

MATH 2190

Discrete Structures I
Course Information (version 1)

Spring 2021

Class times and location: Section 204: Tue & Thu, 12:30–1:45 pm, “ZoomSpace”. **All students are expected to have Zoom accounts and to have a screen name that includes the name under which they registered for the course.** Links for joining class meetings and drop-in hours are available at the Blackboard portal for the course.

Instructor: James Propp. The email address you should use for me is JamesPropp@gmail.com when you’re not communicating with me via Piazza — in particular, please be aware that I check my UML email account only once or twice a week. Administrative questions that are specific to you should be sent to my email address; questions that are mathematical in nature and/or might be of interest to other students should be posted on the Piazza site, unless they might be spoilers. (If you are unsure whether a comment or question might be a spoiler, check with me.)

Course websites: <http://jamespropp.org/2190/> (it has some overlap with this syllabus, but you need to read both) and <https://piazza.com/uml/spring2021/math2190204> (the Piazza page for MATH 2190).

Drop-in hours: My drop-in hours will be held via Zoom on Tuesdays and Thursdays, from 11:30am to 12:15pm and 3:15pm to 4:00pm, unless otherwise announced. Links for joining class meetings and drop-in hours are available at the Blackboard portal for the course. You can also post questions at the Piazza site for Discrete Structures I or ask me question by emailing me at jamespropp@gmail.com. Note that you can use LaTeX formatting commands inside Piazza; go to

<https://piazza.com/help/formatting.html>

and click on “LaTeX Support”. For a video introduction to LaTeX, view

<https://www.youtube.com/watch?v=NXW4cbHBthY>.

Text: “Applied Discrete Structures” (3rd edition, version 7) by Alan Doerr and Kenneth Levasseur, available for free online at

<https://discretemath.org/>

We will not be covering the Sage Notes interspersed throughout the text. (**Note: If you are unable to see images or diagrams in the html version of the textbook, it is almost certainly because your browser has an AdBlocker extension that is restricting permissions for the images. All you need to do is allow ads on the site.**)

Prerequisites: High school mathematics, one semester of calculus, intellectual curiosity, and the willingness to work hard.

Class meetings: Class meets twice a week on Zoom, and attendance is expected. See the Blackboard page for the course for Zoom links and passwords. To get full credit for attendance (which counts towards the class participation component of your grade), you will need to attend the Zoom meeting with your camera on and with a screen name that includes the name the registrar uses for you. (For the camera shy, there are other ways to get class participation credit, but this route is not recommended, for reasons I will discuss in class.) You should obtain the Zoom desktop program or the Zoom phone app so that you'll be properly assigned to breakout rooms. Emergency loaner Chromebooks are available from Academic Affairs.

Exams: There will be an in-class midterm examination on March 11 and a final exam during Exam Period. The second exam is cumulative, and will involve material from the entire semester. If the final exam for this course conflicts with the final exam for another course you're taking, you should arrange **at least two weeks in advance** to take the exam at another time.

Preparing for class: In view of the flipped nature of the class I teach, **it is essential to come to class prepared**; this means that you have done the reading and have acquainted yourself with the basic ideas. You may be asked to list key concepts and define them, referring to your section summary as needed. You are *not* expected to have fully mastered the material. Moving you from acquaintance to mastery is what the in-class activities are designed to accomplish, but they won't achieve this function if you haven't already looked at material, identified what the difficult points are, formulated questions, etc. A good way to do this pre-class preparation is to participate in discussions on the Piazza website for the course (which will also give you class participation credit). If for some reason on a particular day you have not done the reading, coming to class unprepared is better than not coming to class at all, but you will not get as much benefit from the class as students who have done the assigned reading. Consistent attendance will lead to better performance; reading the textbook and the lecture notes is a poor substitute for coming to class. I will be recording this class for pedagogical purposes so students can have access to materials previously presented. If you have concerns about this, please reach out to me privately.

Reading: In conjunction with the scheduled reading assignments, you are expected to create and submit to Blackboard a summary of the assigned readings from the textbook. Section summaries are due on the same day as the reading, and are expected to be *serious attempts to summarize the main ideas of the day's reading*. You may discuss the readings with others but the summaries are expected to be your own work. Each summary should be no more than two pages long, and must be hand-written or typed by you; you may not photocopy material or copy things from the web. In the case of extra assigned readings not in the textbook (PDF files created by the lecturer), you are free to create summaries, and you are free to use those summaries during the exam, but you won't get credit for creating them. In your section summaries you may copy word-for-word from any source you like and not give attribution, since the notes are for your own use only. These

summaries count towards your class participation score. Your summaries will be available to you for use during the exams. You cannot submit these summaries after the submission deadline; this provides extra incentive for doing the reading assignments on time. Some past students have found that some topics treated in the class are covered in a clearer fashion in Kenneth Rosen's Discrete Mathematics and its Applications.

Homework and exams: If you wish to succeed in this course, you must learn the material, and the only way to do that is to do the homework. There is really no other way. Homework will be posted on a Friday, and will be due on a Saturday eight days later. It must be submitted by 3:30; late homework will not be accepted. Some problems will be graded in detail, and for full credit on those problems, you must have the correct answer and explain your steps clearly and neatly; other problems will be graded solely on effort, as assessed by the grader. Since some problems are graded solely on effort, do not assume that you got a problem right, just because you got full points! This could prove a disastrous assumption on the first or second exam. The best way to learn how to do a homework problem is to look at the on-line solutions from previous assignments.

To unlock each homework assignment, you will need a password. This will be an extraneous non-mathematical word included in the solutions to the preceding assignment (with one exception: the password for the first homework assignment is an extraneous non-mathematical word in the syllabus). Please do not ask other students to tell you the password. If someone asks you for the password, please do not tell it to them, in person or on Piazza.

Please look at the homework carefully immediately after you receive the assignment, so that you have an advance idea of those areas for which you will need help, and can ask questions on the Piazza site and/or during my drop-in hours. I can try to answer questions throughout the week, but do not wait until the morning the assignment is due to ask me your questions; I will probably not be able to respond in time to help you if you wait until the last minute.

You will submit homework on Blackboard. Be aware that SAVE does not mean the same thing as SUBMIT. You are responsible for making sure that your assignment has been successfully uploaded as is legible. The program ilovepdf and others like it will let you convert multiple files into one pdf.

The homework that you turn in is expected to be your work and yours alone. Helping your peers and seeking help from them is allowed; mindlessly copying answers is highly unethical (aside from being a lousy way to learn material and therefore a bad way to prepare for exams); the grader and I will be looking closely for evidence of copied answers. Be certain that you are able to explain anything and everything that you turn in. The elixir ideas can be developed in collaboration, but the words must be yours and yours alone. This applies also to help you receive by looking at the answers to odd-numbered exercises in the book; **if you look at the answers, you must say that you have done so.** To omit this statement will be treated as an act of plagiarism. The same applies if you use an answer obtained from Mathematica (or some other similar program) without acknowledging the source of the answer.

Where you do collaborate (and here I use “collaborate” in the broadest sense), you must acknowledge your collaborators and sources; for instance, if you use web-resources or tutors or collaborators of any kind, the role of their contribution must be acknowledged. If you use a web-site, provide the URL; if you use a tutor, provide his/her name. Also note that if your tutor copies a solution from the web and then you copy your tutor’s solution, that will be treated as the same as your copying directly from the web; please mention this to your tutor.

If the grader and I feel you’re relying on such resources too heavily for ideas, we may require you to change your way of doing homework. If you worked alone, you must say so. If you worked with someone else and all the assistance is in one direction, you must still say “I helped X”. Note that letting someone else copy your work is a violation of the university’s academic integrity policy.

Copying verbatim or near verbatim, even with citation, is unacceptable. You may take ideas from others, but you must still put them in your own words. Only in this way will you truly learn them and make them your own. Violations of this policy may result in your getting a zero for the assignment. I reserve the right to give a student a 0 for an assignment even if it wasn’t strictly plagiarized (e.g., the student says “I got some of my solutions from the web”) if it seems that the word-for-word copying was deliberate. Leaning too heavily on other people’s work or other resources may result in a zero for the assignment; this includes but is not limited to word-for-word copying.

It is forbidden to post the homework questions online. Posting assigned questions to a website that permits plagiarism counts as a violation of academic integrity and could result in failing the course or expulsion from the university.

My expectations for appropriate ways of doing the homework will be discussed in class; in case you are in any doubt about what is expected, it is your responsibility to contact me for clarification. See **the UMass Lowell online catalog** (Home > Catalog > Undergraduate Programs & Policies > Policies > Academic Policies > Academic Integrity) for a definitive statement of UMass Lowell’s academic honesty policy.

It is also important that you write clearly and neatly, with your solutions appearing in the **same order** as the problems appear on the assignment sheet (labelled “A”, “B”, “C”, etc.), and that you show all work. Your best guide to what is expected on the homework will be the solutions that I post throughout the semester.

Handwriting must be legible.

Finally, there will be two exams: a midterm exam in March and a cumulative exam during Exam Period. I do not usually give make-up exams and an unexcused absence from any exam will be counted as a zero. Excused absences are determined on a case-by-case basis. Of course giving and receiving help on exams is absolutely not allowed. Cheating on homework or exams is considered a very serious breach of academic conduct. When cheating is detected, I have no choice but to refer such cases to the university’s administration for disciplinary action.

In taking an exam, you are allowed to refer to the textbook, the homework problems and solutions, and any notes you may have prepared prior to the exam that were written or typed by

you, and the section summaries you created. You may NOT discuss the problems with other people in any way, nor may you go on-line in search of information.

Grading of homework: Homework will be assigned weekly. Some problems will be graded for content; others will be graded on the basis of effort. The grader and I will decide which problems to grade for content and which problems to grade for effort after the assignments have been handed in. Your lowest homework score will be dropped.

Grades: Your final course grade will be determined by your homework (40%), the first exam (20%), the second exam (30%) and class participation (10%). The numerical score thus obtained may or may not be scaled before it is converted to a letter grade. I reserve the right to decide whether or not to scale grades until the very end of the semester; my goal will be to give grades that are consistent with the practices of other courses at the University (especially in mathematics and computer science).

Student Accessibility Services: If you are requesting an accommodation due to a documented disability, you must register with the Disability Services Office; to do so, call Disability Services office at 978-934-4574 to arrange an appointment. Please notify me that you are requesting an accommodation during the first two weeks of the semester. I am not required to grant an accommodation if your request comes less than a week before the exam date.

Course description: The two-course sequence presents propositional logic, combinatorics, methods of proof, mathematical systems, algebra of sets, matrix algebra, relations and functions, recursion and generating functions, graph theory, and applications to computer science. Students who finish the sequence successfully will be able to apply discrete numerical methods to solve problems that arise elsewhere in mathematics and in computer science. There will be two-and-a-half hours of instructor-led class time per week. A comprehensive list of the topics covered in the course can be found at <https://jamespropp.org/2190/Topics-Spring-2021.pdf>.

Matters of courtesy: Here are some ground rules that I expect you to observe in this class in order to make the experience a pleasant and intellectually enriching one for all of us.

- Please arrive on time for class so that you do not disturb your classmates and the instructor by arriving late. Please wait until the end to leave for the very same reason. If you must arrive late or leave early, please do so as unobtrusively as possible. While you are in the class, please stay focused on the course material. In particular, do not talk to others in a manner that distracts them or me.
- Questions are encouraged. If you do not understand something the instructor is saying, chances are that others also do not, so please raise your hand and ask for clarification. Asking

questions counts towards the class participation portion of your grade. (Answering questions counts too, whether your answer is right or wrong.)

- All students are responsible for maintaining a classroom atmosphere in which everyone feels comfortable contributing to discussions (and sometimes making mistakes).
- You may only use computers or tablets in this class for the purpose of taking notes. Make sure that your use of electronic devices is not distracting to others. Cellphone use is not permitted; please turn off all cellphones so that they do not interrupt the lecture. You should never, ever, ever answer any electronic communications media in class, nor should you step outside to answer electronic communications. Please reserve our class time for class, and class alone.
- You will typically have six or seven days to complete your homework assignments. It is important that the grader get all the assignments at once so that they can be graded together, and it is important that I be able to post solutions soon after assignments are turned in without worrying about students making inappropriate use of those solutions, so late homework will not be accepted. It is a good idea to start assignments early, so that if something unexpected crops up (such as an illness), don't find yourself in a bind.
- I will not give you any warnings for missed homework assignments, below-par performance on the first exam, low grade average, etc. Though I urge you to take the initiative to come to drop-in hours to seek help (especially if you are falling behind,) I will not require you to do so. It is expected that you are at a point in your educational development where you take responsibility for your academic performance and take remedial action as appropriate. When you do so, I will be there to help you to the best of my ability.

Modifications to syllabus: The information in this syllabus is subject to change with notice at any time during the semester.