Instructor: Estie Arkin, Math Tower P134B, 632-8363, esther.arkin@stonybrook.edu;

Office hours: Tentative: Tuesday 12-1, Wednesday 10-12 and by appointment.

Teaching Assistants: Nikhila Vangala nikhila.vangala@stonybrook.edu office hours Wednesday 1:30-3:30, Ziyu Lei ziyu.lei@stonybrook.edu office hours Monday 10-12, Nicole Chan nicole.chan@stonybrook.edu office hours Monday and Tuesday 8-9am Joseph Levesque joseph.levesque@stonybrook.edu office hours Monday and Friday 2:30-3:30. All TA office hours will be in Harriman 132.

Lectures: Tuesday, Thursday 10-11:20, Javits 111.


Optional texts: There are many books on the subject, here is a very partial list: Applied Mathematical Programming, by Bradley, Hax, and Magnanti, Introduction to Operations Research, by Hillier and Lieberman, Linear Programming, by Chvátal, and Linear Programming and Related Problems, by Nering and Tucker.

Computing: LP’s can be solved by a many programs, you can choose to use whichever you’d like. The two options discussed in the textbook are Excel and Lindo.

Homeworks: Homework will be assigned weekly (approximately), posted on blackboard, to be turned in via blackboard, as a single PDF file, before the due date and time. Homework that does not meet these expectations will not be graded and will not receive credit. If you want to correct your submission (before the deadline) you may upload a revision. Only your last submission will be graded. 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.) Homeworks will be posted on blackboard. 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. Please staple!

Exams: There will be three exams. Exams 1 and 2 will be during class, tentatively scheduled for Thursday September 28 and Thursday November 2. The third third exam (final) is Friday December 15, 11:15-12:45, 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 (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 you bag! No calculators are allowed.

Grades: Your total average score will be computed based on 10% homework, 30% for each of the three exams. 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: The following chapters will be covered: 1-2, 3, 4 Sections 1-9, 11-13, 5 Sections 1-3, 6 Sections 4-8, Transportation and Assignment problems (Chapter 7 Sections 1-3, 5), CPM (Section 8-4), Integer programming (Chapter 9 Sections 1-4, 8) and Dynamic Programming (Chapter 13[WV] 18[W], Sections 1-2, 4-5).

Learning Outcomes
1.) Become familiar with the many optimization problems arising in diverse settings that can modeled as linear programs, and construct mathematical models for an array of such optimization problems.

- Maximizing income subject to supply constraints;
- Minimizing costs subject to minimum requirements;
- Scheduling problems;
• short-term and long-term financial planning problems;
• blending problems;
• multi-period planning problems.

2.) Learn the simplex algorithm and use it to solve linear programs
• putting linear programs in standard form with slack and excess variables;
• finding an initial basic feasible solution (using big M or two-phase simplex for min problems);
• choosing which variable enters and which variable leaves the basis;
• handling unbounded and infeasible problems.

3.) Apply sensitivity analysis to optimal solutions
• shadow prices and reduced costs;
• range for objective function coefficients and right-hand sides;
• connections to the dual linear programs and complementary slackness.

4.) Learn and use specialized algorithms for solving network problems:
• transportation problems;
• assignment problems;
• critical path problems.

5.) Demonstrate an understanding of integer programs and how to solve them.
• model various discrete optimization problems as integer programs;
• solve integer programs using a branch-and-bound strategy.

6.) Demonstrate an understanding of dynamic programming and solution techniques.
• model a class of discrete optimization problems as dynamic programs;
• solve simple dynamic programs using a sequential solution technique.

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

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