Instructors: Dr. Wayne Goddard goddard@clemson.edu and Dr. Beth Novick nbeth@clemson.edu

Office Hours: TBA

Class: MWF location TBA.

Modality: Hybrid

Website: TBA

A free on-line version will be provided

Prerequisites: Introductory linear algebra and the ability to write proofs.

Course Description:

○ Primary purpose: to provide an introduction to the basics of graph theory. Accordingly, the bulk of the course is devoted to classical topics: paths, trees, matchings, coverings and packings, connectivity, planarity, coloring, flows in graphs, and Hamiltonicity. Chapters 1-6 and 10 in Diestel.

○ Secondary purpose: to give an introductory preview of advanced topics in graph theory. Depending on class interest and time, a handful of lectures will therefore be selected from among the following: extremal graph theory, graph minors, Ramsey theory for graphs, polynomials associated with graphs, embeddings in surfaces of higher genus, random graphs and the probabilistic method, infinite graphs, groups and graphs. Appropriate sections in Diestel and additional material.

○ Further goals: to discuss open problems, both long-standing, difficult ones as well as some possibly tractable ones; to highlight connections with other areas of mathematics, e.g. algebra, geometry, probability and number theory; to mention important applications (students who desire more knowledge of a specific application will be encouraged to explore such in a class project).

Evaluation:

Homework will be assigned approximately every other week and will be posted on our course website. Solutions will be posted on Canvas.

Students will be evaluated as follows:

OPTION 1
- 40% Homework Assignments
- 25% Midterm (take-home)
- 35% Final Exam (take-home)

OPTION 2
- 40% Homework Assignments
- 35% Midterm (take-home)
- 25% Project

➢ The homework is designed to be a challenging experience. Although discussions with other students are encouraged, each student must turn in their own assignment. Students should not use the internet to search for solutions to homework.
➢ Students are encouraged (but not required) to work in teams for the class project (if they choose to do one) and to turn in one project per team.

Grading Scale: A: 90% A- :85% B+: 80% B: 77% B- : 73%
C: 67% D: 50% F: < 50%

I reserve the right to adjust the grading scale in your favor. For example, a final grade of 90% will be an A regardless, but I may lower the A line to e.g. 88%.
Class Attendance: Students are expected to attend class regularly and punctually. Students are expected to wait 15 minutes before leaving if the instructor is not present at the scheduled start time of the class.

Official Policies:

- It is University policy to provide, on a flexible and individual basis, reasonable accommodations to students who have disabilities. Students are encouraged to contact Student Disability Services to discuss their individual needs for accommodation.
- Clemson’s academic integrity policies will be followed. See: http://www.clemson.edu/administration/student-affairs/student-handbook/universitypolicies/academic_integrity

Academic Continuity Plan:
Clemson has developed an academic continuity plan for academic operations. Should University administration officially determine that the physical classroom facility is not available, class will be conducted in a virtual (online) format. The University issues official disruption notifications through email/ www/ test notification / social media. When notified, use one of the following links to navigate for Clemson Canvas, where you will find important information about how we will conduct class:
• Primary access link: www.clemson.edu/canvas
• Secondary access link, if needed: https://clemson.instructure.com/
• You can also use the Canvas Student App.

Our activities for teaching and learning will occur through our Canvas course. This includes: listening to one or more video lectures and completing on-line homework.

Student Learning Outcomes:
Students will
1. Demonstrate knowledge of the classical concepts in graph theory.
2. Be able to solve problems and prove theorems involving matching, coverings and packings.
3. Be able to solve problems and prove theorems involving graph connectivity.
4. Be able to solve problems and prove theorems involving planarity and graph coloring.
5. Be able to recognize connections of graph theory with other areas of mathematics: using other areas of mathematics to solve graph theoretic problems and conversely to use graph theoretic techniques to address problems in other areas of mathematics.
6. Demonstrate knowledge of the important applications of graph theory.
7. Be able to recognize when graph theoretic techniques may be used in an application setting.