MATH 381H Discrete Mathematics

Fall 2020

Instructor:	Xuqiang Qin	**Time:**	TR 3:00 – 4:15pm
Email:	qinx@unc.edu	**Place:**	Online by Zoom

Course Pages: sakai.unc.edu

Office Hours: Online by Zoom. Monday 3-4pm. Tuesday 6-7pm. Friday 10-11am.

Textbook: The textbook is "Discrete mathematics and its applications" by Kenneth H. Rosen, 8th edition, McGraw Hall, 2018. A paperback version customized for UNC is available from the university bookstore, and an e-book is available from the McGraw Hill website. You can find other options (possibly cheaper) on Amazon.

If you have a copy of the 7th edition it will be fine for most purposes. However, you will need access to the 8th edition for the homework assignments (as they add new problems each edition, the numbering can change).

There are answers to the odd-numbered problems at the back of the textbook. For more detailed solutions to the odd-numbered problems, you may wish to consult the "Student's solutions guide", prepared by Jerrold Grossman, 8th edition, McGraw Hall, 2018.

An undergraduate-level understanding of probability, statistics, graph theory, algorithms, and linear algebra is assumed.

Exam Policy: We follow the university's guidance for online exams. Online exams will be monitored in real time as well as recorded, both voice and video. That recording will not be stored past the end of the semester. For that recording you are required to show your face as well as your work area and immediate surroundings at all times. At the end of the exam you need to scan or take a picture of any written work and submit through Gradescope within 15 minutes of the end of the exam, and that will be part of the recorded record. If you are not able to accomplish this because of technological or personal reasons, please explain and work with the instructor on an alternate testing approach.

Grading Policy: Your overall score will be composed of homework (15%), midterms (25% each), and the final exam (35%). Corresponding grades are: A- to A = 90-100, B- to B+ = 80-89, C-to C+ = 70-79, D = 60-69, F = 59 or below.

As an alternative to earning a letter grade, you have the option to declare this course pass/fail. Courses declared pass/fail in Fall 2020 will be eligible to be used toward major, minor, General Education and any other degree requirement. There is no limit on the number of courses that a student can declare pass/fail in Fall 2020. Any courses declared pass/fail in Fall 2020 will not count toward any graduation limits on pass/fail courses.

Students are strongly encouraged to meet with Academic Advising or an advisor in their respective major or professional school prior to making any decisions on declaring an undergraduate course or courses as pass/fail for Fall 2020. **You can elect to make any course pass/fail by the last day of classes, November 17, 2020.**

Courses declared pass/fail in Fall 2020 will receive one of three grades: Pass, Low Pass, or Fail. Grades of C or higher will be converted to a Pass. Grades of C-, D+ or D will be converted to a Low Pass. Grades of F will remain a Fail. Courses that receive a Low Pass cannot be used for graduation requirements or prerequisites that require a grade of C or higher.

Important Dates:

Midterm #1 (in class) ..... Thursday Sep 24th
Midterm #2 (in class) ..... Thursday Oct 15th
Final Exam ..... 12pm Thursday Nov 19th

Syllabus:

- Chapter 1 : Logic and proofs
  - 1.1 Propositional logic
  - 1.3 Propositional equivalences
  - 1.4 Predicates and quantifiers
  - 1.5 Nested quantifiers
  - 1.6 Rules of inference
  - 1.7 Introductions to proofs
  - 1.8 Proof methods and strategy
- Chapter 2 : Sets and functions
  - 2.1 Sets
  - 2.2 Set operations
  - 2.3 Functions
- Chapter 4 : Number theory
  - 4.1 Divisibility and modular arithmetic
  - 4.2 Integer representations and algorithms
  - 4.3 Primes and greatest common divisors
- Chapter 5 : Induction
  - 5.1 Mathematical induction
  - 5.2 Strong induction
- Chapter 9 : Relations
  - 9.1 Relations and their properties
  - 9.3 Representing relations
  - 9.5 Equivalence relations
- Chapter 6 : Counting
  - 6.1 Basics of counting
  - 6.2 The pigeonhole principle
  - 6.3 Permutations and combinations
  - 6.4 Binomial coefficients
  - 6.5 Generalized permutations and combinations
- Chapter 7 : Discrete probability
  - 7.1 An introduction to discrete probability
  - 7.2 Probability theory
  - 7.3 Bayes's Theorem