Hello, Trigonometry students! My name is Dr. Colin Lawson and I am so excited to begin the semester with you and explore the wonderful world of trigonometry. Math 1316 is a 3-credit course where we will study the relationship between length and angles. In this class, we will explore angles and how to measure them, trigonometric functions, identities, and equations, and also how to use trigonometry to solve real-world problems.

Primary course website: Access course announcements, syllabus, schedule, and grades on D2L: https://d2l.sfasu.edu.

Office hours: I am available to meet in my office at the days/times listed below.

<table>
<thead>
<tr>
<th>Mon</th>
<th>Tues</th>
<th>Wed</th>
<th>Thurs</th>
<th>Fri</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-11:30am and 1-3pm</td>
<td>11-11:30am and 1-3pm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For the times in the table above, no appointment is needed; simply show up to my office. Appointments at other times may also be scheduled.


Materials: Fillable notes will be provided, so you should acquire a 3-ring binder to keep course materials organized. Calculators are not permitted on tests.

Assessments: Expect a wide range of assessments: homework, quizzes, three tests during the semester, and a comprehensive final exam at the end of the semester, regularly assigned homework, and a writing assignment. Your grade is determined by these assessments. Details follow:

Online Homework (13%): Expect weekly online homework in WebWorks throughout the semester. Information regarding WebWorks will be given within the first two weeks of classes.

Quizzes (13%): Expect several quizzes throughout the semester, some individual and some group, some quizzes scheduled and some not.

Tests: The test dates are tentative and may change. If an exam must be missed, make arrangements with me prior to the date of the exam.

Test 1 (13%): Friday, February 16, 2024
Test 2 (13%): Friday, March 22, 2024
Test 3 (13%): Friday, April 19, 2024

Writing Assignments (13%): Expect two writing assignments, the first due at the end of Module 1 and the second at the end of Module 2.

Comprehensive Final Exam (22%): The final is university-scheduled and cannot be taken at a different time without permission of the Dean of the College of Sciences and Mathematics. The final exam is on Monday, May 6, 2024 from 1:00pm – 3:00pm.

Grading Policy: Participation: I reserve the right to reduce a student’s grade on any assessment based on their lack of participation on the assessment.

Grading Policy: 13% Online Homework  Grade Scale: 90% - 100% A
13% Quizzes 80% - 90% B
39% Three tests (13% each) 70% - 80% C
13% Writing assignment 60% - 70% D
22% Comprehensive Final Exam Below 60% F
Assignment Title: Real World Trig

Objective: Apply trigonometric concepts learned in the first module to real-world scenarios.

Instructions:

1. **A Theme:** A theme or real-world scenario will be decided by the class at the beginning of Module 1 and then a different theme at the beginning of Module 2. It could be anything from architecture and engineering to nature and sports.

2. **Identify Trigonometric Concepts:** List the specific trigonometric concepts covered in the current module.

3. **Construct a Problem:** Devise a homework problem related to the theme that involves applying one or more of the trigonometric concepts from the module. Ensure that the problem is solvable using the knowledge gained from the module.

4. **Provide Context:** Write a brief paragraph explaining the real-world context of your problem. Discuss how understanding trigonometry is essential in solving problems related to the chosen theme.

5. **Solve the Problem:** Solve the problem you created, demonstrating the application of trigonometric principles. Include any necessary calculations and explanations.

6. **Reflect:** Write a reflection paragraph discussing the process of creating the problem, its relevance to the chosen theme, and how trigonometry enhances our understanding of the real world.

Submission Guidelines:

- Submit a typed document with your constructed problem, context paragraph, solution, and reflection.
- Use clear and concise language.
- Ensure mathematical notation is accurate.

**More details on writing assignments will be given in class.**

**Writing assignments are due in D2L by 11:59pm (Nacogdoches, TX time) on the night of the module test.**
## SCHEDULE OF EVENTS

<table>
<thead>
<tr>
<th>MODULE 1</th>
<th>Weeks 1-2: Introduction to Angles and Their Measures (5.1)</th>
<th>Weeks 3-4: Trig Functions and Unit Circle (5.2-5.4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Introduction to angles, degrees, and radians</td>
<td>- Introduction to right angle trigonometry</td>
</tr>
<tr>
<td></td>
<td>- Conversion between degrees and radians</td>
<td>- The trigonometric functions in the coordinate plane</td>
</tr>
<tr>
<td></td>
<td>- Coterminal angles</td>
<td>- Unit circle trigonometry</td>
</tr>
<tr>
<td></td>
<td>- Arc length, linear/angular speeds, and area of a sector</td>
<td></td>
</tr>
<tr>
<td><strong>Friday, February 16, 2024</strong></td>
<td><strong>TEST 1</strong></td>
<td>(Module 1 Writing Assignment due by 11:59pm)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MODULE 2</th>
<th>Weeks 5-6: Graphs of Trigonometric Functions (5.5 – 5.6)</th>
<th>Week 7: Inverse Trigonometric Functions (5.7)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Graphs of sine, cosine, and tangent functions</td>
<td>- An introduction to inverse trig functions</td>
</tr>
<tr>
<td></td>
<td>- Transformations of trigonometric graphs</td>
<td>- Evaluating inverse sine, cosine, and tangent</td>
</tr>
<tr>
<td></td>
<td>- Graphs of cosecant, secant, and cotangent</td>
<td>- Evaluating composition involving inverse trig functions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Inverse cosecant, secant, and cotangent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>%%% SPRING BREAK %%%</td>
</tr>
<tr>
<td><strong>Friday, March 22, 2024</strong></td>
<td><strong>TEST 2</strong></td>
<td>(Module 2 Writing Assignment due by 11:59pm)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MODULE 3</th>
<th>Weeks 9-10: Trigonometric Identities (6.1)</th>
<th>Weeks 11-12: Trigonometric Equations (6.2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Fundamental trigonometric identities</td>
<td>- Solving basic trigonometric equations</td>
</tr>
<tr>
<td></td>
<td>- Proving trigonometric identities</td>
<td>- Solving advanced trigonometric equations</td>
</tr>
<tr>
<td></td>
<td>- Sum and difference identities</td>
<td>- Applications of trigonometric equations</td>
</tr>
<tr>
<td><strong>Friday, April 19, 2024</strong></td>
<td><strong>TEST 3</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MODULE 4</th>
<th>Week 13: Sum\Difference, Double\Half-Angle For (6.3-6.4)</th>
<th>Week 14: Law of Sines and Law of Cosines (7.1 – 7.2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Introduction to the sum and difference formulas</td>
<td>- Law of Sines</td>
</tr>
<tr>
<td></td>
<td>- Introduction to double-angle formulas</td>
<td>- Law of Cosines</td>
</tr>
<tr>
<td></td>
<td>- Introduction to half-angle formulas</td>
<td>- Applications of the laws in solving triangles</td>
</tr>
<tr>
<td></td>
<td>- Applications of these formulas</td>
<td></td>
</tr>
<tr>
<td>**<strong>COMPREHENSIVE FINAL EXAM</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Math 1316 – Plane Trigonometry
Course Syllabus

Course description: Trigonometric functions of angles, radian measure, fundamental identities; addition, product, and half angle formulas, solution of triangles; polar coordinates; inverse trigonometric functions, complex numbers.

Credit hours: 3

The following is an excerpt from SFA Policy 5.4:

The federal definition of a credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates:

1. Not less than one hour of classroom or direct faculty instruction and a minimum of two hours out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or 10 to 12 weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time, or;

2. At least an equivalent amount of work as outlined in item 1 above for other academic activities as established by the institution including laboratory work, internships, practica, studio work, and other academic work leading to the award of credit hours.

To this end, all students in courses offered by the Department of Mathematics and Statistics that wish to be successful should plan to spend a minimum of two hours outside of class for every credit hour associated with this course. Expected activities to be completed in the time outside of class include reviewing notes from previous class meetings, reading assigned course resources, completing all assigned exercises and projects, and performing periodic assessment preparation.

Course Prerequisites and Corequisites: See general course prerequisites.

Course outline:

- Angles and definitions of trigonometric functions
  - Angles
    - Degree measure of angles
    - Reference angles
    - Radian measure of angles
    - Arc length, angular velocity, linear velocity
  - Trigonometric functions
    - Definition using the unit circle
    - Reciprocal, ratio, and Pythagorean identities
    - Definition using ratios of sides of right triangles
    - Evaluating exact values for special angles

- Graphs of trigonometric functions
  - Basic graphs of the trigonometric functions
  - Modified graphs of the trigonometric functions
    - Amplitude
    - Period
    - Vertical translation
    - Phase shift

- Inverse Trigonometric Functions and Solving Equations
  - Definitions and graphs of inverse trigonometric functions
  - Calculations with inverse trigonometric functions
  - Solving trigonometric equations
    - Using factoring, identities, and quadratic formula
    - Arguments with multiple angles
    - Using inverse functions to approximate solutions

Approximate time spent

- 15%
• **Identities** 20%
  - Logic and techniques for proving identities
  - Calculations with identities
  - Sum and difference identities
  - Even, odd, and cofunction identities
  - Double and half-angle identities
  - Product-to-sum and sum-to-product identities

• **Solving Triangles** 15%
  - Accuracy and significant digits
  - Solving right triangles
  - Law of Cosines
  - Law of Sines
  - Ambiguous case (SSA)
  - Applications
    - Navigation
    - Surveying
    - Angles of depression/elevation
    - Areas of triangles

• **Vectors, Complex Numbers, and Polar Coordinates** 20%
  - Vectors
    - Definitions
    - Algebraic representations and resolving vectors
    - Resultant vector
    - Angle between vectors
    - Dot product and orthogonality
    - Applications
      - Forces
      - Air speed/ground speed
      - Work
  - Complex number system
    - Definitions
    - Arithmetic and simplification of complex numbers
    - Trigonometric form
    - Products and quotients in trigonometric form
    - De Moivre’s Theorem
    - nth root theorem
  - Polar coordinate system
    - Definitions
    - Various representations for points using polar
    - Conversion between polar and rectangular coordinates
    - Graphs of polar equations
    - Conversion between polar and rectangular
    - Special polar graphs

**Student Learning Outcomes (SLO):** At the end of MTH 1316, a student who has studied and learned the material should be able to:

1. State and use the unit circle and ratio definitions of the six trigonometric functions.
2. Recall and use exact values of the trigonometric functions at integer multiples of π/4 and π/6 in various contexts, especially in graphing trigonometric functions.
3. Graph the trigonometric functions, and graph transformations of trigonometric functions by recognizing amplitude, changes in period, vertical translations, and phase shifts.
4. Use appropriate trigonometric identities in solving equations involving trigonometric functions and in calculating trigonometric function values.
5. Use logical reasoning and known trigonometric identities to verify that an equation is a trigonometric identity.
6. Use inverse trigonometric functions in applications and in solving equations.
7. Determine unknown measures of sides and/or angles of triangles for which some specific measures are given.
8. Solve application problems using tools such as vectors, right triangle trigonometry, the Law of Sines, and the Law of Cosines.
9. Perform arithmetical operations with complex numbers and find powers and roots of complex numbers in trigonometric form.
10. Use the polar coordinate system, relate it to the rectangular coordinate system, and graph equations using polar coordinates.

There are no specific program learning outcomes for this major addressed in this course. It is a general education core curriculum course and/or a service course.

Academic Integrity

The Code of Student Conduct and Academic Integrity outlines the prohibited conduct by any student enrolled in a course at SFA. It is the responsibility of all members of all faculty, staff, and students to adhere to and uphold this policy.

Articles IV, VI, and VII of the new Code of Student Conduct and Academic Integrity outline the violations and procedures concerning academic conduct, including cheating, plagiarism, collusion, and misrepresentation. Cheating includes, but is not limited to: (1) Copying from the test paper (or other assignment) of another student, (2) Possession and/or use during a test of materials that are not authorized by the person giving the test, (3) Using, obtaining, or attempting to obtain by any means the whole or any part of a non-administered test, test key, homework solution, or computer program, or using a test that has been administered in prior classes or semesters without permission of the Faculty member, (4) Substituting for another person, or permitting another person to substitute for one’s self, to take a test, (5) Falsifying research data, laboratory reports, and/or other records or academic work offered for credit, (6) Using any sort of unauthorized resources or technology in completion of educational activities.

Plagiarism is the appropriation of material that is attributable in whole or in part to another source or the use of one’s own previous work in another context without citing that it was used previously, without any indication of the original source, including words, ideas, illustrations, structure, computer code, and other expression or media, and presenting that material as one’s own academic work being offered for credit or in conjunction with a program course or degree requirements.

Collusion is the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any provision of the rules on academic dishonesty, including disclosing and/or distributing the contents of an exam.

Misrepresentation is providing false grades or résumés; providing false or misleading information in an effort to receive a postponement or an extension on a test, quiz, or other assignment for the purpose of obtaining an academic or financial benefit for oneself or another individual or to injure another student academically or financially.

Withheld Grades Semester Grades (SFA Policy 5.5)

Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average. The circumstances precipitating the request must have occurred after the last day in which a student could withdraw from a course. Students requesting a WH must be passing the course with a minimum projected grade of C. For additional information, go to https://www.sfasu.edu/policies/course-grades-5.5.pdf.

Students with Disabilities

To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be sfasu.edu/math
provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices.

Student Wellness and Well-Being

SFA values students' overall well-being, mental health and the role it plays in academic and overall student success. Students may experience stressors that can impact both their academic experience and their personal well-being. These may include academic pressure and challenges associated with relationships, emotional well-being, alcohol and other drugs, identities, finances, etc.

If you are experiencing concerns, seeking help, SFA provides a variety of resources to support students’ mental health and wellness. Many of these resources are free, and all of them are confidential.

On-campus Resources:
The Dean of Students Office (Rusk Building, 3rd floor lobby)
www.sfasu.edu/deanofstudents
936.468.7249
dos@sfasu.edu

SFA Human Services Counseling Clinic Human Services, Room 202
www.sfasu.edu/humanservices/139.asp
936.468.1041

The Health and Wellness Hub “The Hub”
Location: corner of E. College and Raguet St.

To support the health and well-being of every Lumberjack, the Health and Wellness Hub offers comprehensive services that treat the whole person – mind, body and spirit. Services include:

- Health Services
- Counseling Services
- Student Outreach and Support
- Food Pantry
- Wellness Coaching
- Alcohol and Other Drug Education

www.sfasu.edu/thehub
936.468.4008
thehub@sfasu.edu

Crisis Resources:
- Burke 24-hour crisis line: 1.800.392.8343
- National Suicide Crisis Prevention: 9-8-8
- Suicide Prevention Lifeline: 1.800.273.TALK (8255)
- Crisis Text Line: Text HELLO to 741-741

Acceptable Student Behavior

Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy 10.4). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom.

Date of document: 08/23/2023