Math 154 Syllabus

Fall 2021

**Lecture:** Monday, Wednesday, Friday 12:00-12:50pm in PCYNH 106

**Discussion Section:** Mondays 6-7pm or 7-8pm in AP&M 6402, or 7-8pm or 8-9pm in AP&M B412, or Thursday 4-5pm in AP&M 5402. Please attend whichever discussion section you find most convenient.

**Course Webpage:** [http://cseweb.ucsd.edu/~dakane/Math154/](http://cseweb.ucsd.edu/~dakane/Math154/)

**Professor:** Daniel Kane
Email: dakane “at” ucsd.edu
Office Hours: Wednesday 5-6pm on zoom at [https://ucsd.zoom.us/my/dankane](https://ucsd.zoom.us/my/dankane), Friday 1:30-3:30pm in AP&M 7131 or on zoom at [https://ucsd.zoom.us/my/dankane](https://ucsd.zoom.us/my/dankane), or by appointment.

**TAs:**

*Haixiao Wang:* Office hours Tuesday 6:00-8:00pm in AP&M 5829 and Wednesday 7:30-9:00pm over zoom at [https://ucsd.zoom.us/j/4945968431](https://ucsd.zoom.us/j/4945968431).

*John Li:* Office Hours Tuesday 12-1 in AP&M 6414, Friday 7-9 over zoom at [https://ucsd.zoom.us/j/91995590864](https://ucsd.zoom.us/j/91995590864).

*Qingyuan Chen:* Office Hours Thursday 10:00-10:30 and 5:00-6:00 in AP&M 5829 or over zoom at [https://ucsd.zoom.us/j/97108359812](https://ucsd.zoom.us/j/97108359812).

**Course Description:** Math 154 will be an introduction to graph theory. We will cover a number of topics including, basic definitions, trees, colorings, planarity, matchings, and some algorithms related to these topics.

**Prerequisites:** Math 31CH or Math 109.

**Textbook:** The textbook for the course will be “Combinatorics and Graph Theory”, Second Edition, by Harris, Hirst, and Mossinghoff. We will also be supplementing some topics with “Introduction to Graph Theory” by Jacques Verstraete, which can be found on the course webpage.

**Exams:** We will have two in class midterms, on October 29th and on November 19th. We will have a final exam on December 9th from 11:30-2:30. Although exams will be in-class, there will be accommodations for those who cannot reasonably make it to campus to take them online. If you believe this applies to you, please contact the professor about it soon.

**Homework:**
Submission Policy: Homework will be assigned due each week excepting the first week, the last week, Thanksgiving, and weeks with exams. Homework should be submitted on gradescope and will be due by 11:59pm on Friday the week that it is due. To accommodate exceptional situations such as accidents or serious illness, your lowest homework score will be dropped. If you have an illness that prevents you from completing more than one homework, please let the instructor know as soon as possible. I will attempt to have new homeworks available on the course webpage at least a week before they are due, and they will usually consist of material already covered in class before they were assigned. To get an account for the gradescope for this course (if one was not created for you automatically), use entry code JBV4VD.

Write-up Guidelines: Unless otherwise specified, all homework problems will require you to justify your answers. This will usually mean that you provide some sort of mathematical proof to justify your claims.

In addition to this you should make sure to write your solution either in clear handwriting or typed using a computer. Use of \LaTeX or similar typesetting package is recommended (for those unfamiliar, there is a basic introduction to \LaTeX on the course webpage at [http://cseweb.ucsd.edu/~dakane/Math154/latexGuide.pdf](http://cseweb.ucsd.edu/~dakane/Math154/latexGuide.pdf)). If the graders are unable to decipher your writing, you will not get credit for it.

Collaboration Guidelines: Students are encouraged to collaborate on homework assignments. You should feel free to discuss the problems and talk about how to come up with solutions with each other. On the other hand, you are expected to write up your solution independently of any collaborators, and you should not share written solutions to homework problems with other students before the homework deadline. If you do collaborate with other students on the homework, you should make sure to list any collaborators that you had on any given problem.

Use of Outside Resources: You should not attempt to search for homework solutions online or in sources outside of the course text. You may use such sources as a study guide, but if you accidentally stumble upon a homework solution in such an outside source you should cite it in your homework solution. If your solution proves to be too similar to the cited one, you may lose credit on the problem, however failure to cite the other solution will be treated as academic dishonesty.

It is also impermissible to seek advice on specific homework problems from anybody not associated with the course. This includes submitting problems to websites for solution help.

Academic Integrity: Academic integrity will be taken very seriously be the course staff. Breaches of integrity may have broader consequences outside of the assignment in question. The following will all considered to be breaches of academic integrity:

- Collaboration on homeworks beyond the scope outlined in the section above (including sharing of homework solutions with other students before the homework deadline).

- Failure to cite collaborators on homeworks or outside sources used to find homework solutions.

- Collaboration or copying on exams of any kind.
• Use of aids on exams outside of explicitly allowed materials (this may vary by exam).

**Grading:** Course grades will be determined using the following breakdown:

- Homework: 20%
- Midterms: $2 \times 20$
- Final: 40%

I have a tendency to give very difficult exams. Because of this my grading scheme is commensurately generous. Tentatively, I will give As for final grades above 80%, Bs for grades above 60% and Cs for grades above 40%. I may also lower these bars further if assignments prove more challenging than anticipated, but I will not raise them.

**Schedule:** Below is a rough schedule for topics covered in the class:

- Introduction (Ch 1.1)
- Trees (Ch 1.3, Verstraete Ch 3)
- Paths and Cycles (Ch 1.4)
- Structure of Connected Graphs (Verstraete Ch 4)
- Planarity (Ch 1.5)
- Colorings (Ch 1.6)
- Matchings (Ch 1.7)

If there is additional time we may cover:

- Ramsey Theory (Ch 1.8)
- Extremal Graph Theory (Verstraete Ch 9)