
**PREREQUISITES:**
The Math Aptitude Test (MAT) is required to register for this course. See http://www.uta.edu/math/pages/main/mpt.htm for test details.

**Course Content:** From the UTA Catalog: Trigonometric functions, radian measure, solution of triangles, graphs of trigonometric functions, trigonometric identities and equations, and complex numbers. This course is not intended for Science majors.

Information concerning major assignments/examinations and makeup policy:
[Add to any information given: This is a course which satisfies the mathematics core requirement for the State of Texas and as such you will be ask to submit a "signature" assignment which addresses the core objectives of the course]

**Attendance Policy:**

**Calculation of Grade:**

**COURSE PURPOSE, LEARNING OUTCOMES AND OBJECTIVES (SEE ATTACHED ASSIGNMENT SHEET):**

**PURPOSE**

This is a traditional trigonometry course intended for non-science majors, and which satisfies the UTA core curriculum requirement in mathematics. Note however that degree plans in various disciplines at UTA may call for additional math. Science, engineering and math students should explore the possibility of enrolling in PreCalculus II, which also covers trigonometry.

**OBJECTIVES**

The main objectives in a mathematics core curriculum course such as this one are to enhance the student’s

(1) ability to communicate effectively,

(2) ability to apply critical thinking skills, particularly to the types of real world problems encountered in the course, and

(3) skills in handling problems that are highly quantitative in nature or that require an empirical mode of thought to be successful.
LEARNING OUTCOMES

Upon successfully completing the course, the student

1. Will be familiar with the definitions and basic formulas having to do with: angles (both traditional geometric ones and those viewed as signed rotations, particularly those in standard position), the measure of angles, arc length on a circle, areas of circles and circular sectors, areas of triangles, similar triangles, right triangles (e.g. the Pythagorean Theorem) -- 30°-60° and 45° triangles, in particular.

2. Will be able to define and will know the basic identities involving the six trigonometric functions. Students will encounter right triangle definitions and the beginning identities first and only then are given those involving general angles in standard position and the unit-circle. The student will be able to find the exact values of these functions for special angles in standard position and will be able to use a scientific calculator to evaluate them otherwise.

3. Will be able to determine whether a given equation involving trigonometric functions is an identity, a conditional equation or a contradiction, and if an identity, be able to establish that fact. Traditional identities requiring considerably more algebraic manipulations than the ones just mentioned are given also, but only after an interlude of several unrelated assignments.

4. Will be able to graph by hand trigonometric functions which are standard combinations (including shifting up and down) of A sin Bx, A cos Bx and A tan Bx. Emphasis will placed on the more basic ones involving sines and cosines. The student will also be expected to be able to identify the graph of a function from a list of graphs and to write the equation of a given graph.

5. Will know the formulas for sin(A+B), cos(A+B), tan(A+B), sin 2A, cos 2A, tan 2A, and the corresponding formulas for A/2. He or she will be able to use these formulas to find the exact values of the trig functions of angles heretofore not possible to find, and will be able to prove identities involving these formulas. These are potentially the most bothersome ones in the course.

6. Will be able to define and evaluate inverse trig functions (primarily those of sin, cos and tan). These definitions are intimately tied to the concepts of the range and domain of the functions and the student will be expected to know when and how to take corrective actions to avoid getting an incorrect answer by just "plugging into" a calculator.

7. Will be able to solve trigonometric equations involving one or two functions, primarily (but not always)those that ask for solutions between 0 and 2n or 0° and 360°.

8. Will know the Law of Sines, the Law of Cosines, and will be able to use them to solve for the unknown parts of triangles in the traditional SAS, ASA, SSS situations as well as in the ambiguous" case.

9. Will know and be able to use correctly the various formulas from trigonometry for the area of a triangle.

10. Will understand complex numbers and their arithmetic, and will understand the meaning of polar coordinates and be able switch from rectangular coordinates to polar coordinates and vice versa.

Students who have acquired the knowledge and capabilities described above will find their skills in the course objectives above enhanced in the following ways:
Communication Skills

The students will be creating solutions to real world word problems throughout the course ("word problems"), and the presentations of those solutions will require strong communication skills. However, nowhere are communication skills called upon more (in any elementary math course) than in the special problems at the end of every section on the assignment sheet called "CATCH THE MISTAKE". Here the student is ask to explain what is wrong with a proposed mathematical solution to a problem. By the very nature of the problem the student has to use strong critical thinking skills to identify errors not so obvious, algebraic (quantitative) skills to back that claim up by patching things up, and communication skills to described what has gone on. There are such problems on all of the assignments. Examples of ones either on, or similar to ones on, the assignment sheet are: 1.1 #67, 68, p.16; 2.4 #63, 64, p.119; 3.4 #79, 80, p. 168; 6.1 #113, 114, p.341.

Critical Thinking Skills

As above for communication skills, critical thinking skills are called for throughout the course and in particular in the word problems. Even early problems like #60, p. 15 on assignment 1, as simple as they are mathematically, call for careful reading and analysis. The student is ask to find how far away to drive in a stake holding up a Christmas tree so that the angle of inclination of the line is a certain value. Problems such as #53-#60 on section 4.1 and #47-#50 on section 4.2 (assignments 13 and 14) are examples of non-word problems calling for a high degree of critical thinking skills. These problems call for the student to either match a given graph which the correct equation or to write a correct equation for a graph pictured. In either case the student sees one object and is expected --without working the problem out—to visualize what that object transforms into in one case, and to visualize what object from a list transformed into it. Probably the problems calling for the most skill in this area are traditional ones like #57, p. 395, assignment 24 (a "triangulation" problem) and #31, p. 287, assignment 18 (a very far from obvious identity to prove). The former is representative of the type which gave trigonometry its name, and the latter representative of type which trig students traditionally remember with extreme uneasiness if not fear. The latter identity is not difficult symbolically, but it requires careful critical analysis of the details of the equation involved.

Empirical and Quantitative Skills

Being a traditional math course these skills are obviously called upon and developed throughout the course. However several assignments stand out in this regard. One is the identities the students are ask to prove in sections 5.1, 5.2, 5.3, 5.4. Most of these problems require a strong two pronged attack: strong quantitative skills which act as echo locators, probing quickly ahead a few mental "what if" steps in order to avoid collisions and investigate possible paths ahead, Critical Thinking skills acting as a global navigation system keeping your mind as best as possible on a correct heading to the solution. Also calling for a high level of quantitative skills, of another type, are assignments 21 and 22. They concern trig equations, ones with only one function in 21, two or more in 22. To work these problems efficiently a student must repeated recall the values of the trig functions of numerous basic acute angles, take into account sign, use the appropriate reference angle, and then determine the angle which is then one part of the solution. No skill is more important in solving trig equations that the quantitative skill associated with being able to plug values in quickly as probes to see what's really going on. It often illuminates aspects of the problem which lead not only to a solution but to one that then seems obvious to you.
Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance.** Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/aaio/fao/).

Americans with Disabilities Act: The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the Americans with Disabilities Act (ADA). All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Academic Integrity: Students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

> I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.
>
> I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System Regents’ Rule 50101, §2.2, suspected violations of university’s standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student’s suspension or expulsion from the University.

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as “lecture,” “seminar,” or “laboratory” shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student’s feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington’s effort to
solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs.

**Final Review Week:** A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabus. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except make-up tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

**Emergency Exit Procedures:** [NEW and REQUIRED] Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which is located [insert a description of the nearest exit/emergency exit]. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.

[As you see, this new section requires faculty members to be fully aware of the exits nearest their classrooms, even before the semester begins. In the case that you are unable to ascertain this information in time for your syllabus, you must be sure to explain to your students on day one how best to exit the building. Inclusion of this verbiage as well as a brief discussion on the matter with your students at the beginning of the term is mandated by UT Arlington Procedure 7-6: Emergency/Fire Evacuation Procedures (https://www.uta.edu/policy/procedure/7-6).]

**Course Schedule.** [Required]
You must provide students with a schedule / timetable for the course. Furthermore, per House Bill 2504, your course schedule must “[provide] a general description of the subject matter of each lecture or discussion.”

In your course schedule, you should strive to indicate (to the extent possible) dates for all major work to be completed. (The definition of “major” is left to the discretion of each instructor.)

Immediately before or after the course schedule, you are encouraged to include the following verbiage (or something similar): “As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. –First M. Last.” Should you find such adjustments to be necessary, please do your best to advise students in a timely manner. (The definition of “timely” is left to the discretion of each instructor.)

If you plan to include important administrative dates (e.g., the officially-scheduled time slot for your course’s final examination, the last day to drop), please be sure to double-check the relevant information published by the Office of Records and Registration. Particularly useful are the pages for Faculty and Staff Services and for the Academic Calendar.
SIGNATURE ASSIGNMENT FOR MATH 1303:

1. p.119, #63, 2.4  
2. p.150, #74, 3.2  
3. p.224, #81, 4.2  
4. p. 352, #72, 6.2  
5. p. 395, #58, 7.2  
6. p. 59, #64, 1.5  
7. p. 384, #47, 7.1  
8. p. 350, #28, 6.2  
9. p. 357, #22, 6.3  
10. p. 287, #31, 5.2

Problems 1 through 4 are all of the "CATCH THE MISTAKE" type discussed before. All require explanations about what in incorrect with a purported solution. The problems clearly call for all three of the core objective skills, but the one thing that most gives these problems their distinctive flavor is the extent to which they call for communication skills.

Problems 5 - 7 are word problems which describe real world geometric situations. These are fairly lengthy descriptions and as is the case with #5 may even have no accompanying picture. One must read these descriptions very, very carefully, using - in terms of the core objectives - a lot of critical thinking skills in order to translate the problem into the proper mathematical model.

Problems 8 - 10, two equations and one identity call for two types of skills under the "Quantitative Skills" label. The identity in problem 10 calls for the ability to manipulate both numbers and symbols accurately and reasonably quickly in order to be able to probe ahead quickly with your thoughts, investigating avenues of attack. The other two problems are equations which will have embedded in their solutions sections where manipulations of a highly quantitative nature dominate the proceedings. A hypothetical example: "I know 1/2 is one solution of this equation I've reduced the problem to... that makes the unknown cos 2x here equal to 1/2...so 2x has a primitive solution of 60 degrees...so how about x equal 30 degrees? ...seems to work, but now I need other angles between 0 and 360 which when doubled give an angle whose cosine equals 1/2......the angle could be anything that when doubled ends up on a terminal ray in quadrant I or IV with reference angle 60 degrees---because that's where x/R is positive and that's where ......etc. etc." The ability to add, subtract, multiply and divide positive and negative numbers quickly while focusing mainly on something else is the key to learning to handle these types of problems effectively. Quantitative Skills is the name of the game here.