SU DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE
SYLLABUS *(Tentative)*
MATH 471/571   *Numerical Methods*

Objectives: To introduce computational mathematics and basic numerical analysis. To introduce various techniques to solve problems in mathematics, computer science, engineering, and physical science.

Description: This is an ideal course for those who wish to solve real-world problems through mathematical techniques, and also learn about various errors which may contaminate numerical results.

Prerequisites: Programming experience (COSC 117, 118, or 120) and one of the following: MATH 306, MATH 310, or MATH/PHYS 309.

Text: Numerical Methods and Analysis, 2nd edition by James F. Epperson; Wiley

	Weeks
Mathematical Preliminaries and Error Analysis	2.5
Review of calculus (limits, continuity, differentiability, Riemann integral, Taylor Series), computer arithmetic, errors in scientific computation, computer software.	
Survey of simple methods and tools	1.0
Numerical Diffferentiation, Nested Multiplication, Euler's method and Linear interpolation	
Solutions of Equations of One Variable	2.0
The bisection method, Newton's method, error analysis, secant Method, fixed point interation.	
Interpolation and Approximation	2.0
Lagrange polynomials, divided differences, Hermite interpolation, splines.	
Numerical Integration	2.0
Simpson's, Trapezoidal and Midpoint Rules, Gaussian quadrature,,	
Numerical Solution of Initial-Value Problems	2.0
Euler's methods, Runge-Kutta methods, Multistep methods, stability.	
Optional Topics	.5
Tests and Review	2.0
	14.0

EVALUATION

Assignments and Projects	50%
Tests	25-38%
Final Examination	12-25%

Graduate students will be assigned special homework/test problems or projects.

NOTE: ONCE A STUDENT HAS RECEIVED CREDIT, INCLUDING TRANSFER CREDIT, FOR A COURSE, CREDIT MAY NOT BE RECEIVED FOR ANY COURSE WITH MATERIAL THAT IS EQUIVALENT TO IT OR IS A PREREQUISITE FOR IT.