Texas A&M University
Core Curriculum
Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Mathematics

In the box below, describe how this course meets the Foundational Component Area description for Mathematics. Courses in this category focus on quantitative literacy in logic, patterns, and relationships. Courses involve the understanding of key mathematical concepts, and the application of appropriate quantitative tools to everyday experience.

The proposed course must contain all elements of the Foundational Component Area. How does the proposed course specifically address the Foundational Component Area definition above?

This course is focused on quantitative literacy in mathematics in order to prepare students for calculus. Upon successful completion of this course, student will be able to
- Perform operations (adding, subtracting, multiplying, dividing) on real numbers, complex numbers, functions, exponents, radicals and vectors
- Graph relations, functions, and vectors
- Solve an equation, a system of equations, and inequalities
- Identify characteristics of a particular function
- Comprehend and solve an application problem (time-to-do work, distance = rate \times time, mixtures)
- Understand the importance of domain and be able to find the domain
- Apply exponential functions and logarithmic functions
- Understand and apply basic trigonometry

Core Objectives

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning on each objective will be evaluated.

The proposed course is required to contain each element of the Core Objective.

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

The following critical thinking skills will be assessed on in-class quizzes and exams. Students will
- Think creatively to discern what technique is needed to simplify an expression, or solve an equation or application.
- Analyze functions and their inverses, if they exist.
- Use inquiry to determine if they need to check the domain or check for extraneous solutions after solving an equation.
- Synthesize inverse functions and unique triangles to solve for all of the sides and angles of a triangle
- Translate movement into a resulting vector

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

The following communication skills will be assessed on in-class quizzes, exams and in lecture. Students will
- Transform functions through shifts, stretches, shrinks, and reflections
- Interpret graphs and be able to identify their basic parent functions
- Create a sign-chart model to solve non-linear inequalities
Texas A&M University

Core Curriculum

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- Interpret a solution, including any units, to an application problem
- Be required to answer questions during class concerning topics discussed in class
- Discuss with others approaches and solutions to problems in the required recitation

Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

The following empirical and quantitative skills will be assessed on in-class quizzes and exams. Students will
- Solve application problems and draw conclusions regarding the mathematical answer.
- Logically prove if a function is a one-to-one function or not, if a relation is even, odd or neither, or if a trigonometric equation is an identity or not.
- Identify the domains, range, intercepts, symmetries, zeros, and asymptotes of a function or graph.
- Analyze an exponential or logarithmic application, including half-life problem, to determine what technique is needed to solve the problem.
- Transform numerical data into a functional model.
- Understand and apply the difference quotient to various types of functions.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
Math 150 Functions, Trigonometry, and Linear Systems

Course Description: Math 150: Functions, Trigonometry, and Linear Systems. (3-2). Credit 4. Graphs, functions, college algebra and trigonometry, linear systems and vectors.

Learning Outcomes
This course is focused on quantitative literacy in mathematics in order to prepare students for calculus. Upon successful completion of this course, student will be able to

- Perform operations (adding, subtracting, multiplying, dividing) on real numbers, complex numbers, functions, exponents, radicals and vectors
- Graph relations, functions, and vectors
- Solve an equation, a system of equations, and inequalities
- Identify characteristics of a particular function
- Comprehend and solve an application problem (time-to-do work, distance = rate×time, mixtures)
- Understand the importance of domain and be able to find the domain
- Apply exponential functions and logarithmic functions
- Understand and apply basic trigonometry

Core Objectives

Critical Thinking
The following critical thinking skills will be assessed on in-class quizzes and exams. Students will

- Think creatively to discern what technique is needed to simplify an expression, or solve an equation or application.
- Analyze functions and their inverses, if they exist.
- Use inquiry to determine if they need to check the domain or check for extraneous solutions after solving an equation.
- Synthesize inverse functions and unique triangles to solve for all of the sides and angles of a triangle
- Translate movement into a resulting vector

Communication Skills
The following communication skills will be assessed on in-class quizzes, exams and in lecture. Students will

- Transform functions through shifts, stretches, shrinks, and reflections
- Interpret graphs and be able to identify their basic parent functions
- Create a sign-chart model to solve non-linear inequalities
- Interpret a solution, including any units, to an application problem
- Be required to answer questions during class concerning topics discussed in class
- Discuss with others approaches and solutions to problems in the required recitation

Empirical and Quantitative Skills
The following empirical and quantitative skills will be assessed on in-class quizzes and exams. Students will

- Solve application problems and draw conclusions regarding the mathematical answer.
- Logically prove if a function is a one-to-one function or not, if a relation is even, odd or neither, or if a trigonometric equation is an identity or not.
- Identify the domains, range, intercepts, symmetries, zeros, and asymptotes of a function or graph.
- Analyze an exponential or logarithmic application, including half-life problem, to determine what technique is needed to solve the problem.
- Transform numerical data into a functional model.
- Understand and apply the difference quotient to various types of functions.