MAS477 Introduction to Graph Theory
2018 Fall, KAIST

This course is an introduction to some of the major topics of graph theory. They include graph connectivity, matchings, planar graphs, graph coloring, and nowhere-zero flows.

Basic notions and theorems covered in Discrete Mathematics (MAS275 or CS204) will be assumed; but we will review them in the first week. Usually it is recommended to take MAS275 before taking this course, unless you are familiar with proofs using the mathematical induction.

Lecture	TTh 1PM-2:15PM	Classroom: E6, 3438
Instructor	Sang-il Oum (엄상일)	`http://mathsci.kaist.ac.kr/~sangil/`
	Email: sangil@kaist.edu	Office: E6-1 Room 3403.
Recitation	Monday 5PM-6PM (tentative)	
	We will discuss homework solutions.	
Course website	`http://klms.kaist.ac.kr/`.	
Textbook	No main textbook.	
	Main references:	

1. R. Diestel, "Graph Theory", 5th edition. Springer
   `http://diestel-graph-theory.com/`
   From KAIST, you can access it online at `https://doi.org/10.1007/978-3-662-53622-3`
2. A. Bondy, U. S. R. Murty, "Graph Theory", Springer

Grading	20% Homework, 30% Midterm, 50% Final.
	The lowest score and the second lowest scores from assignments will be dropped. You will earn A if (but not only if) your score is at least $80-\epsilon$, B if your score is at least $70-\epsilon$, C if your score is at least $60-\epsilon$, for some $\epsilon \geq 0$ to be determined later.
Midterm Exam	T.B.A.
Final Exam	T.B.A.
	There will be no make-up exams. Exams will be "closed book", "closed note". Calculators are not allowed in the exams. Any violation of honor code will be reported.
Homework	Homework will be given weekly or biweekly online on Wednesday. The assignment is due at the beginning of class on the following Monday. You may collaborate with other students. But **homework should be written by yourself independently and you must understand your solution.**
Plan	**Week 1-2** Basics. Reviews. (chapter 1)
	Week 2-4 Matchings (chapter 2)
	Week 5-7 Connectivity (chapter 3)
	Week 8 Midterm Exam
	Week 9-10 Planar graphs (chapter 4)

Week 11-12 Coloring (chapter 5)

Week 13 Flows (chapter 6)

Week 14 Extremal Graph Theory (chapter 7)

Week 15 Ramsey Theory for Graphs (chapter 9)

Week 16 Final Exam

No lectures on : Sep. 25 (Chuseok) Oct 9 (Hangul Day)

- For week 14-15, we may cover alternative materials.
- Hint for the course: Definitions are very important!

  Attend the class, Ask questions, Do the homework, Solve exercise problems.

  You should learn how to prove mathematically. Most of the homework problems and exam problems will require you to prove something that were NOT proven in class.
- Try to be familiar with mathematical induction. In particular the "strong induction" is very useful. Be familiar with the well-ordering principle. (Every non-empty set of positive integers has the minimum element.) Thus, it is recommended to take "Discrete Mathematics" (MAS275) before taking this course