MTH213-01

# PLANE TRIGONOMETRY

Spring 2021

**Class Time and Location:** 11:16-12:06 M T W R F Room 107
**Instructor**: Bernice Philpot, B.S.E., M.S.E., Henderson State University EdS., U.A. Fayetteville
**Office Location:** Mena High School, room 107
**Office Hours:** 9:30 -10:20 am Mena High School, Room 107
**Contact Information:** Cell: (479) 216-4707
Email: Bernice.philpot@menaschools.org

**Prerequisite**: MTH203 College Algebra

**Resources**:

Text: *Trigonometry*, 2nd Edition, by Mark Dugopolski, Pearson Education, Inc., Copyright 2007, ISBN # 13: 978-0321356901

Required Materials:

Loose-leaf binder or spiral notebook divided into three sections: (a) class notes, (b) homework, (c) formulas and rules.
Pencils with good erasers (no ink)
TI 84 plus graphing calculator (See teacher if you need help.)
Straight Edge, graph paper, or graph stamp are optional.

**Course Description**: The content of this course includes a brief review of the real number system, the coordinate plane, and functions and their graphs; basic right triangle trigonometry and trigonometric functions and their graphs; trigonometric identities and equations; applications of trigonometry to right and oblique triangles; vectors; complex numbers; and polar coordinates and parametric equations. (ACTS MATH1203)

**Program Outcomes:** The purpose of the Associate of Arts Program is to provide students with the knowledge and critical thinking skills that will enable students to analyze problems, arrive at intelligent conclusions, and make reasoned choices in their professional and personal lives.

- Students will demonstrate competency in mathematics, including analysis and applications..
- Students will apply technological skills to process information.
- Students will be prepared academically upon transfer to a four-year institution.

**Rationale:** An objective of post-secondary education is to provide a core of knowledge that is shared with most educated people. By studying and developing a deeper understanding of mathematical computations, students can better analyze, problem solve, and prepare critical thinking strategies for real world scenarios. Technological skills with the graphing calculator are necessary for future math courses.

**Course Objectives:** Upon successful completion of MTH 213 Plane Trigonometry, the student should

be able to:

1. Use the six trigonometric functions of acute angles in right triangles to find missing side lengths and angles in a triangle, arc lengths, and areas of portions of a circle.
2. Use the calculator to apply approximate values (radian and/or degree mode) of trigonometric functions of an angle to find angular velocity in practical applications.
3. Graph the six trigonometric functions and various transformations of those functions.
4. Simplify expressions and verify equations involving fundamental trigonometric identities.
5. Solve conditional trigonometric equations by using inverse properties of functions and the techniques involved in solving quadratic equations.
6. Solve oblique triangles using the laws of sines and cosines.
7. Perform operations on complex numbers.
8. Convert polar coordinates to rectangular coordinates (and vice versa).
9. Plot points and sketch graphs in the polar coordinate system.

Students will demonstrate mastery of the above objectives by grades of C or above on quizzes, tests, and exams.

**Topical Course Outline:**

Chapter P: <u>Algebraic Prerequisites (1 week)</u>

P.1 The Cartesian Coordinate System
P.2 Functions
P.3 Families of Functions, Transformations, and Symmetry
P.4 Compositions and Inverses

Chapter 1 <u>Angles and the Trigonometric Functions (1 week)</u>

1. Angles and Degree Measure
2. Radian Measure, Arc Length, and Area
3. Angular and Linear Velocity
4. The Trigonometric Functions
5. Right Triangle Trigonometry
6. The Fundamental Identity and Reference Angles

Chapter 2: <u>Graphs of the Trigonometric Functions (2 weeks)</u>

2.1 The Unit Circle and Graphing
2.2 The General Sine Wave
2.3 Graphs of the Secant and Cosecant Functions
2.4 Graphs of the Tangent and Cotangent Functions
2.5 Combining Functions

Chapter 3: <u>Trigonometric Identities (3.5 weeks)</u>

3.1 Basic Identities
3.2 Verifying Identities
3.3 Sum and Difference Identities for Cosine
3.4 Sum and Difference Identities for Sine and Tangent
3.5 Double-Angle and Half-Angle Identities
3.6 Product and Sum Identities

Chapter 4: <u>Solving Conditional Trigonometric Equations (2 weeks)</u>

4.1 The Inverse Trigonometric Functions

4.2 Basic Sine, Cosine, and Tangent Equations

Chapter 5: Applications of Trigonometry (3.5 weeks)

5.1 The Law of Sines
5.2 The Law of Cosines
5.3 Areas of a Triangle
5.4 Vectors
5.5 Applications of Vectors

Chapter 6: Complex Numbers, Polar Coordinates, and Parametric Equations (2 weeks)

6.1 Complex Numbers
6.2 Trigonometric Form of Complex Numbers
6.3 Powers and Roots of Complex Numbers
6.4 Polar Equations
6.5 Parametric Equations

**Important Dates:**

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| January 11 | First Day of classes |
| January 14 | Last day to drop 8-week classes with a refund |
| January 15 | Last day to add classes for registered students |
| January 25 | 11th Class Day |
| February 8 | Four week grades are due |
| February 15 | Winter Break |
| March 8 | Eight Week (Mid-term) grades due |
| March 22-26 | Spring Holidays (no classes/offices open) |
| April 12 | Twelve week grades are due |
| April 28 | Honors Evening |
| April 30 | Last day of classes/ last day to drop the class with a W |
| May 3 - 6 | Final Exams |
| May 6 | Graduation; Grades due |

**Proposed Schedule:**

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| Week 1 | 1.1-1.4 pg. 45-67 |
| Week2 | 1.3-1.5 Review and Exam |
| Week 3 | 2.1-2.3 |
| Week 4 | 2.4-2.5 Review |
| Week 5 | Chapter 2 Exam 3.1-3.2 |
| Week 6 | 3.3-3.5 |
| Week 7 | 3.6- Chapter 3 Review |
| Week 8 | Chapter 3 Exam 4.1 |
| Week 9 | 4.2-4.4 |
| Week 10 | Spring Break |
| Week 11 | Chapter 4 and Exam |
| Week 12 | 5.1-5.3 |
| Week 13 | 5.4-5.5 Review |
| Week 14 | chapter 5 Exam 6.1 |
| Week 15 | 6.2-6.4 |

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| Week 16 | 6.5 Chapter 6 Review and Exam |
| Week 17 | Review and Final exam |

**Course Conduct:**

The class will be taught using a combination of lecture, group interaction, question and answer approach, and independent study. New topics will be demonstrated using the board, overhead (Elmo) projector, and TI 84+ Smartview computer program for support of graphing calculator use. Students are strongly encouraged to discuss concepts and examples as opportunities are presented during instructor presentation. It is the student's responsibility to inform the instructor when a concept is confusing or otherwise unclear.

**UA Rich Mountain Credit Hour Calculator:**

For every course credit hour, you should expect to spend at least three clock hours per week of concentrated attention on course-related work, including but not limited to time attending class, as well as out-of-class time spent completing homework, seeking help from instructor or tutors, preparing for upcoming quizzes/tests/exam, reviewing material, problem solving, and organizing your notebook. For a three hour course, a typical student should expect to spend at least nine hours per week dedicated to this course. This includes the time spent in class. Please see the credit hour calculator attached to the end of the syllabus.

**Course Requirements / Evaluation (Grading):** For High school concurrent class only:

**Tests and Quizzes** are 50% of your quarter grade. Three chapter tests are scheduled for each quarter. Quizzes may or may not be announced.

**Homework** is 50% of your quarter grade.

Your grade for this course comes from tests (100 points each) at the end of each chapter, occasional special assigned activities ($\leq$ 50 points), homework (checked daily), and a comprehensive final exam (100 points). On each of these, all work must be shown in neat form so that the teacher can grade it for partial credit even if you got the wrong answer. The final grade for the course will be determined by multiplying 3*(3rd quarter grade) + 3*(4th quarter grade) + Final exam and dividing by 7. Grades are assigned on the basis of the following percentage scale:

90 – 100 = A  80 – 89 = B  70 – 70 = C  60 – 69 = D  0 – 59 = F

**Class Procedures/Student Requirements**:

Computer and On-Campus Resources: Your student portal contains resources/documents for each chapter studied, including assignments, examples, and review problems. You must open and print these documents prior to the beginning of each chapter. Computer labs with printers are available in several places on campus including the Johnson Learning Commons. UA Rich Mountain offers students assistance with quality tutors available in the Student Support Services (SSS) and Learning Enrichment and Counseling Center (LEAC) in the Johnson Learning Commons.

tutor.com provides 5 hours of free tutoring online for each UA Rich Mountain student per semester. Jonson Learning Commons has a contract with this online site where personal tutors are available 24/7. Create an account and get help personally from home or anywhere if internet access is available. Follow the link to log in www.tutor.com/uarichmountain.

Attendance / Make-up Policy: If a student is absent from any class, it is the student's responsibility to contact the teacher before the next class meets to determine if the absence is to be excused and if the student will be allowed to make up the missed work. There will be no make-up tests, quizzes, or exams given except in instances of the most unavoidable, serious circumstances. Approved make-ups will be taken before the class period following the absence unless other arrangements are made ahead of time with the teacher. Meanwhile, the student is responsible for instruction missed during that class by studying the material in the book, seeking help from tutors, and/or by getting class notes from another student.

Cell Phones**:** The use of cell phones in the classroom is prohibited. Turn cell phones off or on vibrate and store it out of sight during class time.

**Academic Dishonesty**: Any suspicion of academic dishonesty will result in no credit for the paper in question.

**Disability Policy:** It is the policy of UA Rich Mountain to accommodate students with disabilities, pursuant to state and federal law. Any student with a disability who needs accommodations should contact the Vice- Chancellor for Student Affairs Office, 394-7622, ext. 1400.

**Arkansas Clean Air Act**: In compliance with the Arkansas Clean Air Act, UA Rich Mountain is a smoke and tobacco free facility. Students and guests are to refrain from the use of all tobacco products while on campus.

**Student Misconduct**: Students committing misconduct are subject to disciplinary sanction(s) and/or restrictions. Misconduct or prohibited behavior includes, but is not limited to endangerment, harassment, disruption, sexual misconduct, illegal drugs and/or alcohol, fire or safety issues, gambling, property violations, computer violations or other violations as listed in the UA Rich Mountain catalog.

**Face Mask Policy:** As per the Executive Order from the governor of Arkansas, all students are required to wear a proper face covering that completely covers the nose and mouth while on campus and in class. Masks with holes or masks that do not completely cover the nose and mouth are not acceptable. Any student that does not have a proper mask will leave class and be referred to the Vice Chancellor for Student Affairs for possible disciplinary action.

**Attendance Policy**: It is the student's responsibility to immediately contact the instructor if they will not be present for class.

**Food and Drink**: Food and drinks, including water are not allowed in the classroom at any time.

**UA Rich Mountain Mission:** University of Arkansas Rich Mountain provides transformative education to all learners..

| Credit Hour Requirement Calculator | | | | | |
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| **Course Information** | | | | | |
| Department, Course Number | | | | Mathematics MTH213 | |
| Course Title | | | | Plane Trigonometry | |
| Credit Hours | 3 | | | | |
| Mode of Delivery | Traditional | | | | |
| Weeks in Part of Term | 15 | | | | |
| Level of Reading Material | Advanced/Scientific/Technical (2) | | | 2 | |
| Reading Level of Students | Average Student (2) | | | 2 | |
| Average Pages per Hour | 11 | | | | |
| | | | | | |
| | | *Enter either week or term, not both* | | | |
| **Contact Hours** | | **Hours/Week** | **Hours/Term** | **Total Hours** | |
| Lecture/Recitation | | | 45 | 45 | |
| | | | | | |
| | **Pages Asg'd** | **Hours/Week** | **Hours/Term** | | |
| **Syllabus Items** | | | | | |
| Weekly Homework Assignments | | 4 | | 60 | |
| Prepare for Chapter Tests | | | 12 | 12 | |
| Prepare for Final Exam | | | 4 | 4 | |
| Study Assigned Examples | 87 | | | 7.9 | |
| | | | | 0 | |
| | | | | 0 | |
| | | | | 0 | |
| | | | | 0 | |
| | | | | 0 | |
| | | | | 0 | |
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| **Total Hours** | | | | 128.9 | |
| **Required Hours** | | | | 112.5 | |
| **Difference** | | | | Ok + 16.4 | |

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