MATH 532 COMBINATORICS FALL 2023 SYLLABUS

GRETA PANOVA

Location and meeting times: MWF 2-2:50pm, room KAP 113. Instructor Office Hours: TBA.

Teaching Assistant: TBA

Course description. In the first part of the course (about 8-9 weeks) we will cover the basics of *Enumerative Combinatorics* – counting principles, generating functions, by studying concrete combinatorial structures: permutations, sets, set partitions, integer partitions. We will apply these principles to more complex structures like 0-1 matrices, counting spaces over finite fields, rook theory. We will briefly discuss partially ordered sets (posets).

In the second part of the course (about 4 weeks) we will touch on some basics from structural *Graph Theory* like colorings and matchings, planar graphs, Ramsey theory, trees and the matrix-tree theorem.

Prerequisites. There are no formal prerequisites for this course. In principle, everyone with enough mathematical experience and sophistication should be able to take it. Some basic familiarity with discrete mathematics would be very helpful, and certain parts of the material would use some linear algebra and some basic real and complex analysis.

Textbooks and sources. Richard P. Stanley, *Enumerative Combinatorics* Volume 1, second edition, available online at http://http://www-math.mit.edu/~rstan/ec/ec1/. This will be the main source for the first part of the course.

Victor Bryant, Aspects of Combinatorics, available online at http://pdf.to/ bookinfo/aspects-of-combinatorics-a-wide-ranging-introduction_2.pdf/ and Miklos Bona, A Walk through Combinatorics: an Introduction to Enumeration and Graph Theory will be used for the second part of the course on Graph Theory.

Other useful sources are

J. H. Van Lint and R. M. Wilson, A Course in Combinatorics and Herbert Wilf, generatingfunctionology, available online at https://www.math.upenn.edu/~wilf/DownldGF.html.

Grading. There will be a total of 8 problem sets distributed evenly throughout the semester. There will be an in-class midterm on October 4, and a take-home final exam (due December 8). The final grade will be determined by the formula:

50% Homeworks + 20% Midterm + 30% Final

Office KAP 424C, mailto:gpanova@usc.edu, https://sites.google.com/usc.edu/gpanova/.

Schedule. The daily course schedule including contents of each lecture, and homework assignments will be regularly posted on the blackboard course website.

STATEMENT OF ACADEMIC CONDUCT AND SUPPORT SYSTEMS

Academic Conduct:

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, "Behavior Violating University Standards" https://policy.usc.edu/ scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on Research and Scholarship Misconduct.

Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at https://osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call https://studenthealth.usc.edu/counseling Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call https: //suicidepreventionlifeline.org Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press "0" after hours – 24/7 on call https://studenthealth.usc.edu/sexual-assault Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) - (213) 740-5086 https://eeotix.usc.edu Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298 https://usc-advocate.symplicity.com/care_report Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services (OSAS) - (213) 740-0776 https: //osas.usc.edu OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy. USC Campus Support and Intervention - (213) 821-4710 https://campussupport.usc.edu Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity, Equity and Inclusion - (213) 740-2101 https://diversity.usc.edu Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 - 24/7 on call https://dps.usc.edu, https://emergency.usc.edu Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call https://dps.usc.edu Non-emergency assistance or information.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC) https:)//ombuds.usc.edu A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

Occupational Therapy Faculty Practice - (323) 442-3340 or otfp@med.usc.edu https://chan.usc.edu/otfp Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.