THE CHINESE UNIVERSITY OF HONG KONG
Print Course Catalog Details

Academic Org: Dept of Computer Sci & Engg – Subject: AI: Systems & Tech

Course: AIST3010 **Course ID:** 013182 **Eff Date:** 2022-07-02 **Crse Status: Active** **Apprv. Status:** Approved **[**Course Rev**]**

Numerical Optimization **數值優化**

This course aims to provide students with the basic knowledge of optimization theory and introduce various computational libraries and programming techniques to perform optimization. Topics include unconstrained optimization methods, conjugate gradient methods, quasi-newton methods, theory of constrained optimization, linear programming, non-linear constrained optimization, etc.

本科旨在爲學生提供優化理論的基本知識和介紹各種計算庫和編程技術以進行優化。主題包括無約束優化方法，共軛梯度法，擬牛頓法，約束優化理論，線性規劃，非線性約束優化等。

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: 2 (Min) / 2 (Max) / 2 (Acad Progress)
Grading Basis: Graded
Repeat for Credit: N
Multiple Enroll: N
Course Attributes:

Topics:

COURSE OUTCOMES

Learning Outcomes:

At the end of the course of studies, students will have acquired the ability to
1. formulate unconstrained optimization problems
2. solve unconstrained optimization problems, either analytically or via computing modules
3. formulate constrained optimization problems
4. solve constrained optimization problems, either analytically or via computing modules

Course Syllabus:

This course aims to provide students with the basic knowledge of optimization theory and introduce various computational libraries and programming techniques to perform optimization. Topics include unconstrained optimization methods, conjugate gradient methods, quasi-newton methods, theory of constrained optimization, linear programming, non-linear constrained optimization, etc.

Assessment Type:

Essay test or exam	: 60%
Homework or assignment	: 40%

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:

1. Numerical Optimization by Jorge Nocedal, Stephen J. Wright
2. A Gentle Introduction to Optimization by B. Guenin, J. Knnemain, L. Tuncel
3. Introduction to Optimization, by Edwin K.P. Chong, Stanislaw H. Zak
4. Optimization Theory: A Concise Introduction, by Jiongmin Yong

Recommended Readings:

OFFERINGS

1. AIST3010 — Acad Organization=CSD; Acad Career=UG

COMPONENTS

LEC : Size=30; Final Exam=Y; Contact=2
TUT : Size=30; Final Exam=N; Contact=1

ENROLMENT REQUIREMENTS

1. AIST3010

Enrollment Requirement Group:
Pre-requisite: ENGG1120/ESTR1005 or ENGG1130/ESTR1006 or MATH1510
Not for students who have taken AIST3030 or ESTR3112 or ESTR3114

New Enrollment Requirement(s):
Pre-requisite = no change
Exclusion = add AIST3030 or ESTR3112 or ESTR3114

CAF

eLearning hrs for blended cls 0
No. of micro-modules 0
Research components (UG) 0%

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