San Francisco State University
Department of Mathematics
Course Syllabus

MATH 330
Discrete Mathematics

Prerequisites
Math 226 with a grade of C or better

Bulletin Description
The algebra of sets; relations and function; elementary propositional logic.
Proof techniques, including mathematical induction. Integers and modular
arithmetic. Elementary combinatorial identities, recursion and generating
functions. Graph theory, including trees.

Course Objectives
Students improve their mathematical reasoning by learning elementary
propositional logic and different methods of proof, including proof by
contradiction. Students prove basic properties of the integers (e.g., Euclidean
algorithm) and learn how use mathematical induction to prove statements
about natural numbers. Students are introduced to elementary set theory and
study the basic properties of relations, with emphasis on equivalence relations
and partial orderings. Students learn techniques to solve elementary
recurrence relations (e.g., second-order linear with constant coefficients). As
time permits, students study growth of functions (e.g., big-O) with applications
to algorithm complexity, and basic concepts of graphs and trees.

Evaluation of Students
Instructors typically use a combination of frequent, graded homework
assignments, quizzes, midterm exams, and a final exam to evaluate students.
Course Outline

The following timeline is approximate.

- Logic and Methods of Proof: 4 weeks
- Integers and Mathematical Induction: 3 weeks
- Sets and Relations: 3 weeks
- Recurrence Relations: 2 weeks
- Other Topics (as time permits, chosen from growth of functions, graphs and trees): 3 weeks

Textbooks


Submitted by: Bob Marcucci  Date: June 17, 2003
San Francisco State University  
Department of Mathematics  
Course Syllabus

MATH 110  
Business Calculus

Prerequisites
Satisfactory completion of ELM requirement.

Bulletin Description
Functions, derivatives, and applications of differentiation, including optimization. Problems involving business, finance, and economics. Elements of basic calculus. Meets Quantitative Reasoning requirement. Equivalent to BA 110.

Course Objectives
The principal aim of Business Calculus is for students to grasp the concept of rate of change in the context of business and financial applications. Students should understand average and instantaneous rates of change and their relations to the notion of marginal analysis of costs, income, etc. They should be able to explain their understanding in their own words and solve problems requiring marginal analysis of simple production cost and income models. In solving these problems they should make appropriate use of differentiation formulas for powers, roots, exponentials and logarithms.

Optionally, instructors may include the use of spreadsheets for graphical and numerical analysis of simple financial models.

Evaluation of Students
Instructors design their own assessment schemes, which usually include graded weekly homework, midterm examinations and a final exam. Homework and examinations cover formal differentiation, application problems, and possibly short essays requiring basic comprehension of the concept of rate of change. Instructors may also assign short reports on applied problems and spreadsheet analyses for homework. Writing about mathematical topics is an important component of this course, and students will engage in some graded writing assignments during the semester.

Business students are expected to learn to work effectively in teams; consequently the course will benefit from group assignments requiring reports.
Course Outline

1. Review of algebra concepts and introduction to average rate of change. Includes review of polynomials, exponential and logarithmic functions (4 weeks).
2. Conceptual development of instantaneous rates of change with applications to economics and business (3 weeks).
3. Formal differentiation (3 weeks).
4. Applications mostly to business and economics including optimization (5 weeks).

Textbooks and Software


Submitted by: David Meredith                      Date: November 21, 2002