Math 1001, Excursions in Mathematics, Spring 2003 Semester

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Objectives. Many people think "mathematics = arithmetic," and that mathematicians sit around all day adding large numbers together or computing square roots. Suprise – that's not true! This course is designed to show you some different areas of modern mathematics, particularly those which are not covered in the standard "algebra, geometry, trigonometry, calculus" sequence of courses. The course aims to expose you to mathematical thinking, applied concretely to the modern world. You will learn about mathematical approaches to various real–world problems, and will demonstrate your understanding by implementing the approaches in specific cases.

Prerequisites. Three years of high school math or a placement exam. If you don't satisfy this requirement you should talk to me immediately. You don't need to know a lot of algebra for this course, but we will use some arithmetic and other basic mathematical ideas.

Class sessions. Lecture will be held MWF at 11:15 in room 3-230 of the EE/CSci Building. Discussion sections will be held on Thursdays. Attendance at lectures *and* discussion sections is mandatory, and non-attendance will negatively affect your grade.

Textbook. Excursions in Modern Mathematics, by P. Tannenbaum and R. Arnold (4th edition). There is also a companion website to the book, at `www.prenhall.com/tannenbaum`. The website is not officially part of the course, but it might be helpful.

Material covered. You will be responsible for all of Chapters 15, 10, 1, 2, 3, 5, 6, and 7 from the text, covered in that order. The lectures will follow the book fairly closely, but you are responsible for all the material in the assigned reading, even if it is not specifically covered in lecture. Similarly, you are responsible for anything covered in lecture but not in the book. Before exams I might occasionally tell you that certain topics will not be covered, but you shouldn't make any assumptions like that on your own.

Calculator. You must have a basic calculator which can do exponentials. Anything labelled "scientific calculator" should be ok. Many stores sell these for about $10. More expensive calculators with more capabilities are usually harder to use and won't be any more helpful for this course. In particular, graphing calculators will not be allowed, and would be a waste of money for this course anyway.

Grading System

You can earn up to 1000 points during the semester:

Homework:	150 points
Quizzes:	150 points
Tests:	300 points
Final Exam:	400 points

Homework. Due every Friday, by 4:30 in your TA's mailbox in Vincent Hall room 107. Each week's assignment is worth 10 points, awarded as follows:

- **6 points for completeness.** If you do all the problems completely, with all necessary work shown, you will get the 6 points. If your homework is incomplete, you will get points based on your TA's judgment of what percentage of the homework you did.
- **4 points for correctness.** There will be four problems selected to be graded. You will not know ahead of time which problems will be checked. On each of the four problems, you will get one point for getting the problem completely correct, with all necessary work legibly written, and no points if your answer is not correct, or if it is illegible or if important work is missing. There will be no partial credit. Your partial credit was already given to you in the form of 6 points for completeness.

Late homework will be accepted at any time before the final, but only for 3 completion points. I will give your TA the option of deducting one point from your homework score if your assignment is not stapled and/or has "frizzies" on the side of the paper. (You can find a stapler and a paper cutter in the mailroom, across from the mailbox.) In general, unless there is a serious and/or systematic problem, I will not interfere with the TA's judgement on homework points.

Quizzes: There will be 8 scheduled quizzes and 3 pop-quizzes. The pop quizzes are intended to be easier, and to reward attendance. Each quiz will be worth 15 points, and the lowest quiz score will be dropped. Quizzes will be graded with little or no partial credit.

Exams: You will have three exams during the semester, and you will take them during the normal lecture hour. Each exam will be worth 100 points; I will *not* drop the lowest exam score. You will also have a cumulative final exam on May 12, 2003, at 1:30–4:30pm at a location to be announced. As with the quizzes, the exams will be graded with little or no partial credit.

Grades. The final gradelines will be at least this generous:

900	–	1000	A-, A
800	–	899	B-, B, B+
700	–	799	C-, C, C+
600	–	699	D, D+

I reserve the right to *lower* the gradelines if I feel it is justified – for example, if the exams turn out to be too hard, or homework was graded too stricly, and so on.

Appropriate Collaboration versus Cheating. In general you will find me to be easy-going, and I will treat you with the respect that you deserve as an adult. As part of that, I expect and trust that you will not cheat. You will face severe consequences if I find my trust and respect has been misplaced. *Academic dishonesty will not be tolerated.* Cheating on homework, quizzes or tests will result in a failing grade on the assignment or test, and usually further sanctions, possibly including a failing grade in the course or further sanctions through the university. Any collaboration on quizzes and tests given in class will be considered cheating.

However, *please do collaborate on learning how to do the homework.* After cooperating on learning how to do a problem, each student must do the problem themselves to turn it in. Copying homework, or turning in homework that you did not do yourself, is considered cheating.

Incompletes: These are given only in extremely unusual circumstances, and only if you arrange it with me (not your TA) in advance. Incompletes are given only if you have completed most of the course material at a satisfactory level – at least two midterms at a C level – but some terrible, unexpected event prevents you from finishing the course. In particular, we cannot give you an incomplete if you simply fall behind in your work.

Guidelines for success

Time commitment. This is a 3-credit class. According to University guidelines, the average student should spend 3 hours per week per credit, for a total of 9 hours per week in this class. After attending the 4 scheduled class sessions (3 hours, 20 minutes total) you should expect to spend between 5 and 6 hours per week on reading the textbook, doing the homework and studying. If you are not able to commit this amount of time, I recommend that you do not take this course.

Stay ahead. I recommend that you read the relevant sections of the text before coming to the lecture. Lectures will be easier to follow when you have already thought about the material. I also recommend starting all assignments early, to give yourself opportunities to get your questions answered before it's too late.

Office hours. Office hours can be a great resource for you, and I highly encourage you to use them. (Your tuition money is paying for us to sit there. Get your money's worth!) It's a chance for you to get one-on-one help. We can cover things in more depth, or find out what's confusing you and explain it a different way. If you have questions and none of our office hours work for you, email me or your TA and set up a different meeting time.

Ask questions. Asking questions in class can help you and your classmates. When I was an undergraduate, I often sat in class thinking I was the only one who was confused, so I didn't ask. Later, as I got to know the other students in my major, I found out that they had been confused by many of the same things, but had also been afraid to ask!

Mathematics is not a spectator sport. Even if you understand every word in lecture and in the textbook, the only way to really learn mathematics is by *doing* mathematics. Sometimes this means doing even more than the assigned problems. (See "time committment" above.) This is how to avoid the common pitfall of "understanding everything in class but blanking out on the exams."

I realize this isn't welcome advice, and I admit that I haven't always followed it myself. But in years of teaching (and 20+ years of learning) mathematics I haven't found any shortcut.

Disability accommodations: It is university policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities that may affect their ability to participate in course activities or to meet course requirements. Students with disabilities are encouraged to contact me early in the semester to discuss their individual needs for accommodations.

Preliminary Schedule (subject to change)

Day	Date	Reading Assignment	Topic
W	Jan 22		Syllabus and probability
Th	Jan 23		Probability
F	Jan 24	15.Intro to 15.2	Probability (Hwk 1 due)
M	Jan 27	15.3 to 15.4	Probability
W	Jan 29	15.5 to 15.6	Probability
Th	Jan 30		Probability
F	Feb 31		Probability (Hwk 2 due) (Quiz: Prob.)
M	Feb 3	10.Intro to 10.2	Population
W	Feb 4	10.3	Population
Th	Feb 5		Population
F	Feb 7		Population (Hwk 3 due)
M	Feb 10		Population (Quiz: Pop.)
W	Feb 12		Review
Th	Feb 13		Population and Review
F	Feb 14		**Test** (Probability and Population) (Hwk 4 due)
M	Feb 17	1.Intro to 1.2	Voting
W	Feb 19	1.3 to 1.4	Voting
Th	Feb 20		Voting
F	Feb 21	1.5 to 1.6	Voting (Hwk 5 due)
M	Feb 24		Voting (Quiz: Voting)
W	Feb 26	2.Intro to 2.1	Voting/Weighted Voting
Th	Feb 27		Voting/Weighted Voting
F	Feb 28	2.2 to 2.3	Weighted Voting (Hwk 6 due)
M	Mar 3	2.4 to 2.5	Weighted Voting
W	Mar 5		Weighted Voting
Th	Mar 6		Weighted Voting
F	Mar 7		Weighted Voting (Hwk 7 due) (Quiz: W. Vot.)
M	Mar 10	3.Intro to 3.2	Fair Division
W	Mar 12	3.3 to 3.5	Fair Division
Th	Mar 13		Fair Division
F	Mar 14	3.6 to 3.7	Fair Division (Hwk 8 due) (Quiz: F.D.)
M-F	Mar 17-21	Pick a good book!	Spring Break
M	Mar 25		Fair Division
W	Mar 26		Review
Th	Mar 27		Fair Division/Review
F	Mar 28		**Test** (Vot., W. Vot. and F.D.) (Hwk 9 due)
M	Mar 31	5.Intro to 5.3	Euler Circuits
W	Apr 2	5.4 to 5.5	Euler Circuits
Th	Apr 3		Euler Circuits
F	Apr 4	5.6 to 5.7	Euler Circuits (Hwk 10 due)
M	Apr 7		Euler Circuits (Quiz: Eul.)
W	Apr 9		Euler Circuits/Hamilton Circuits
Th	Apr 10		Euler Circuits/Hamilton Circuits
F	Apr 11	6.Intro to 6.3	Hamilton Circuits (Hwk 11 due)
M	Apr 14	6.4 to 6.7	Hamilton Circuits
W	Apr 16	6.8	Hamilton Circuits
Th	Apr 17		Hamilton Circuits
F	Apr 18		Hamilton Circuits (Hwk 12 due) (Quiz: Ham.)
M	Apr 21	7.Intro to 7.3	Networks
W	Apr 23	7.3 to 7.5	Networks
Th	Apr 24		Networks
F	Apr 25		Networks (Hwk 13 due)
M	Apr 28		Networks (Quiz: Net.)
W	Apr 30		Review
Th	May 1		Networks/Review
F	May 2		**Test** (Eul., Ham. and Networks) (Hwk 14 due)
M	May 5		Review
W	May 7		Review
Th	May 8		Review
F	May 9		Review (Hwk 15 due)
M	May 12		**FINAL EXAM** 1:30–4:30, Location TBA

Homework assignments

Number	Due Date	Chapter(s)	Problems
1	Jan 24	15	2, 4, 12, 14, 20, 66
2	Jan 31	15	16, 18, 22, 24, 26, 28, 36, 38, 42–60 (even)
3	Feb 7	15	68, 81
		10	2–36 (even)
4	Feb 14	15	3, 15, 21, 23, 49, 51, 53, 55
		10	3, 7, 11, 13, 25, 27, 29, 31, 57
5	Feb 21	1	2, 4, 10, 12, 14, 16, 18, 22, 24, 26, 28, 30, 34, 36, 38
6	Feb 28	1	20, 32, 40, 42, 44, 46, 48, 50, 52
		2	2, 6, 8, 10
7	Mar 7	2	12, 14, 16, 18, 20, 24, 26, 28, 30, 34, 44, 48, 52a, 53, 56
8	Mar 14	3	6, 8, 9, 16, 18, 20, 22, 24, 34, 36, 38, 40, 42
9	Mar 28	1	11, 19, 31, 37, 39, 43
		2	11, 15, 27, 51a
		3	47, 49, 51, 61
10	Apr 4	5	2-44 even
11	Apr 11	5	46, 50, 54, 62, 66 + worksheet
		6	2-14 even
12	Apr 18	6	16, 20, 22, 24, 26, 30, 32, 36, 38, 40, 42, 46, 48, 50, 70
13	Apr 25	7	2, 12, 14, 16, 20, 22, 24, 26, 28, 43, 49
14	May 2	5	5, 17, 19, 23, 29, 43
		6	23, 27, 37, 41, 45, 49
		7	1, 11, 13, 19, 23, 25, 29
15	May 9	15	25, 29, 41
		10	5, 23
		1	9a, 17, 25, 35
		2	13, 25
		3	15, 35, 41, 53
		5	25, 29, 41
		6	29, 39
		7	11a, 21, 27

Grade Calculator

This form is designed to help you answer, at any point during the semester, the question, "How am I doing in this class?" Keep track of your scores in the blanks provided. At any time in the semester, add up all the points that you have earned, and divide by the number of possible points on the assignments that are already scored. Then multiply by 1000 and compare with the grade scale given in the syllabus. If the grade you are earning is not as good as you want, ask yourself some questions.

(1) Am I attending all the lectures and the recitation section?
(2) Am I putting in 6 hours a week outside of class?
(3) Am I reading the textbook before the lecture and asking questions in lecture about the things I don't understand?
(4) Am I starting the assignments early so I have time to get my questions answered?
(5) Am I going to my Lecturer or TA to get help with things that I'm stuck on?

If the answer to all these questions is "yes" and you are still unhappy with your progress in this class, please come and talk to me. I may be able to suggest some other ways you can improve your performance.

Item	Your score	Possible score
Homework 1		10
Homework 2		10
Homework 3		10
Homework 4		10
Homework 5		10
Homework 6		10
Homework 7		10
Homework 8		10
Homework 9		10
Homework 10		10
Homework 11		10
Homework 12		10
Homework 13		10
Homework 14		10
Homework 15		10
Homework Total		150
Probability Quiz		15
Population Quiz		15
Voting Quiz		15
W. Voting Quiz		15
Fair Division Quiz		15
Euler Quiz		15
Hamilton Quiz		15
Networks Quiz		15
Pop Quiz 1		15
Pop Quiz 2		15
Pop Quiz 3		15
Quiz Total (drop one)		150
Test 1		100
Test 2		100
Test 3		100
Test Total		300
Final Exam		400
Final Score		1000