

MATH 2190

Discrete Structures I
Course Information (version 1)

Spring 2020

Class times and location: Section 204: Tue & Thu, 2:00–3:15 pm, Olsen 403.

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/spring2020/math2190> (the Piazza page for MATH 2190).

Drop-in hours: My drop-in hours will be held in Olney 428C on Tuesdays and Thursdays, from 11:45 to 12:15 pm and 3:25 to 3:55 pm, unless otherwise announced. I will almost surely be in my office and available at those times, though I might be a few minutes late to my afternoon office hour if I am answering students' quick questions in the classroom. If you need to see me outside of office hours, please email me to make an appointment at some mutually convenient time. You can also post questions at the Piazza site for Discrete Structures I. Note that you can use LaTeX formatting commands inside Piazza; go to <https://piazza.com/help/formatting.html> and click on "LaTeX Support".

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

<https://discretemath.org/ads-3-7/index-ads.html>

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.

Exams: There will be an in-class midterm examination on March 5 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 to take the exam at another time **at least two weeks in advance**.

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 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.

Reading: In conjunction with the scheduled reading assignments, you are expected to hand in your own summaries of the assigned readings. These 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*. (Use one sheet of paper per section of the textbook; you may write on both sides. If you must use two one-sided sheets instead of one two-sided sheet, you must *staple* the two pages together. You may type or hand-write, but you may not photocopy material or print things out from the web. Cutting and pasting is not allowed.) There cannot be any chad at the border of the page. In the case of extra assigned readings not in the textbook (PDF files created by the lecturer), you have the option of submitting a one-sheet summary, but it is not required; that is, you won't get credit for it, but you will be able to use it on an exam. 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. Summaries must be submitted on standard 8.5 inch by 11 inch paper. Do NOT staple together your summaries of different sections. These summaries count towards your class participation score. Your summaries will be made available to you for use during the exams. You cannot submit these summaries after the day of the assigned reading; this provides extra incentive for doing the reading assignments on time. (If you cannot attend class but have prepared the day's section summaries, send me a scan before the end of class to prove that you did it on time; then I will permit you to submit it at the next class.)

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 usually be posted on a Thursday or Friday, and will be due in class the following Thursday. Late homework will not be accepted. (If you cannot come to class, please put your homework in my mailbox or under my door before 3:30. If you cannot come to campus, then ONE TIME during the semester you may scan the homework and email it to me in the form of a *single* PDF or JPG, but it must be legible, and I must receive it by 3:30. It is not guaranteed that homework submitted electronically will 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.

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 office 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.

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.

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.

Each homework assignment will be collected at the beginning of class on the day it is due. You must write your first and last names clearly on the front of your homework, along with the course title "Discrete I", and write your initials on each page. Please leave a little bit of space on the reverse side of the first page, where the grader will record your total score for the assignment. **YOU MUST STAPLE ALL PAGES TOGETHER**, with the different problems all appearing in the *same order* in which they appeared in the assignment. Homework must be submitted on standard 8.5 inch by 11 inch paper. There cannot be any chad at the border of the page. Handwriting must be legible. Deviations from this standard will cost up to 5 points per assignment.

If there is a snow day or other university-wide cancellation of classes, all students will automatically receive an extension and be able to turn in the day's assignment(s) at the next class meeting.

Finally, there will be two exams. 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.

The midterm exam is only 75 minutes long, so it is expected that you will not need to use the bathroom.

In an exam, you are allowed to use your section summaries (I will give them to you at the start of the exam; I will collect them at the end of the first exam, but you may keep them when you leave the second exam). You are also allowed to prepare (and use during the exam) five two-sided pages of supplementary notes, on any topic you think you might find useful; for instance, you could write down homework problems and their solutions. Your section summaries and supplementary notes must be handwritten or typed by you; you may not photocopy material or print things out from the web. However, in your section summaries and supplementary notes it is fine to copy things

word-for-word without giving credit.

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 (25%), the first exam (35%), the second exam (35%) and class participation (5%). 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.

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 office 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.