

**MATHEMATICAL SCIENCES**  
**Institutional (ILO), Program (PLO), and Course (SLO) Alignment**

|  |                                |                                    |  |
|--|--------------------------------|------------------------------------|--|
| Program: <b>Math (GE and Non-Science Majors)</b> | Number of Courses:<br><b>7</b> | Date Updated:<br><b>11.07.2015</b> | Submitted by:<br>Susanne Bucher, ext. 3221 |
|--|--------------------------------|------------------------------------|--|

| ILOs | <b>1. Critical Thinking</b><br><i>Students apply critical, creative and analytical skills to identify and solve problems, analyze information, synthesize and evaluate ideas, and transform existing ideas into new forms.</i> | <b>2. Communication</b><br><i>Students effectively communicate with and respond to varied audiences in written, spoken or signed, and artistic forms.</i> | <b>3. Community and Personal Development</b><br><i>Students are productive and engaged members of society, demonstrating personal responsibility, and community and social awareness through their engagement in campus programs and services.</i> | <b>4. Information Literacy</b><br><i>Students determine an information need and use various media and formats to develop a research strategy and locate, evaluate, document, and use information to accomplish a specific purpose. Students demonstrate an understanding of the legal, social, and ethical aspects related to information use.</i> |
|------|--|---|--|--|
|------|--|---|--|--|

**SLO-PLO-ILO ALIGNMENT NOTES:**

*Mark boxes with an 'X' if: SLO/PLO is a major focus or an important part of the course/program; direct instruction or some direct instruction is provided; students are evaluated multiple times (and possibly in various ways) throughout the course or are evaluated on the concepts once or twice within the course.*

*DO NOT mark with an 'X' if: SLO/PLO is a minor focus of the course/program and some instruction is given in the area but students are not formally evaluated on the concepts; or if the SLO/PLO is minimally or not at all part of the course/program.*

| PLOs  | <b>PLO to ILO Alignment</b> |   |   |   |
|---|-----------------------------|---|---|---|
|   | <i>(Mark with an X)</i>     |   |   |   |
|   | 1                           | 2 | 3 | 4 |
| <b>PLO #1 Graphical Methods</b><br>Students will be able to analyze and solve application problems involving business, the social sciences, and/or biological sciences using graphical methods.                                   | X                           | X |   | X |
| <b>PLO #2 Analytical and Computational Skills</b><br>Students will be able to analyze and solve application problems involving business, the social sciences, and/or biological sciences using analytical and computation skills. | X                           | X |   | X |

| SLOs  | SLO to PLO Alignment<br><i>(Mark with an X)</i> |    | COURSE to ILO Alignment |   |   |   |   |   |  |   |
|---|---|----|-------------------------|---|---|---|---|---|--|---|
|   | P1  | P2 | 1                       | 2 | 3 | 4 |   |   |  |   |
| <b>MATH 120 Nature of Mathematics: SLO #1 Solve Loan Problems</b><br>Apply techniques of simple and compound interest to solve loan and annuity problems.   |   | X  |                         |   |   |   |   |   |  |   |
| <b>MATH 120 Nature of Mathematics: SLO #2 Solve Application Problems Using Graphical Methods</b><br>Solve application problems using graphical methods such as: 3-ring Venn diagrams, truth tables, Euclidean, Riemannian and Lobachevskian geometries. | X   |    |                         |   |   |   |   |   |  |   |
| <b>MATH 120 Nature of Mathematics: SLO #3 Analyze Voting System</b><br>Analyze voting systems, methods of apportionment and representation to further the understanding of the political process.   |   | X  |                         |   |   |   | X | X |  | X |
| <b>MATH 120 Nature of Mathematics: SLO #4 Solve Application Problems</b><br>Solve application problems using basic counting principles, permutations, combinations, probability, expected value and frequency distribution.                             | X   | X  |                         |   |   |   |   |   |  |   |
| <b>MATH 130 College Algebra: SLO #1 Solve Nonlinear Inequalities</b><br>Solve nonlinear inequalities and a variety of equations such as: polynomial, rational, radical, exponential, and logarithmic.   |   | X  |                         |   |   |   |   |   |  |   |
| <b>MATH 130 College Algebra: SLO #2 Solve Problems using Graphical Methods</b><br>Solve problems using graphical methods involving a variety of functions, such as: polynomial, rational, radical, exponential, and logarithmic.                        | X   |    |                         |   |   |   | X | X |  | X |
| <b>MATH 130 College Algebra: SLO #3 Solve Problems Using Sequences and Series</b><br><i>Solve problems using sequences and series.</i>  |   | X  |                         |   |   |   |   |   |  |   |
| <b>MATH 130 College Algebra: SLO #4 Solve Application Problems</b><br>Solve college algebra level application problems and use technology.  | X   | X  |                         |   |   |   |   |   |  |   |
| <b>MATH 140 Finite Mathematics for Business and Social Sciences: SLO #1 Use of Gauss-Jordan</b><br>Use the Gauss-Jordan technique to solve systems of linear equations.   |   | X  |                         |   |   |   |   |   |  |   |
| <b>MATH 140 Finite Mathematics for Business and Social Sciences: SLO #2 Use of Matrices</b><br>Solve problems using matrices.   |   | X  |                         |   |   |   |   |   |  |   |
| <b>MATH 140 Finite Mathematics for Business and Social Sciences: SLO #3 Use of Geometrical Approach</b><br>Solve linear programming problems using the geometrical approach.  | X   |    |                         |   |   |   | X | X |  | X |
| <b>MATH 140 Finite Mathematics for Business and Social Sciences: SLO #4 Use of Finite Mathematics Techniques</b><br>Solve application problems using finite mathematics techniques.   | X   | X  |                         |   |   |   |   |   |  |   |

| SLOs   | SLO to PLO Alignment<br><i>(Mark with an X)</i> |    | COURSE to ILO Alignment |   |   |   |
|--|---|----|-------------------------|---|---|---|
|  | P1  | P2 | 1                       | 2 | 3 | 4 |
| <b>MATH 150 Elementary Statistics with Probability: SLO #1 Computing and Interpreting Various Measures</b><br>From data or bivariate data, compute statistics and develop displays of the data that illustrate the measures of central tendency, variation, relative position, and correlation. Interpret the displays in context. | X   |    |                         |   |   |   |
| <b>MATH 150 Elementary Statistics with Probability: SLO #2 Probability</b><br>Compute probability of an event by applying the basic assumption in classical probability and using addition rule and multiplication rule for contingency tables.  | X   | X  |                         |   |   |   |
| <b>MATH 150 Elementary Statistics with Probability: SLO #3 Central Limit Theorem</b><br>Use the Central Limit Theorem to compute probabilities concerning the distribution of the sample means and comparing these to the probabilities of the related random variable.  | X   | X  | X                       | X |   | X |
| <b>MATH 150 Elementary Statistics with Probability: SLO #4 Confidence Intervals and Hypothesis Testing</b><br>Compute the confidence intervals and conduct hypothesis testing for a variety of parameters, and perform non-parametric hypothesis testing.  | X   | X  |                         |   |   |   |
| <b>MATH 160 Calculus I for Biological, Management and Social Sciences: SLO #1 Determine and Interpret Limits</b><br>Determine limits, classify types of continuity of functions, and determine first and second derivatives of functions.  | X   |    |                         |   |   |   |
| <b>MATH 160 Calculus I for Biological, Management and Social Sciences: SLO #2 Sketch graphs of functions</b><br>Identify the intercepts, relative extrema, inflection points, and concavity, and use this information to sketch graphs of functions.   | X   | X  |                         |   |   |   |
| <b>MATH 160 Calculus I for Biological, Management and Social Sciences: SLO #3 Area Problems</b><br>Solve area problems using integral calculus.  | X   | X  | X                       | X |   | X |
| <b>MATH 160 Calculus I for Biological, Management and Social Sciences: SLO #4 Using Calculus, Solve Application Problems</b><br>Solve calculus-level application problems and use technology.  | X   | X  |                         |   |   |   |
| <b>MATH 161 Calculus II for Biological, Management and Social Sciences: SLO #1 Compute and Interpret Integrals</b><br>Find integrals using a variety of methods, including: substitution, parts, and partial fractions.  |   | X  |                         |   |   |   |
| <b>MATH 161 Calculus II for Biological, Management and Social Sciences: SLO #2 Compute and Interpret Derivatives</b><br>Compute and interpret partial derivatives and apply these skills to application problems.  | X   | X  |                         |   |   |   |
| <b>MATH 161 Calculus II for Biological, Management and Social Sciences: SLO #3 Convergence and Divergence of Series</b><br>Determine convergence and divergence of infinite series.  |   | X  | X                       | X |   | X |
| <b>MATH 161 Calculus II for Biological, Management and Social Sciences: SLO #4 Solve Application Problems Using Calculus</b><br>Use single-variable and double-variable integral calculus methods to solve application problems from relevant disciplines, including economics.  | X   | X  |                         |   |   |   |

| SLOs  | SLO to PLO Alignment<br><i>(Mark with an X)</i> |    | COURSE to ILO Alignment |   |   |   |
|---|---|----|-------------------------|---|---|---|
|   | P1  | P2 | 1                       | 2 | 3 | 4 |
| <b>Math 165 Calculus for Biological, Management and Social Sciences: SLO #1 Compute and Interpret Derivatives</b><br>Determine limits, classify types of continuity of functions, use derivatives to find increments, rates of change and tangent lines, and compute first and second derivatives of functions including partial derivatives. |   | X  | X                       | X |   | X |
| <b>Math 165 Calculus for Biological, Management and Social Sciences: SLO #2 Compute and Interpret Integrals</b> Evaluate integrals and improper integrals using a variety of methods, including substitution and by parts.  |   | X  |                         |   |   |   |
| <b>Math 165 Calculus for Biological, Management and Social Sciences: SLO #3 Sketch Graphs of Functions</b> Identify the intercepts, asymptotes, relative extrema, inflection points, and concavity, and use this information to sketch graphs of functions.   | X   |    |                         |   |   |   |
| <b>Math 165 Calculus for Biological, Management and Social Sciences: SLO #4 Solve Application Problems Using Calculus</b><br>Use single-variable and multi-variable calculus methods to solve application problems in business and economics, including marginal revenue, marginal profit and marginal cost.                                  | X   | X  |                         |   |   |   |