<table>
<thead>
<tr>
<th>Course Number</th>
<th>Math 2140 Introduction to Numerical Computing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Name</td>
<td></td>
</tr>
<tr>
<td>Credit Value</td>
<td>3 Theory</td>
</tr>
<tr>
<td>(Breakdown of</td>
<td></td>
</tr>
<tr>
<td>theory and lab</td>
<td></td>
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<tr>
<td>credits)</td>
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</tr>
<tr>
<td>Catalog Course</td>
<td>This course will introduce solutions of</td>
</tr>
<tr>
<td>Description</td>
<td>non-linear equations of one variable,</td>
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<tr>
<td></td>
<td>solutions of linear equations in many</td>
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<tr>
<td></td>
<td>variables (matrices), interpolation,</td>
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<tr>
<td></td>
<td>approximation of integration and</td>
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<tr>
<td></td>
<td>differentiation of functions, computational</td>
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<tr>
<td></td>
<td>solutions of initial-value problems for</td>
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<tr>
<td></td>
<td>ordinary differential equations, and</td>
</tr>
<tr>
<td></td>
<td>programming with mathematical software.</td>
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<tr>
<td></td>
<td>Prerequisite: Math 1520 and a computer</td>
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<tr>
<td></td>
<td>language (3, 3T+0S)</td>
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<tr>
<td>Student Learning</td>
<td>Student Learning Outcomes: At the end of</td>
</tr>
<tr>
<td>Outcomes/</td>
<td>this course the student will be able to:</td>
</tr>
<tr>
<td>Objectives/</td>
<td>1. Find roots of non-linear equations</td>
</tr>
<tr>
<td>Competencies</td>
<td>a. Bisection</td>
</tr>
<tr>
<td>of the</td>
<td>b. Newton-Rhapson</td>
</tr>
<tr>
<td>Course</td>
<td>c. Secant</td>
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<tr>
<td></td>
<td>2. Interpolate functions using</td>
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<tr>
<td></td>
<td>a. Lagrange polynomials</td>
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<td></td>
<td>b. Hermite polynomials</td>
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<td>c. Cubic splines</td>
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<td></td>
<td>3. Numerically differentiate functions</td>
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<td>4. Numerically integrate functions with</td>
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<tr>
<td></td>
<td>a. Trapezoid rule</td>
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<tr>
<td></td>
<td>b. Simpsons rule</td>
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<td>5. Solve initial-value problems</td>
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<tr>
<td></td>
<td>a. Euler’s method</td>
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<tr>
<td></td>
<td>b. Runge-Kutta</td>
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<td>6. Solving linear equations</td>
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<tr>
<td></td>
<td>a. Gaussian elimination</td>
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<td>b. Iterative methods</td>
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<tr>
<td>College-Wide Student</td>
<td>Math 2140 learning objectives align with</td>
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<tr>
<td>Learning Outcomes</td>
<td>the following NNMC College Wide Goal:</td>
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<tr>
<td></td>
<td>Critical thought: Students are required to</td>
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<tr>
<td></td>
<td>analyze and synthesize information and</td>
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<td>draw reasoned conclusions.</td>
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