COLLIN COLLEGE EXPANDED GENERIC COURSE SYLLABUS

COURSE INFORMATION

Course Number: MATH 2412
Course Title: Pre-Calculus Math
Credit Hours: 4
Lecture Hours: 3
Lab Hours: 2

Prerequisite
MATH 1314 with a C or better; or equivalent preparation.

Course Description
In-depth combined study of algebra, trigonometry, and other topics for calculus readiness. Lab required.

Textbook/Supplies
Onsite Courses: *Precalculus: Concepts Through Functions*, 4th Edition by Sullivan and Sullivan, Pearson, 2019.

Online Courses: Email your professor for textbook information.

Supplies: Graphing calculator required.

STUDENT LEARNING OUTCOMES (SLO)

Upon completion of this course the students should be able to do the following:

1. Demonstrate and apply knowledge of properties of functions. (Communication)
2. Recognize and apply algebraic and transcendental functions and solve related equations. (Empirical/Quantitative)
3. Apply graphing techniques to algebraic and transcendental functions. (Critical Thinking)
4. Compute the values of trigonometric functions for key angles in all quadrants of the unit circle measured in both degrees and radians. (Empirical/Quantitative)
5. Prove trigonometric identities. (Critical Thinking and Communication)
6. Solve right and oblique triangles. (Empirical/Quantitative)

METHOD OF EVALUATION

Course requirements
Attending class**,** completing homework assignments**,** completing labs, completing required exams, and knowledge of calculator use are all required.

Course format
Lecture, lab, and guided practice.

There will be a minimum of four written exams, a lab component grade, and a comprehensive final exam. Homework and/or quizzes may be used in place of one exam or in addition to exams. The weight of each of these components of evaluation will be specified in the individual instructor's addendum to this syllabus. All out-of-class course credit, including take-home exams, home assignments, service-learning, etc. may not exceed 25% of the total course grade; thus, at least 75% of a student's grade must consist of exams given in the class or testing center, and no student may retake any of these exams.

COURSE POLICIES

College-wide policies are pre-loaded into the Concourse Syllabi and are not duplicated in the Expanded Generic Syllabi for each course.

Instructor specific policies should be added to the Concourse Syllabus.

COURSE CONTENT

Proofs and derivations will be assigned at the discretion of the instructor. The student will be responsible for knowing all definitions and statements of theorems for each section outlined in the following modules.

Module 1: Algebra Topics

The student will be able to:
1. Factor expressions with rational exponents SLO 1
2. Simplify complex fractions SLO 1
3. Rationalize numerators SLO 1
4. Find and simplify a function's difference quotient SLO 1
5. Form composite functions SLO 1
6. Write functions as compositions SLO 1
7. Verify inverse functions SLO 1
8. Find the inverse of a function SLO 1
9. Use the horizontal line test to determine if a function has an inverse function SLO 1
10. Use the graph of a one-to-one function to graph its inverse function SLO 3

11. Find the domain and range of rational functions SLO 3
12. Use arrow notation SLO 2
13. Identify vertical, horizontal, and slant asymptotes SLO 3
14. Graph rational functions SLO 3
15. Solve quadratic and rational inequalities SLO 3
16. Solve exponential and logarithmic equations SLO 3

Module 2: Partial Fractions and Nonlinear Systems

The student will be able to:
1. Find the partial fraction decomposition of a rational expression SLO 1
2. Recognize systems of nonlinear systems in two variables SLO 2
3. Solve nonlinear systems by substitution SLO 2
4. Solve nonlinear systems by addition SLO 2
5. Solve problems using systems of nonlinear equations SLO 2

Module 3: Trigonometry

The student will be able to:
1. Convert radian and degree measure SLO 4
2. Use Special Triangles and Unit Circle to find the Trigonometric values of special angles SLO 4
3. Solve Right Triangles of any angle SLO 6
4. Analyze the graphs and variations of the sine, cosine, and tangent functions SLO 4
5. Solve problems involving the inverse sine, cosine, and tangent functions SLO 4
6. Inverse trig functions SLO 4
7. Find exact values of composite functions with inverse trig functions SLO 4
8. Use power reducing formulas SLO 5
9. Find all solutions to a trigonometric equation SLO 4
10. Solve equations with multiple angles SLO 6
11. Solve trigonometric equations in quadratic form SLO 4
12. Use factoring to separate different functions in trigonometric equations SLO 4
13. Use identities to solve trigonometric equations SLO 5

Module 4: Additional Topics in Trigonometry

The student will be able to:
1. Trigonometric Applications and Models SLO 4
2. Law of Sines and Law of Cosines SLO 5
3. Find the area of triangles SLO 5

Module 5: Sequences and Series

The student will be able to:
1.   Determine the terms and sum of an arithmetic sequence SLO 1
2.   Determine the terms and sum of a finite and infinite geometric sequence SLO 1
3.   Find the terms of a binomial expansion SLO 2