# Math 455 - Discrete Math
# Spring 2018

**Course website:**
`http://people.math.umass.edu/~raymond/math455spring18.html`

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**Office hours:**
Tuesday from 3:00 to 4:00 in Annie's office
Wednesday from 10:00 to 11:00 in GaYee's office
Wednesday from 2:30 to 3:30 in Annie's office
If you are not available during those times, please e-mail one of us to schedule an appointment.

**Text:** We will be using *Combinatorics and Graph Theory* by Harris, Hirst and Mossinghoff which is available online as a pdf for free through the library. If you prefer, you can also order a print-on-demand copy through the library for about $25. To get it, go to the `http://fcaw.library.umass.edu/`. Search for "Harris Hirst Mossinghoff". You will find different versions of the book. Click on "UM Internet" in the Location and Call Number column. Then click on "UMass: Link to resource". You can then either choose to download the book as a pdf or to buy a high quality softcover edition (in the top right corner).

**Course content:** This is a rigorous introduction to some topics in mathematics that underlie areas in computer science and computer engineering, including: graphs and trees, spanning trees, colorings and matchings; the pigeonhole principle, induction and recursion, and generating functions. The course integrates learning mathematical theories with applications to concrete problems from other disciplines using discrete modeling techniques. Student groups will be formed to investigate a problem and each group will report its findings to the class in a final presentation.

**Grading:** The weight for each part of the course is given below.

| Category | Weight |
|---|---|
| Homework | 16 |
| Quiz | 6 |
| Diary | 8 |
| Midterm | 20 |
| Project | 20 |
| Final | 30 |

**Homework:** There will be nine homework assignments due almost every Thursday at the beginning of class. Your lowest grade (or one missed homework) will be dropped.

You may discuss homework problems with your classmates, and you should feel free to ask me or anyone else for help—actually, you are encouraged to do so! You will be called to work a lot together in this class. Still, you are responsible to understand all of the material—so make sure not to only get an answer from somebody else but to actually understand their explanations. Ideally, you should understand enough that, a few hours after discussing some problem, you are able to write down the solution fully on your own without using any notes that you took during those discussions. Please write the name of every person you discussed the homework with.

Please also kindly note that the internet is not a person. If you use the internet to help you solve a problem, please indicate that clearly and state your source—you should still write the solution in your own words to show your understanding of the problem. Such problems will be graded out of 8/10.

Also, knowing when you're wrong is an important skill in mathematics. If you explain clearly why your solution is wrong or incomplete, and what might help resolve the issue, you will earn an additional 1/10.

**Quiz:** There will be one quiz on February 1st to make sure everybody has mastered all the vocabulary necessary not to be lost in class.

**Exams:** The midterm will be on March 8 during the normal lecture time. The final exam will be on May 9 from 10:30 to 12:30. (The date of the final might change to before the projects are due—we will discuss this in class.)

**Project:** As part of the integrative experience of the course, you will be required to complete a project in small groups. This will be a chance to go much deeper into a topic of your choice. At the end of the semester, we will have presentations in class so you can show what youve done to the rest of the class. I will suggest possible topics.

**Diary:** As part of the integrative designation of the course, you must complete an essay that will be done throughout the semester. You will be asked for a short math bio early in the semester. Then at the end of each class, you will write a very brief summary of the key points of that class. Finally, at the end of the semester, you will compile all of this and write a short self-reflexive essay about your experience in the class.

**Exam dates:** There won't be any make-ups for homework assignments, quizzes or exams. If you miss a quiz or the midterm due to **unavoidable, compelling, and well-documented** circumstances (e.g., illness, transportation emergency), your final exam may be weighted more heavily. **Contact me immediately if one of these circumstances arises.**

**Grading scheme:** I will set the grade scale for the course at the end of the semester. My preliminary estimate is that the scale will be as follows. The actual grading scale will be no tougher than this.

| | |
|---|---|
| A | $\geq 93\%$ |
| A- | $\geq 90\%$ and $< 93\%$ |
| B+ | $\geq 86\%$ and $< 90\%$ |
| B | $\geq 82\%$ and $< 86\%$ |
| B- | $\geq 78\%$ and $< 82\%$ |
| C+ | $\geq 74\%$ and $< 78\%$ |
| C | $\geq 70\%$ and $< 74\%$ |
| C- | $\geq 65\%$ and $< 70\%$ |
| D | $\geq 60\%$ and $< 65\%$ |
| F | $< 60\%$ |