THE CHINESE UNIVERSITY OF HONG KONG
Print Course Catalog Details

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

Course: CSCI5160 **Course ID:** 002621 **Eff Date:** 2022-07-01 **Crse Status: Active** **Apprv. Status:** Approved **[**Course Rev**]**
Advanced Algorithms **高級算法**

This course will study the design and analysis of exact and approximation algorithms using advanced techniques such as combinatorial methods, probabilistic methods, linear programming, semidefinite programming, and spectral methods.

本科將通過組合方法、概率方法、綫性規劃、半正定規劃以及譜方法等新技術對精確算法和近似算法的設計及分析進行研究。

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 have acquired the ability to
1. Apply algorithmic techniques to solve problems in computer science
2. Understand one advanced algorithmic technique in depth, including the technical knowledge and the various applications
3. See the connections between the course content and their own research area

Course Syllabus:

This course will study the design and analysis of exact and approximation algorithms using advanced techniques such as combinatorial methods, probabilistic methods, linear programming, semidefinite programming, and spectral methods.

Assessment Type:

Essays	: 50%
Others	: 50%

Feedback for Evaluation:

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

Required Readings:

To be provided by course teacher.

Recommended Readings:

1. Combinatorial Optimization: Polyhedral and Efficiency, by Alexander Schrijver, Springer, 2003.
2. The Design of Approximation Algorithms, by David Williamson and David Shmoys, Cambridge University Press, 2010.
3. Semidefinite programs and combinatorial optimization, by L. Lovász, in: Recent Advances in Algorithms and Combinatorics (ed. B.A. Reed, C.L. Linhares-Sales), CMS Books Math./Ouvrages Math. SMC 11, Springer, New York (2003), 137-194.
4. Randomized Algorithms, by Rajeev Motwani and Prabhakar Raghavan, Cambridge University Press, 1995.
5. Lecture notes on "spectral graph theory", by Daniel Spielman, Yale University, 2012.

OFFERINGS

1. CSCI5160 — Acad Organization=CSEGV; Acad Career=RPG

COMPONENTS

LEC : Size=30; Final Exam=Y; Contact=3
TUT : Size=30; Final Exam=N; Contact=1

ENROLMENT REQUIREMENTS

1. CSCI5160

Enrollment Requirement Group:

For students in MSc Computer Science; or
For students in MPhil-PhD Computer Science & Engineering; or
For students in UG Computer Science; or
For students in UG Computer Engineering;
Not for students who have ENGG5102

CAF

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