

General Education Goals and Course Learning Objectives For Block II Courses

1. All Block II mathematics courses are expected to include a section on the course syllabus entitled “General Education Goals and the Course” beginning Fall 2006. This requirement applies to all sections of Block II mathematics. All Block II mathematics courses address goals two, seven, and eight.
 - a. The course syllabi for all Block II courses should have the following statement: Students will be able to:
 - Use appropriate methods of critical thinking and quantitative reasoning to examine issues and to identify solutions. (Goal two)
 - Distinguish the methods that underlie the search for knowledge in the arts, humanities, natural sciences, history, and social and behavioral sciences. (Goal seven)
 - Integrate knowledge that will deepen their understanding of, and will inform their own choices about, issues of personal and public importance. (Goal eight)

2. When the General Education Committee approved MAT courses for Block II, they approved course-specific learning objectives for each course. All sections of each MAT courses are expected to use the approved learning objectives, but individual faculty members may supplement the approved the learning objectives.
 - a. If the department wishes to revise course-specific learning objectives, the department should provide the revised course-specific learning objectives for approval by the General Education Committee prior to implementation.

3. As part of the assessment of General Education, the General Education Committee will be conducting a content analysis of course syllabi each semester. Department Chairs should collect an electronic copy of the course syllabus from all sections of MAT courses in Block II by the end of the third week of the semester and send those syllabi to the Chair of the University General Education Committee.

Course-Specific Learning Objectives

MAT 105

Upon completion of MAT 105, students should be able 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

Upon completion of MAT 106, the student should be able 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.

MAT 107

Upon successful completion of MAT 107, the student should be able 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 108

In MAT 108, students 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 109

Upon completion of the course, students should be able 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 124/124H

Upon completion of the course, students should be able 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 problems.
6. Be able to compute limits, derivatives, and antiderivatives.
7. Effectively communicate solutions to problems using correct mathematical terminology.

MAT 211

Upon successfully completing MAT 211, the student should be able 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.
 - 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.
 - 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 224/224H

Calculus should teach students how to apply mathematics in different contexts, to abstract and generalize, and to analyze quantitatively and qualitatively. Students in this class should be able to:

1. Understand that the definite integral and infinite series are limits.
2. Compute definite and indefinite integrals.
3. Set up integrals to compute areas and volumes.
4. Use calculus to formulate and solve problems and communicate solutions.

MAT 261

Students should be able 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.
5. Use techniques of differentiation.
6. Use differentiation to solve optimization problems.
7. Apply differentiation to rates of change, such as velocity, acceleration, population growth, and other real-world problems.
8. Integrate polynomial, piecewise, rational, exponential, and logarithmic functions.
9. Use techniques of integration.
10. Use integration to find the area under a curve and the area between two curves.
11. Apply integration to motion problems, learning curves, and other real world situations.