Effective Fall 2018, 201920

Required Syllabus Information – all must be included in the course syllabus

MAT 122
Credits: 3
Long Title: College Trigonometry: GT-MA1
Course Description: Explores trigonometric functions, their graphs, inverse functions and identities. Topics include: trigonometric equations, solutions of triangles, trigonometric form of complex numbers, and polar coordinates. This course provides essential skills for Science, Technology, Engineering, and Math (STEM) pathways.

Guaranteed Transfer (GT) Pathways Course Statement:
The Colorado Commission on Higher Education has approved MAT 122 for inclusion in the Guaranteed Transfer (GT) Pathways program in the GT- MA1 category. For transferring students, successful completion with a minimum C– grade guarantees transfer and application of credit in this GT Pathways category. For more information on the GT Pathways program, go to CDHE Website on GT Pathways.

MATHEMATICS CONTENT CRITERIA GT-MA1

a) Demonstrate good problem-solving habits, including:
   - Estimating solutions and recognizing unreasonable results.
   - Considering a variety of approaches to a given problem, and selecting one that is appropriate.
   - Interpreting solutions correctly.
b) Generate and interpret symbolic, graphical, numerical, and verbal (written or oral) representations of mathematical ideas.
c) Communicate mathematical ideas in written and/or oral form using appropriate mathematical language, notation, and style.
d) Apply mathematical concepts, procedures, and techniques appropriate to the course.
e) Recognize and apply patterns or mathematical structure.
f) Utilize and integrate appropriate technology.

COMPETENCIES & STUDENT LEARNING OUTCOMES FOR GT-MA1

Quantitative Literacy:

1. **Interpret Information**
   a. Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).
2. **Represent Information**
   a. Convert information into and between various mathematical forms (e.g., equations, graphs, diagrams, tables, words).
3. **Perform Calculations**
   a. Solve problems or equations at the appropriate course level.
   b. Use appropriate mathematical notation.
   c. Solve a variety of different problem types that involve a multi-step solution and address the validity of the results.
4. **Apply and Analyze Information**

a. Make use of graphical objects (such as graphs of equations in two or three variables, histograms, scatterplots of bivariate data, geometrical figures, etc.) to supplement a solution to a typical problem at the appropriate level.
b. Formulate, organize, and articulate solutions to theoretical and application problems at the appropriate course level.
c. Make judgments based on mathematical analysis appropriate to the course level.

5. **Communicate Using Mathematical Forms**
    a. Express mathematical analysis symbolically, graphically, and in written language that clarifies/justifies/summarizes reasoning (may also include oral communication).

SYSTEM REQUIREMENTS:

REQUIRED COURSE LEARNING OUTCOMES

1. Utilize basic definitions of trigonometric concepts.
2. Extend concepts of trigonometry to solve application problems.
3. Apply the six inverse trigonometric functions.
4. Graph trigonometric functions.
5. Make use of trigonometric identities.
6. Utilize methods of analytic trigonometry to solve trigonometric equations.
7. Apply definitions of the polar coordinate system to perform operations in the rectangular, polar and complex systems.
8.

RECOMMENDED COURSE LEARNING OUTCOMES

1. Investigate vector operations and parametric equations.

REQUIRED TOPICAL OUTLINE

The required topical outline information MUST be included in the syllabi. It may be incorporated using one of the following variations: copying the topical outline as written below, integrating the topics within the assignment schedule, or listing the topics to be covered.

REQUIRED TOPICAL OUTLINE

I. Basic definitions of trigonometric concepts
    a. Radian and degree measure conversion
    b. Definition of the six trigonometric functions using right triangles
    c. Fundamental trigonometric identities
    d. Trigonometric functions on the unit circle
    e. Reference angles
    f. Coterminal angles

II. Concepts of trigonometry to solve application problems
    a. Applications of right triangles
    b. Arc length
    c. Area of a sector
    d. Angular and linear velocity
    e. Law of Sines
    f. Law of Cosines

III. Six inverse trigonometric functions
    a. Definition of the six inverse trigonometric functions

b. Evaluation of inverse trigonometric expressions
c. Domain and range of the inverse trigonometric functions
d. Compositions of trigonometric and inverse trigonometric functions

IV. Trigonometric functions
a. Graphing the six trigonometric functions with transformations
b. Graphing the six inverse trigonometric functions
c. An introduction to combinations of trigonometric and algebraic functions

V. Trigonometric identities
a. Fundamental trigonometric identities (reciprocal, quotient and Pythagorean)
b. Sum and difference trigonometric identities
c. Double and half angle trigonometric identities
d. Cofunction trigonometric identities
e. Even and odd trigonometric identities
f. Proving and verifying non-standard trigonometric identities

VI. Methods of analytic trigonometry to solve trigonometric equations
a. Using trigonometric identities to simplify equations and expressions
b. Solving trigonometric equations

VII. Definitions of the polar coordinate system to perform operations in the rectangular, polar and complex systems.
a. Converting points and equations between rectangular and polar form
b. Graphing polar equations
c. Trigonometric form of complex numbers

RECOMMENDED TOPICAL OUTLINE

I. Basic definitions of trigonometric concepts
a. Decimal degree and degree minute seconds

II. Concepts of trigonometry to solve application problems
a. Area using trigonometric functions

III. Trigonometric functions
a. Trigonometric equations graphically

IV. Definitions of the polar coordinate system to perform operations in the rectangular, polar and complex systems
a. Products/Quotients of Complex Numbers in Polar Form
b. Powers and roots of complex numbers

V. Vector operations and parametric equations
a. Definition of vectors
b. Vector operations
c. Horizontal and vertical components
d. Angle between two vectors
e. Applications of vectors
f. Parametric equations

Syllabi requirements, including legal compliance information must be included. Individual College syllabi guidelines may include additional information. Please contact your VPI/CAO for specific College requirements.