Topics in Graph Algorithms

This course will discuss graph theory and graph algorithms with emphasis on the algorithmic aspects of graph theory. The course will cover classical topics such as search techniques, connectivity, colouring, matching and covering, network flows, planarity, traversability, perfect graphs, and NP-completeness of graph problems. The course will also discuss FPT algorithms for solving graph problems.

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.

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.

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.
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.

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.

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. use some fundamental graph algorithms to solve other graph problems,
2. establish NP-completeness of graph problems, and
3. use various tools to design FPT algorithms to solve NP-complete graph problems in practice.
Course Syllabus:

This course will discuss graph theory and graph algorithms with emphasis on the algorithmic aspects of graph theory. The course will cover classical topics such as search techniques, connectivity, colouring, matching and covering, network flows, planarity, traversability, perfect graphs, and NP-completeness of graph problems. The course will also discuss FPT algorithms for solving graph problems.

Assessment Type:

Others : 100%

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:

To be provided by course teacher.

Recommended Readings:


OFFERINGS

1. CSCI5320   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. CSCI5320   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;
   Prerequisite: CSCI3160