Common Course Outline for: MATH 1500 Pre-Calculus

A. Course Description

1. Number of credits: 5
2. Lecture hours per week: 5
3. Prerequisites: MATH 1100 (C or higher) or eligible for MATH 1500
4. Co-requisites: None
5. MnTC Goal 4

This course is intended to prepare students for a multiple-term calculus sequence. This is an accelerated treatment of all elementary functions from MATH 1100, followed by a thorough treatment of trigonometric functions. Other topics include: polar coordinates and equations, complex numbers, DeMoivre's Theorem, vectors and their applications, the conic sections, and parametric equations. You may not receive credit for both MATH 1500 and MATH 1150.

B. Date last reviewed: November 2021

C. Outline of Major Content Areas

1. Review of Basic Functions from College Algebra (Polynomial, Rational, Exponential, and Logarithmic Functions)
2. Right Triangle and Circular Trigonometry with Applications
3. Inverse Trigonometric Functions, Trigonometric Equations and Trigonometric Identities
4. Polar and Parametric Coordinates, Complex Plane and DeMoivre's Theorem, Conic Sections
5. Vectors with Basic Physical Applications

D. Course Learning Outcomes

Upon successful completion of MATH 1500 a student should be able to determine the following for each of the tasks listed below (MnTC Goals in parentheses):

- What is the central question?
- What information is relevant?
- What assumptions are being made?
- What mathematical knowledge/tools will apply?
- How well does the mathematical model used actually fit the situation?
- Exactly how do the mathematical tools help me answer the central question?

1. Demonstrate mastery of basic functions from College Algebra. (4b, c, d)
2. Use the unit circle definitions of the trigonometric functions. (4b, c)
3. Develop graphs of trigonometric functions as visual summaries of their properties. (4a, b)
4. Solve triangles with sufficient information given, including applications. (2b; 4b, c, d)

5. Use trigonometric identities to simplify trigonometric expressions and prove new identities. (4a, b, c, d)
6. Define inverse trigonometric functions and use them to solve problems. (4b, d)
7. Analyze equations and graphs of conic sections, and use them in applications. (4a, c)
8. Use algebraic and graphical methods to solve systems of nonlinear equations. (4a, b)
9. Write complex numbers in polar form, and use DeMoivre's theorem to find powers and roots of complex numbers. (2b; 4b, d)
10. Solve applied problems using vectors. (2c; 4a d)
11. Use polar equations and parametric equations to describe curves in a plane. (4a, c, d)

E. Methods for Assessing Student Learning

The instructor will choose from among various evaluation techniques including – but not limited to – online and in-class testing, take-home testing, assignments, quizzes, and attendance. The instructor will also choose a method for end-of-the-semester evaluation.

F. Special Information

Internet access is required. For most sections, content and learning aids are available online. A scientific or graphing calculator may be required.