CENTRAL TEXAS COLLEGE  
SYLLABUS FOR MATH 1316  
TRIGONOMETRY  

Semester Hours Credit: 3

I. INTRODUCTION

A. Math 1316, Trigonometry, is a three semester hour course. The course covers topics including trigonometric functions, radian and degree measure, circular functions, solving right and oblique triangle problems, deriving and verifying trigonometric identities, inverse trigonometric functions, and solving conditional equations.

B. This course meets the college core requirement.

C. Prerequisites: DSMA 0303 or equivalent, or acceptable placement test score.

II. LEARNING OUTCOMES

Upon successful completion of this course, Trigonometry, the student will be able to:

A. State and apply the definitions of the six trigonometric functions in terms of the unit circle, a point on the terminal side of an angle, and right triangle relations. (C5, C6, F3, F4, F11)
B. Evaluate trigonometric functions using definitions and calculators. (C5, C6, F3, F9, F11)
C. Solve problems involving degree and radian measure. (C5, C6, F3, F4, F10, F11, F12)
D. Graph the six trigonometric functions and answer questions related to the graphs. (C5, C6, F1, F3, F4, F10)
E. Solve problems involving the inverse trigonometric functions. (C5, C6, F3, F4, F12)
F. Verify and solve problems involving trigonometric identities. (C5,C6, F3, F4, F12)
G. Solve trigonometric equations. (C5, C6, F3, F4, F11)
I. Solve problems involving vectors, complex numbers, DeMoivres Theorem, parametric equations and polar coordinates. (C5, C6, F3, F4, F10, F12)
J. Determine the trigonometric form of a complex number. (C5, C6, F3, F4, F12)
K. Use electronic and other media, such as the computer and DVD, to reinforce and supplement the learning process. (F1, F2, F3, F4, F6)

III. INSTRUCTIONAL MATERIALS

The Instructional materials identified for this course are viewable through www.ctcd.edu/books
IV. COURSE REQUIREMENTS

A. Assignments are given in MyMathLab (MML) and are due as scheduled by your instructor. The instructor will monitor students’ progress in completing the assignments.

B. Students are expected to attend every class, to arrive at each class on time, and remain in class for the entire period. Instructors may choose to lower a student's grade because of tardiness.

V. EXAMINATIONS

A. Examinations will be given at appropriate points during the semester. Each examination will be announced in class in advance. There will be three examinations, including the comprehensive final exam.

B. Students who miss an exam should discuss with the instructor the circumstances surrounding the absence. The instructor will determine whether a make-up exam is to be given. It is necessary to make an appointment with the instructor for a make-up exam.

VI. SEMESTER GRADE COMPUTATIONS

The semester average is derived from the homework, quizzes, Chapter Applications, unit exams, and REQUIRED comprehensive final exam in MyMathLab. You must take the final exam and score at least 50% to pass the course.

Final grades will follow the grade designation below:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Class Average</th>
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<tbody>
<tr>
<td>“A”</td>
<td>90 to 100</td>
</tr>
<tr>
<td>“B”</td>
<td>80 to 89</td>
</tr>
<tr>
<td>“C”</td>
<td>70 to 79</td>
</tr>
<tr>
<td>“D”</td>
<td>60 to 69</td>
</tr>
<tr>
<td>“F”</td>
<td>0 to 59</td>
</tr>
</tbody>
</table>
VII. NOTES AND ADDITIONAL INSTRUCTIONS

A. Withdrawal from Course: It is the student's responsibility to officially drop a class if circumstances prevent attendance. Any student who desires to, or must, officially withdraw from a course after the first scheduled class meeting must file an Application for Withdrawal or an Application for Refund. The withdrawal form must be signed by the student.

An Application for withdrawal will be accepted at any time prior to Friday of the 12th week of classes during the 16-week fall and spring semesters. The deadline for sessions of other lengths is as follows.

<table>
<thead>
<tr>
<th>Session</th>
<th>Deadline for Withdrawal</th>
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</thead>
<tbody>
<tr>
<td>12-week session</td>
<td>Friday of the 9th week</td>
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<tr>
<td>10-week session</td>
<td>Friday of the 7th week</td>
</tr>
<tr>
<td>8-week session</td>
<td>Friday of the 6th week</td>
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<tr>
<td>6-week session</td>
<td>Friday of the 4th week</td>
</tr>
<tr>
<td>5-week session</td>
<td>Friday of the 3rd week</td>
</tr>
</tbody>
</table>

The equivalent date (75% of the semester) will be used for sessions of other lengths. The specific last day to withdraw is published each semester in the Schedule Bulletin.

Students who officially withdraw will be awarded the grade of "W" provided the student's attendance and academic performance are satisfactory at the time of official withdrawal. Students must file a withdrawal application with the college before they may be considered for withdrawal.

A student may not withdraw from a class for which the instructor has previously issued the student a grade of "F".

B. An Incomplete Grade: The College catalog states, "An incomplete grade may be given in those cases where the student has completed the majority of the course work but, because of personal illness, death in the immediate family, or military orders, the student is unable to complete the requirements for a course..." Prior approval from the instructor is required before the grade of "I" is recorded. A student who merely fails to show for the final examination will receive a zero for the final and an "F" for the course.

C. Cellular Phones and Beepers: Cellular phones and beepers will be turned off while the student is in the classroom or laboratory.

D. Americans With Disabilities Act (ADA): Disability Support Services provide services to students who have appropriate documentation of a disability. Students requiring accommodations for class are responsible for contacting the Office of...
Disability Support Services (DSS) located on the central campus. This service is available to all students, regardless of location. Explore the website at www.ctcd.edu/disability-support for further information. Reasonable accommodations will be given in accordance with the federal and state laws through the DSS office.

E. **Civility:** Individuals are expected to be cognizant of what a constructive educational experience is and respectful of those participating in a learning environment. Failure to do so can result in disciplinary action up to and including expulsion.

F. **Advanced Math Lab:** The Math Department operates an Advanced Mathematics Lab in Building 152, Room 145. All courses offered by the Math Department are supported in the lab with appropriate tutorial software. Calculators are available for student use in the lab. Students are encouraged to take advantage of these opportunities. See posted hours for the Advanced Math Lab.

G. **Office Hours:** Full-time instructors post office hours outside the door of the Mathematics Department (Building 152, Room 223). Part-time instructors may be available by appointment. If you have difficulty with the course work, please consult your instructor.

VIII. **COURSE OUTLINE**

A. **Lesson One:** The Trigonometric Functions, Acute Angles, and Right Triangles (Chapters 1 & 2)

1. **Lesson Objectives:** Upon successful completion of this lesson, the student will be able to:
   a. Discuss and apply the concept of angle.
   b. Define and apply the six trigonometric functions based on angles.
   c. Define and apply the six trigonometric functions of acute angles.
   d. Define and apply reference angles and coterminal angles.
   e. Find trigonometric function values using a calculator.
   f. Find trigonometric functions values: exact and approximate.
   g. Solve right triangles.

2. **Learning Activities:**
   a. Listen to classroom lecture and discuss exercises. (F5, F6, F7, F8)
   b. Read pages of assigned chapter. (F1)
   c. Work problems as assigned by the instructor. (F2, F7, F8, F9, F10, F11, F12)

3. **Lesson Outline:**
a. Section 1.1 Angles
b. Section 1.2 Angle Relationships and Similar Triangles
c. Section 1.3 Trigonometric Functions
d. Section 1.4 Using the Definitions of the Trigonometric Functions
e. Section 2.1 Trigonometric Functions of Acute Angles
f. Section 2.2 Trigonometric Functions of Non-Acute Angles
g. Section 2.3. Approximations of Trigonometric Function Values
h. Section 2.4. Solutions and Applications of Right Triangles
i. Section 2.5 Further Applications of Right Triangles

B. Lesson Two: Radian Measure, Circular Functions, and Graphs of the Circular Functions Inverse functions. (Chapters 3 & 4)

1. Lesson Objectives: Upon successful completion of this lesson, the student will be able to:

   a. Define and apply radian measure.
   b. Define and apply circular functions of real numbers.
   c. Solve problems involving linear and angular velocity.
   d. Graph the circular functions.
   e. Define and graph inverse functions.
   f. Evaluate inverse functions.

2. Learning Activities:

   a. Listen to classroom lecture and discuss exercises. (F5, F6, F7, F8)
   b. Read pages of assigned chapter. (F1)
   c. Work problems as assigned by the instructor. (F2, F7, F8, F9, F10, F11, F12)

3. Lesson Outline:

   a. Section 3.1 Radian Measure
b. Section 3.2 Applications of Radian Measure  
c. Section 3.3 The Unit Circle and Circular Functions  
d. Section 3.4 Linear and Angular Speed  
e. Section 4.1 Graphs of the Sine and Cosine Functions  
f. Section 4.2 Translations of the Graphs of the Sine and Cosine Functions  
g. Section 4.3 Graphs of Tangent and Cotangent Functions  
h. Section 4.4 Graphs of Secant and Cosecant Functions  
i. Section 4.5 Harmonic Motion  

C. Lesson Three: Trigonometric Identities (Chapter 5)  

1. Lesson Objectives: Upon successful completion of this lesson, the student will be able to:  
   a. Derive and apply the fundamental identities.  
   b. Verify trigonometric identities.  
   c. Derive and apply the sum for cosine.  
   d. Derive and apply the sum and difference identities for sine and tangent.  
   e. Derive and apply the double-angle identities.  
   f. Derive and apply the half-angle identities.  
   g. Derive and apply additional identities.  

2. Learning Activities:  
   a. Listen to classroom lecture and discuss exercises. (F5, F6, F7, F8)  
   b. Read pages of assigned chapter. (F1)  
   c. Work problems as assigned by the instructor. (F2, F7, F8, F9, F10, F11, F12)  

3. Lesson Outline:  
   a. Section 5.1 Fundamental Identities  
   b. Section 5.2 Verifying Trigonometric Identities  
   c. Section 5.3 Sum and Difference Identities for Cosine  
   d. Section 5.4 Sum and Difference Identities for Sine and Tangent  
   e. Section 5.5 Double-Angle Identities  
   f. Section 5.6 Half-Angle Identities  

D. Lesson Four: Trigonometric Equations, Applications of Trigonometry and Vectors (Chapters 6 & 7)
1. **Lesson Objectives:** Upon successful completion of this lesson, the student will be able to:
   
a. Define and apply inverse circular functions.
b. Solve trigonometric equations using linear methods, factoring, quadratic methods, and trigonometric identities
c. Solve trigonometric equations using half-angles and multiple angles.
d. Derive and use the Law of Sines.
e. Solve problems involving the ambiguous case.
f. Derive and use the Law of Cosines.
g. Compute the area of a triangle.
h. Solve problems involving vectors.
i. Solve problems involving the dot product of vectors.

2. **Learning Activities:**
   
a. Listen to classroom lecture and discuss exercises. (F5, F6, F7, F8)
b. Read pages of assigned chapter. (F1)
c. Work problems as assigned by the instructor. (F2, F7, F8, F9, F10, F11, F12)

3. **Lesson Outline:**
   
a. Section 6.1 Inverse Circular Functions
b. Section 6.2 Trigonometric Equations I
c. Section 6.3 Trigonometric Equations II
d. Section 6.4 Equations Involving Inverse Trigonometric Functions
e. Section 7.1 Oblique Triangles and the Law of Sines
f. Section 7.2 The Ambiguous Case of the Law Sines
g. Section 7.3 The Law of Cosines
h. Section 7.4. Geometrically Defined Vectors and Applications
i. Section 7.5. Algebraically Defined Vectors and the Dot Product

E. **Lesson Five:** Complex Numbers, Polar Equations, and Parametric Equations (Chapter 8)

1. **Lesson Objectives:** Upon successful completion of this lesson, the student will be able to:
   
a. Define and solve problems involving complex numbers.
b. Define and solve problems involving trigonometric form of complex numbers.
c. Find products and quotients in trigonometric form.
d. Find roots of a complex number.
e. Define and solve problems involving polar coordinates.
f. Solve polar equations.
g. Graph polar equations.

2. Learning Activities:
   a. Listen to classroom lecture and discuss exercises.  (F5, F6, F7, F8)
   b. Read pages of assigned chapter.  (F1)
   c. Work problems as assigned by the instructor.  (F2, F7, F8, F9, F10, F11, F12)

3. Lesson Outline:
   a. Section 8.1 Complex Numbers
   b. Section 8.2 Trigonometric (Polar) Form of Complex Numbers
   c. Section 8.3 The Product and Quotient Theorems
   d. Section 8.4 De Moivre’s Theorem: Powers and Roots of Complex Numbers
   e. Section 8.5 Polar Equations and Graphs
   f. Section 8.6 Parametric Equations, Graphs, and Applications