Instructor: Estie Arkin, Math Tower P-134B, 632-8363, esther.arkin@stonybrook.edu

Office hours: Tentative: Tuesday 12-2, Wednesday 10-12, and by appointment. You may also stop by whenever you have a question. I also welcome questions by email.

TA: Joseph Levesque joseph.levesque@stonybrook.edu office hours Friday 10:50-12:50, Ziyu Lei ziyu.lei@stonybrook.edu office hours Tuesday Thursday 11-12, Xin Liu, xin.liu.4@stonybrook.edu office hours Tuesday 2:30-3:30, Wednesday 12-1, Yinming Zhu, yinming.zhu@stonybrook.edu office hours Tuesday 3:30-4:30 and Thursday 2:30-3:30, Jiawen.Xu, jiawen.xu@stonybrook.edu office hours Tuesday-Thursday 11:30-12:30, Zhangzhang Liu zhangzhang.liu@stonybrook.edu office hours Tuesday 9:15-11:15(am), Siwu Liu siwu.liu@stonybrook.edu, office hours Monday 10:30-12:30. All TA office hours will be in Harriman 132 (new!).

Lectures: Monday, Wednesday 2:30-3:50, ESS 001.


Homeworks: Homework will be assigned weekly (approximately), posted on blackboard, to be turned in via blackboard before the due date and time. Most homework sets will be broken into 2 parts for ease of grading. Make sure to do both parts! Each homework part must be submitted through Blackboard as a single PDF file Homework that does not meet these expectations will not be graded and will not receive credit. There will be approximately 10 homework sets, equally weighted, and I will drop the lowest two scores before computing your average. No late homework will be accepted. (Since I drop the 2 lowest scores, missing a homework due to illness should not be a problem.) You may discuss homework problems with other students taking the course, with the TA, and with the instructor. But the work that you turn in should always be your own write-up, and you should show that you personally understand everything that you write. Please make certain that your writing is neat and clear, and that you have expressed your reasoning, not just the final answer.

Exams: There will be three exams. The first two midterms will be in class, tentatively Wednesday February 22, and Wednesday April 5. The third exam (final) is Tuesday May 9, 5:30-7pm, and is non cumulative. All exams are closed notes and book, however, you will be allowed a “cheat sheet”. This is a 4 by 6 index card that must be hand written by you (not typed, not xeroxed), and it will be turned in with your exam. All cell phones must be turned off during exams, and placed inside your bag! No calculators are allowed.

Grades: Your total average score will be computed based on 10% homework, 30% per midterm. Please note that there will be no extra credit option. I will use your total average score to assign a letter grade; about 30% A’s, 35% B’s, 25% C’s, and 10% D’s and F’s.

Course Outline:
Graph Theory Basic definitions, models, isomorphism, Planar graphs, Euler, Hamilton circuits, coloring, Trees, Shortest paths, minimum spanning trees, traveling salesperson.

Enumeration and Counting: Basic counting principles; Arrangements and selections, Binomial coefficients, permutations, combinations, Generating functions, Recurrence relations/Divide and conquer, Inclusion-Exclusion formulas.

Learning Outcomes
1.) Strengthen logical reasoning skills to solve combinatorial problems using:
   • elements of propositional calculus;
   • proof by contradiction;
   • logical consequences of assumptions.

2.) Learn to find multiple (equally valid) ways to solve a combinatorics problem:
   • apply a top-down strategy (breaking a problem into parts and subparts);
   • apply a bottom-up strategy (solving special subcases and building up).
   • learn to solve problems from first principles, rather than looking for existing templates or formulas.
• solve a complementary problem;
• use different strategies to categorize subcases of a problem;
• use different techniques (e.g., generating functions, inclusion-exclusion).

3.) Learn basic graph theory results and apply them in problem-solving:
• isomorphism;
• planar graphs;
• Hamilton circuits and Euler cycles;
• graph coloring;
• trees and ways to search them.

4.) Use formulas for counting basic combinatorial outcomes to construct solutions to more complex combinatorial enumeration problems:
• permutations, with and without repetition;
• combinations, with and without repetition.

5.) Apply counting strategies to solve discrete probability problems.

6.) Use specialized techniques to solve combinatorial enumeration problems:
• generating functions;
• recurrence relations;
• inclusion-exclusion principle.

Academic Integrity: Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person’s work as your own is always wrong. Any suspected instance of academic dishonesty will be reported to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at http://www.stonybrook.edu/uaa/academicjudiciary/

Disability Policy: If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, room 128, (631) 632-6748. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information, go to the following website. http://www.ehs.sunysb.edu/fire/disabilities.asp

The University at Stony Brook expects students to maintain standards of personal integrity that are in harmony with the educational goals of the institution; to observe national, state, and local laws and University regulations; and to respect the rights, privileges, and property of other people. Faculty is required to report disruptive behavior that interrupts faculty’s ability to teach, the safety of the learning environment, and/or students’ ability to learn to Judicial Affairs.