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| Program Information |

Academic Program: Doctor of Philosophy in Computer Science and Engineering
Academic Year: 2023

Select Language: [English   ▾]

Study Scheme   Learning Outcomes

Study Scheme

Postgraduate Student Handbook 2023-24   (CSE-I)

FACULTY OF ENGINEERING

Computer Science and Engineering

Study Scheme

M.Phil. – Ph.D. Programme in Computer Science and Engineering (Full-time and/or Part-time)

I.   *Applicable to Full-time and/or Part-time students admitted in 2016-17*

A.   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)   Lecture courses:

   (i)   Each Ph.D. student is required to complete a minimum of 12 units of postgraduate courses offered by the Division and other related courses as approved by the Division.

   (ii)   Out of the 12 units, at least 3 units must be taken from the list of faculty core courses. To satisfy the Faculty core course requirement, students must achieve at least a grade B in the course. Otherwise, the course will only be counted as an elective.

(b)   Thesis research / monitoring courses:
   Each Ph.D. student must register for the relevant Thesis Research Course in every term throughout his/her study period.
   (i)   Full-time Ph.D. (pre-candidacy) student: CSCI8006
   (ii)   Part-time Ph.D. (pre-candidacy) student: CSCI8003

(c)   Other courses:
   Each Ph.D. student is required to take CSCI7600 'Seminar for Ph.D. Studies' in every term throughout his/her normative study period.

2.   Candidacy Examination

(a)   Each Ph.D. student is required to pass the Candidacy Examination within the maximum period of his/her pre-candidacy stage for the advancement to his/her post-candidacy stage.

(b)   Each Ph.D. student is required to obtain grade B or above in two additional courses taken from any two of the following areas:
   ● Artificial Intelligence / Bioinformatics
   ● Theoretical Computer Science

- Theoretical Computer Science
- Data Engineering / Software Engineering / Programming Languages
- Rich Media / Visual Computing / Human-Computer Interaction
- Networking and Security
- Digital Circuits & VLSI Design
- Microprocessors & Systems

(c)   No exemptions to the above two additional courses will be allowed.

3.   *Thesis Proposal and Oral Defence*

Each Ph.D. student is required to submit a written thesis proposal and pass an oral defence.

4.   *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 may be required by the Division to complete other courses, such as ELTU5501 Postgraduate Presentation Skills or its equivalent, if deemed necessary.

(c)   A student must achieve a minimum grade of C- in each of the courses taken in order to fulfill the graduation requirements, unless special approval is granted by the Division.

(d)   Students are required to submit a term paper followed by an oral presentation at the end of every two terms.

5.   *Remarks*

(a)   For the advancement to post-candidacy stage, each Ph.D. student is required to pass:
   (i)   at least 12 units of graduate courses
   (ii)   the candidacy examination, and
   (iii)   a thesis proposal followed by an oral defence.

(b)   A student is required to discontinue from study if he/she cannot fulfill the candidacy requirement within the maximum period.

(c)   Concerning the elective courses in coursework requirement, a student may take graduate courses relevant to their research from other divisions, faculties, and universities as approved by the supervisor and the Division.

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

1.   *Coursework Requirement*

(a)   Lecture courses:
   There is no additional course requirement for Ph.D. candidate.

(b)   Thesis research / monitoring courses:
   Each Ph.D. student must register for the relevant Thesis Research Course in every term throughout his/her study period.
   (i)   Full-time Ph.D. (post-candidacy) student: CSCI8012
   (ii)   Part-time Ph.D. (post-candidacy) student: CSCI8006
   (iii)   Continuing Ph.D. (post-candidacy) student: CSCI8003

(c)   Other courses:
   Each Ph.D. student is required to take CSCI7600 'Seminar for Ph.D. Studies' in every term throughout his/her normative study period.

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 may be required to take any courses if deemed necessary.

(c)   If the Division deems necessary, students who fail CSCI8xxx may be required to take course(s) or submit project report(s).

(d)   Students are required to submit a term paper followed by an oral presentation at the end of every two terms.

(e)   A student must achieve a minimum grade of C- in each of the courses taken in order to fulfill the graduation requirements, unless special approval is granted by the Division.

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

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

II.   Applicable to Full-time and/or Part-time students admitted in 2017-18 and thereafter

A.   M.Phil. Student

1.   Coursework Requirement

(a)   Lecture courses:
Each M.Phil. student is required to complete a minimum of 12 units of postgraduate courses offered by the Division and other related courses as approved by the Division.

(b)   Thesis research / monitoring courses:
Each M.Phil. student must register for the relevant Thesis Research Course in every term throughout his/her study period.
(i)   Year One M.Phil. student :CSCI8006
(ii)   Year Two M.Phil. student :CSCI8012
(iii)   Continuing M.Phil. student :CSCI8003

(c)   Other courses
Each M.Phil. student is required to take CSCI6500 'Seminar for M.Phil. Studies' in every term throughout his/her normative study period.

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 may be required by the Division to complete other courses, such as ELTU5501 Postgraduate Presentation Skills or its equivalent, if deemed necessary.

(c)   A student must achieve a minimum grade of C- in each of the courses taken in order to fulfill the graduation requirements, unless special approval is granted by the Division.

(d)   Students are required to submit a term paper followed by an oral presentation at the end of every two terms.

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

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

(g)   Starting from the 2022-23 intake, all RPg students are required to complete the Research Data Management (RDM) training in the first year of study as part of the graduation requirements. Relevant information is available at http://www.cuhk.edu.hk/clear/prodev/ipl.html and https://www.cuhk.edu.hk/clear/download/IPL-Researchskills.pdf.

(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) Transfer of candidature to doctoral degree programme:

An M.Phil. student who wishes to transfer to the doctoral degree programme shall apply before their year 1 study and shall have to fulfill the University's regulation governing the transfer of candidature. In addition, he/she will have to satisfy the following requirements:

(i) has completed at least 4 graduate courses, with each course grade at "B-" or above;

(ii) the GPA of courses taken must be at least 2.6 for each term; and

(iii) has demonstrated his/her research ability in the opinion of the Division.

(b) Credit transfer

CSE Undergraduate students cannot transfer 5000-level course(s) to their postgraduate studies for fulfilling candidacy requirements.

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:

A PhD student is required to obtain at least 18 units of courses before graduation, including coursework requirement (a faculty core course of 3 units and elective courses of 9 units) and candidacy examination (6 units)

1. *Coursework Requirement*

(a) Lecture courses:

(i) Each Ph.D. student is required to complete a minimum of 12 units of postgraduate courses offered by the Division and other related courses as approved by the Division.

(ii) Out of the 12 units, at least 3 units must be taken from the list of faculty core courses. To satisfy the Faculty core course requirement, students must achieve at least a grade B in the course. Otherwise, the course will only be counted as an elective.

(iii) Out of the remaining 9 units of elective courses, the student may take a 3-unit senior undergraduate course (in 3000 level or above) offered by the Division, but in case of this, the student must achieve at least a grade B+ in the course.

(b) Thesis research / monitoring courses:

Each Ph.D. student must register for the relevant Thesis Research Course in every term throughout his/her study period.

(i) Full-time Ph.D. (pre-candidacy) student: CSCI8006

(ii) Part-time Ph.D. (pre-candidacy) student: CSCI8003

(c) Other courses:

Each Ph.D. student is required to take CSCI7600 'Seminar for Ph.D. Studies' in every term throughout his/her normative study period.

2. *Candidacy Examination*

(a) Each Ph.D. student is required to pass the Candidacy Examination within the maximum period of his/her pre-candidacy stage for the advancement to his/her post-candidacy stage.

(b) Each Ph.D. student is required to obtain grade B or above in two additional courses taken from any two of the following areas:

● Artificial Intelligence / Bioinformatics

● Theoretical Computer Science

- Data Engineering / Software Engineering / Programming Languages
- Rich Media / Visual Computing / Human-Computer Interaction
- Networking and Security
- Digital Circuits & VLSI Design
- Microprocessors & Systems

(c)   No exemptions to the above two additional courses will be allowed.

3.   *Thesis Proposal and Oral Defence*

Each Ph.D. student is required to submit a written thesis proposal and pass an oral defence.

4.   *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 may be required by the Division to complete other courses, such as ELTU5501 Postgraduate Presentation Skills or its equivalent, if deemed necessary.

(c)   A student must achieve a minimum grade of C- in each of the courses taken in order to fulfill the graduation requirements, unless special approval is granted by the Division.

(d)   Students are required to submit a term paper followed by an oral presentation at the end of every two terms.

(e)   Starting from the 2022-23 intake, all RPg students are required to complete the Research Data Management (RDM) training in the first year of study as part of the graduation requirements. Relevant information is available at http://www.cuhk.edu.hk/clear/prodev/ipl.html and https://www.cuhk.edu.hk/clear/download/IPL-Researchskills.pdf.

5.   *Remarks*

(a)   For the advancement to post-candidacy stage, each Ph.D. student is required to pass:
    (i)   at least 12 units of graduate courses (or 9 units of graduate courses plus a 3-unit senior undergraduate course (in 3000 level or above))
    (ii)   the candidacy examination, and
    (iii)   a thesis proposal followed by an oral defence.

(b)   A student is required to discontinue from study if he/she cannot fulfill the candidacy requirement within the maximum period.

(c)   Overall, the student can only take a maximum of 3 units of the undergraduate courses over the pre- and post-candidacy periods to fulfill the graduate requirements.

(d)   Concerning the elective courses in coursework requirement, a student may take graduate courses relevant to their research from other divisions, faculties, and universities as approved by the supervisor and the Division.

(e)   Credit transfer
    CSE Undergraduate students cannot transfer 5000-level course(s) to their postgraduate studies for fulfilling candidacy requirements.

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

1.   *Coursework Requirement*

(a)   Lecture courses:
    There is no additional course requirement for Ph.D. candidate.

(b)   Thesis research / monitoring courses:

Each Ph.D. student must register for the relevant Thesis Research Course in every term throughout his/her study period.

(i)   Full-time Ph.D. (post-candidacy) student: CSCI8012

(ii)   Part-time Ph.D. (post-candidacy) student: CSCI8006

(iii)   Continuing Ph.D. (post-candidacy) student: CSCI8003

(c)   Other courses:

Each Ph.D. student is required to take CSCI7600 'Seminar for Ph.D. Studies' in every term throughout his/her normative study period.

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 may be required to take any courses if deemed necessary.

(c)   If the Division deems necessary, students who fail CSCI8xxx may be required to take course(s) or submit project report(s).

(d)   Students are required to submit a term paper followed by an oral presentation at the end of every two terms.

(e)   A student must achieve a minimum grade of C- in each of the courses taken in order to fulfill the graduation requirements, unless special approval is granted by the Division.

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

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

(h)   Starting from the 2022-23 intake, all RPg students are required to complete the Research Data Management (RDM) training in the first year of study as part of the graduation requirements. Relevant information is available at http://www.cuhk.edu.hk/clear/prodev/ipl.html and https://www.cuhk.edu.hk/clear/download/IPL-Researchskills.pdf.

(i)   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

Concerning the elective courses in coursework requirement, a student may take graduate courses relevant to their research from other divisions, faculties, and universities as approved by the supervisor and the Division.

CSE Undergraduate students cannot transfer 5000-level course(s) to their postgraduate studies for fulfilling candidacy requirements.

Course List

Code	Course Title	Unit
CENG5030	Energy Efficient Computing	3
CENG5050	Hardware for Human Machine Interface	3
CENG5270	EDA for Physical Design of Digital Systems	3
CSCI5010	Practical Computational Geometry Algorithms	3
CSCI5030	Machine Learning Theory	3
CSCI5050	Bioinformatics and Computational Biology	3
CSCI5120	Advanced Topics in Database Systems	3
CSCI5150	Machine Learning Algorithms and Applications	3
CSCI5160	Advanced Algorithms	3
CSCI5170	Theory of Computation Complexity	3
CSCI5210	Advanced Computer Graphics and Visualization	3
CSCI5240	Combinatorial Search and Optimization with Constraints	3

CSCI5320	Topics in Graph Algorithms	3
CSCI5350	Advanced Topics in Game Theory	3
CSCI5370	Quantum Computing	3
CSCI5390	Advanced GPU Programming	3
CSCI5440	Theory of Cryptography	3
CSCI5460	Virtual Reality	3
CSCI5550	Advanced File and Storage Systems	3
CSCI5570	Large Scale Data Processing Systems	3
CSCI5590	Advanced Topics in Blockchain	3
CSCI5600	Advanced Topics in Distributed Systems	3
CSCI5610	Advanced Data Structure	3
CSCI5620	Algorithms for Data Science	3
CSCI5630	Advanced Topics in Graph Mining	3
CSCI5640	Natural Language Processing	3
CSCI5650	Graph Neural Networks	3
CSCI5660	Advanced Topics of AI for Life Sciences	3
CSCI6500	Seminars for M.Phil. Studies	1
CSCI7600	Seminars for Ph.D. Studies	1
CSCI8003	Thesis Research	3
CSCI8006	Thesis Research	6
CSCI8012	Thesis Research	12

Faculty Core Course List

ENGG5101	Advanced Computer Architecture	3
ENGG5103	Techniques for Data Mining	3
ENGG5104	Image Processing and Computer Vision	3
ENGG5105	Computer and Network Security	3
ENGG5106	Information Retrieval and Search Engines	3
ENGG5108	Big Data Analytics	3
ENGG5202	Pattern Recognition	3
ENGG5281	Advanced Microwave Engineering	3
ENGG5282	Nanoelectronics	3
ENGG5291	Fiber Optics: Principles and Technologies	3
ENGG5301	Information Theory	3
ENGG5303	Advanced Wireless Communications	3
ENGG5383	Applied Crypto	3
ENGG5392	Lightware System Tech	3
ENGG5402	Advanced Robotics	3
ENGG5403	Linear System Theory and Design	3
ENGG5404	Micromaching and Microelectromechanical Systems	3
ENGG5501	Optimization I	3
ENGG5601	Principles of Biomechanics and Biomaterials	3
ENGG5781	Matrix Analysis and Computations	3

[Study Scheme](#)   [Learning Outcomes](#)

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.

Course Information

Return to Search   Previous in List   Next in List