

**LAST REVIEW: 2010-2011**

*(i.e. 2006-2007)*

**NEXT REVIEW: 2015-2016**

*(i.e. 2011-2012)*

**STATUS: A**

*(A, I, D)*

**COURSE TITLE: Trigonometry**

**COMMON COURSE NUMBER: MAC 1114**

**CREDIT HOURS: 3**

**CONTACT HOUR BREAKDOWN**

*(Per 16 week term)*

**CLOCK HOURS:**

*(Voc. Course ONLY)*

Lecture: 48      Lab:

Clinic:              Other:

**PREREQUISITE(S): MAC 1105**

**COREQUISITE(S): None**

**PRE/COREQUISITE(S):**

**COURSE DESCRIPTION** *(750 characters, maximum):*

This course, in conjunction with MAC 1140, is designed to prepare the student for the study of calculus. Topics include a functional approach to trigonometry; trigonometric equations; trigonometric identities; solving triangles; DeMoivre's Theorem; vectors; polar coordinates; and parametric equations. A graphing calculator may be required. Recommendation of the Mathematics Department or at least a grade of "C" in the prerequisite course required.

General Education Requirements – Associate of Arts Degree (AA), meets Area(s):              Area 5

General Education Requirements – Associate in Science Degree (AS), meets Area(s):              Area 4

General Education Requirements – Associate in Applied Science Degree (AAS), meets Area(s):      Area

## **UNIT TITLES**

- 1. Trigonometric Functions and their Graphs.**
- 2. Inverse Trigonometric Functions and their Graphs**
- 3. Trigonometric Identities and Conditional Trigonometric Equations**
- 4. Solutions of Triangles**
- 5. Trigonometric Form of Complex Numbers, Polar Coordinates and DeMoivre's Theorem**
- 6. Vectors and Parametric Equations**

\*\*\* Complete the following only if course is seeking general education status \*\*\*

**GENERAL EDUCATION Competencies and Skills \*:**

In the box to the right of the Competency/Skill, enter all specific **student learning outcome** unit numbers, as indicated in the course outline (i.e. 1.1, 2.7, 4.2, 4.0 and 5.12) that apply.

<b>Course must include <u>all</u> of the following:</b>	
<b>1. Read with critical comprehension**</b>	4.1,4.3,6.5
<b>2. Write clearly and coherently**</b>	3.1,3.2,4.2,4.3,5.1,6.1
<b>3. Demonstrate literacy as appropriate within a given discipline**</b>	1.4(e),1.5(e),2.1(e),4.3(f),6.1(f),6.5(f)
<b>4. Apply problem solving skills or methods to make informed decisions in a variety of contexts**</b>	1.3,2.2,4.2,6.5
<b>Course must include at least <u>one</u> of the following:</b>	
<b>5. Differentiate between ethical and unethical behavior</b>	
<b>6. Demonstrate an understanding of the physical, biological, and social environments and how individual behaviors impact this complex system.</b>	1.1,4.3,6.1,6.5
<b>7. Demonstrate an understanding of and appreciation for human diversities and commonalities.</b>	
<b>8. Speak and listen effectively.</b>	

*\*General Education Competencies and Skills endorsed by 2010-2011 General Education Task Force*

**\*\*Required Competencies**

**1) Read with critical comprehension.**

The student will be introduced to the basic texts, concepts, vocabulary, and methods necessary for developing an understanding of the discipline and meeting the required benchmarks as stated in the course outline.

**2) Write clearly and coherently.**

The student will demonstrate an understanding and mastery of subject matter in a variety of ways, including writing. Writing activities may include both graded and ungraded essays, short answer quizzes, summaries, reactions, journals, and various other reports.

**3) Demonstrate and apply literacy across all the disciplines (indicate which ones apply).**

- a) **Information literacy** means understanding how to locate needed information, using the appropriate technology for the task, managing and evaluating the extracted information and using it effectively and ethically.
- b) **Technology literacy** is the ability to responsibly and effectively use appropriate technology to access, manage, integrate, or create information, and/or use technology to accomplish a given task.
- c) **Workplace literacy** is having the appropriate knowledge and skills to communicate and work with others effectively and perform job duties, whether it is through the use of computers and/or other technology.
- d) **Cultural literacy** is recognizing, understanding, and appreciating the similarities and differences between one's own culture and the cultures of others through a study of the arts, customs, beliefs, values, and history that define a culture.
- e) **Quantitative literacy** is having the ability to formulate, solve and interpret mathematical/statistical operations and graphical/tabular representations to make informed decisions.
- f) **Scientific literacy** means understanding the methodology and application of the scientific process, the physical and biological worlds, and recognizing that scientific knowledge is continuously updated or revised as new information is discovered.

**g) Environmental literacy** is creating a context within which environmental issues can be viewed, imparting knowledge to enhance one's ability to analyze the issues, make the connections between humans' decisions and actions and the challenges facing the environment, and instilling the desire to sustain the environment through ethical practices in both one's professional and personal lives.

**4. Apply problem-solving skills or methods to make informed decisions in a variety of contexts.**

The student will use acquired skills or methods to recognize, analyze, adapt, and apply critical thinking to solve problems and make informed decisions.

**EVALUATION:**

In the box to the right of the Methods of Assessment, enter all specific learning outcome numbers (i.e. 1.1, 2.7, 4.0, 4.2 and 5.12) that apply.

1. Portfolio	
2. Short essays	
3. Research Papers	
4. Group projects	
5. Discussions (In class and online)	1.1-1.5, 2.1-2.2, 3.1-3.2,4.1 – 4.3, 5.1 – 5.6, 6.1 – 6.7
6. Multiple Choice tests	1.1-1.5, 2.1-2.2, 3.1-3.2,4.1 – 4.3, 5.1 – 5.6, 6.1 – 6.7
7. Presentations	
8. Service Learning Projects	
9. Quizzes (pop, announced, etc.)	1.1-1.5, 2.1-2.2, 3.1-3.2,4.1 – 4.3, 5.1 – 5.6, 6.1 – 6.7
10. Take-home tests	1.1-1.5, 2.1-2.2, 3.1-3.2,4.1 – 4.3, 5.1 – 5.6, 6.1 – 6.7
11. Summaries, critiques, and analyses	
12. Reaction papers	
13. Surveys	
14. Performance	
15. Short answer tests	1.1-1.5, 2.1-2.2, 3.1-3.2,4.1 – 4.3, 5.1 – 5.6, 6.1 – 6.7
16. Classroom debates and colloquia	
17. Blogs, wikis, web pages	
18. Other (Please explain)	

## UNITS

### Unit 1 Trigonometric functions and their graphs

#### General Outcome:

**1.0 The students should be able to define, apply, and graph the trigonometric functions.**

#### Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 1.1 Solve problems involving degree and radian measure of angles as they relate to circular models in the physical world.**
- 1.2 Define the sine, cosine, tangent, cotangent, secant, and cosecant functions of angles and of real numbers.**
- 1.3 Know and apply the fundamental identities relating the functions.**
- 1.4 Sketch the graphs of the six basic trigonometric functions and specify the intervals over which they increase or decrease.**
- 1.5 Identify and use the domain, range, amplitude, period and phase shift to graph trigonometric functions.**

**Common Course Number: MAC 1114**

**Unit 2 Inverse Trigonometric Functions, their properties and graphs**

**General Outcome:**

- 2.0 The students should be able to define, apply, and graph the inverse trigonometric functions.**

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 2.1 Define, and graph the inverse trigonometric functions.**
- 2.2 Apply the definitions, methods of evaluating, and techniques of graphing the inverse trigonometric functions.**

Common Course Number: MAC 1114

### Unit 3 Trigonometric Identities and Trigonometric Equations

#### General Outcome:

- 3.0 The students should be able to verify trigonometric identities and solve trigonometric equations.**

#### Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 3.1 Write the proof of trigonometric identities using fundamental identities, addition-subtraction formulas, co-function formulas, half-angle formulas, double-angle formulas, half-angle identities and product-to-sum and sum-to-product formulas.**
- 3.2 Algebraically solve trigonometric equations, both with and without an interval specified.**

**Common Course Number: MAC 1114**

**Unit 4 Solutions of Triangles**

**General Outcome:**

**4.0 The students should be able to solve right and oblique triangles.**

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 4.1 Solve a right triangle using the definitions of sine, cosine and tangent (along with cosecant, secant and cotangent).**
- 4.2 Read and interpret a word problem and apply the Law of Sines and Law of Cosines.**
- 4.3 Read and interpret real world problems such as navigational, angle of elevation/depression, temperature, air flow, biorhythms, and time.**

**Common Course Number: MAC 1114**

**Unit 5 Trigonometric Form of Complex Numbers, DeMoivre's Theorem, and Polar Coordinates.**

**General Outcome:**

- 5.0 The students should be able to manipulate complex numbers in trigonometric form and use DeMoivre's theorem to find nth roots and powers of complex numbers.**

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 5.1 Compute the absolute value of complex numbers; represent complex numbers geometrically and in trigonometric form; and compute products and quotients of complex numbers in trigonometric form (optional).**
- 5.2 Use DeMoivre's theorem to find nth powers and nth roots of complex numbers in trigonometric form (optional).**
- 5.3 Plot points in polar coordinates on a polar plane.**
- 5.4 Convert ordered pairs from rectangular to polar coordinates and vice-versa.**
- 5.5 Convert equations in rectangular form to polar form and vice-versa.**
- 5.6 Plot graphs of simple polar equations.**

Common Course Number: MAC 1114

## Unit 6 Vectors and Parametric Equations

### General Outcome:

- 6.0 The students should be able to manipulate 2-dimensional vectors; use vectors to solve applied problems; and work with parametric equations.

### Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 6.1 Interpret the various forms of vectors both geometrically and analytically as used in physics.
- 6.2 Perform operations of addition, subtraction, and scalar multiplication of vectors both geometrically and analytically.
- 6.3 Calculate the dot product of vectors, the scalar projection of a vector onto another vector, and the cosine of the angle between vectors.
- 6.4 Express vectors in trigonometric form.
- 6.5 Read, interpret, and solve applied problems using vectors as used in physics.
- 6.6 Plot equations represented by parametric equations (optional).
- 6.7 Eliminate the parameter in a set of equations (optional).