

MATH 2190 **Discrete Structures I, Sections 203 and 205** Fall 2024
Course Information (version 1)

Class times and location:

Section 203: Tue & Thu, 11:00am–12:15pm in Olsen 405;

Section 205: Tue & Thu, 12:30pm– 1:45pm in Olsen 405.

Please include your section number next to your name on every email you send me, every homework you submit, and every test you take, to help me keep track of who's in which section. **All students are expected to have Zoom accounts and to have a screen name that includes the first and last name under which they registered for the course.** Links for joining class meetings are available at the Blackboard portal for the course. Smartphones or other web-enabled devices will be used for taking attendance via www.uml.edu/attendance.

Instructor: James Propp. Administrative questions that are specific to you should be sent to my email address (James_Propp@uml.edu); questions that are mathematical in nature and/or might be of interest to other students should be posted on the Piazza site (unless you think they might be spoilers, in which case, use email).

Course websites: <http://faculty.uml.edu/jpropp/2190/> (it has some overlap with this syllabus, but you need to read both) and <https://piazza.com/uml/fall12024/math2190/> (the Piazza page for MATH 2190; if this link doesn't work for you please let me know!).

Office hours: My office hours will be held in Southwick 350I on Tuesdays and Thursdays from 10:00am to 10:45pm and from 2:00pm to 2:45pm, unless otherwise announced. Please let me know in advance if you plan to show up so that I'll know to be there. 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 the course. The Piazza site will be the main place where I post homework hints. 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 11) 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 algebra, one semester of calculus, intellectual curiosity, and the willingness to work hard.

Requirements: All students are **required** to complete assignment #0 by September 7 (even though it is worth 0 points). Additionally, all students are **required** to post to Piazza at least once during September. Students who fail to meet these requirements and do not ask for and receive an extension may receive 0 points on the engagement component of their grade. For detailed description of engagement points, see the notes from the first lecture.

Class meetings: Class meets twice a week in person, and attendance is expected. Zoom chat will also be used during class meetings and contributes toward the course engagement component of your grade. See the Blackboard page for the course for Zoom links and passwords. If you are sick with Coronavirus, RSV, or the flu, please wear a mask in class, and if you have a fever over 100, please stay home.

Exams: There will be a 75-minute midterm examination during class time on Tuesday, October 22 and a three-hour final exam during Exam Period. The final will be cumulative (i.e., will involve material from the entire semester). If the schedule for midterm exams causes any conflicts for a student, it is the student's responsibility to notify the instructor no later than the end of the second week of the course. 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. All exams will be **closed book**. You may bring and use up to three two-sided sheets of notes, which will be collected along with your exams; make sure your name and section number appear on your notes. The use of phones, calculators, or other electronic devices (including headphones and earbuds) during exams is prohibited.

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 course engagement 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 via Echo 360 (through the course website). 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, scan, and submit to Blackboard a summary of the assigned readings from the textbook. Section summaries are due on the same day as the reading, **before the start of class**, 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 section summary should be roughly two pages long, and must be hand-written or typed by you; you may not photocopy material or copy things from the web. 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 course engagement score. (In the case of extra assigned readings not in the textbook, you are free to create summaries but you won't be able to scan and submit them or get engagement credit for them.) You cannot submit these summaries after the submission deadline; this stricture 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.

I am hoping to replace some of the extra assigned readings (pdf documents that I've created over the years) with video content. On certain days I will assign a video, labelled A, B, C, D, etc.; I'll give instructions on how to access these videos later in the term. On the days when a video is assigned, you are expected to watch the video OR do the extra readings (or both).

Every student is required to post to Piazza at least once in September.

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 by mid-day Sunday, and will be due on a Saturday six days later. It must be submitted by 11:59pm; late homework will not be accepted, You can always scan a partial submission and then replace it by a fuller submission later, but since each submission overwrites the earlier ones, **make sure your last submission includes everything**. 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 an exam.

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). The word will always be in lower-case; you must enter it in lower-case to unlock the assignment. 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; have them contact me. (Hint: The password is not “stricture” or “pedagogical”; both are valid words that make sense in context, not extraneous words that are randomly stuck into the middle of a sentence. It is expected that when you read, you are in the habit of looking up all words you don’t recognize.)

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 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 if you wait until the last minute.

You will submit homework on Blackboard. Your submission must be a **single file** (**not** one-file-per-problem or one-file-per-page). 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 and is legible. Note that iPhones have a “secret” ability to scan documents using Notes; see <https://9to5mac.com/2020/08/21/ios-how-to-scan-documents-notes-app/>. If you submit with a phone, don’t close the phone app mid-upload, because the process won’t complete. Word documents and photos are not acceptable; pdfs and jpgs only. The program ilovepdf and others like it will let you convert multiple files into one pdf. Please do not submit multiple files; if you must submit multiple times, make sure that everything you want graded is in the last file you submit, **since that is the only file that will be graded.**

The homework that you turn in is expected to be your work and yours alone. Helping your peers and seeking help from them is encouraged, but mindlessly copying answers is highly unethical (and also 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. If you use an answer obtained from Mathematica or Wolfram Alpha or ChatGPT or some other similar program without acknowledging the source of the answer, you must disclose the source; to submit such an answer without giving credit will be treated as an act of plagiarism.

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 website, 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 you merely use a person or digital resource to check an answer that you obtained on your

own, then you do not have to include any acknowledgment.

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. If you have an account with a site like Chegg or Coursehero, you are responsible for every use of that account, and may incur disciplinary actions 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.

In taking an exam, you are allowed to refer to up to 3 two-sided pages of notes you prepare while studying for the exam; these notes must be turned in along with your exam. (If you want to retain a copy of those notes, you must make the copy *before* before the start of the exam.) During an exam you may not communicate with anyone or use any electronic resources besides the textbook. You may not discuss the problems with other people in any way until the next class meeting (or, in the case of the final exam, until Exam Period ends). You also may not post exam problems on the web; doing so could open you to prosecution for copyright violation as well as severe academic consequences.

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 two lowest homework scores will be dropped.

Grades: Your final course grade will be determined by your homework (30%), the first exam (30%), the second exam (30%) and course engagement (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).

Note that if you ace the exams and contribute brilliantly in class discussions but do none of the homework, the highest grade you can get in this course is a C and your actual grade is likely to be significantly lower. Doing the homework assignments is a must.

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 for an exam 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://faculty.uml.edu/jpropp/2190/Topics-Fall-2024.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 course engagement 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. This is especially important in group work. If someone in your group acts in a way that inhibits discussion, please let me know.
- 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 permitted solely for the purpose of participating in Zoom Chat; you must put your phone in do-not-disturb mode and turn off all cellphone sounds so that they do not interrupt the lecture. You should never 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 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 may not be able to give you timely warnings for missed homework assignments, below-par performance on the first exam, low grade average, etc. It is expected that you are at a point in your educational development where you take responsibility for your academic performance and take corrective action as appropriate. If you fall behind or have trouble understanding some of the material, I urge you to take the initiative to come to office hours to seek help. 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. Such changes will be announced via Piazza.