San Francisco State University
Department of Mathematics
Course Syllabus

MATH 455
Set Theory

Prerequisites
Math 335 or 330 or consent of instructor.

Bulletin Description
Quantifier logic, paradoxes of set theory, cardinal and ordinal arithmetic, and equivalents of the axiom of choice.

Course Objectives
The course is intended as an introduction to the Foundations of Mathematics. It begins with Cantor’s initial work in set theory, followed by a description of the paradoxes found within his approach and approaches to set theory which avoid the paradoxes. The construction of cardinal and ordinal numbers and operations on those classes are studied. Finally the axiom of choice is discussed with some of its principle equivalences.

Evaluation of Students
Students will be graded on regular problem sets, and in-class or take-home examination and a written final examination.

Course Outline

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<tr>
<th>Topics</th>
<th>Number of Weeks</th>
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<tr>
<td>Cantor's plan, the paradoxes, and remedies for the paradoxes</td>
<td>2</td>
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<tr>
<td>Cardinal numbers and operations on cardinals</td>
<td>4</td>
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<tr>
<td>Ordinal numbers and operations on ordinals</td>
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<tr>
<td>Equivalences of the axiom of choice</td>
<td>3</td>
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<tr>
<td>Axiom systems for set theory</td>
<td>2</td>
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Textbooks and Software

None required.

Submitted by: ___Diane Resek___________       Date: ___April 28, 2003__
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