

MATH 1171
Topics in Contemporary Mathematics
Syllabus

Fall 2009

Instructor: Sam Smith

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Office Hours: Tue 10:00-11:30, 1:00-2:30, Thur 10:30-11:30, or by appointment.

Text: Excursion in Modern Mathematics, Sixth Edition, Tannenbaum and Arnold, Prentice Hall

Course Description: In this course, we will study applications of mathematics to a wide range of contemporary problems which arise in politics, sociology, psychology and business. We will consider a variety of topics -- from voting paradoxes to probability to flight networks for airlines to calculating the values of annuities -- and explore the mathematical models and techniques which have been developed for their study. The only prerequisites for the course are some familiarity with high school algebra and a willingness to work hard and think logically.

Course Structure: Your responsibilities for this course are: two in-class exams, four written assignments, the in-class assignments (see below) and the final exam. The dates for the assignments and tests are indicated on the attached course calendar. The cumulative final exam will be given at the date scheduled by the registrar.

Grades: I will determine final course grades by curving your total scores, out of a possible 700 points, computed as follows: The tests will each be worth 100 points and the final exam 200 points. Each of the four written assignments will be worth 50 points. Class attendance, class participation and the in-class homework assignments will total 100 points.

The Written Assignments: I will collect written solutions to selected exercises approximately every three weeks (see the attached calendar). *You are encouraged to discuss problems with me and with others in the class but you must hand in your own work.* Also, I expect your problem solutions to be written neatly and all explanations given in complete sentences. If you do not turn your writing assignment in during the class period when it is due you may turn it in late for reduced credit. However, I will only accept late writing assignments handed in before the date that the next writing assignment is due. In the case of the fourth written assignment, the final exam is the deadline for handing in late work.

Learning Goals: By the end of this course the student will be able to

- count using formulas for combinations and permutations
- compute elementary probabilities using these formulas
- determine the outcome of an election using various election methods
- analyze the fairness of an election method in terms of various fairness criteria
- compute the Banzhaf and Shapley-Shubik power indexes for weighted voting systems
- use Euler's Theorem and related ideas to find the minimal length circuit in a graph
- implement the Nearest Neighbor and Cheapest-Link algorithms for the Traveling Salesman problem
- apply population growth models using linear and exponential growth functions

Class Attendance and In-Class Homework You are expected to attend every class period and to participate actively in the discovery of the ideas and concepts of the course. At the end of the semester, I will give each student a score worth 30-40 points based on their class attendance and participation. Also, periodically (roughly, 8-10 times during the semester) I will give out an In-Class Assignment which will cover the preceding day's lecture topic. You will have the remainder of the class period to work with a group on the assignment sheet and you may hand the assignment sheet in at the next class. However, **you cannot hand in an assignment if you weren't in the class when it was assigned.** Also, **I will not accept late assignments.** Thus the in-class homework assignments will function as an attendance check as well.

Policy on Academic Honesty: I will adhere to the Academic Honesty Policy as stated in the University Catalogue. All tests and assignments found to be in violation of this policy will receive a zero.

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Calendar

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Monday	Thursday
August 31	Sept 3
Sept 7 Labor Day – No Class	Sept 10
Sept 14	Sept 17
Sept 21	Sept 24 Assignment 1 Due
Sept 28	Oct 1
Oct 5	Oct 8 Assignment 2 Due
Oct 12	Oct 15 Test 1
Oct 19 Fall Break -- No Class	Oct 22
Oct 26	Oct 29
Nov 2	Nov 5
Nov 9	Nov 12 Assignment 3 Due
Nov 16	Nov 19 Test 2
Nov 23	Nov 26 Thanksgiving -- No Class
Nov 30	Dec 3
Dec 7	Dec 10 Assignment 4 Due
Dec 14 Final Exams	Dec 17