Syllabus
MA 692
Shannon Starr
9 May 2018

Contact Information

Class room: Campbell Hall 402
Class times: 10:20am – 12:20pm, Tuesdays and Thursdays
Instructor Starr’s Office: Campbell Hall 478a
Office Hours: Tuesday 2:50–3:50pm
Email: slstarr at uab dot edu.

Topics

The topic of the course is Combinatorics and Graph Theory. Either one of these topics by itself is more than sufficient to cover several courses. We will review the basics of combinatorics and graph theory. Then we will focus on examples to demonstrate the usefulness of the subjects. Two main examples/applications will be as follows:

- describing the representations of the symmetric group using partitions/Young tableaux,
- some elementary results from algebraic topology, such as Sperner’s lemma.

Student Learning Outcomes

There are several goals of this class. The first is for students to gain some background in higher level mathematics, outside of the usual routine of prepatory classes such as graduate level abstract algebra, measure theory, or point-set topology. Mathematics is also about exploration of general ideas. Combinatorics and graph theory have historically been important paths for students to learn about and enjoy the beauty of mathematics, even if not always appreciated by the broader community.

Because of the instructor’s background, the focus of this semester will be on using combinatorics and graph theory in applications. But a significant part of the course is IBL, inquiry based learning. That means each student will have an opportunity to prepare and lecture on material, themselves.

Students will learn some basic skills such as generating functions. Another topic which will be discussed for several lectures is Ramsey theory. In graph theory, we will discuss proper colorings.
Grades

\[(15)_{\text{HW}} + (10)_{\text{Part}} + (40)_{\text{IBL}} + (15)_{\text{TakeHomeMT}} + (20)_{\text{Final}} = 100.\]

Homework: 15% There will be homework assignments every week. It will be due the following week. Then I will comment on your handed-in work, and you will have 1 week to improve it.

Daily participation: 10% Attendance will be taken. This will count for half the participation credit. The other half will be for volunteering to answer in-class questions.

IBL presentations: 40% Each student will present several lectures during the semester (2 to 4 depending on class size). These lectures will come from Dr. Peter O’Neil’s notes (Professor Emeritus). The notes are online on Canvas. You will have to lecture for 1 hour each time.

Take-home midterm: 15% There will be a take-home midterm in the style of the weekly homework, but without collaboration.

Final: 20% There will be a take-home and in-class final exam. The higher of the two scores will be used for the gradebook.