

	Time	Location
Lecture	MWF 11:00-11:50am	Eng. 1 Bld. 244

Instructor: Robert Ellis, Assistant Professor of Applied Mathematics

Office Info: Eng. 1 Bldg. Rm. 105C, 567-5336, rellis@math.iit.edu (with appropriate modification)

Office hours: M 1:30-2:30pm General Office hour
 R 2:00-3:00pm *Math 454 Priority* Office hour
 R 4:45-5:45pm *Math 152 Priority* Office hour

Otherwise, request an appointment or send detailed questions by email. I encourage you to request joint appointments so that more people can benefit from the discussion. Any changes to office hours will be posted on the course homepage.

Graduate Teaching Assistant: (If any) To be announced

Course Home Page: <http://math.iit.edu/~rellis/454F05/> **Assignments posted here, check often!**

Prerequisites: Math 251 or Math 252

Text: *Introduction to Graph Theory*, Doug West, 2nd edition, Prentice Hall

Minor corrections and typo fixes are available at <http://www.math.uiuc.edu/~west/igt/igt2err.html>.

Description. This is a serious proofs-oriented introductory course about properties and applications of graphs. We will study many important and widely-used topics in graph theory, including paths and trees (with application to building roads or telephone lines at minimum cost), matchings (with application to assigning tasks to workers), connectivity and network flow (with application to transshipment), coloring and intersection graphs (with application to scheduling), and planarity (important in facility location and VLSI/computer chip layout). The particular applications considered may be influenced by the interests of the students.

Grade Breakdown. There will be two in-class midterms worth 20% each. The final exam, taking place Monday Dec. 12th from 2:00-4:00pm in E1 Rm. 244, is worth 25%. Homework is worth 35%. Part of this homework may consist of a large project or a number of small projects, to be determined.

Class Attendance. The text is excellent but it is extremely difficult to master the material therein without the regular guidance of the instructor. The importance of proofs in this course makes it critical to practice and be exposed to good proof techniques in lecture. Attending every class is strongly expected, although absences are not penalized per se, except that they are virtually guaranteed to reduce your grades on exams and homeworks.

Topics. We will attempt to cover all material of Chapters 1–7 of the text. If optional material or outside material is included along the way, other material will be omitted.

Supplemental Reading. The following texts in Galvin library will expand your understanding of the applications of graph theory. Some of these might become references for projects.

Graphs and Applications: An Introductory Approach, J.M.Aldous R.J.Wilson

Applied Combinatorics, F.R.Roberts *Applied Combinatorics*, A.Tucker

Graph Theory, R.Diestel *Graph Theory Applications*, L.R.Foulds

Topics in Intersection Graph Theory, T.A.McKee F.R.McMorris

Introduction to Graph Theory, D.B.West *Graph Theory and Applications*, Marshall

Bipartite Graphs and their Applications, A.S.Asratian, T.MJ Denley, R.Haggkvist

Homework and objectives. Homework will serve to improve students' clarity of thought and language when writing or communicating mathematics. Each week there will be one or more assignments consisting of a number of problems each. Solutions should be presented carefully, and will be graded both on correctness of mathematics and on presentation. Write solutions so that a fellow student can understand – an un-annotated sequence of calculations is generally not well-communicated mathematics. Homework will be due at the beginning of class on the due date so as not to disrupt the lecture.

Homework collaboration. You are encouraged to discuss homework problems but **only** with another student in **this** class, the TA, or the instructor. When you **write up** the solution, however, **you must not consult any notes or other aids from these discussions**. Then you may only use the textbook unless otherwise instructed. For example, if you start to write the solution, get stuck, and consult someone half-way, you must start the solution over without referring to the first attempt. Use your common sense to extrapolate from these guidelines or contact the instructor regarding uncertainties. You are recommended not to violate this policy both because of possible prosecution and because of the resulting ill-preparedness for exams.