THE CHINESE UNIVERSITY OF HONG KONG
Print Course Catalog Details

Academic Org: Div of Computer Science & Engg – Subject: Computer Science

Course: CSCI5370 **Course ID:** 002640 **Eff Date:** 2024-07-01 **Crse Status: Active** **Apprv. Status:** Approved **[**New Course**]**
Quantum Computing 量子計算

This course provides an introduction to the following topics in quantum computation: 1. Models of quantum computation and communication; 2. Quantum algorithms and their limitations; 3. Other topics (quantum communication, quantum cryptography, quantum proofs, quantum error correction, quantum supremacy).

本科介紹量子計算中的以下主題：1. 量子計算與通信模型；2. 量子算法及其局限性；3. 其他主題（量子通信，量子密碼學，量子證明，量子糾錯，量子優越性）。

Grade Descriptor:

A

EXCELLENT – exceptionally good performance and far exceeding expectation in all or most of the course learning outcomes; demonstration of superior understanding of the subject matter, the ability to analyze problems and apply extensive knowledge, and skillful use of concepts and materials to derive proper solutions.

有關等級說明的資料，請參閱英文版本。

B

GOOD – good performance in all course learning outcomes and exceeding expectation in some of them; demonstration of good understanding of the subject matter and the ability to use proper concepts and materials to solve most of the problems encountered.

有關等級說明的資料，請參閱英文版本。

C

FAIR – adequate performance and meeting expectation in all course learning outcomes; demonstration of adequate understanding of the subject matter and the ability to solve simple problems.

有關等級說明的資料，請參閱英文版本。

D

MARGINAL – performance barely meets the expectation in the essential course learning outcomes; demonstration of partial understanding of the subject matter and the ability to solve simple problems.

有關等級說明的資料，請參閱英文版本。

F

FAILURE – performance does not meet the expectation in the essential course learning outcomes; demonstration of serious deficiencies and the need to retake the course.

有關等級說明的資料，請參閱英文版本。

Equivalent Offering:
Units: 3 (Min) / 3 (Max) / 3 (Acad Progress)
Grading Basis: Graded
Repeat for Credit: N
Multiple Enroll: N
Course Attributes: MSc Computer Science
MPhil-PhD Computer Sci & Erg

Topics:

COURSE OUTCOMES

Learning Outcomes:

At the end of the course of studies, students will

1. understand the power and limitations of quantum computation;
2. be able to program a quantum computer;
3. be able to use and modify existing quantum algorithms in computational applications.

Course Syllabus:

This course provides an introduction to the following topics in quantum computation: 1. Models of quantum computation and communication; 2. Quantum algorithms and their limitations; 3. Other topics (quantum communication, quantum cryptography, quantum proofs, quantum error correction, quantum supremacy).

Assessment Type:

Homework or assignment	: 30%
Presentation	: 40%
Test or quiz	: 30%

Feedback for Evaluation:

1. Quiz and examinations
2. Course evaluation and questionnaire
3. Question-and-answer sessions during class
4. Student consultation during office hours or online

Required Readings:

To be provided by course instructor.

Recommended Readings:

1. Ronald de Wolf. Quantum computing: Lecture notes. https://homepages.cwi.nl/~rdewolf/qcnotes.pdf
2. N. David Mermin. Quantum computer science: An introduction. Cambridge Univ. Press, 2007
3. Michael A. Nielsen and Isaac R. Chuang. Quantum computation and quantum information. Cambridge Univ. Press, 2011
4. Scott Aaronson. Quantum computing since Democritus. Cambridge Univ. Press, 2013

OFFERINGS

1. CSCI5370 — Acad Organization=CSEGV; Acad Career=RPG

COMPONENTS

LEC : Size=30; Final Exam=Y; Contact=3

ENROLMENT REQUIREMENTS

1. CSCI5370

Enrollment Requirement Group:

For students in MSc Computer Science; or
For students in MPhil-PhD Computer Science & Engineering; or
For undergraduate students in Computer Science (CSCIU & CSCIN) or Computer Engineering (CENGU & CENGN)

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Additional Information

VTL-Onsite face-to-face hrs 0
VTL-Online synch. hrs 0
VTL-Online asynch. hrs 0

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