Course Outline

Course Number: MTH-112
Title: Trigonometry and Pre-Calculus
Date Approved: 5/16/2014

Credits: 5
Length of Course: 55
For each credit, the student will be expected to spend, on average, 3 hours per week in combination of in-class and out-of-class activity.

Grading Method: A-F or Pass/No Pass
Prerequisites: MTH-111 with a C or better or placement in MTH-112
Co-requisites: None
Recommended: WRD-098 or placement in WR-121
Required: None
Related Instruction Area: Computation
Uses Library Resources: No

Department: Mathematics
Outline Developed by: Mark Hull
Course Approved as: Lower Division Collegiate

Course Description:
A transfer course designed to prepare students for calculus. AMATYC standards-based approach utilizing the rule of four to analyze elementary functions and applications is used for this course. The rule of four requires that each topic should be presented symbolically, graphically, numerically, and verbally. Topics include trigonometric functions, trigonometry developed from the unit circle, right triangle trigonometry, inverse trigonometric functions, the laws of sines and cosines, trigonometric identities, and conic sections. Students will also learn to use vectors, polar equations, and parametric equations. Particular attention will be paid to modeling applications and solving mathematical problems.

Student Learning Outcomes:
Upon successful completion of this course, students should be able to:
1. define and identify trigonometric functions,
2. convert between radian measure and degrees,
3. use radian measure to compute the length of an arc,
4. compute the value of trigonometric function for particular angles in a right triangle,
5. evaluate the sine and cosine functions for particular angles on the unit circle from memory,
6. define sine and cosine functions based on the unit circle,
7. demonstrate the ability to graph, transform, and analyze the graphs of sine and cosine functions;
8. write tangent, secant, cosecant, and cotangent functions in terms of sine and cosine functions;
9. use the trigonometric identities and inverse trigonometric functions appropriately to solve mathematical problems in cross discipline applications,
10. demonstrate the ability to verify trigonometric identities,
11. use the laws of sines and cosines to solve mathematical problems within cross discipline applications,
12. demonstrate the ability to recognize, model, and solve cross discipline applications using trigonometry;
13. demonstrate the ability to perform vector arithmetic,
14. use vectors to model cross discipline applications and solve mathematical problems,
15. use parametric equations to describe curves within solve cross discipline applications,
16. convert between Cartesian and polar coordinates,
17. use polar equations to describe curves,
18. recognize, and solve mathematical problems within cross discipline applications with polar equations,
19. demonstrate the ability to graph and translate graphs of Parabolic, Elliptic, and Hyperbolic functions;
20. use technology to solve problems,
21. use technology to fit functions to data sets,
22. demonstrate rigorous and analytical thinking by reading, writing, and utilizing the technical and logical language and symbolism necessary to do mathematics effectively and efficiently;
23. demonstrate the ability to work effectively as a team member to engage in using pre-calculus concepts to solve mathematical problems.

Major Topic Outline:

1. Periodic functions.
2. Sine and cosine functions.
3. Remaining trigonometric functions.
4. Right triangle trigonometry.
5. Inverse trigonometric functions.
7. Trigonometric identities.
8. Vectors.
9. Vector arithmetic.
12. Conic sections.
Outcomes addressed by the course:

'C' - this course completely addresses the outcome. Students who successfully complete this course are likely to have attained this learning outcome.

'S' - this course substantially addresses the outcome. More than one course is required for the outcome to be completely addressed. Students who successfully complete all of the required courses are likely to have attained this learning outcome.

'P' - this course partially addresses the outcome. Students will have been exposed to the outcome as part of the class, but the class is not a primary means for attaining the outcome and assessment for general education purposes may not be necessary.

As a result of completing the AAOT/ASOT general education requirements students will be able to:

---

MA: Mathematics Outcomes

1. Use appropriate mathematics to solve problems.

2. Recognize which mathematical concepts are applicable to a scenario, apply appropriate mathematics and technology in its analysis, and then accurately interpret, validate, and communicate the results.