

MATH 253: DISCRETE MATHEMATICAL STRUCTURES (FALL 2016)

Course number: MAT 253

Course title: Discrete Mathematical Structures

Credits: 3

Meetings: Tue & Thu 2:00–3:15 am, Petty 303

Prerequisites: Grade of at least C in MAT 151 or MAT 191.

Instructor information:

Instructor: Dr. Dan Yasaki d_yasaki@uncg.edu

Homepage: http://www.uncg.edu/math/faculty/d_yasaki/teaching.html

Office Hours (146 Petty): Tue & Fri 11:00–12:30 and by appointment

For whom planned: This is a core course designed for mathematics majors as an early introduction to discrete mathematical structures, rigorous proof techniques, and mathematical programming.

Catalog description: A rigorous introduction to discrete mathematical structures, proof techniques, and programming. Topics include sets, functions, sequences, relations, induction, propositional and predicate logic, modular arithmetic, and mathematical programming.

Student learning outcomes: Upon successful completion of this course, students will be able to:

- define the fundamental discrete mathematical structures.
- identify and describe various types of relations.
- explain how RSA encryption allows for secure message transcription.
- translate pseudocode algorithms into Python scripts.
- compute the number of solutions to several arrangement problems.
- analyze simple algorithms and identify values of variables at various stages of completion.
- combine definitions and results produced in class to create rigorous proofs of basic statements about discrete mathematical structures.
- evaluate an argument for logical validity.

Teaching methods and assignments for achieving learning outcomes: The course material will be presented via traditional lectures. Achievement of learning outcomes will be facilitated via homework assignments, programming projects, and exams.

Evaluation and grading: Semester averages are computed according to the syllabus, and letter grades are assigned on a 10 point scale. Grades are not curved or rounded.

A+ : 97–100	B+ : 87–89	C+ : 77–79	D+ : 67–69	
A : 93–96	B : 83–86	C : 73–76	D : 63–66	F : 0–59
A– : 90–92	B– : 80–82	C– : 70–72	D– : 60–62	

- Participation (5%): This includes attendance, answering questions, and staying involved in the class.
- Programming projects (10%): All projects are weighted equally and uploaded to Canvas.
- Weekly homework assignments (15%): The textbook exercises are listed in the [course notes](#). All assignments are weighted equally and collected in class.

- Tests (70%): The three tests count 15% each. The final exam counts 25%.

Required materials:

- Textbook: *Discrete Mathematics and Its Applications* by Kenneth H. Rosen (seventh edition)
- Software: *Python 3.X* You can use Python on the central Linux server of UNCG. It is also installed on the computers in all ITS computer labs. You can download it for free at

<http://www.python.org/download/>

- We will cover most of the sections 1–5 of the *Python Tutorial* available at

<http://docs.python.org/py3k/tutorial/>

Academic Integrity Policy: Each student is required to sign the Academic Integrity Policy on all major work submitted for the course.

I have abided by the UNCG Academic Integrity Policy on this assignment.

Signature _____ Date _____

More information can be found at

<http://sa.uncg.edu/handbook/academic-integrity-policy/> .

Attendance Policy: Attendance is mandatory and measured with a daily sign-in sheet.

Final examination: The Final Exam covers the entire semester. The exam is 3 hours and will be given on Saturday, December 10 at 3:30 pm.

Additional information:

- (1) UNCG seeks to comply fully with the Americans with Disabilities Act (ADA). Students requesting accommodations based on a disability must be registered with the Office of Accessibility Resources and Services (OARS) in 215 Elliott University Center, 334-5440, <http://oars.uncg.edu> .
- (2) Assignments Policy: Assignments are due in class on the due date, and late after 5 pm that day. Late assignments will be accepted at the following lecture period for half credit.
- (3) Absence Policy: You are responsible for all missed material. Any missed assignment, test, or final exam will result in a score of 0. Make-up tests and final exam will be given only if you receive prior approval for a valid excuse by contacting me at least one week in advance.
- (4) Copyright Policy: Selling or purchasing notes from classes for commercial gain is a violation of the UNCG Copyright Policy.

<http://policy.uncg.edu/copyright/>

Any student who sells notes taken in class for commercial gain, or who purchases notes taken by another student for commercial gain, is in violation of this policy and, by extension, is committing a violation of the Student Code of Conduct.

<http://sa.uncg.edu/handbook/student-code-of-conduct/>

- (5) Email Policy: All email correspondence should be made using your UNCG email account. You must check your email regularly for updates and announcements.

Schedule Fall 2016:

Tuesday	Thursday
Aug 23 Prop. Logic and Applications (1.1, 1.2)	Aug 25 Propositional Equivalences (1.3), P0
Aug 30 Predicates and Quantifiers (1.4)	Sept 1 Introduction to Proofs (1.7), P1
Sept 6 Sets (2.1)	Sept 8 Set Operations (2.2), P2
Sept 13 Functions (2.3)	Sept 15 Sequences and Summations (2.4), P3
Sept 20 Review	Sept 22 Test 1 (1.1–2.4, P0–P2)
Sept 27 Divisibility and Modular Arithmetic (4.1)	Sept 29 Integer Representations (4.2), P4
Oct 4 Algorithms (4.2)	Oct 6 Primes and Greatest Common Divisor (4.3), P5
Oct 11 Solving Congruences(4.4)	Oct 13 Cryptography (4.6), RSA, P6
Oct 18 Fall break: No class.	Oct 20 Mathematical Induction (5.1)
Oct 25 Review	Oct 27 Test 2 (4.1–4.6, P3–P7)
Nov 1 Strong Induction (5.2)	Nov 3 The Basics of Counting (6.1), P7
Nov 8 The Pigeonhole Principle (6.2)	Nov 10 Permutations and Combinations (6.3), P8
Nov 15 Relations and Their Properties (9.1)	Nov 17 Equivalence Relations (9.5),
Nov 22 Equivalence Relations (9.5), Poptional	Nov 24 Thanksgiving
Nov 29 Review	Dec 1 Test 3 (5.1–6.5, P8)
Dec 6 Reading Day	Dec 10 (Saturday) Final exam: Saturday at 3:30 pm (cumulative)