

MAS477 Introduction to Graph Theory
2014 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. It is recommended to take MAS275 before taking this course, unless you are familiar with proofs using the mathematical induction.

| | | |
|----------------|---|--|
| Lecture | TTh 10:30AM-11:45AM | Classroom: E6-1 (자연과학동), Room 2413 |
| Instructor | Sang-il Oum (엄상일) Email: sangil@kaist.edu | http://mathsci.kaist.ac.kr/~sangil/ Office: E6-1 Room 3403. |
| Office Hours | Tuesday 4PM or by appointments. (tentative) We will discuss homework solutions during the office hour following the due date. Therefore it is recommended to attend office hours. | |
| Course website | http://klms.kaist.ac.kr/ . | |
| Textbook | Main textbook: R. Diestel, "Graph Theory", 4th edition. Springer (3rd edition is fine) http://diestel-graph-theory.com/ (To be available at KAIST bookstore by the end of the first week) Reference: Bondy, Murty, "Graph Theory", Springer http://dx.doi.org/10.1007/978-1-84628-970-5 | |
| Grading | 20% Homework, 30% Midterm, 50% Final. The lowest score and the second lowest scores from assignments will be dropped. You will earn <i>A</i> if (but not only if) your score is at least 80, <i>B</i> if your score is at least 70, <i>C</i> if your score is at least 60. | |
| 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 in class 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 4-5 Connectivity (chapter 3) Week 6-7 Planar graphs (chapter 4) Week 8 Midterm Exam Week 9-10 Coloring (chapter 5) Week 11-12 Flows (chapter 6) Week 13-14 Extremal Graph Theory (chapter 7) Week 14 Ramsey Theory for Graphs (chapter 9) Week 15 Graph minors and well-quasi-ordering (chapter 12) Week 16 Final Exam | |

- For week 13-15, 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.
- 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 have the minimum element.) Thus, it is recommended to take “Discrete Mathematics” (MAS275) before taking this course