Bemidji State University

MATH 5720: Numerical Methods

A. COURSE DESCRIPTION

   Credits: 3
   Lecture Hours/Week: 0
   Lab Hours/Week: 0
   OJT Hours/Week: *.*
   Prerequisites: None
   Corequisites: None
   MnTC Goals: None

   Root finding techniques, fixed point iteration, polynomial interpolation, methods for solving linear and nonlinear systems of equations, numerical integration and differentiation, numerical solutions of differential equations, and the method of steepest descent. Prerequisite: Programming competency or consent of instructor.

B. COURSE EFFECTIVE DATES: 07/31/2012 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

   1. Methods of algebra or calculus to compute solutions to problems involving roots, integration, curve fitting, and differential equations
   2. Graphical and verbal descriptions of the derivations of algorithms involving roots, integration, curve fitting, and differential equations
   3. Taylor's Theorem and Lagrange Polynomials and their applications in the derivations of numerical methods
   4. Determining the output of short computer programs
   5. Writing computer programs for algorithms involving roots, integration, curve fitting, and differential equations

D. LEARNING OUTCOMES (General)

   1. understand general and specific strategies for developing numerical algorithms.
   2. analyze problems, discern structure and pattern in a variety of numerical modeling contexts.
   3. apply analytic thinking to develop algorithms to solve mathematical problems.
   4. effectively communicate mathematical and algorithmic ideas and understanding.
   5. appreciate the diversity of problems that can be solved use numerical methods.

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

   None

F. LEARNER OUTCOMES ASSESSMENT

   As noted on course syllabus

G. SPECIAL INFORMATION

   None noted