# MA 503 Computers in Mathematics

**Catalog Description**:

This course provides students, who have basic computer literacy and some elementary knowledge of computer programming, specific skills in using mathematical software. Problems and projects will be taken from a variety of mathematical subjects including: precalculus, calculus, number theory, geometry, linear algebra, abstract algebra, and statistics. Explanations and introductions to these subjects are provided.

**Prerequisite**: MATH 502 Concepts of Computer Science or permission of department chair.

**Instructional Procedures**

The following resources will be used:
Software reference guide.
Computer facilities of the Reckzeh Math Resource Center
Procedures and methods will include:

a. Lectures covering the theory and areas of application
b. Guest Lecturers discussing their specialties
c. Assignment of programming projects
d. Independent projects

**Content of Course**:

1. Introduction
    a. Inventory of student backgrounds in related skills
    b. Inventory of student access to computers
    c. Orientation to Reckzeh Computer Resource Center (Math Lab)
2. Writing Reports
    a. Insetting tables, formulas, and mathematics paper-and-pencil work into a word-processing document
    b. Use of special math. Editors
    c. Inserting Bar graph, line graph from Excel.
3. Resources on the Internet
    a. Searching
    b. Organizing and retaining
4. Tutorials
    a. Elementary Algebra
    b. Intermediate Algebra
    c. Trigonometry

5. Geometry
    a. Using The Geometry's Sketchpad software
    b. Using Terrapin Logo software
6. Calculus
    a. Using Derive (the Mathematical Assistant) on Tangents, Limits, Riemann sums, Derivatives and Integrals
    b. Using Derive to sketching curve
    c. Some Numerical methods
7. Linear Algebra
    a. Solving systems of linear equations
    b. Curve-fitting
    c. Applications to geometry
    d. Coding
8. Number Theory
    a. Divisors and primes
    b. Special primes
    c. GCF and LCM
    d. Magic squares
9. C++ Programming
    a. Basic syntax and input-output files
    b. Conditional
    c. Loops
    d. Arrays
10. Statistics
    a. Importing and exporting data
    b. Resources for descriptive statistics
    c. Basic tests for inferential statistics
    d. Simulation
11. Linear Programming
    a. Simplex method
    b. Business applications

**Grading Policy**:

The component of the grade for the course:
Projects: 50%
Tests: 25%
Final: 25%

**Bibliography**

A. Required Text: None

B. Supporting Bibliography

a. Battista, M., *Shape Makers: Developing Geometric Reasoning with The Geometer's Sketchpad*, Key Curriculum Press, Emeryville, CA: 1998.

b. Chanan, S., E. Bergofsky, and D. Bennett, *Exploring Algebra with The Geometer's Sketchpad*, Key Curriculum Press, Emeryville, CA: 2002.

c. Clements, C., and R. Pantozzi, *Exploring Calculus with The Geometer's Sketchpad*, Key Curriculum Press, Emeryville, CA: 2002.

d. Kutzler, Bernhard, *Derive™ 5 Reference Guide*, Vlasta KOKOL-VOLJC, Leonding, Austria: 2000.

e. Wyatt, K., A. Lawrence, and G. Foletta, *Geometry Activities for Middle School Students with The Geometer's Sketchpad*, Key Curriculum Press Emeryville, CA: 2002.