

**MATH-UA 120: DISCRETE MATHEMATICS -
SYLLABUS - FALL 2015**

Instructor: Drew C. Youngren, Ph.D.

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Office: Courant Institute (Warren Weaver Hall) Rm. 721

Office Hours: • Wed 11:00am–1:00pm

Meetings:

- Section 002 - 194 Mercer - TR 11:00am–12:50pm

Course description: This course is a one-semester introduction to discrete mathematics with an emphasis on the understanding, composition and critiquing of mathematical proofs. At the semester's conclusion, the successful student will be able to:

- write clear mathematical statements using standard notation and terminology.
- understand and execute a variety of proof techniques (contradiction, induction, etc.).
- show fluency in the language of basic set theory and Boolean logic.
- understand the basic theorems and their implications in a variety of (discrete) fields including:
 - function theory
 - group theory
 - number theory
 - graph theory

Textbook:

- Scheinerman, E. *Mathematics: A Discrete Introduction*. 3rd Edition.

Grading: The final grade will be computed with the following weights:

Homework	20%
Participation	5%
Quizzes	15%
Midterm Exams	35%
Final Exam	25%

NYU Classes: The chief means of communication for this course will be the course Classes site, accessed through home.nyu.edu. Students are expected to check this for up-to-date assignments—including material separate from the text—and announcements.

Homework: Written homework assignments will be due most weeks. These are distributed via the Classes site.

Quizzes: Short quizzes will be given (almost) weekly. These will generally cover material on the previous week's homework.

When calculating the homework and quiz grades for the semester, the lowest grades in each category will be dropped. **N.B.** It is advised that students reserve these “passes” for unexpected absences. In fairness to all students and graders, **late homework will not be accepted.**

Exams: There will be two in-class exams during the semester. See the attached schedule for likely dates.

Final Exam: The final exam will take place on Tuesday, December 22 from 10:00am–11:50pm.

A note on grades of W and I.

You may drop the course in the first three weeks without it appearing on your transcript. After that, and through the ninth week, you may withdraw and receive a grade of ‘W’ on your transcript. No withdrawals are granted after the ninth week.

A grade of ‘Incomplete’ (I) is granted only in the rare circumstances that an emergency prevents a student in good standing from finishing the course in its last few weeks. As per the CAS Bulletin:

Students who are ill or have a serious personal problem should see, call, or write to an adviser in the College Advising Center, College of Arts and Science, New York University,

Silver Center, 100 Washington Square East, Room 905, New York, NY 10003-6688; 212-998-8130.

Participation: Each section meets twice weekly for 110 minutes. It is expected that students be active and prepared during this time. Learning to communicate in mathematics, like any language, cannot be done passively. Students are expected to work in class, share their results and respectfully critique each other's work as well as to read the relevant sections (rarely more than a few pages) before coming to class. The participation grade (5%) will be assigned based on regular attendance and presentation of one's work at least once during the semester.

Make-up Exams: We are only able to accommodate a limited number of out-of-sequence exams due to limited availability of rooms and proctors. For this reason, we may approve out-of-sequence exams in the following cases:

- (1) A documented medical excuse.
- (2) A University sponsored event such as an athletic tournament, a play, or a musical performance. Athletic practices and rehearsals do not fall into this category. Please have your coach, conductor, or other faculty advisor contact your instructor.
- (3) A religious holiday.
- (4) Extreme hardship such as a family emergency.

We will not be able to accommodate out-of-sequence exams, quizzes, and finals for purposes of more convenient travel, including already purchased tickets. Please note again the date of the final and plan your summer break travel accordingly. Scheduled out-of-sequence exams and quizzes (those not arising from emergencies) must be taken before the actual exam. Makeups must occur within one week of the regularly scheduled exam or quiz, otherwise a zero score will be given.

If you require additional accommodations as determined by the Center for Student Disabilities, please let your instructor know as soon as possible.

Technology: Technology can play an important role in the learning of mathematics, and as such, graphing and scientific calculators are permitted for class and homework, though they will not be required. Calculators will not be permitted on tests and quizzes, and thus it is emphasized that students learn not to rely on them.

Academic Honesty: Guidelines regarding cheating and plagiarism are laid out in the [College of Arts and Sciences guidelines](#) and will be adhered to strictly. Collaboration is permitted, in fact encouraged, for home and class assignments; however, all submitted assignments must be written up independently and represent the student's own work and understanding.

Below is a proposed schedule for covering topics and assignments during the semester. All are subject to change as the semester progresses.

Day	M/W	T/Th	Sections	Topic	Due	Note	
1	9/2/2015	9/3/2015	§1–3	Introduction, Definitions			
2	9/9/2015	9/8/2015	§4–5	Theorems and Proofs		Q0	
3	9/14/2015	9/10/2015	§6–7	CounterExamples, Boolean Algebra	HW1		
4	9/16/2015	9/15/2015	§8–9	Lists, Factorials		Q1	
5	9/21/2015	9/17/2015	§10–11	Sets, Quantifiers	HW2		
6	9/23/2015	9/22/2015	§11–12	More Sets		Q2	
7	9/28/2015	9/24/2015	§13	Combinatorial Proofs	HW3		
8	9/30/2015	9/29/2015	§14–15	Equivalence Relations		Q3	
9	10/5/2015	10/1/2015	§16	Partitions	HW4		
10	10/7/2015	10/6/2015	MIDTERM EXAM 1 (through 15)				
11	10/13/2015	10/8/2015	§17	Binomial Coefficients			
12	10/14/2015	10/15/2015	§20	Contradiction	HW5		
13	10/19/2015	10/20/2015	§21	Smallest Counterexample		Q4	
14	10/21/2015	10/22/2015	§22	Induction	HW6		
15	10/26/2015	10/27/2015	§23	Polynomial Seq		Q5	
16	10/28/2015	10/29/2015	§23	Recurrence Relations	HW7		
17	11/2/2015	11/3/2015	§24–25	Functions and Pigeonhole		Q6	
18	11/4/2015	11/5/2015	§26	Composition			
19	11/9/2015	11/10/2015	§27	Permutations	HW8		
20	11/11/2015	11/12/2015	MIDTERM EXAM 2 (through 26)				
21	11/16/2015	11/17/2015	§28, 40	Symmetry and Groups			
22	11/18/2015	11/19/2015	§40–42	Groups and Subgroups	HW9		
23	11/23/2015	11/24/2015	§35–36	Divisibility, GCD		Q7	
24	11/30/2015	12/1/2015	§47–48	Graphs and Subgraphs	HW10		
25	12/2/2015	12/3/2015	§48–49	Connection		Q8	
26	12/7/2015	12/8/2015	§50	Trees	HW11		
27	12/9/2015	12/10/2015	§51	Eulerian Graphs		Q9	
28	12/14/2015	12/15/2015	§52–53	Planar Graphs and Coloring	HW12		
			FINAL EXAM				
			Additional topics (time-permitting)				
			§37–39	Modular Arithmetic, Factoring			
			§43	Fermat's Little Theorem			