



<b>Course Number</b>	Math 2140 Introduction to Numerical Computing
<b>Course Name</b>	
<b>Credit Value (Breakdown of theory and lab credits)</b>	3 Theory
<b>Catalog Course Description</b>	This course will introduce solutions of non-linear equations of one variable, solutions of linear equations in many variables (matrices), interpolation, approximation of integration and differentiation of functions, computational solutions of initial-value problems for ordinary differential equations, and programming with mathematical software. Prerequisite: Math 1520 and a computer language (3, 3T+0S)
<b>Course Student Learning Outcomes/Objectives /Competencies of the Course</b>	<p><b>Student Learning Outcomes:</b> At the end of this course the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Find roots of non-linear equations             <ol style="list-style-type: none"> <li>a. Bisection</li> <li>b. Newton-Rhapson</li> <li>c. Secant</li> </ol> </li> <li>2. Interpolate functions using             <ol style="list-style-type: none"> <li>a. Lagrange polynomials</li> <li>b. Hermite polynomials</li> <li>c. Cubic splines</li> </ol> </li> <li>3. Numerically differentiate functions</li> <li>4. Numerically integrate functions with             <ol style="list-style-type: none"> <li>a. Trapezoid rule</li> <li>b. Simpsons rule</li> </ol> </li> <li>5. Solve initial-value problems             <ol style="list-style-type: none"> <li>a. Euler's method</li> <li>b. Runge-Kutta</li> </ol> </li> <li>6. Solving linear equations             <ol style="list-style-type: none"> <li>a. Gaussian elimination</li> <li>b. Iterative methods</li> </ol> </li> </ol>
<b>College-Wide Student Learning Outcomes</b>	<p>Math 2140 exposes students to the following NNMCC College Wide Goals:</p> <p><i>Critical thought: Students are required to analyze and synthesize information and draw reasoned conclusions.</i></p> <p><i>Quantitative reasoning: Calculate, represent, apply, analyze, and communicate both quantitative and qualitative information.</i></p>
<b>Program Student Learning Outcomes measured</b>	<p>PSLO #6: Use computational programming and numerical analysis to solve a mathematical problem.</p> <p>PSLO #7: Write a scientific paper with citations to describe the results of a mathematical computation or research project.</p>