

Math 2000
Discrete Mathematics
Spring 2015 UNT

Lecture:	Cury 322, Tues/Thurs 11--12:20
Professor:	Dr. Anne Shepler
Office:	GAB 471B, phone: 940-565-4943
Office hours:	Tuesdays 9--11, 2--3; Thursdays 2--3; by appointment
Web:	http://www.math.unt.edu/~ashepler/Math2000S15.html
Prerequisites:	Math 1650 and Math 1710 (concurrently okay)
Text:	Discrete Mathematics and Its Applications, SIXTH Edition , by Rosen

Grading: Course grade is based on

- Homework worth 15%;
- Three Midterm Exams worth 45% (each worth 15%) on **Feb 19, March 26, April 30**;
- Special projects worth 15%; and the
- Final Exam worth 25% on **Tuesday, May 12, 10:30--12:30 pm**.

Attendance: Class attendance is mandatory. Students may be administratively dropped for nonattendance with a grade of W or WF. Note that 2 or more absences constitute non-attendance. Missing ANY part of class constitutes an absence.

Homework and Exams: Come to lecture each Thursday with your homework stapled and ready to turn in at the beginning of class. No late homework will be accepted. Your lowest homework score will be dropped. (This includes work you miss due to illness, family emergency, transportation problems, oversleeping, work schedule, completing the wrong section, completing the wrong problems, etc.) Homework that is difficult to read will earn a zero score.

You must take the final exam to pass the course. You **MUST** take the final exam at its scheduled time and place. You must take the midterms on the scheduled dates at the scheduled times. There will be no make-up exams. Plan your schedule accordingly. In the event of a documentable emergency or illness, contact the professor immediately (BEFORE the scheduled exam when possible). If everyone does well, the grades will reflect this, so study together and avoid competition. Count your points on exams and homework to be sure the totals are correct and keep a record of all your scores.

Written work: Show all your work (in clear steps) on exams and homework. No (or little) work shown usually earns no credit---even if the answer is correct. Your proofs (and solutions) will be graded on four "C's": solutions must be clear, concise, complete, and correct. Your audience should be an average student in this course, someone who has read the problem but does not know a solution. Rule of thumb: If a fact is "obvious", then it can be proved in one or two lines, so you might as well include those lines. The back of the book contains hints, not solutions, to odd-numbered problems: your solution must contain more detail than in the back of the book or any solution guide. Copying the hint from the back of the book will earn little or no credit. In general, proofs without enough detail or with confused steps will earn little or no credit.

Expectations: You are expected to come to every lecture and come on time. Plan ahead so you are not late. You are responsible for everything that happens in class. You are expected to read the assigned sections BEFORE each lecture and to review your notes for an hour or two after each lecture. Feel free to bring beverages to class (coffee, cola, tea, water, etc.) or quiet snacks. NO ELECTRONIC DEVICES IN CLASS.

An average college student spends about 2--3 hours studying per week for every 1 hour in class and more time before exams and difficult assignments. Thus, if you are an "average learner", you probably want to budget 6--9 hours a week for this class and extra time before midterms and special projects. Adjust the time to accommodate your learning style.

Successful students use their time *efficiently*: they read the assigned section BEFORE the instructor discusses it in class and thus absorb more during lecture, they work examples instead of just reading the text, they turn off their electronic gizmo's for hours at a time, they work on homework every day instead of waiting until the evening before it is due. Successful students also know how to get help from a study group or online source without becoming dependent: They know that merely copying solutions leads to low exam scores later.

Math is not a spectator sport. You will not learn mathematics from watching the instructor or friends or some screen display ideas and solve problems. You must try the problems, finish problems, ask questions, make mistakes, correct mistakes, put concepts in your own words, and practice, practice, practice!

Disabilities: The Department of Mathematics cooperates with the Office of Disability Accommodation to make reasonable accommodations for qualified students with disabilities. It is the responsibility of students with certified disabilities to provide the instructor with appropriate documentation from the Dean of Students Office before the third week of classes.

Extra Credit: Do not expect to be able to do some extra work to help your grade either before or after the final exam. There will be no extra credit during the semester. You must complete the assigned work on time.

Cheating: Academic honesty is a minimal expectation for this and all UNT classes. Anyone caught cheating will receive an F for the course. Furthermore, a letter will be sent to the appropriate dean who may take further disciplinary action.

Special Projects:

- Meet Class Mentor before second class meeting and fill out questionnaire.
- Short report on Twin Prime Conjecture.
- Short report on Fibonacci Numbers in the natural world; present a Fibonacci object to the class.
- Logical Errors : Identify scientific research articles, political writings, or social commentaries published in the last year which exhibit various logical fallacies; provide a critique of the writing samples based solely on logic and mathematical standards for rigorous thought. **Sample articles due Feb. 24, rough draft due April 7, final version due May 5.**
- Solution Guide: Meet with an assigned small group of Math 2000 students and write a polished and detailed solution guide to one homework assignment. The small group must debate choices of word and notation, as well as choice of correct proof to include based on aesthetic taste. The solution guide will be copied and distributed to the whole class. The class may then discuss choices of notation, proof techniques, and creative insights presented in the guide.
- Fill out a short questionnaire after receiving each solution guide. Students will be asked to judge if the solution guide prepared by peers provided effective and well-crafted mathematical communication.

Expected Core Learning Outcomes:

- Express critical thinking in formal proofs and mathematical solutions and use formal logic to construct compelling arguments;
- Craft thoughtful mathematical communication helpful to peers;
- Demonstrate empirical and quantitative skills by applying different systems of analysis to basic mathematical questions, including those using induction, contradiction, quantifiers, algorithms, prime numbers, sequences and sums, recursion, counting principals, permutations and combinations, binomial coefficients, recurrence relations, inclusion-exclusion, generating functions.

Last Comment: Anything on this syllabus is subject to change at the discretion of the instructor.

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Homework Problems (from Rosen's 6th edition)

Problems are sometimes listed out-of-order on purpose.

Section	Topic	Problems
1.1	Logic	5,4,7,11,12,19,18,23,24
1.2	Propositional Equivalences	5,6,7,8
1.3	Quantifiers	3,5,6,7,10,11,13,14,21,23,24,25,33,32
1.4	Nested	1,2,3,9,10,37
1.5	(extra practice)	15,16
1.6	Intro to Proofs	6,7,13,14,15,17b,26,27,28,30,34,38
1.7	Proof Methods	3,6,7,12,17,36,37,38,39,40
2.1	Sets	1--7, 12--14, 15,16, 17,23
2.2	Set Operations	2,3,4,15,17,19,26,27
2.3	One-to-one, onto	9,12,13,16,19,32,29
3.5	Primes and GCD	4,5,8,10,11,12,16
2.4	Sequences/Sums	3,4,10abe, 13,15,16,19,20
4.1	Induction	3,4,5,6,7,10,18,22,31,47
4.2	Strong Induction	3,4,7,10
4.3	Recursive Def'ns	1,5,8,12,13
7.1	Recurrence Relations	1,3,5,9abfg,8abcd,37,44
7.2	Solving Recurrence Rel's	3abd, 4abc,8,12
5.1	Counting	1,2,3,4,5,6,7,23,24,26,27,28,30,61
5.2	Pidgeonhole	2,3,6,18,24
5.3	Permutations/Combo's	2,3,5,6,8,10,15,21,27,26
5.4	Binomial Coefficients	1,2,4,7,9,12,19,21,24
7.5	Inclusion/Exclusion	2,3,7,14
5.5	Stars and Bars (if time)	4,5,8,9,10,15
7.4	Generating Functions (if time)	3,33,32,35,34,19,20,31,30