

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

Course: CSCI5240 **Course ID:** 002628 **Eff Date:** 2022-07-01 **Crse Status:** Active **Apprv. Status:** Approved **【Course Rev】**
Combinatorial Search and Optimization with Constraints 基於限制的組合搜索與優化

Students will be exposed to various constraint-based combinatorial search and optimization techniques that arise in artificial intelligence, operations research, etc. Topics include, but are not limited to, local propagation, consistency algorithms, Boolean constraint solving, numerical constraint solving, linear programming, search, and their applications.

Blended-mode class section is available for this course. Please refer to the "Class Notes" of the blended-mode class section for details.

學生將會學習到各基於限制的組合搜索與優化技術在人工智能，運籌學等。課題包括〔但不僅限於〕局部傳播，相容性算法，布爾限制解法，數值限制解法，線性規劃，搜索及其應用。

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

Blended-mode class available

Topics:

COURSE OUTCOMES

Learning Outcomes:

- At the end of the course of studies, students will have acquired the ability to
1. understand of Constraint Satisfaction Problems (CSPs).
 2. formulate a real-life problem into a CSP.
 3. understand of various constraint solving techniques for CSPs in a particular domain.

4. understand of the tree-search techniques for solving general CSPs.
5. understand of the various local consistency notions and their associated enforcement algorithms.
6. understand of how local consistency algorithms can be combined with tree search.
7. understand of stochastic local search algorithms.
8. make use of existing constraint solving tools to solve CSPs.

Course Syllabus:

Students will be exposed to various constraint-based combinatorial search and optimization techniques that arise in artificial intelligence, operations research, etc. Topics include, but are not limited to, local propagation, consistency algorithms, Boolean constraint solving, numerical constraint solving, linear programming, search, and their applications.

Assessment Type:

Essays	: 30%
Lab reports	: 40%
Presentation	: 30%

Feedback for Evaluation:

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

Required Readings:

1. Programming with Constraints: An Introduction, Kim Marriott and Peter J. Stuckey, The MIT Press, 1998
2. Principles of Constraint Programming, Krzysztof R. Apt, Cambridge University Press, 2003

Recommended Readings:

OFFERINGS

- | | |
|-------------|--|
| 1. CSCI5240 | Acad Organization=CSEGV; Acad Career=RPG |
|-------------|--|

COMPONENTS

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

ENROLMENT REQUIREMENTS

- | | |
|-------------|-------------------------------|
| 1. CSCI5240 | 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

CAF

eLearning hrs for blended cls 23.5

< E N D O F R E P O R T >