

# COMSW3203\_001\_2020\_1 - DISCRETE MATHEMATICS

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## Welcome to Discrete Mathematics!

No content. Not visible to students

**THIS PAGE IS ALL YOU NEED TO GET STARTED**

**Time:** Mondays and Wednesdays @10:10am-11:25am

**Room:** 417 International Affairs Building

**Piazza:** <https://piazza.com/class/k5jz39wa41067d> [\\_ \(https://piazza.com/class/k5jz39wa41067d\)](https://piazza.com/class/k5jz39wa41067d)

**Gradescope code:** TBA

**Instructor:**

- Ansaf Salieb-Aouissi [ansaf@cs.columbia.edu](mailto:ansaf@cs.columbia.edu) (<mailto:ansaf@cs.columbia.edu>)
- Office hours: TBA. Location: 702 CEPsR.

Office hours will start the week of MONDAY JANUARY 27.

**Teaching Assistants:**

TA pictures are available in the TA\_PICS folder.

1. Sam Deng (Head TA):
2. Amir Idris Wednesdays 4:15 pm - 6:15 pm; [aai2125@columbia.edu](mailto:aai2125@columbia.edu) (<mailto:aai2125@columbia.edu>)
3. Jorge Solis: Mondays, 4pm - 6pm; [jas2430@columbia.edu](mailto:jas2430@columbia.edu) (<mailto:jas2430@columbia.edu>)
4. Sohbet Dovranov: Thursdays, 4:30pm - 6:30pm , [sd3093@columbia.edu](mailto:sd3093@columbia.edu) (<mailto:sd3093@columbia.edu>)
5. Sanjana Marcé: Fridays, 2pm - 4pm; [sm4397@columbia.edu](mailto:sm4397@columbia.edu) (<mailto:sm4397@columbia.edu>)
6. Garrett Harrison: Tuesdays, 8:30am-10:30am; [gth2111@columbia.edu](mailto:gth2111@columbia.edu) (<mailto:gth2111@columbia.edu>)

**Office hours schedule:**

TA Office Hours below. Some TAs may need to change their OH during the semester. TA office hours will be held in the TA room in Mudd 122A or Barnard CS TA room (502 Milstein).

	Monday	Tuesday	Wednesday	Thursday	Friday
Morning					
Afternoon					

**Pre-requisites:**

1. Any introductory course in computer programming.
2. High school mathematics.

**Lecture Notes:**

Lectures notes will be available. These are a brief description of the content. Please do not use this as an excuse to miss class. Please take your own notes.

### Recommended Textbook:

Scheinerman, Edward R. Mathematics : a discrete introduction (3rd edition ISBN 9780840049421)

### Other recommended books:

Discrete Mathematics and Its Applications by Kenneth H. Rosen (8th edition ISBN 9781259731280)

### Academic Honesty:

Please familiarize yourself with these university and department policies:

- [Columbia University Guide to Academic Integrity](https://www.college.columbia.edu/academics/academicintegrity) [\\_ \(https://www.college.columbia.edu/academics/academicintegrity\)](https://www.college.columbia.edu/academics/academicintegrity)
- [Department of Computer Science Academic Honesty Policy](http://www.cs.columbia.edu/education/honesty) [\\_ \(http://www.cs.columbia.edu/education/honesty\)](http://www.cs.columbia.edu/education/honesty)

### Grading: Grades will be assigned as follows:

- **Midterm** (~20%): in class. Tentative date will be posted below.
- **Final** (~30%): During final week.
- **Written Assignments** (~35%):
  - There will be weekly written homework assignments (~11 assignments). The lowest grade will be dropped.
  - Written homework assignments are released on Fridays/Saturdays and due the Sunday of the following week. We will use this schedule unless otherwise instructed in the schedule below.
  - All written HW need need to be neatly typed generated PDF. You can use Word, LATEX, or other text processing but you can't submit a scanned nor hand-written document.
  - You will submit the LaTeX file here in courseworks AND the PDF generated in Gradescope (class entry code above).
  - Written HW has to be done individually, no collaboration. **You submit your own work.**
- **Coding assignments** (~15%):
  - **Please note: there will be coding assignments in Python throughout the semester. We will offer Python recitations. The first HW will introduce you to Python.**
  - There will be bi-weekly coding assignments (~4-5 assignments).
  - Coding HW can be done individually or by groups of at most 2 students. More on this TBA.
  - You will submit your code in gradescope.
- **All regrade requests for exams and HW are to be submitted within one week after grades are released.**

### Late Policy:

Your homework assignments are due by the deadline provided that is Sundays. Late policy will be available soon.

### Exceptions:

To be considered for an exception to the above policies, you must provide **both** a letter from your doctor describing with details a medically-necessary delay in your studies **and** a letter sent directly to your instructor from your academic dean.

### No make-up exams:

In case you must miss an exam for a well-justified valid medical/family emergency (a simple vague note from a doctor will not be accepted), your grade composition will be adjusted.

### Disability:

All ODS/disability forms are signed once with the disability office. You no longer need to bring in forms to sign.

### Collaboration:

**You are expected to submit your own work.**

Written homework assignments are not to be completed by groups of students. You may *verbally* discuss the questions with your peers but you must not look at their solutions or show them/share yours. Any notes you take during such conversations should be destroyed

before writing up your solutions. You must not look at solutions **from any source**. If you have any questions at all about this policy please ask before submitting an assignment.

Violation of this policy will result in a penalty to be assessed at the instructor's discretion. *This may include receiving a zero grade for the assignment in question and/or a failing grade for the whole course plus a report to the dean's office.*

#### Contacting the instruction team:

You should always use Piazza for questions; You can post private questions to the instructor or instruction team. Doing it through Piazza is the best way to ensure you get a quick answer.

#### Course content:

- Logic
- Proofs
- Collections (set theory)
- Relations and Functions
- More Proofs (Smallest counter example and induction)
- Number Theory
- Graph Theory
- Counting
- Probability
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#### Class Schedule:

**SUBJECT TO CHANGE. PLEASE CONSULT REGULARLY FOR DEADLINES.**

Week	Date	Topic	Book sections	Homework Assignments
1	Mon Jan 20	<b>No class University Holiday</b>		
	Wed Jan 22	<b>FIRST LECTURE</b> <b>Introduction</b> <b>Logic (Chapter 1)</b>	1, 2 3, 4, 7	HW1 LaTeX Released: Jan 22 Due: Sun Feb 2
2	Mon Jan 27	Propositional logic	Appendix D 3, 4, 7	
	Wed Jan 29	Propositional logic, Inference	3, 4, 7 Inference is not in the book	HW2 Logic Released: Due: Coding 1 Released: Wed Jan 29 Due: Wed Feb 12

3	Mon Feb 3	Inference, Quantifiers, First order logic	11	
	Wed Feb 5	Inference, First order logic	11	
4	Mon Feb 10	<b>Proofs methods (chapter 1)</b>	5, 6	HW3 Proofs Released: Due:
	Wed Feb 12	Proof methods	5, 6	
5	Mon Feb 17	<b>Sets (Chapter 2)</b> Sets, subsets, operations	10, 12	HW4 Sets Released: Due:
	Wed Feb 19	Sets	10, 12	
6	Mon Feb 24	<b>Relations (Chapter 3)</b>	14, 15	HW5 Relations Released: Due:
	Wed Feb 26	Relations	14, 15	
7	Mon Mar 2	<b>More Proofs (Chapter 4)</b>  Induction, smallest counter example, Strong induction	20, 21, 22	

	Wed Mar 4	<b>More Proofs</b> Strong induction		HW6 More proofs  Released:  Due:
8	Mon Mar 9	<b>Functions</b> <b>(Chapter 5)</b> Functions, onto, one-to-one, bijections,	<b>24-26</b>	
	Wed Mar 11	<b>Midterm</b> <b>One cheat sheet both sides, handwritten or typed</b>	<b>Lectures from Jan 22 to Mar 4</b>  <b>Logic, Proofs, Sets, Relations and More proofs</b>  <b>Week 1-7</b>	
9	Mar 16-20	<b>Spring recess</b>	<b>Spring recess</b>	<b>Spring recess</b>
10	Mon Mar 23	<b>Functions</b> countability, Composition, inverse, pigeon hole principle		HW7 Functions  Released:  Due:
	Wed Mar 25	<b>Number Theory</b> <b>(Chapter 7)</b> Dividing, Div and Mod operators, GCD, Euclid algorithm, prime numbers	35-39	
11	Mon Mar 30	Fundamental theorem of arithmetic,  Modular arithmetic	35-39	HW8 Number theory  Release:  Due:
	Wed Apr 1			

		Fermat Little, Intro to cryptography, RSA.		
12	Mon Apr 6	<b>Graph Theory</b> <b>(Chapter 8)</b> Fundamentals, terminology, isomorphism, subgraphs, connection,	47-53	HW9 Graphs Released: Due:
	Wed Apr 8	<b>Graph theory continued</b> trees, Eulerian graphs, coloring, planar graphs		
13	Mon Apr 13	<b>Counting</b> <b>(Chapter 3)</b> Lists, Factorial, Anagrams, permutations	8, 9, 16, 17, 19	HW10 Counting Released: Due:
	Wed Apr 15	binomial coefficients Principle of Inclusion-Exclusion (PIE)		
14	Mon Apr 20	<b>Probability</b> <b>(Chapter 6)</b> Sample space, events,	30-34	HW11 Probability Released: Due:
	Wed Apr 22	conditional probability, Bayes rule, Usefulness of Bayes rule,		
15	Mon Apr 27	Union and intersection of events, chain rule random variables.		

	Wed Apr 29	Expectation, variance Law of large numbers Central Limit theorem Hypothesis testing, confidence intervals		
16	Mon May 4	<b>LAST LECTURE</b> Distributions: Gaussian, Binomial, geometric, fitting distributions, parameter estimation CONCLUSION		
<b>FINAL WEEK</b>	<b>MAY 13</b>	<b>Final Exam</b> <b>Non cumulative</b> <b>One cheat sheet both sides, handwritten or typed</b>	<b>Lecture from Mar 9 to May 4 &amp; all proof techniques</b>	

#### Recitation Schedule: TBA

These are optional if you cannot attend, but they will be good review for the topics listed below! Materials from each recitation will be posted on Courseworks.

Location	Date & Time	Topics	TAs
Hamilton 303	Friday Jan 31@1:10-3:10	Python	Sam
Hamilton 303	Friday Feb 7 @1:10-3:10	Logic, inference	
Hamilton 303	Friday Feb 14 @1:10-3:10	proofs	
		sets, relations and more proofs	
		Functions, number theory, graph theory, more proofs	
		Counting and probability	

# Course Summary:

Date	Details
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