

MATH 245: Discrete Mathematics
Spring 2021 Section 1: MWF 10-10:50am
online lecture modality Zoom link for all meetings:
<https://sdsu.zoom.us/j/2865540514>

Overview:

This course is a rigorous introduction to many of the tools useful in higher mathematics and computer science. The major topics to be covered will be logic and proof techniques. Also included will be a brief introduction to set theory, number theory, relations, functions, recurrences, and complexity.

This course is required for all students pursuing majors in computer science, computer engineering, mathematics, and statistics.

Prerequisites:

Students must meet *all* of these requirements to take the course. Students should read this list carefully, and if they do not or cannot meet a requirement they should strongly consider taking the course later¹. Failure to meet even one of these requirements will likely lead to failure in the course.

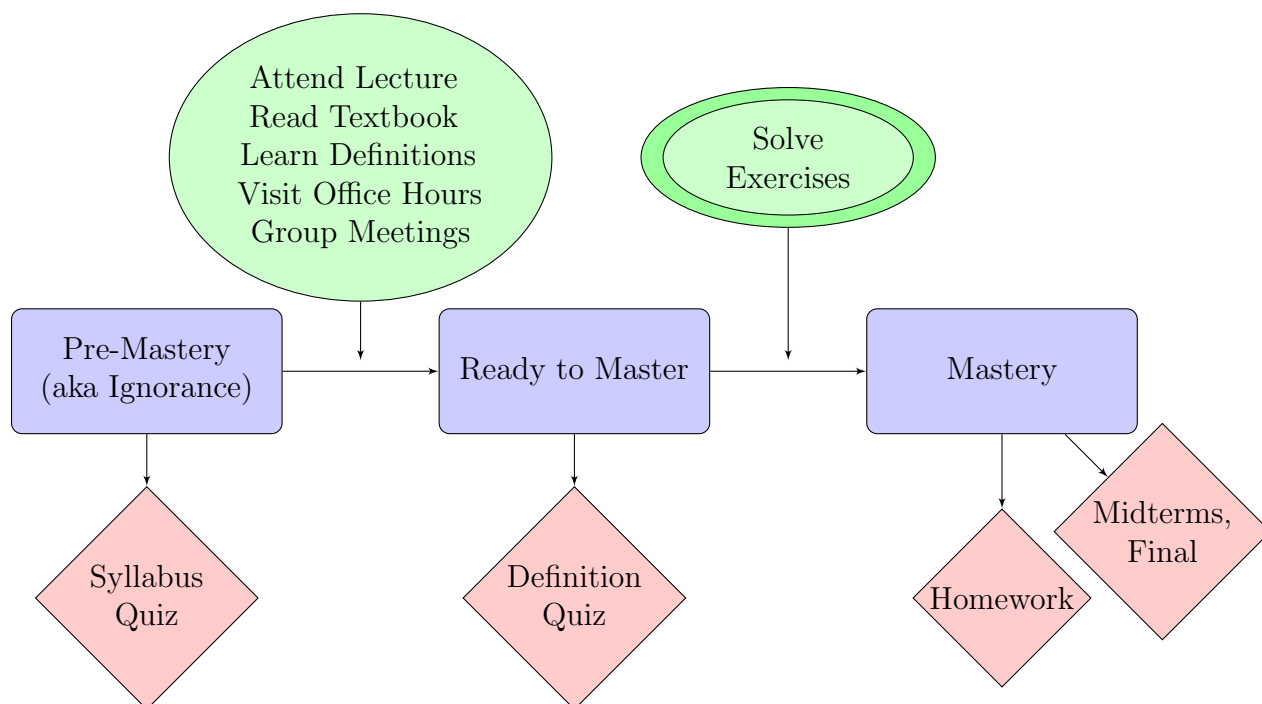
1. Attitude Prerequisite: This course is difficult, with a 40% fail rate typically. Students must take the course seriously. Taking a break, even for a few days, will make it almost impossible to recover. Don't be a statistic, keep up with the course. In case of problems, seek help immediately – do not wait until the course is almost over, it will be too late.
2. Time Prerequisite: Students must spend 10-20 hours per week on this course, every single week from the first to the last. This includes 3 hours of lecture, 1-2 hours of group meetings, 0-1 hours of office hours, and 5-15 hours of solving and writing up homework exercises.
3. Technology Prerequisite: Students must have suitable technology for two-way Zoom calls, including a working video camera (webcam or phone) and sufficiently high-speed internet connection². They must also have a working still camera (webcam or phone) to take pictures of their handwritten work.
4. Use of Technology Prerequisite: Students must be capable of using the technology for this course. This includes joining and initiating Zoom calls, taking photographs, correct uploads of documents, checking email³ for announcements, and taking online quizzes/tests through Canvas and Gradescope. Students must practice these skills on their own time, well before any deadlines. Unfamiliarity with the technology does not constitute a valid excuse.

¹All variances must be requested before the instructor adjustment deadline (1pm Feb. 2).

²Students who do not own such technology should contact SDSU's Economic Crisis Response Team (<https://sa.sdsu.edu/ecrt>) to ask for immediate help. This technology is necessary for the entire duration of the course.

³Note: Starting in Fall 2020, SDSU students will be contacted only through their official sdsu.edu email.

5. Attendance Prerequisite: This course meets on Zoom during its regularly scheduled times. Attendance is mandatory, and students must give their full attention to the course meetings for the duration. No recordings of lectures are permitted. Like in a face-to-face class, students must pay attention or the material will simply go past them, gone forever.
6. Subject Prerequisite: This course has as prerequisite a grade of C or better in Math 124 or 150 or 151; or a 4 or better on the Calculus AB exam; or a 3 or better on the Calculus BC exam. Students barely meeting the prerequisite (i.e. a grade of C/C+/B-) are at substantial risk of failing this course, and will likely need additional study time.
7. Textbook Prerequisite: Students must have a copy of *Mathematical Maturity via Discrete Mathematics*, ISBN 0-486-83857-9, for the duration of the course⁴.
8. Writing Prerequisite: Students must write solutions to all of the assigned exercises in the textbook (as well as all exam solutions), by hand, on paper⁵.
9. Participation Prerequisite: Students must hold meetings with their study group at least weekly, either in-person or via Zoom. It is not sufficient to exchange texts/emails/images. They must also participate and ask questions in office hours and in class.
10. Integrity Prerequisite: Students must understand and comply with the academic integrity standards in this course, and ask questions about any unclear issues. Unfamiliarity with the rules does not constitute a valid excuse.



⁴Be sure to have the printed softcover Dover edition, not one of the old coursepacks of the same name.

⁵Students unable to write by hand due to physical limitations must seek accommodations through the SASC ASAP.

Course Structure:

This course has Zoom meetings three times per week, all of which students must attend. There are also office hours (both the instructor and the TA) which students are strongly encouraged to attend. Please set your zoom name to be your full name. Students are encouraged to ask questions, through video – not through the chatbox, and not audio-only.

Class meetings will contain one or more attendance checks, during which students are expected to type “present” into the chatbox within two minutes of the start of the check. They will end with a definition quiz, on Canvas.

Students are expected to form study groups, ideally of size 4, and are expected to meet with their groups at least weekly to discuss homework solutions. Meetings must be face-to-face or via video chat (not text-based or audio-only).

Students are expected to produce solutions to all homework exercises, in their own handwriting, on paper (although they are welcome to get help with the ideas). Their homework will be collected at the end of each chapter (approx. three class meetings).

Students will also take three midterm exams (during classtime) and a final exam (during finals week).

Grading:

Submitted short-answer grades are all normalized to lie between 50% (blank but present) and 100% (perfect score). Missing grades are still worth 0%. Multiple-choice and other grades are the usual 0% to 100%, except participation which ranges from 50 points (maximum) down to –400. The cutoffs for each letter grade are as below. No other grades are awarded. The passing grade for math/cs/ce majors is C.

What?	When?	Why?
Syllabus Quizzes	as announced	20
Participation	every lecture + others	50
Homework	once per chapter	80
Definition Quizzes	every lecture	190
Rest/Recovery Day	Fri. Feb. 12	
Midterm 1 (Ch. 1-4)	Fri. Feb. 19	120
Rest/Recovery Day	Mon. Mar. 8	
Midterm 2 (Ch. 5-7)	Mon. Mar. 15	120
Spring Break	Mon. Mar. 29 – Fri. Apr. 2	
Midterm 3 (Ch. 8-10)	Mon. Apr. 12	120
Catchup Day	Wed. May 7	
[Midterm 4 (Ch. 11-13) + Final]	Fri. May 7 10:30-12:30	300
Total		1000

A: 900 B+: 880 B: 800 C+: 780 C: 700 D+: 680 D: 600 F: 0

Re-grading:

All regrade requests must be submitted via email, to the professor, due within one week of when the exam/assignment was returned. They should include a compelling explanation of why more points should be awarded. Passionate desire for a higher grade is, sadly, not a compelling explanation.

Textbook:

Students are expected to own and read the textbook; it is inexpensive, very helpful, and brief. Students are expected to solve *all* of the problems in the text⁶. Hints can be found in the back; solutions are not available, by design (see p. xxi for an explanation). Homework is generally not discussed in class due to time constraints – please bring homework questions to office hours, or ask via email. Students must write solutions to the problems by hand, in their own handwriting, on paper.

Attendance:

Students are expected to attend every class, paying attention and taking notes the entire time. Students who miss class, even occasionally, are at substantial risk of failing the course. Makeup quizzes and exams are not given under any circumstances. To ask questions, be sure to have your video and audio on, and raise your virtual hand. Be prepared for the attendance check(s) – failing to respond within 2 minutes will mark you “tardy” and cost 5 participation points, while not responding at all will mark you “absent” and cost 10. Two absences (or four tardies) will be automatically excused, per student, to account for the unexpected. Additional absences/tardies can be cancelled out with extra credit.

Students who will miss class due to a religious observance, or for an official university event or activity (such as athletics), must notify the instructor during the first two weeks of classes. Absences for official university events must be documented with a memorandum from the event’s sponsor with that same deadline. Students missing class due to a medical emergency must provide a signed medical excuse justifying the absence. Student Health Services does not provide these.

Definition Quizzes:

On all class days except exam days, students take a 2 minute⁷ quiz on a recent definition or theorem. These are true-false, giving either 5 points (for a correct answer) or 0 points (for an incorrect answer), or multiple choice. Students may use their textbook and notes, but may not ask for help from other people. Makeup quizzes are not given under any circumstances.

Homework:

Students are expected to solve every exercise in the book (except for sections 7.3 and 9.3). They are encouraged to seek help from the instructors, their study group, and the SDSU Math and Stats Learning Center. They are strongly *discouraged* from seeking help from random online sources – these vary wildly in quality, and will often lead a student in the wrong direction. Homework may be submitted up to 1 day late, at a 50% penalty.

All homework solutions must be written by hand, on paper. A change in handwriting style will be considered as academic misconduct⁸.

Participation:

Students start with 30 points, out of a maximum of 50, in participation. Missing the two-minute window for a participation check will cause a mark of “tardy” (costing 5 points); not responding at all will cause a mark of “absent” (costing 10 points). To account for the unexpected, two such class absences (or four such class tardies) will be forgiven.

⁶Due to SDSU’s Rest and Recovery Day schedule, we will be skipping sections 7.3 and 9.3.

⁷occasionally 3 minute

⁸If you suffer a hand injury or something similar, inform the instructor immediately.

Students are encouraged to ask meaningful mathematical questions from time to time during the semester. This must be either during class or office hours, and must be using video – not text or audio. Doing so will add 10 participation points. These points may be earned at most twice during class, and twice during office hours, per semester, per student. They can raise the participation score up to 50 (maximum), and can compensate for some absences/tardies.

Participation scores can go from 50 (maximum) to below zero! Worst case will give a participation score of -400 , giving a course grade of 600/1000 (D) even with perfect scores on all quizzes, all three midterms, and final.

Exams:

The three midterm exams and final are all open book, open notes, with calculators permitted. No Respondus or other invasive measures will be employed. However, students are not permitted to seek help from anyone else during the exam periods, or use any online resource apart from Canvas and Gradescope. Sharing or discussing a question from an exam in progress, even without solution, is a serious violation of academic integrity, and will lead to automatic failure in the course (which cannot be fixed through course forgiveness).

The final exam will be roughly 120/300 on the last three chapters of material (like a fourth midterm) and roughly 180/300 cumulative (equally on all 13 chapters).

All short answer exam questions are graded on a 50%-100% scale. No makeup exams will be offered under any circumstances.

Collaboration:

Students are strongly encouraged to study together, and to work together on exercises. They are strongly encouraged to form study groups for this purpose. The Canvas discussion board is available for this. Best practice for study groups is size 4.

However, collaboration on quizzes and exams (while in progress) is forbidden. Homework, although it may contain ideas from other sources, must be handwritten by the individual student. Impersonation of a student for participation/quiz/exam purposes is forbidden. Use of online resources (other than Canvas and Gradescope) during quizzes and exams is forbidden. All violations will be reported to the Center for Student Rights and Responsibilities and will also result in grade reductions or worse. Courses failed due to integrity violations are ineligible for course forgiveness. See SDSU's full policy⁹ on academic honesty, or ask the instructor, if you have any doubts or questions.

Learning Objectives:

Students will carefully state all definitions relevant to the course, apply these definitions to objects, and determine whether or not the definition applies. This determination will often involve a calculation. Students will have a ready supply of examples and non-examples to these definitions, and will be able to justify why these are examples or non-examples. Students will prove and disprove statements using the methods of discrete mathematics. They will construct rigorous proofs following the rules of logic. Students will carefully state and apply many mathematical theorems.

⁹http://go.sdsu.edu/student_affairs/srr/cheating-plagiarism.aspx

Online Materials:

The professor maintains a comprehensive website (URL below). It contains old exams, solutions (most of which are correct), syllabi, course evaluations, grade distributions. Keep in mind that the textbook is fairly new; older courses were from an evolving coursepack. Their material may differ in places. The instructor is very diligent and prompt about responding to emails. You may expect a response within 24 hours, often much sooner. The course is also active on Canvas (not Blackboard).

Extra Credit:

Due to the large number of students and transition to online modality, no extra credit will be possible, apart from the bonus participation points described in the “participation” section above.

Contact:

Please contact the professor exclusively through his email, vponomarenko@sdsu.edu. Please do not use Canvas/Gradescope notifications, other email addresses, carrier pigeons, etc.

Additional Help:

The Math and Stats Learning Center¹⁰ offers free drop-in tutoring in this course. Although the MSLC is open for many hours each week, Math 245-certified tutors are available at only certain times. The math department¹¹ maintains a list of paid tutors. Academic advising is available at the Student Success Center¹². Counseling and Psychological Services¹³ helps students with mental health concerns. The SDSU Economic Crisis Response Team¹⁴ helps students with food/housing/financial concerns.

FERPA:

Student information in this course is confidential as required by law and by SDSU policy¹⁵.

SASC:

If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact the Student Ability Success Center at (619) 594-6473. To avoid any delay in the receipt of your accommodations, you should contact SASC as soon as possible. Please note that accommodations are not retroactive, and that accommodations based upon disability cannot be provided until you have presented your instructor with an accommodation letter from SASC.

Professor:

Vadim Ponomarenko vponomarenko@sdsu.edu

Office hours: MWF 9-9:50am, and by appt., at: <https://sdsu.zoom.us/j/2865540514>

Website: <http://vadim.sdsu.edu/> (all old materials may be found here, under “teaching”)

TA:

Joe McDonough jmcdonough@sdsu.edu

Office hours: Tue/Thu 10:30-12, Fri 12:30-2, at: <https://SDSU.zoom.us/j/342733582>

¹⁰mlc.sdsu.edu

¹¹<https://math.sdsu.edu/>

¹²<https://cossuccess.sdsu.edu/academic-advising/>

¹³http://go.sdsu.edu/student_affairs/cps/therapist-consultation.aspx

¹⁴<http://sdsu.edu/ecrt>

¹⁵<https://bfa.sdsu.edu/oerc/students/ferpa.aspx>