



## Course Syllabus

### **Math 1314 – College Algebra**

**Catalog Description:** In-depth study and applications of polynomial, rational, radical, exponential and logarithmic functions, and systems of equations using matrices. Additional topics such as sequences, series, probability, and conics may be included.

**Lecture hours = 3, Lab hours = 0**

**Prerequisites:** TSI Math Complete and high school Algebra II and Geometry

**Semester Credit Hours: 3**

**Lecture Hours per Week: 3**

**Lab Hours per Week: 0**

**Contact Hours per Semester: 48**

**State Approval Code: 27.0101.54 19**

**Class section meeting time:**

**Alternate Operations During Campus Closure:** In the event of an emergency or announced campus closure due to a natural disaster or pandemic, it may be necessary for Panola College to move to altered operations. During this time, Panola College may opt to continue delivery of instruction through methods that include, but are not limited to: online learning management system (CANVAS), online conferencing, email messaging, and/or an alternate schedule. It is the responsibility of the student to monitor Panola College's website ([www.panola.edu](http://www.panola.edu)) for instructions about continuing courses remotely, CANVAS for each class for course-specific communication, and Panola College email for important general information.

#### **Artificial Intelligence (AI) Course Policy:**

There are situations throughout the course where you may be permitted to use artificial intelligence (AI) tools to aide in further understanding of mathematical concepts. However, AI tools may not be used for any graded assignments including but not limited to exams, quizzes, and projects. Use of any AI-generated content in this course without the instructor's consent qualifies as academic dishonesty and violates Panola College's standards of academic integrity.

#### **Core Components and Related College Student Learning Outcomes**

This course counts as part of the academic requirements of the Panola College Core Curriculum and an Associate of Arts or Associate of Science degree.  Yes  No: If no, skip to Instructional Goals.

The items below marked with an X reflect the state-mandated outcomes for this course **IF this is a CORE course:**

- Critical Thinking Skills – to include creative thinking, innovation, inquiry and analysis, evaluation and syntheses of information

- CT1: Generate and communicate ideas by combining, changing, or reapplying existing information
- CT2: Gather and assess information relevant to a question
- CT3: Analyze, evaluate, and synthesize information
- Communication Skills – to include effective development, interpretation, and expression of ideas through written, oral, and visual communication
  - CS1: Develop, interpret, and express ideas through written communication
  - CS2: Develop, interpret, and express ideas through oral communication
  - CS3: Develop, interpret, and express ideas through visual communication
- Empirical and Quantitative Skills – to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions
  - EQS1: Manipulate and analyze numerical data and arrive at an informed conclusion
  - EQS2: Manipulate and analyze observable facts and arrive at an informed conclusion
- Teamwork – to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal
  - TW1: Integrate different viewpoints as a member of a team
  - TW2: Work with others to support and accomplish a shared goal
- Personal Responsibility – to include the ability to connect choices, actions, and consequences to ethical decision-making
  - PR1: Evaluate choices and actions and relate consequences to decision-making
- Social Responsibility – to include intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities
  - SR1: Demonstrate intercultural competence
  - SR2: Identify civic responsibility
  - SR3: Engage in regional, national, and global communities

**Instructional Goals and Purposes:**

Upon completion of MATH 1314, the student will be able to demonstrate:

1. Competence in application of the theorems and identities of exponents and radicals.
2. Competence in factoring using all patterns.
3. Competence in operations using complex numbers.
4. Competence in solving equations and systems of equations and systems of equations including quadratic forms and the use of matrices.
5. Competence in solution of stated problems.
6. Competence in the algebra of functions, composition of functions, and computation of inverses of one-to-one functions.
7. Competence in solving linear (affine), quadratic, and rational equations and inequalities, including those stated in terms of absolute value.
8. Competence in decomposing fractions into a sum of partial fractions.

9. Competence in applications of arithmetic and geometric series and sequences, permutations, and combinations.

**Learning Outcomes:**

Upon successful completion of this course, students will:

1. Demonstrate and apply knowledge of properties of functions, including domain and range, operations, compositions, and inverses.
2. Recognize and apply polynomial, rational, radical, exponential and logarithmic functions and solve related equations.
3. Apply graphing techniques.
4. Evaluate all roots of higher degree polynomial and rational functions.
5. Recognize, solve and apply systems of linear equations using matrices.

**Course Content:**

A general description of lecture/discussion topics included in this course are listed in the Learning Objectives / Specific Course Objectives sections of this syllabus.

Students in all sections of this course will learn the following content:

1. Perform the operations of addition, subtraction, multiplication, and division on polynomials.
2. Factor the following types of polynomials:
  - a. Difference of two squares
  - b. Trinomials
  - c. Sum of two cubes
  - d. Difference of two cubes
3. Reduce algebraic fractions.
4. Add and subtract rational (fractional) expressions.
5. Multiply and divide rational expressions.
6. Use the properties of exponents to simplify a numeric or algebraic expression containing rational exponents.
7. Simplify an arithmetic or algebraic expression containing rational exponents.
8. Translate an expression containing rational exponents into a radical expression.
9. Translate an expression containing radicals into an expression containing rational exponents.
10. Simplify radical expressions; i.e., write in standard form.
11. Combine radical expressions.
12. Multiply two radical expressions.

13. Rationalize a binomial denominator.
14. Find the sum, difference, product, and quotient of two complex numbers.
15. Find the solution set for a first degree equation.
16. Solve a first-degree inequality in one variable.
17. Solve a first-degree equation involving absolute value.
18. Solve a first-degree inequality involving absolute value.
19. Solve quadratic equations using the following methods:
  - a. Square-root method
  - b. Factoring
  - c. Quadratic Formula
20. Solve equations involving radicals.
21. Write an equation in quadratic form and solve.
22. Solve inequalities involving quadratic and rational expressions.
23. Graph an ordered pair.
24. Name the coordinates of a given point.
25. Graph a first-degree equation.
26. Find the distance between two points in the plane.
27. Find the midpoint of a line segment joining two points.
28. Determine the slope of a line passing through two given points.
29. Determine if two given, nonvertical lines are parallel, perpendicular, or neither.
30. Given the standard form, write the equation of a line in slope-intercept form.
31. Write the equation of a line given a point on the line and the slope of the line.
32. Write the equation of a line passing through two given points.
33. Write the equation of a line passing through a given point and parallel to the graph of a given equation.
34. Write the equation of a line passing through a given point and perpendicular to the graph of a given equation.
35. Sketch the graph of inequalities in the  $xy$ -plane.
36. Determine whether a given relation is a function.

37. Determine from a graph if a relation is a function.
38. Given an equation, determine whether the relation is a function.
39. State the domain and range of a given relation.
40. Evaluate a function for specific value of the independent variable.
41. Evaluate a piecewise function for a specific value.
42. State the domain of a function that is specified by an equation.
43. Perform the following operations on functions:
  - a. Addition
  - b. Subtraction
  - c. Multiplication
  - d. Division
  - e. Composition
  - f. Inversion
44. Graph a quadratic function by determining
  - a. the vertex
  - b. if the parabola open upward or downward
  - c. the y-intercept
  - d. the x-intercepts (or zeros), if any
45. Graph a function containing absolute value expressions.
46. Graph a piecewise defined function.
47. Use synthetic division and the remainder theorem to find the required functional value of a polynomial function.
48. Use the factor theorem to determine whether a given first degree binomial is a factor of a given polynomial; and, if so, write the polynomial in factored form.
49. Find all the roots of an equation given in factored form and state the multiplicity of each root and the degree of the equation.
50. Use the quadratic formula and the factor theorem to write a polynomial as a product of binomial and/or trinomial factors.
51. Find a polynomial equation of least degree having given roots. Multiply the factors and simplify the equation.

52. Determine if a given number is a root of a given polynomial equation.
53. Find the inverse of a relation specified by a set of ordered pairs.
54. Find the inverse of a relation or function specified by an equation.
55. Sketch the graphs of exponential functions.
56. Write an exponential equation in logarithmic form.
57. Write a logarithmic equation in exponential form.
58. Evaluate a logarithmic expression.
59. Solve a logarithmic equation with one term in logarithmic form.
60. Use the properties of logarithms to write expressions as sums or differences of simpler logarithmic terms.
61. Write an expression as a single logarithmic term with coefficient of 1.
62. Evaluate logarithmic terms based on given information.
63. Find the approximate values of given common logarithms, using tables and/or calculators.
64. Solve a logarithmic equation involving common logarithms.
65. Use the conversion formula to evaluate logarithm of a number to a base other than 10.
66. Solve an exponential equation by methods such as
  - a. equating bases
  - b. logarithmic techniques.
67. Solve a logarithmic equation with more than one term in logarithmic form.
68. Solve systems of linear equation in two variables using
  - a. graphical methods
  - b. algebraic methods
    - i. addition/elimination
    - ii. substitution
69. Solve systems of linear equations in three variables by using a triangular reduction method.
70. Solve systems of second degree equations in two variables.
71. State the dimensions of a given matrix.
72. Add and subtract matrices.

73. Solve matrix equations.
74. Find the product, if it is defined, of two given matrices.
75. Find the product of a scalar and a matrix.
76. Evaluate a determinant.
77. Solve an equation involving determinants.
78. Solve a system of equations using determinants and Cramer's Rule.
79. Solve systems of linear equation using augmented matrix techniques (i.e., Gauss-Jordan Elimination).
  - a. Write the augmented matrix for a given system.
  - b. Write the system of equations corresponding to a given augmented matrix.
  - c. Solve systems of equations by using the three elementary row operations.

**Methods of Instruction/Course Format/Delivery:**

Methods of Instruction/Course Format/Delivery: Methods employed will include Lecture/demonstration, discussion, problem solving, analysis, and reading assignments. Homework will be assigned. Faculty may choose from, but are not limited to, the following methods of instruction:

1. Lecture
2. Discussion
3. Internet
4. Video
5. Television
6. Demonstrations
7. Field trips
8. Collaboration
9. Readings

**Major Assignments/Assessment:**

Faculty may assign both in- and out-of-class activities to evaluate students' knowledge and abilities. Faculty may choose from – but are not limited to -- the following methods attendance, class preparedness and participation. Collaborative learning projects, exams/tests/quizzes, homework, internet, library assignments, readings, research papers, scientific observations, student-teacher conferences, and written assignments.

The Mathematics Department does not accept late work.

**Assessment(s):**

1. Exam per Chapter
2. Comprehensive Final Exam

**Course Grade:**

<b>Assignment Weights</b>	
Class Participation	10%
Homework/Quiz Average	15%
Exams	55%
Comprehensive Final Exam	20%

**Letter Grades for the Course will be assigned as follows:**

- A: 90 < Average < 100
- B: 80 < Average < 90
- C: 70 < Average < 80
- D: 60 < Average < 70
- F: 00 < Average < 60

**Texts, Materials, and Supplies:**

- Textbook: College Algebra Lumen Learning (No Purchase Necessary)
- Lumen OHM (No Purchase Necessary)
- Canvas Access

**Other:**

- Courses conducted via video conferencing may be recorded and shared for instructional purposes by the instructor.
- For current texts and materials, use the following link to access bookstore listings: <https://www.panolacollegestore.com>
- For testing services, use the following link: <https://www.panola.edu/student-services/student-support/academic-testing-center>
- If any student in this class has special classroom or testing needs because of a physical learning or emotional condition, please contact the ADA Student Coordinator in Support Services located in the Charles C. Matthews Student Center or go to <https://www.panola.edu/student-services/student-support/disability-support-services> for more information.
- Panola College welcomes pregnant and parenting students as a part of the student body. This institution is committed to providing support and adaptations for a successful educational experience for pregnant and parenting students. Students experiencing a need for accommodations related to pregnancy or parenting will find a Pregnancy and Parenting Accommodations Request form in *The Pathfinder* or may request the form from the course instructor.
- Withdrawing from a course is the student's responsibility. Students who do not attend class and who do not withdraw will receive the grade earned for the course.
- Student Handbook, *The Pathfinder*: <https://www.panola.edu/> (located at the bottom under students)