MATH 381.005 Discrete Mathematics

Fall 2021

Instructor:	Xuqiang Qin (he/him)	**Time:**	TR 2:00-3:15pm
Email:	qinx@unc.edu	**Place:**	Phillips Hall Room 381

Course Pages: sakai.unc.edu

Office Hours: Online by Zoom. Tue 11am-12pm, Wed 4:30-5:30pm, Thu 3:30-4:30pm.

Prerequisite: MATH 232 or 283 or permission of instructor.

Textbook: The textbook is "Discrete mathematics and its applications" by Kenneth H. Rosen, 8th edition, McGraw Hall, 2018. See the email from Erin Willis titled "How to Buy MATH 381 Textbook" for purchasing options.

Assignments: Homework will be given weekly via Sakai Assignments. Students should upload photocopies/pdf of their work to the corresponding entries in Sakai Assignments.

Group study is encouraged. However, you should write up your final solution independently from your collaborators and other resources. Copying others' work constitutes an Honor Principle violation and will be dealt with accordingly.

Exams: There will be two midterms and a final. The two midterms are given in class during lecture time. The final exam is given in compliance with UNC final exam regulations and calendar. The time and dates of the exams can be found in the next section.

Important Dates:

Midterm #1 (in class) ..... Tuesday Sep 21
Midterm #2 (in class) ..... Thursday Oct 28
Final Exam ..... 12pm Tueday Dec 07

Honor code statement: Students are bound by the Honor Code in taking exams and in written work. The Honor Code of the University is in effect at all times, and the submission of work signifies understanding and acceptance of those requirements. Plagiarism will not be tolerated. Please consult with me if you have any questions about the Honor Code.

Grading Policy: Your overall score will be composed of homework (15%), midterms (25% each), and the final exam (35%).

Community Standards in Our Course and Mask Use: This semester, while we are in the midst of a global pandemic, all enrolled students are required to wear a mask covering your mouth and nose at all times in our classroom. This requirement is to protect our educational community — your classmates and me – as we learn together. If you choose not to wear a mask, or wear it improperly, I will ask you to leave immediately, and I will submit a report to the Office of Student Conduct. At that point you will be disenrolled from this course for the protection of our educational community. Students who have an authorized accommodation from Accessibility Resources and Service have an exception. For additional information, see Carolina Together.

Accessibility Resources and Services: The University of North Carolina at Chapel Hill facilitates the implementation of reasonable accommodations, including resources and services, for students with disabilities, chronic medical conditions, a temporary disability or pregnancy complications resulting in barriers to fully accessing University courses, programs and activities.

Accommodations are determined through the Office of Accessibility Resources and Service (ARS) for individuals with documented qualifying disabilities in accordance with applicable state and federal laws. See the ARS Website for contact information: https://ars.unc.edu or email ars@unc.edu.

Title IX Resources: Any student who is impacted by discrimination, harassment, interpersonal (relationship) violence, sexual violence, sexual exploitation, or stalking is encouraged to seek resources on campus or in the community. Reports can be made online to the EOC at https://eoc.unc.edu/report-an-incident/. Please contact the University's Title IX Coordinator (Elizabeth Hall, interim – titleixcoordinator@unc.edu), Report and Response Coordinators in the Equal Opportunity and Compliance Office (reportandresponse@unc.edu), Counseling and Psychological Services (confidential), or the Gender Violence Services Coordinators (gvsc@unc.edu; confidential) to discuss your specific needs. Additional resources are available at safe.unc.edu.

Counseling and Psychological Services: CAPS is strongly committed to addressing the mental health needs of a diverse student body through timely access to consultation and connection to clinically appropriate services, whether for short or long-term needs. Go to their website: https://caps.unc.edu/ or visit their facilities on the third floor of the Campus Health Services building for a walk-in evaluation to learn more.

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

Syllabus changes: The instructor reserves the right to make changes to the syllabus, including homework due dates and test dates. These changes will be announced as early as possible.