Instructor: David Glickenstein   **Office:** Math 204
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Course homepage: `http://math.arizona.edu/~glickenstein/math443`.

Office Hours: Monday 10:30-11:30 (in Math 204), Thursday 1:30-2:30 (in Math 220), Friday 2-3 (in Math 204)

Textbook: *Introductory Graph Theory*, by Gary Chartrand, published by Dover.

Supplementary material: We will supplement the textbook by a number of other works, including:

- *Graph Theory* by Diestel. This is available free of charge on the author's website: `http://diestel-graph-theory.com/basic.html`

- *Graph Theory and Applications* by Bondy and Murty.

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- The \$25,000,000,000 Eigenvector: The Linear Algebra Behind Google by K. Bryan and T. Leise.

- *Networks, Crowds, and Markets: Reasoning about a Highly Connected World* by David Easley and Jon Kleinberg. Available free of charge here: `http://www.cs.cornell.edu/home/kleinber/networks-book/`.

- The Small World Phenomenon: An Algorithmic Perspective, by Jon Kleinberg.

- Collective dynamics of 'small-world' networks, by Duncan Watts and Steven Strogatz, published in Nature (you need UA access to get this paper).

- Mathematics for Computer Science by Albert Meyer. This is available free of charge here: `https://archive.org/details/ost-computer-science-mcs`

We may also use additional materials which will be available on the course website.

Homework: Homework will be assigned on a regular basis. Only part of the homework will be turned in, but all should be done. **Since only a small number of problems will be turned in, it is expected that the homework assignments will be immaculate, typed or neatly handwritten, with explanations written in complete sentences when appropriate.** Sloppy work will not be accepted. In addition, exams will consist approximately 30-50% of problems taken directly out of the homework, mostly from problems not turned in for grading. Homework will be worth 100 points, or the equivalent of one exam. Homework will usually be due in class on Friday, with a no penalty extension until 4pm on that day.

Essays: In addition to regular homework, short essays will be assigned, usually due on Monday of the week. At least 1 essay score will be dropped and the essay scores will be averaged and then rescaled to make up 25 points.

Quizzes: In addition to regular homework, there will usually be a short quiz each Monday at the beginning of class. There will be no makeups for quizzes, but at least 2 quiz grades will be dropped before figuring out the quiz grade. The scores for the quizzes will be averaged and then rescaled to make up 25 points.

Exams: There will be two in-class exams and a final. Approximately 30-50% of each midterm will consist of problems taken directly from the homework (including homework assigned but not turned in), and the rest will consist of new problems. Each of the three exams will be worth 100 points. **The midterm exams are tentatively scheduled for and October 15 and December 3 and the final exam will be take home, assigned on the last day of class and due during the scheduled Final Exam Time of Thursday, December 18 at 3pm.**

Grades: A tentative grade will be determined by assigning 25 points to quizzes, 25 points to essays, 100 points to the homework and 100 points to each of the exams (using the standard scale of 90-100% A, 80-89% B, 70-79% C, etc.). In addition, those enrolled in 543 will be required to complete a project by the end of the course. The project will probably involve a report on a theorem or programming an algorithm. The final course grade will be at least as high as the tentative grade. Small adjustments may be made on consideration of positive trends in the class.

Attendance: Students are expected to attend every scheduled class and to be familiar with the University Class Attendance policy as it appears in the General Catalog. **Any student who does not attend the first two classes and does not contact the instructor may be automatically dropped from the course** (but if you want to drop the course, be sure YOU be sure to drop it). Students are expected to behave in accordance with the Student Code of Conduct and the Code of Academic Integrity. The guiding principle of academic integrity is that a student's submitted work must be the student's own. **It is the student's responsibility to keep informed of any announcements, syllabus adjustments or policy changes made during scheduled classes.** . University policies can be found at `http://deanofstudents.arizona.edu/policiesandcodes`.

Students with disabilities: If you anticipate issues related to the format or requirements of this course, please meet with me to discuss ways to ensure your full participation in the course. If you determine that formal, disability-related accommodations are necessary, it is very important that you be registered with Disability Resources (621-3268; `http://drc.arizona.edu`). You should notify me of your eligibility for reasonable accommodations by Wednesday, September 24. At that point, we can plan how best to coordinate your accommodations.

Withdrawal: If you withdraw by September 27, the course will remain on your academic record with a status of dropped, but will not appear on your transcript. If you withdraw between September 28 and November 9, the course will appear on your transcript with a grade of W. Use UAccess to withdraw through November 9. The University allows withdrawals between November 10 and December 10, but only with the Instructor's permission and the Dean's signature. Late withdraws will be dealt with on a case by case basis, and requests for late withdraw with a W without a valid reason may or may not be honored.

Incompletes: The grade of I will be awarded if the student has completed all but a small portion of the required work, has scored at least 50% on the work completed, has a valid reason for not completing the course on time, agrees to make up the material in a short period of time, and asks for the incomplete before grades are due, 48 hours after the scheduled final exam.

Tutoring services: Upper division tutoring is offered at the Math Center in Mathematics 220. Check `http://math.arizona.edu/academics/tutoring/math323` for the schedule.

Tentative approximate schedule

We will try to follow the ordering listed below, however it is possible we will not cover all of the topics listed. C# refers to chapters from Chartrand, D# refers to chapters from Diestel, BM# refers to chapters from Bondy and Murty, M# refers to chapters from Meyer, BL refers to Bryan and Leise, EK refers to Easley and Kleinberg, K refers to Kleinberg. We will generally follow Chartrand as our primary text when the topic is covered. The later topics are advanced, and we may not cover all of them.

Text Chapter	Topic
C1,C2	Introduction to graph theory, isomorphism
C3, D10	Transportation problems, Eulerian, Hamiltonian graphs
C9, D4, D5	Coloring problems and planarity
C4, BM6	Shortest paths, trees, Connector problem
C7, BM10	Digraphs, traffic
C10.1, BL	Graphs and matrices, Pagerank, Laplacians
D6	Networks and feasible flows
EK, K	Small World Phenomena
D12	Graph Minor Theorem and Proof of Kuratowski
M9.2	Matchings and Stable Marriage