George Mason University
Department of Mathematical Sciences

Combinatorics and Graph Theory

Fall 2021

Course: MATH-641, section 001.

Total Credits: 3.

Purpose: A introduction to graph theory and basic enumerative combinatorics. We will discuss theory, algorithms and some applications to real world problems in terms of graphs. Emphasis will be on understanding the main ideas of the theory of graphs rather than just applying it.

The hope is, that after this course, the student should have a firm basic understanding of graph theory and enumerative combinatorics, enough to be able to read more advanced texts, research articles and apply the material to other branches of mathematics and beyond.

Prerequisites: Most important is to have mathematical maturity and an open mind. Roughly what I expect is listed as follows:

- Required – (1) Math 125, Discrete Mathematics I, or equivalent. (2) Math 203, Matrix Algebra (Linear Algebra), or equivalent.

- Preferred – (1) Math 321, Abstract Algebra, or equivalent. (2) Math 325, Discrete Mathematics II, or equivalent.

NOTE! This is slightly different from what is stated in the official website: `catalog.gmu.edu/` (Click on "Course" and write "math 641".)

Times and Places: TR 10:30 – 11:45 am Exploratory Hall (EXPL), room 4106.

Period: From August 23 to December 15.

Professor:
Geir Agnarsson
Exploratory Hall 4412
email: `gagnarss@gmu.edu`

Office-hours: TR 12:30 – 1:30 pm, or by appointment.

Required Text: Geir Agnarsson and Raymond Greenlaw, *Graph Theory; Modeling, Applications, and Algorithms.* Pearson Prentice Hall, (2007). – *NB! There is only 1st edition, but multiple printings of the book.*

Material: Roughly Chapters 1 – 10.

Homework (HW): HW will be assigned every week on Thursdays on Blackboard (Bb). They are to be handed in the following Tuesday at the beginning

of class. They will be graded. The solutions will be written and posted on Bb. Students are responsible for reading and understanding the solutions. Sometimes problems that are not to be handed in will also have solutions.

Examinations: There will be one midterm exam (MT) and one final exam (FL). The midterm will cover the material up to that point in lecture and will be made as an one hour long exam. The final exam will serve as a second midterm and roughly cover the material from the midterm to the end of the course. It will also be made as an one hour long exam.

Midterm (MT): Tuesday, October 19, 10:30 – 11:30 am EXPL 4106.

Final (FL): Tuesday, December 14, 10:30 – 11:30 am EXPL 4106.

Grading: Your grade for this course will be based on the following number (between 0 and 100): HW 10% + MT 45% + FL 45%.

Policy:

- No exam turned in, without proper explanation, is an automatic zero on that exam.

- To pass the class one MUST TAKE THE FINAL.

Geir Agnarsson
August 24, 2021