

Syllabus for MA 637
Combinatorics and Graph Theory – Summer 2021
Instructor: Dr. Shannon Starr
Class Times: Tue/Thurs 10:20am – 12:20pm
Class Room: Heritage Hall Building, Room 221

There are two main topics for the course. The first is combinatorics and the second is graph theory. In the first part of the course we will focus on graph theory. But we will also consider some examples of combinatorics that arise naturally in the first part. Then we will return to combinatorics at the end of the class. The class will focus more on graph theory than combinatorics.

Both subjects are part of finite mathematics. The tools used are diverse. In graph theory a typical question is whether a particular graph may be embedded in the plane. But there are many other types of questions, for graph theory, as well. Combinatorics is that part of mathematics interested in counting, such as counting the number of elements in a prescribed set, also called its cardinality.

We will use the free online textbooks by Dr. Peter O'Neill who is an Emeritus Professor in our department, with notable contributions to graph theory. I will post pdf copies of his textbooks on the Canvas website. Where possible, we will also use Matlab and computing to connect the theoretical concepts we are learning in class to concrete examples. There will be two project/presentations: a short one in the middle of the semester, and a longer one at the end.

Instructor email: slstarr@uab.edu

Office hours: Wednesday, 8-9am University Hall 4008, and by appointment.

Grades:

Homework 35% There will be weekly homework assignments. A HW assignment will be assigned with an initial due date. Then I will read the HW's and make comments, and the final due date for updates (based on your revisions based on my comments) will be stated at the time of my comments. Typically HW will be due, round 1, one week after the assignment is made. Then there will be 1 week after I read your first attempts to submit the 2nd, final version. You will turn in HW's online on Canvas, for example by scanning or taking pictures of your work. (In the last few weeks of class, we will stop having homework assignments, as your work transfers over to the final project instead.)

In-class midterm 20% Halfway through the course, tentatively on July 2, we will have an in-class midterm exam for approximately 1 hour.

Projects 25% There will be two projects: a short one due at the beginning of July and a longer one due at the end of the semester. The projects will involve a written component where you summarize your results, as well as a presentation where you describe your results either in real-time in class or else in a YouTube style video, for example using screen capture software available on Canvas.

Attendance and participation 20% There will be attendance taken daily. There will also be a sign-up sheet for volunteering to answer questions in class.