Math 109, Spring 2007
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Office hours: In general, Monday through Thursday from 2:30 until 4:00, but students should check the class conference for a weekly listing of office hours.

Text: *Graphs and Their Uses* by Oystein Ore and revised by Robin J. Wilson; *How To Solve It* by G. Polya; supplementary materials will be provided.

Goals: This course is designed to be an introduction to graphs and the field of graph theory. The student will be able: (1) to identify several types of planar graphs, (2) to work several non-standard problems related to graph theory, (3) to discuss several well-known problems and theorems in graph theory, (4) to know something about several mathematicians responsible for the development of graph theory, (5) to develop some problem solving skills needed to find patterns.

In addition, this course is designed to introduce the student to related mathematical topics. The student will select a mathematics topic from a prepared list, will engage the class in an exercise related to the mathematics topic, and will write a paper related to the topic.

Grading:		
	3 tests @ 100 points	300
	Homework, three checks @50	150
	Presentation	100
	Class Participation	50
	Paper	100
	Assignment deadlines	50
	Final	250
	TOTAL	1000

In general,	A, A-	900 points and up
	B+, B, B-	800 to 899 points
	C+, C, C-	700 to 799 points
	D+, D	600 to 699 points
	F	below 600 points

In addition, the student must make a presentation, write a paper, and take the final exam to get credit for this course, even if the point distribution is sufficient to pass.

Each student has the following responsibilities:

1. Come prepared and on time to every class.
2. Complete all work on time with proper thought.
3. Consider that it is not always the fault of the instructor if the student doesn't understand the material.
4. Treat the instructor and peers with respect.
5. Ask questions. Asking questions is a sign of maturity, not ignorance.
6. Understand that the instructor is not trying to "nit-pick" when grading and remember that grading is the responsibility of the instructor.

The instructor has the following responsibilities:

1. Come prepared to every class.
2. Design each class so students can accomplish the cognitive objectives listed in the syllabus.
3. Provide appropriate tips for studying and study materials as seem appropriate.
4. Create a mutually respectful classroom environment.
5. Return tests in a timely manner so that students will know their grades.
6. Grading, as far as possible, to be consistent and impersonal even though students might not agree with the decisions concerning partial credit.

Some Policies:

It is the student's responsibility to notify your instructor **before** the scheduled test if there is a conflict that keeps you from taking a test at the set time. If your conflict is legitimate, provisions will be made for you to take the test prior to the scheduled time. Emergencies will be handled on an individual basis.

If there are special testing needs, the student must notify the instructor in sufficient time to make such arrangements prior to the testing time.

Students are responsible for work missed because of absences. For every absence, after two, the student will lose 10 points for this course unless there is a legitimate documented excuse.

ALL STUDENTS ENROLLED HAVE AGREED TO ABIDE BY THE HONOR CODE. ALL WORK SUBMITTED FOR CREDIT IS ASSUMED TO BE THE WORK OF THE STUDENT.

Tests/Final exam: There are **three tests**, given in class on the following days: **February 6, March 1, March 27.** In general, Test 1 will include chapters 1 and 2; Test 2 will include chapters 3 and 5; Test 3 will include chapters 6, 7, 8. In addition to the text, supplementary materials will be provided and included in the respective test along with assigned readings/activities from How to Solve It. The **final exam** will be given in accordance to the college schedule and will include approximately half from the content on the three tests and half from the presentations given in class.

Homework: Homework assignments are made at the end of each class. Students are to complete these homework problems in a spiral notebook, dates and problem numbers clearly labeled. It is important to stay current on homework problems. Students may work together on the homework but each student is responsible for the concepts the homework problems represent.

Notebooks are due on test days. The grade for each individual will be determined by checking a random selection of **five** homework problems from those assigned during each testing period. In general, ten points are given to totally correct work; seven points are given for a reasonable attempt; three points are given for having something; zero points are given for no work. Notebooks will be returned the following class period.

Paper and Presentation: Each student will select a general topic for a paper and a presentation from the topics provided, presentations are made with two students, working together. Even though the general topic will be the same for the paper and presentation, the presentation is not a summary of the paper. Each topic will have two students assigned so that two students, working together, will make the class presentation, but each student will write a separate paper. These must be three separate but related treatments of the same general topic, a class presentation and the two separate papers.

Topics for this semester are as follows: Two students for each topic.
Chinese Tangrams
Pythagoreans/Pythagorean brotherhood
Escher drawings and tessellations
Zero-Sum games and game theory
Strings, music ratios, tones
Fermat's Last Theorem, concept of proof
Four Color Conjecture/Colors on Torus (see chapter 9)
Mobius Strip and Kline Bottle
Optical Illusions, perspective
Zero
π and e
Golden Ratio
Fibonacci Sequence

The **presentation** must be between 20 and 30 minutes long with related "props" and materials, must engage the class in an activity, and must be structured to have an introduction, activity, and conclusion. Dates for presentations will be randomly assigned. Presentations will begin after the third test.

Student grades for the presentation includes the actual **presentation** (up to 100 points, partially determined by student comments) AND class **participation** in other presentations (up to 50 points); therefore, attendance during presentations is necessary. Grades on class presentations are determined by organization, clarity, class engagement, and individual contribution. To this end, **each student in the class will submit an evaluation of and/or reaction to each class presentation** to include at least one paragraph of no less than five sentences, and due the following class period. In addition, a **statement of contribution**, how the two students worked together, is required from each individual and due the day of the respective presentation.

A **paper** (up to 100 points) is required on a specific aspect of the chosen topic. Each student is required to submit a five to seven page double-spaced typed paper (size 12 font, 1200-1800 words) using appropriate style and a minimum of 6 sources, only two of which can be secondary web sources. The paper must have a clear thesis statement, supported by information gleaned from your sources. The paper will be graded on your logical treatment of your thesis. Papers are due no later than **April 17** but may be turned in early.

Specific deadlines must be met as follows: (up to 50 points)

1/30 Topic determined
2/13 Thesis statement for paper (10 points)
2/22 Presentation Activity outline (10 points)
3/6 List of Sources (10 points)
3/22 Presentation outline (10 points)
4/3 Paper outline (10 points)
4/5 - 4/24 Presentations

Schedule:

1/18, 1/23, 1/25	Introduction and Chapter 1, "What is a Graph?" Jordan Curve Theorem and Sprouts
1/30	**Topic approval deadline**
1/30, 2/1	Chapter 2, "Connected Graphs"
2/6	**Test 1, notebook due**
2/8, 2/13, 2/15	Chapter 3, "Trees"
2/13	**Thesis statement due**
2/20, 2/22, 2/27	Chapter 5, "Directed Graphs"
2/22	**Presentation Activity outline due**
3/1	**Test 2, notebook due**
3/6	Chapter 6, "Games and Puzzles"
3/6	**List of Sources due**
3/8	Chapter 7, "Relations"
SPRING BREAK	
3/20, 3/22, 3/27	Chapter 8, "Planar Graphs" (revisited)
3/22	**Presentation Outline due**
3/29	**Test 3, notebook due**
4/3	Tests returned, notebooks returned, presentation preparation
4/3	**Paper outline due**
4/5, 4/10, 4/12, 4/17, 4/19, 4/24	Presentation dates, two presentations per class.
4/17	**Paper due**
4/26, 5/1	Catch-up (if needed), last class day, evaluations