursework Requirement

(a) A student with/without a research Master's degree has to complete the followings within the normative study period:

(i) Full-time students:
PHYS8006 and 7210 in each term
A minimum of 12 units from lecture courses list at PHYS 5000-level.

(ii) Part-time students:
PHYS8003 and 7210 in each term
A minimum of 12 units from lecture courses list at PHYS 5000-level.

(b) Thesis research/monitoring courses:
PHYS8003, 8006

2. Candidacy Examination

(a) Students are required to take a written examination by the end of the first year from first entry. A second attempt is allowed, but it must be taken before the end of the second year from first entry. If the students fail two times, they shall be required to discontinue studies in the Graduate School.

(b) Part of the written examination can be replaced by passing some 5000-level courses at good grades, subject to Division's approval.

3. Thesis Proposal and Oral Defence

An oral presentation of the research plan, which should be passed by the end of the second year from first entry. A second attempt is allowed, but it must be taken within six months from the first attempt.

4. Remarks

(a) Students in experimental research projects are required to take PHYS5330.

(b) Students in theoretical research projects are required to take at least 2 courses from the following list:

(i) PHYS5410
(ii) PHYS5420
(iii) PHYS5430
(iv) Either PHYS5510 or 5520 or 5540
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(c) Students may take at most one course in MSEG, CHEM, ELEG, CSCI, MATH at 5000-level to replace one PHYS course at 5000-level, subject to Division's approval.

(d) Students may take either PHYS5710 or 5720 to replace at most one PHYS lecture course at 5000-level subject to Division's approval.

(e) Course exemptions may be granted on the basis of graduate level courses already taken.

C. Ph.D. Student (Post-candidacy)

1. Coursework Requirement

(a) A student with/without a research Master's degree has to complete the followings within the normative study period:

(i) Full-time students:
PHYS8012 and 7210 in each term

(ii) Part-time students:
PHYS8006 and 7210 in each term

(b) Thesis research/monitoring courses:
PHYS8003, 8006, 8012

2. Other Requirements

(a) Students must fulfill the Term Assessment Requirement of the Graduate School. For details, please refer to Section 13.0 "Unsatisfactory Performance and Discontinuation of Studies" of the General Regulations Governing Postgraduate Studies which can be accessed from the Graduate School Homepage: http://www.gs.cuhk.edu.hk.

(b) Continuing students must register for PHYS8003 in each term.

(c) Students are required to submit a research thesis and pass an oral examination for graduation.

(d) Complete an Improving Postgraduate Learning (IPL) module on "Observing Intellectual Property and Copyright Law during Research". This will be an online module and relevant information can be accessed from the website: http://www.cuhk.edu.hk/clear/prodev/ipl.html.

(e) Students are also required to attend IPL modules on "General Safety", "Biological Safety", and "Chemical Safety" courses, and other required laboratory safety courses, depending on the nature of the research project. Students should consult Division for details.

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Applicable to students admitted in 2016-17 and before

A. M.Phil. Student

1. Coursework Requirement

(a) Total number of units required for graduation within the normative study period for:

(i) Full-time students:
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PHYS8003, 8006

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(d) Students may take either PHYS5710 or 5720 to replace at most one PHYS lecture course at 5000-level subject to Division's approval.

(e) Course exemptions may be granted on the basis of graduate level courses already taken.

C. Ph.D. Student (Post-candidacy)

1. Coursework Requirement

(a) A student with/without a research Master's degree has to complete the followings within the normative study period:

(i) Full-time students:
PHYS8012 and 7210 in each term

(ii) Part-time students:
PHYS8006 and 7210 in each term

(b) Thesis research/monitoring courses:
PHYS8003, 8006, 8012

2. Other Requirements

(a) Students must fulfill the Term Assessment Requirement of the Graduate School. For details, please refer to Section 13.0 "Unsatisfactory Performance and Discontinuation of Studies" of the General Regulations Governing Postgraduate Studies which can be accessed from the Graduate School Homepage: http://www.gs.cuhk.edu.hk.

(b) Continuing students must register for PHYS8003 in each term.

(c) Students are required to submit a research thesis and pass an oral examination for graduation.

(d) Complete an Improving Postgraduate Learning (IPL) module on "Observing Intellectual Property and Copyright Law during Research". This will be an online module and relevant information can be accessed from the website: http://www.cuhk.edu.hk/clear/prodev/ipl.html.

(e) Students are also required to attend IPL modules on "General Safety", "Biological Safety", and "Chemical Safety" courses, and other required laboratory safety courses, depending on the nature of the research project. Students should consult Division for details.

Course List

Code	*Course Title*	*Unit*
MSEG5020	Frontiers in Materials Science	3
MSEG5040	Topics in Advanced Materials Research IV (Electron Microscopy: Principles, Techniques and Analysis)	3
MSEG5080	Surface Science	3
PHYS5320	Photonics: Materials and Devices	3
PHYS5330	Instrumentation I	3
PHYS5350	Techniques in Materials Characterization	4
PHYS5410	Advanced Quantum Mechanics	3
PHYS5420	Classical Electrodynamics	3
PHYS5430	Solid State Theory	3
PHYS5450	Introduction to Soft Matter Physics	3
PHYS5460	Instrumentation II	3
PHYS5510	Topics in Theoretical Physics (Advanced Statistical Mechanics)	3
PHYS5520	Topics in Theoretical Physics (Introduction to Many-body Theory)	3
PHYS5530	Topics in Theoretical Physics (Introduction to Particle Physics)	3
PHYS5540	Topics in Theoretical Physics (Advanced Computational Physics)	3

PHYS5550	Topics in Theoretical Physics (Quantum Optics)	3
PHYS5560	Topics in the Frontiers of Physics	3
PHYS5561	Topics in the Frontiers of Physics (General Relativity)	3
PHYS5562	Topics in Theoretical Physics (Astrophysics)	3
PHYS5580	Physics of Quantum Information and Quantum Computation	3
PHYS5590	Modern Atomic Physics	3
PHYS5610	Introduction to Biophysics	3
PHYS5620	Topics in Experimental Physics (Thin Film Physics and Technology)	3
PHYS5660	Semiconductor Physics and Devices	3
PHYS5710	Guided Study	3
PHYS5720	Guided Study	3
PHYS7210	Guided Study	1
PHYS8003	Thesis Research	3
PHYS8006	Thesis Research	6
PHYS8012	Thesis Research	12

Study Scheme

Learning Outcomes

1. Our research programmes aim to educate researchers to embark on careers that would allow them to become world leaders in their fields, working as university professors, principal investigators in research institutes, senior managers in enterprises, or experts in other professions related to the pursuit and application of knowledge.

2. The University expects **doctoral degree graduates** of research programmes to have acquired in-depth knowledge in a number of major areas of an academic discipline while maintaining a broad understanding of other related fields. Doctoral degree graduates should have accumulated enough educational experience and background learning to be capable of performing independent research to advance scholarship, with global standards. In particular, doctoral graduates should have the ability to identify research trends and opportunities, venture into new research areas when appropriate, define long-term research objectives, formulate original research problems, and originate and develop solution methodologies. Doctoral graduates should be capable of producing research output at a level that can either lead to publications in high-ranking scholastic venues, or to novel applications in relevant industrial, commercial, or other public sectors, or to other forms of useful knowledge transfer to society. They should have gained proficiency in techniques of knowledge dissemination through presentation and writing and some teaching experiences through student tutoring.

3. The University expects **master's degree graduates** of research programmes to have acquired advanced knowledge in major areas of an academic discipline while maintaining a broad understanding of other related fields. Master's degree graduates should have gained enough background knowledge to enable them to perform research with minimal supervision. In particular, they should have the ability to formulate individual research tasks and to develop solution methodologies under minimal supervision. Master's degree graduates should be capable of producing original, innovative research output, some of which may lead to publication in well-respected scholastic venues. They should have gained proficiency in techniques of knowledge dissemination through presentation and writing.

4. For graduates of research programmes at both doctoral and master's level, communication and language skills at a level appropriate to university graduates are expected already at the time of admission. In particular, fluent communication skills are expected in the language(s) essential to their research areas. In general, a high level of proficiency in English is expected as it is commonly regarded as the default international research language. Ability in a second language is encouraged.

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