

SYLLABUS REQUIREMENTS: ELEMENT 2

Instructions: All syllabi for GE courses must include the following two sections:

1. General Education Goals
2. Student Learning Outcomes

General Education Goals: The required GE goals for Element 2 courses are listed below. Instructors may copy/paste these goals directly into syllabi.

Student Learning Outcomes: The *approved, core set* of student learning outcomes is listed below for each course in this GE Element. Instructors may copy/paste these SLOs directly into syllabi. These are the *core set* of SLOs that must appear on every syllabus, for every section of a GE course. Instructors may add to this core set other SLOs that are specific to their sections.

ELEMENT 2: Quantitative Reasoning

GENERAL EDUCATION GOALS FOR MATHEMATICS COURSES

Students will be able to:

1. Use appropriate methods of critical thinking and quantitative reasoning to examine issues and to identify solutions. (GE Goal two)
2. Distinguish the methods that underlie the search for knowledge in the arts, humanities, natural sciences, history, and social and behavioral sciences. (GE Goal seven)
3. Integrate knowledge that will deepen their understanding of, and will inform their own choices about, issues of personal and public importance. (GE Goal eight)

COURSE SPECIFIC STUDENT LEARNING OUTCOMES (revised for fall 2010)

All Writing Intensive Courses:

For all writing intensive courses this student learning outcome should be added to the core set of outcomes:

1. Demonstrate a writing process that produces effective documents appropriate to course level.

MAT 105: Mathematics with Applications

Students who successfully complete MAT 105 will demonstrate the ability to . . .

1. Make connections between mathematics and its historical and cultural context.
2. Communicate using mathematics as part of written language.
3. Engage in problem-solving strategies: understanding, conjecturing, exploring routine and non-routine problems.
4. Calculate the monthly payments required for various types of loans and understand loans well enough to make educated decisions when selecting one.
5. Compute and interpret basic measures of central tendency as well as to construct and understand graphical presentations of data.
6. Use geometric shapes for problem solving.
7. Select appropriate mathematical models and interpret the meaning of the solution for the particular application.

MAT 106: Applied Finite Mathematics

Students who successfully complete MAT 106 will demonstrate the ability to . . .

1. Find an Euler circuit on a graph or show that no Euler circuit exists.
2. Solve the traveling salesperson problem for complete weighted graphs with four or fewer vertices.
3. Find a minimum cost spanning tree.
4. Schedule tasks using a list-processing algorithm.
5. Apply bin-packing heuristics.
6. Apply graph theory to real-world problems.
7. Solve real-world linear programming problems using the pictorial method.
8. Apply other mathematical models and techniques to real-world problems.

In order to successfully complete MAT 106, students will demonstrate the ability to . . .

1. Find an Euler circuit on a graph or show that no Euler circuit exists.
2. Solve the traveling salesperson problem for complete weighted graphs with four or fewer vertices.
3. Find a minimum cost spanning tree.
4. Apply bin-packing heuristics.
5. Apply graph theory to real-world problems.
6. Solve real-world linear programming problems using the pictorial method.
7. Understand basic financial concepts related to saving and borrowing money.
8. Understand the idea of credit and how this applies to financial health.
9. Create a real-world budget using principles of financial mathematics.
10. Apply other mathematical models and techniques to real-world problems.

MAT112A: Algebra: Polynomial (passed GE 3.20.18)

MAT 112A students will read and analyze application problems involving a variety of algebraic functions. Students who successfully complete MAT 112A should have the algebraic skills necessary to apply certain algebraic techniques in other fields. Students will develop quantitative reasoning skills to be successful in courses that incorporate applied mathematics. In order to successfully complete MAT 112A, students will demonstrate the ability to ...

1. Solve applied problems that can be modeled with linear and quadratic equations and inequalities.
2. Read and analyze real-life problems using mathematical modeling.
3. Graph and interpret data represented by linear, quadratic, and power functions.
4. Use numerical and graphical data to make reasonable and valid conclusions.
5. Solve applied problems that can be modeled with equations and inequalities involving absolute value.

MAT112B: Algebra: Functions and Matrices (passed GE 3.20.18)

MAT 112B students will read and analyze application problems involving a variety of algebraic functions. Students who successfully complete MAT 112B should have the algebraic skills necessary to apply certain algebraic techniques in other fields. Students will develop quantitative reasoning skills to be successful in courses that incorporate applied mathematics. In order to successfully complete MAT 112B, students will demonstrate the ability to ...

- Solve applied problems that can be modeled with exponential, logarithmic, and polynomial functions.
- Read and analyze real-life problems using mathematical modeling.
- Perform matrix operations.
- Graph and interpret data represented by exponential, logarithmic, and polynomial functions.
- Use numerical and graphical data to make reasonable and valid conclusions.
- Solve systems of linear equations using several techniques including matrices.
- Find terms of sequences.
- Find the sum of finite series.

MAT 114: College Algebra (passed GE 8.28.14)

Students who successfully complete MAT 114 will demonstrate the ability to:

1. Simplify algebraic expressions.
2. Solve linear and quadratic equations.
3. Solve equations reducible to quadratic.
4. Solve equations and inequalities involving absolute value.
5. Solve systems of linear equations.
6. Solve exponential and logarithmic equations.
7. Find the roots of polynomial functions and solve polynomial equations.
8. Graph linear, quadratic, exponential, logarithmic and polynomial functions.
9. Perform complex number arithmetic.
10. Use the graphing calculator to solve and graph various types of equations and inequalities.
11. Find terms of sequences given the n th term.

MAT 120: Trigonometry (passed GE 8.28.14)

Students who successfully complete MAT 120 will demonstrate the ability to . . .

1. Evaluate a trigonometric function for an angle expressed in radians or degrees.
2. Solve right and oblique triangles, including real-life applications.
3. Use and verify trigonometric identities.
4. Solve trigonometric equations.
5. Graph and interpret graphs of trigonometric functions in rectangular and polar form.

MAT 122: Precalculus Mathematics (passed GE 8.28.14)

Students who successfully complete MAT 122 will demonstrate the ability to . . .

1. Solve equations and inequalities involving polynomial, rational, exponential, logarithmic, or trigonometric functions.
2. Understand and apply the behavior and properties of polynomial, rational, exponential, logarithmic, and trigonometric functions.
3. Graph polynomial, rational, exponential, logarithmic, and trigonometric functions.
4. Use technology to solve and graph various types of equations and inequalities.
5. Prove trigonometric identities.

MAT 211: Applied Calculus (GE Rev. 8.28.14)

Students who successfully complete MAT 211 will demonstrate the ability to . . .

1. Identify, evaluate, graph, and find roots of polynomial, piecewise, greatest integer, rational, exponential and logarithmic functions.
2. Select an appropriate function to model a situation.
3. Compute limits and discuss the continuity of polynomial, piecewise, greatest integer, rational, exponential and logarithmic functions.
4. Differentiate polynomial, piecewise, rational, exponential, and logarithmic functions, specifically:
 - a. Use techniques of differentiation.
 - b. Use differentiation to solve optimization problems.
 - c. Apply differentiation to marginal analysis and other real-world situations.
5. Integrate polynomial, piecewise, rational, exponential and logarithmic functions, specifically:
 - a. Use techniques of integration.
 - b. Use integration to find the area under a curve and the area between two curves.
 - c. Apply integration to cost analysis problems and other real-world situations

MAT 234: Calculus I (passed GE 8.28.14)

Students who successfully complete MAT 234 will demonstrate the ability to . . .

1. Understand and use the concept of a function whether the function is represented by tabulated data, graphs, or formulas.
2. Use calculus to formulate and solve problems.
3. Understand the derivative as a rate of change including its connections to tangent lines, linear approximations, extrema, and instantaneous velocity.
4. Understand the definite integral as a measurement of area and as a limit and as an inverse of differentiation.
5. Use technology to help solve calculus problems.
6. Be able to compute limits, derivatives, and antiderivatives.
7. Effectively communicate solutions to problems using correct mathematical terminology.

STA 215: Introduction to Statistical Reasoning *(Passed GE 9.11.14)*

Students who successfully complete STA 215 will demonstrate the ability to . . .

1. Describe data sets using graphs and numerical summaries.
2. Use normal distributions to model real-life situations.
3. Interpret regression and correlation results.
4. Use a regression equation to make predictions.
5. Describe appropriate ways of collecting data.
6. Apply basic rules of probability.
7. Solve problems that require the use of the Central Limit Theorem.
8. Compute and interpret confidence intervals.
9. Conduct tests of hypotheses and draw relevant conclusions.
10. Interpret output from a software analysis package.

STA 270: Applied Statistics *(Passed GE 9.11.14)* **Removed "I" per GE 2.10.16**

Students who successfully complete STA 270 will demonstrate the ability to . . .

1. Describe data sets using graphs and numerical summaries.
2. Discern and use binomial and normal distributions to model real-life situations.
3. Carry out rudimentary regression analysis, including using a regression equation to make predictions.
4. Apply rules of probability.
5. Recognize and solve problems that require the use of the Central Limit Theorem.
6. Compute and interpret confidence intervals.
7. Conduct tests of hypotheses and draw relevant conclusions.
8. Interpret output from a software analysis package.

PHI 101/101R. *(Passed GE 05.01.18)*

In PHI 101 and 101R students will:

1. Identify the premises and conclusion of arguments.
2. Distinguish between inductive and deductive arguments.
3. Distinguish between the validity and soundness of deductive arguments.
4. Identify the logical form of an argument using categorical and propositional logic.
5. Translate statements into the symbolic notation of propositional logic.
6. Determine the truth value of statements using propositional logic.
7. Assess the validity of arguments using categorical and propositional logic.
8. Recognize and apply elementary rules of inference in propositional logic.
9. Draw valid inferences from premises using categorical and propositional logic.
10. Use logic and critical thinking to evaluate real-life arguments.