

Math 2100
Time: MTRF 11:00-11:50pm
Room: B255
Office Hours: M 12 – 2 pm, TR 10 - 11 am, W 11–Noon; or by appt.

Instructor: Candace Blazek
Office: H112
763.433.1133
Candace.Blazek@anokaramsey.edu
Website: webs.anokaramsey.edu/blazek/

Anoka-Ramsey Community College
Course Syllabus
MATH 2100 – Discrete Mathematics
Spring 2010

Course Prerequisites: MATH 1400 with a grade of C or better, or equivalent, or permission of instructor.

Required Text: Mathematics: A Discrete Introduction, Second Edition; Scheinerman.

Supplies: A notebook and a calculator. Note: Calculators will not be allowed on some parts, or all parts, of tests and quizzes.

Attendance and Responsibilities: For success in discrete mathematics, students should attend all classes. A student must notify the instructor prior to an exam if the exam is to be missed. An exam or assignment missed without the instructor's permission will typically result in a score of zero. It is the student's responsibility to keep up with what happens in class each day (material covered, assignments given, etc). Students are expected to read the text, study examples, and work problems concurrently with the sections covered in class. Any cheating or plagiarism will result in a zero for that work and a possible meeting with the Dean.

Homework and Quizzes: Homework problems will be assigned daily. I encourage you to work together on homework assignments, but be sure to turn in your own work. Each section will include "suggested" and "hand-in" homework problems. The due date for "assigned" homework problems will be given at the start of each chapter. Label each assignment and problem. Be sure to circle your answer and show your work, if applicable. **Keep it neat.** If I cannot read the homework, the work will not be graded. No late work or quizzes will be accepted unless prior arrangements are made with the instructor. Quizzes will reflect the homework assigned.

Tests: Tests are worth 100 points each. Tests may include a take home portion, an in class portion, a calculator portion and a non-calculator portion. Test dates are as follows:

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- February 5th
- March 5th
- April 9th
- April 30th
- Take-home portion of final exam distributed April 30th, 2010. Take-home portion of exam is due May 6th.
- Take-home exam presentations May 6th and 7th, 2009.
- Final Exams: 9:40 – 11:40 am, Thursday, May 13th, 2010. The location will be announced at a later date.

The final exam is comprehensive and is worth 200 points.

Grading Policy:

90 – 100% → A ; 80 – 89% → B; 70 – 79% → C; 60 – 69% → D; 0 – 59% → F

Pass/No Credit: If you wish to take this course on a pass/no credit basis, you must inform me in writing by the third week of the semester. P is 70% or better.

Incomplete: An incomplete will be considered only if at least 75% of the semester's work has been completed with an average of C or better. An incomplete is decided on an individual basis.

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Integrity and Honesty: Cheating of any kind will not be tolerated. When taking tests all cell phones must be kept in your backpack or purse. When taking tests, all calculators must be removed from any covers or sheaths. If you are using a graphing or programmable calculator, I may clear the member before each test. If you do not wish to have the memory reset, you should bring a different calculator for the test. If you are dishonest, the consequences are minimally a grade of "0" on that paper. We may also meet with the dean to decide on an appropriate course of action.

Help: If you are having difficulties with a topic get help right away. You have several options:

1. Me – stop by during my office hours or make an appointment
2. Other students in your class – Study groups are a great way to get a strong grasp on material.
3. The Student Academic Center.

Important Dates

- Final Exam is scheduled for 9:40 – 11:40 am on Thursday, May 13th, 2010.
- Last day to drop with a 100% refund is January 15, 2009.
- The final day to drop is April 23, 2009.

Learner Outcomes:

1. Make truth tables for statements involving "not", "and", "or", "if-then", and "if and only if".
2. Transfer to and from symbolic notation.
3. Demonstrate their knowledge of DeMorgan's Laws, logical equivalence, tautologies, and contradictions.
4. Write the negation of a conditional statement.
5. Write the contrapositive, converse, and inverse of a conditional statement and know that the contrapositive and the original conditional statement have the same truth value.
6. Determine if an argument is valid or invalid by modus ponens, modus tollens, converse and inverse errors, rule of contradiction, or using a truth table to determine whether an argument form is valid.
7. Construct circuits for Boolean expressions and find Boolean expressions for a given circuit.
8. Simplify circuits by using Boolean Algebra.
9. Convert from binary or hexadecimal to decimal and from decimal to binary or hexadecimal.
10. Add and Subtract in binary.
11. Draw a circuit for computer addition.
12. Rewrite statements using quantifiers in English and rewrite English statements using quantifiers and variables.
13. Write the negation of statements that involve quantifiers.
14. Determine if an argument containing quantifiers is valid or invalid.
15. Prove statements including rationals, divisibility, mod floor, and ceiling by direct proof, disprove by counterexample.
16. Prove statements by using an indirect argument: contradiction and contrapositive.
17. Find explicit formulas for sequences, compute summations and products, and write sums or products in summation or product notation.
18. Prove statements using Mathematical Induction.
19. Use the following terms and their symbols correctly: subset, proper subset, element of, equals, union, intersection, difference, complement, Cartesian product, empty set, partitions, power sets.
20. Prove set statements are true directly from the definitions of set operations or find a counterexample for each statement that is false.
21. Illustrate set statements by drawing a Venn diagram.
22. Count elements of a list: permutations, combinations, and possibility trees.

23. Find the probability of an event happening.
24. Calculate $(a + b)^n$ using Pascal's triangle and using the Binomial Theorem.
25. Determine if a relation is a function, a one-to-one function, onto function, or inverse function and prove that it is so or give a counterexample.
26. Find the finite-state automaton's states, input symbols, initial state, accepting states, and write its annotated next-state table when given its transition diagram.
27. Find the finite-state automaton's states, input symbols, initial state, accepting states, and draw its transition diagram when given its annotated next-state table.
28. Work applications using the Pigeonhole Principle.
29. Find the composition of functions.
30. List several terms of a recursively defined function and given a recursively defined function find the explicit formula for the sequence.
31. Express Statements using O-notation.
32. Find the best Big-Oh approximation for a polynomial, from the set of rational power functions, and functions involving logs.
33. Determine if a binary relation is reflexive, symmetric, or transitive.
34. Find the distinct equivalence classes of an equivalence relation on a set.
35. For Finite-state automata A, given by a transition diagram, find 0-, 1-, etc equivalence classes of states of A. Draw the transition diagram for A, the quotient automaton of A.
36. Determine if two automata are equivalent, given their transition diagrams.
37. Draw the Hasse diagram for a relation.
38. Determine whether a walk is a path, closed walk, circuit, simple circuit, or just a walk.
39. Find an Euler circuit for a graph that has one or explain why it does not have one.
40. Find a Hamiltonian circuit for a graph that has one or explain why it does not have one.
41. Determine whether a pair of graphs is isomorphic. If they are, find functions that define the isomorphism. If they are not, give an isomorphic invariant that they do not share.
42. Determine whether a graph is a tree.
43. Find a minimal spanning tree for a graph and indicate the order in which edges are added to form the tree.



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	Homework	Hand-in	Date Due
Chapter 1	Section 2.1-10	2, 5, 8, 9	
	Section 3.1-10	2, 4, 5	
	Section 4.1-15	2, 3, 6, 7, 8, 10	
	Section 5.1-9	2, 3, 9	
	Section 6.1 – 19	3, 5, 7, 11, 12	
Chapter 2	Section 7.1 – 15	2, 3, 6, 8, 9, 14	
	Section 8.1 – 11	1, 4, 8, 9	
	Section 9.1 – 10	3, 4, 5, 7	
	Section 10.1-6	1, 4	
	Section 11.1-25	2, 10, 11, 15, 17	
	Section 12.1-5	1	
Chapter 3	Section 13.1-13	3, 4, 10	
	Section 14.1-14	3, 5, 8, 9	
	Section 15.1-16	2, 7, 8, 10, 14	
	Section 16.1 – 7, 9, think about 10, 12 – 15, 17, 18, 22, , 27, 28, 29	4, 7, 9, 12, 28	
Chapter 4	Section 19.1 – 11	5, 6, 7, 8, 9	
	Section 20.1 – 9	3, 4	
	Section 21.1 – 10	2, 3, 4, 5	
	Section 22.1 – 14	2, 3, 7, 9, 14	
Chapter 5	Section 23.1-15	1, 10, 11	
	Section 24.1 – 10	1, 2, 3, 4, 9	
	Section 25.1 – 20	3, 6, 9	
	Section 26.1 – 20	2, 3, 4, 5, 7, 8	
	Section 27.1 – 9	5, 6	
	Section 28.1 – 8	1, 2, 3, 4	
Chapter 6	Section 29.1 – 9	4, 5, 6	
	Section 30.1 – 20	2, 3, 4, 6, 7, 8, 13, 15, 16, 17	
	Section 31.1 – 26	3, 4, 13, 14, 15, 16	
Chapter 7	Section 34.1 – 6	1, 2, 5, 6	
	Section 35.1 – 17	1, 5	
	Section 36.1 – 7	1, 6, 7	
Chapter 8	Section 39.1 – 1 – 7, 10, 11, 13, 18	Hand in 4, 5, 18	
	Section 40.1 – 13	1, 4, 7	
	Section 41.1 – 11	1, 2, 3, 10	
Chapter 9	Section 46.1 – 18	1, 2, 14, 16, 18	
	Section 47.1 – 9	1, 4, 5, 7	
	Section 48.1 – 11	1, 3, 6, 7	
	Section 49.1 – 16	1, 5, 6, 9, 16	
	Section 50.1 – 6	3	
	Section 51.1 – 14	1, 11	