Math 455 - Introduction to Discrete Structures
Fall 2018

Course website:
http://people.math.umass.edu/~raymond/math455fall18.html

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Office hours:
Tuesday from 10:00 to 11:00 in Annie's office
Wednesday from 2:30 to 3:30 in Annie's office
Another office hour TBD in TA'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 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	15
Quiz	5
Integrative experience	10
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 for whatever reason, including temporary illness like a cold) 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. Please write the solution in your own words to show your understanding of the problem. Such problems will be graded out of 8.5/10.

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 September 13 to make sure everybody has mastered all the vocabulary necessary not to be lost in class.

Exams: The midterm will be on October 16 during normal class time. The final exam will be on December 19 from 8:00 to 10:00AM. Check Spire for the location as this might change.

Integrative Experience: 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 before every class, you will write a very brief summary of the key points of what you read on moodle as well as anything that stuck out from the previous 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.

Moreover, given that class time will include a lot of activities, I will expect you to attend class and engage in groupwork. Thus participation is part of your integrative experience grade. You may miss up to four classes for whatever reason (religious holiday, oversleeping or catching a cold, for instance). Every subsequent class missed will result in losing points. Moreover, I still expect you to complete the readings when you miss class, and so you should still write a summary of your readings on moodle.

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 you've done to the rest of the class. I will suggest possible topics.

Exam dates: There won't be any make-ups for homework assignments, quizzes or exams. If you miss the 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	$< 60\%$

Pronouns: Everyone has the right to be addressed by the name and pronouns that they use for themselves. Students can indicate their preferred/chosen first name and pronouns on SPIRE, which appear on class rosters. Please let me know what name and pronouns I should use for you if they are not on the roster. A student's chosen name and pronouns are to be respected at all times in the classroom.

Disability Services: The University of Massachusetts Amherst is committed to making reasonable, effective and appropriate accommodations to meet the

needs of students with disabilities and help create a barrier-free campus. If you have a disability and require accommodations, please register with Disability Services (161 Whitmore Administration building; phone 413-545-0892) to have an accommodation letter sent to your faculty. Information on services and materials for registering are also available on their website www.umass.edu/disability.

Academic Honesty: Since the integrity of the academic enterprise of any institution of higher education requires honesty in scholarship and research, academic honesty is required of all students at the University of Massachusetts Amherst. Academic dishonesty is prohibited in all programs of the University, including online courses. Academic dishonesty includes but is not limited to: cheating, fabrication, plagiarism, and facilitating dishonesty. Appropriate sanctions may be imposed on any student who has committed an act of academic dishonesty.

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Tentative Schedule

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09/04	Introduction	
09/06	1.1.1, 1.1.2	
09/11	1.1.2, 1.1.3	
09/13	1.2.2, **quiz**	HW1
09/18	1.3.1, 1.3.2	
09/20	1.3.3, 1.3.4	HW2
09/25	1.4.1, 1.4.2	
09/27	1.4.3	HW3
10/02	1.5.1, 1.5.2	
10/04	1.5.3, 1.5.4	HW4
10/09	No class, Monday schedule	
10/11	Review	HW5
10/16	**Midterm**	
10/18	Project day	
10/23	1.7.1, 1.7.2	
10/25	1.7.3	
10/30	2.1, 2.2	
11/01	2.4	HW6
11/06	2.5	
11/08	2.6.1, 2.6.2	HW7
11/13	2.6.3	
11/15	2.6.4, 2.6.5	HW8
11/20	Thanksgiving week	
11/22	Thanksgiving week	
11/27	2.6.6	
11/29	Projects	HW9
12/04	Projects	
12/06	Projects	
12/11	Review	
12/19	**Final exam (8am-10am)**	