OBJECTIVES: This course is designed for students who intend to take calculus and who do not yet possess complete mastery of such precalculus topics as: functions and graphs; exponential, logarithmic, and trigonometric functions; inverse functions; conic sections; systems of linear equations. Students who do not intend to take calculus and who desire algebra review in preparation for work in statistics or other quantitative studies (such as BSNS 2120), Quantitative Business Methods) are advised to take GEN 1135, College Algebra, instead of MATH 1100. Note: A student may not earn more than 4 credits toward graduation by taking more than one of GEN 1135, GNM 1157, and MATH 1100.

COURSE CONTENT: Review of algebra and coordinate geometry. Functions and graphs, Trigonometric, logarithmic, and exponential functions.

PREREQUISITE: GNM 1125 or high school algebra (two years) and geometry. Not open to students who have completed MATH 2215, or Math 2225 (Discrete Math)

CLASS FORMAT: Lecture.

**OBJECTIVES:** The course is designed for students who intend to take Calculus and who do not yet possess complete mastery of such precalculus topics as: functions, and graphs; exponential, logarithmic, and trigonometric functions; inverse functions.

**COURSE CONTENT:** Students who do not intend to take Calculus and who desire algebra review in preparation for work in statistics or other quantitative studies (such as MGMT 2120, Quantitative Business Methods) are advised to take GEN 1135, College Algebra, instead of MATH 1100. Note: A student may not earn more than 4 credits toward graduation by taking more than one of GEN 1135, GNM 1157, and MATH 1100.

**PREREQUISITES:** High School algebra (two years) and geometry. Not open to students who have completed MATH 2215 or MATH 2225. There will be a Diagnostic Exam on the first day, which will let you know if you are ready for MATH 1100.

**ATTENDANCE:** Expected. “Course = Notes” in the sense that material covered in class is a whittling down – with pictorial emphasis – of material in the text and provides background for all quizzes, exams and assignments (which are given during each class). But that phrase certainly does not mean that items on those three situations explicitly appear in the notes in some form. In fact, one of the goals of the course is that students develop confidence and ability to solve problems that they have never seen.

**CLASS FORMAT:** Students will have opportunity to practice solving problems in conjunction with the presentations. Class participation is welcomed and encouraged.


**PAPERS:** The Poincaré Assignment is an ungraded assignment on problem-solving and the creative process, which is an important part of a completed course. It is a companion-piece to the essay “Mathematical Discovery” by the renowned French mathematician Henri Poincaré (1854-1912).

**EVALUATION:** Assignments, three quizzes, three exams; interest and effort also come into play.
MATH 2215
Calculus I
Fall 2006
(Q1)

002 Christine Carracino MWF 09:55AM-11:10PM; T 10:30AM-12:20PM
003 Christine Carracino MWF 11:20AM-12:35PM; T 12:30PM-02:20PM
004 Brandy Rapatski MWF 09:55AM-11:10AM; R 10:30PM-12:20PM
005 Brandy Rapatski MWF 11:20AM-12:35PM; R 12:30PM-02:20PM

COURSE OBJECTIVES: To learn basic of calculus such as limits, derivatives and integrals. We will look at some interesting applications of these ideas in areas of natural sciences.

COURSE CONTENTS: CHAPTER 1, 2, 3, 4, and 5

PREREQUISITES: A grade of C or better in Precalculus or 2 years of high school algebra and trigonometry,

ATTENDANCE: Mandatory

TEXTBOOK: Calculus by Larson and Hosteler 8th edition

CALCULATOR: expected to have at least a scientific calculator.

EVALUATION: Problem sets or quizzes, homework sets, tests and a comprehensive final examination.
OBJECTIVE: We will study different aspects of functions, study properties like continuity, differentiability, integrability. We will give several applications to other areas of science, economic etc. We will also give an extensive rigorous presentation of exponential and logarithmic functions.

PREREQUISITES: A very good understanding in precalculus or high school algebra and geometry.

ATTENDANCE: Optional but strongly recommended.

EVALUATION: Based on problem sets, quizzes, exams, class participation etc.
OBJECTIVES: To cover the material of the standard second course in calculus and prepare the student for multi-variable.

COURSE CONTENT: Applications of integration, techniques of integration, improper integrals, infinite series, conic parametric equations, and polar.

PREREQUISITES: MATH 2215 (with a grade of C or better)

ATTENDANCE: REQUIRED

CLASS FORMAT: Lectures, and Class work.


EVALUATION: Problem sets or quizzes, homework sets, tests and a comprehensive final examination.
COURSE CONTENT: Calculus I and II are single-variable calculus; in those courses, we consider functions of one real variable. Calculus III is primarily a multi-variable calculus course, with special emphasis on functions of two real variables (i.e. $z=f(x,y)$; the graphs of these functions are surfaces in 3-dimensional space). We will begin with a quick review of integration and conic sections and proceed with Chapters 10-14 of L/H/E, developing the following topics: Plane curves, polar coordinates, parametric equations, arc length, Vectors in 2, 3, and n dimensions, Vector-valued functions; curvature, motion “Partial derivatives” of functions of two or more variables “Multiple integrals” of functions of two or more variables Green’s Theorem, Stokes’s Theorem, and the Divergence Theorem. I will try to include enough applications and numerical examples to stimulate non-Math majors in the class, as well as enough theory to prepare Math majors for subsequent Math courses. This course is required for MATH, PHYS, and Engineering dual-degree majors and is strongly recommended for CHEM, CSIS, GEOL, and MARS (Oceanography Track) majors.

PREREQUISITES: Completion of MATH 2216 or its equivalent (i.e. chapters 1-9 in L/H/E) with a grade of C or better.


TESTS/GRADING: There will be two or three midterm exams and a comprehensive final exam

HOMEWORK: As you already know, the way to learn mathematics is to do mathematics. Homework will be assigned at practically every class meeting; so that you can ask questions at the beginning of class and be fully caught up before we move on to the new material.

MATH 2225
Discrete Math
Judith Vogel
001 TR 08:30AM-10:20AM
002 TR 10:30AM-12:20PM
Fall 2006

COURSE OBJECTIVES: To learn basic mathematics ideas related to computer science such as: Set theory, elements of logic, proof Techniques like induction, proof by contradiction, indirect proofs, functions, elementary combinatorics, difference equations, types of relations, modular arithmetic and its applications, graph theory.

COURSE CONTENTS: CHAPTERS 1, 2, 3, 4, 5, 6, 7.

PREREQUISITES: Math 1100, Precalculus or a good understanding of high school algebra and geometry. Courage and inquisitive.

ATTENDANCE: Mandatory

CLASS FORMAT: Lectures, Discussions and students participation- doing problems on the Blackboard.


EVALUATION:
Problem sets, homework sets, test and a comprehensive final examination.
MATH 3323  
Linear Algebra  
Christine Carracino  
001 MWF 02:10PM – 03:25PM  
Fall 2006

OBJECTIVES: Mastery of the concept of linearity and some of its applications.

COURSE CONTENT: Vectors, matrices, determinants, linear transformations, systems of linear equations, equations problems and applications

PREREQUISITES: MATH 2216 with a grade of “C” or better.

ATTENDANCE: REQUIRED

CLASS FORMAT: Lectures, and discussion.

READINGS: Anton, Elementary Linear Algebra.

PAPERS/PROJECTS: Optional extra assignments, some of which can lead to optional senior thesis.

EVALUATION: Homework, quizzes, exams.
MATH 3325  
Foundations of Mathematics  
Chia-Lin Wu  
001 MWF  11:20AM – 12:35PM  
Fall 2006

**OBJECTIVES:** This course is intended as the bridge from the freshman/sophomore mathematics core (Calculus I-II-II, Linear Algebra) to the upper-level mathematics courses (Math 44xx). We will attempt to develop sophisticated mathematical thinking (i.e. the ability to formulate conjectures, prove theorems, and construct counterexamples) by looking at a variety of mathematical structures. This is a required course for MATH majors and is a prerequisite for almost all MATH 4000-level courses. The course is also strongly recommended for CSCI (Computer Science track) and PHYS majors.

**COURSE CONTENT:** Exploration, conjectures, and proofs regarding: logic, set theory, the real number system; the integers, induction, elementary number theory; functions and relations; cardinality; Introduction to algebraic structures; other advanced topics as time permits.

**PREREQUISITES:** Ideally, completion of MATH 2217(Calculus III) and MATH 3323 (Linear Algebra) with grades of C or better. However, students who have successfully completed either MATH 2217 or MATH 3323 should take Foundations now, rather than wait till Spring 2003. (Foundations is not offered in the Fall.) {Very good students who have done well in MATH 2216 (Calculus II) but have taken neither MATH 2217 nor MATH 3323 may take Foundations now but should be aware that most of the students in the class will have stronger backgrounds. In general, a student who has just completed MATH 2216 should probably take Calculus III this Spring or next Fall, Linear Algebra Fall, and Foundation next Spring.]

**CLASS FORMAT:** Combination of lecture and student problem solving/theorem proving. Some of the material will not be from the text. Attendance is mandatory.

**TEXT:** To Be Announced

**EVALUATION:** Subjective, based on students performance on written homework assignments (2 or 3 per week), in-class activities, and exams. There will be a midterm exam and a final exam Course grades will reflect my assessment of student readiness for upper-level MATH courses such as Algebraic Structures (Math 4441, offered Fall 2002, Advanced Calculus (MATH 4431, offered Spring 2003 ), Modern Geometry (MATH 4445, offered Fall 2003), and Complex Analysis (Math 4432, offered spring 2004). This course, unlike (for example) calculus I or Linear Algebra, does not consist of a standard body of material to be “covered.” Rather, the emphasis is on the processes of doing mathematics: How does one perceive the existence of a problem? How does one think about a problem and describe it? How does one go about trying to solve a problem, once it has been formulated? What constitutes a “solution” to a problem?
OBJECTIVES: 1) To gain an appreciation for groups, rings and fields by way of abstractions of very basic and concrete examples associated with elementary courses. 2) To see that algebraic structures interrelate with a wide variety of seemingly outside areas of mathematics, in particular with many recently solved problems and current open problems; a subtitle of the course is ‘Innerconnections of Mathematics via Algebraic Structures.’ 3) To gain increased confidence in learning mathematics and in solving mathematical problems.

COURSE CONTENT: 1) Core material includes: groups and rings, and their substructures, quotient structures, and morphisms; fields, subfields, and morphisms. 2) Additional material includes selections from: group structure of elliptic curves; introductory aspects of Lie theory (groups and algebras), Galois theory (groups and fields), and their innerconnections with Fermat’s last theorem; quotient spaces of group actions for classification of low-dimensional manifolds.

PREREQUISITES: Math 3323 (Linear Algebra) and Math 3325 (Foundations) with grades C or better; or, speak with me to see if you have sufficient background that might not explicitly include those courses.

ATTENDANCE: Expected. “Course = Notes” in the sense that what we cover in class provides the background for all assignments, quizzes and exams. But that phrase certainly does not mean that items on those three situations explicitly appear in the notes in some form. In fact, one of the goals of the course is that you develop the confidence and ability to solve problems that you have never seen.

CLASS FORMAT: Students will have the opportunity to practice solving problems in conjunction with the presentations. Class participation is welcomed and encouraged.


PAPERS: The Poincaré Assignment is an ungraded assignment (that is an important part of a completed course) on problem-solving and the creative process; it is a companion-piece to the essay “Mathematical Discovery” by the French mathematician Henri Poincaré (1854-1912).

EVALUATION: Assignments, three quizzes, three exams, interest and effort.

BEYOND: The course also can serve as the starting point for several possible optional senior projects, which are necessary -- but not sufficient -- for graduating with MATH Program Distinction.
MATH 4461-001  
Numerical analysis  
Suzanne Nezzar  
001 MWF 02:10PM–03:25PM  
Fall 2006

**COURSE CONTENT:** The main topics included are: computer representation of numbers, source of error, root finding methods, interpolation, approximation of functions, numerical integration and differentiation.

**PREREQUISITE:** MATH 2217, some programming experience, and either MATH 3323, 3325 or see the instructor.

**ATTENDANCE:** Not mandatory, but strongly advised.

**CLASS FORMAT:** Lectures and solution of problems session, combined with MAPLE programming.

**READINGS:** Textbook TBA

**PAPERS/PROJECTS:** Computer programs to solve specific mathematical problems.

**EVALUATION:** Grades will be based upon 2 midterms, a final exam and several projects.
OBJECTIVES: To stimulate the interest in mathematics and to expand the mathematical background of the students.

COURSE CONTENT: Talks by faculty, students, and guest speakers, on various topics in mathematics.

PREREQUISITES: Prerequisites will vary from talk to talk. Most talks will assume a minimal knowledge in mathematics. Students should know at least Calculus I (MATH 2215).

ATTENDANCE: Students must sign attendance sheets each class.

CLASS FORMAT: Talks with active participation of the seminar members.

READING: Related readings will be suggested prior to talks whenever possible.

PAPERS/PROJECTS: Creative projects on mathematics are strongly encouraged. Each project can be presented in the seminar.

EVALUATION: By attendance and written reports. Students must write a brief summary after each talk and send it via e-mail to the evaluator no later than the next talk. Presentations in the seminar are encouraged.