

# Discrete Mathematical Modeling - Math 381 A - Spring 2021

**Lecturer:** Dr. Matthew M. Conroy

**Email:** conroy@math.washington.edu (always specify Math 381 in the subject line) Please use an email program or gmail rather than sending mail through Canvas, if possible.

**Text:** There is no “required text” for this course. There will be suggested readings as the course progresses.

**Course topics:** This course will introduce you to a number of mathematical modeling concepts including: linear and integer programming, graph theory, Markov chains, multidimensional scaling, Monte Carlo simulation, and queuing theory.

**Canvas:** Course materials will be on Canvas. Lectures will be posted under Discussions, to encourage discussion of them. Assignments will be made available through Canvas, and you will turn assignments in through Canvas. I will use Announcements on Canvas to communicate with the class, generally. **I expect that everyone has their notifications set so that, when I post an Announcement, you will be immediately notified. I will expect that everyone reads and acts on the Announcements in a timely fashion.**

**Weekly structure:**

Each week, there will be lecture videos and accompanying slides introducing the course concepts.

I will suggest things to read and to try that will help you learn more about each topic.

There will be a quiz due at the end of the first week of the course. This is the only quiz or exam in the course.

Most weeks, there will be an assignment due on Friday.

Sometimes the assignments will involve programming, and/or using a new piece of software. I will give you feedback each week on these assignments.

I encourage you to send drafts of your assignments to me for feedback before the assignments are due. The earlier you can send them, the more time you will have to incorporate the suggestions I make.

I will hold office hours on Zoom at the same time each week. **You should attend some zoom hours every week.** Come with questions about course material and assignments. I’ll let you know when the zoom hours will be and how to connect. If you are able, I really appreciate people having their cameras turned on during these zoom hours to improve the human-ness of our interactions.

You are encouraged to work with other students to complete assignments.

However, the work you turn in should be your own. **Do not copy another student’s work, and do not allow your work to be copied.** There is no point in turning things in that are not your own, personal work.

**Course grades:**

This quarter will be very unusual. This course is not meant to be taught online, and this quarter’s version of the course will be very, very different from the usual course. I will be assessing your

working using a non-standard method. Particularly as we are all suffering under the strains of this pandemic, I do not want students to worry too much about their grade in the course.

For these reasons, I am making the unusual choice of giving everyone who participates in the course the same grade of 3.5. Participating means showing some significant work on each weekly assignment. As long as you do those things, you will get a grade of 3.5 in the course.

Thus, there are only two grades possible in this course: 3.5 and 0.0.

I will score the assignments coarsely. For each assignment, I will give you a score of H, M, or L, or no score if an assignment is not turned in, or is very minimally done.

- H means the assignment is well done, with at most minor issues.
- M means the assignment is well done in parts, but has one or two significant issues (such as incompleteness).
- L means the assignment has a number of significant issues.

So, H is better than M, M is better than L. And H is better than L.

**To pass the course (i.e., get a 3.5 and not a 0.0), there are three requirements:**

1. Pass the first week quiz. This will require you to install and run the software lpsolve and solve a simple LP by the end of the first week of the course. This quiz will be graded all-or-nothing.
2. Get mostly (i.e., at least 50 percent of your scores (after dropping the lowest score)) H's, **and** at most two L scores on your assignments. You can miss one assignment completely without any penalty. If you do not miss any assignments, I will "drop" your lowest score when assessing your course grade.
3. You must get an M or an H on at least one of the final two assignments (so, you cannot get two L's, or miss one and get an L on the other, and pass the course, for example.)

### **Examples:**

Suppose we have seven assignments during the quarter.

Suppose your score sequence is H-H-M-L-H-M-L and you passed the first week's quiz. First note that of the last two assignments, one was scored an M, so this satisfies point #2 above. Then, I drop your lowest score (an 'L') which will give you the score multiset  $\{H, H, H, M, M, L\}$  consisting of six elements, three of which are 'H'. Since  $3/6 = 0.5 = 50\% \geq 50\%$ , and point #2 is satisfied, you will pass with a grade of 3.5.

On the other hand, if your score sequence is H-H-M-H-M-L-L, then point #3 is not satisfied and you will not pass.

The sequence L-L-L-L-H-H-H also would not result in a pass (since there are more than two L's after dropping the lowest score).

**Do the first week quiz, get mostly H's, and don't neglect the final two assignments, and you will pass.**

If you miss more than one assignment, then you will not pass.

We may have a two-week assignment. If we do, then your score on it **may** count twice in assessing your overall performance; I will decide whether or not the assignment counts twice when the assignment is assigned.

The reason for the particular grade of 3.5 is that that is approximately what the median grade has been in this course (in quarters that I have taught the course). In this way, the grades will be comparable to other quarters, at least as far as the medians are concerned.

**Late assignments will not be accepted.** However, you are allowed to miss *one* assignment, for any reason, without penalty to your grade, as described above. It is always to your advantage to turn assignments in rather than not.

If you are sick or having other difficulty getting an assignment done on time, I encourage you to contact me so I can help, if possible.

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Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW's policy, including more information about how to request an accommodation, is available at <https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/>.

Accommodations must be requested within the first two weeks of this course using the Religious Accommodations Request form at <https://registrar.washington.edu/students/religious-accommodations-request/>.