MATH 1314 - College Algebra Course Syllabus

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.

Semester Offered
Fall
Winter
Spring
May
Summer 1
Credits 3
Lecture Hours 3
Lab Hours 0
Extended Hours 0
Contact Hours 48
State Approval Code 27.0101.54 19
Instructor Name Regina Brazzel
Semester/Year Fall 2024

Meeting Time and Location
Math1314.503 M-F 9:45 to 10:30 am

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) for instructions about continuing courses remotely, CANVAS for each class for course-specific communication, and Panola College email for important general information.

Student Basic Needs
Unexpected circumstances may arise, but Panola College offers various resources to support students. If you need mental health services or are facing challenges with transportation, affording class materials and supplies, or accessing food regularly—issues that may impact your class performance—please visit panola.edu/resources.

Class Attendance
Regular and punctual attendance of classes and laboratories is required of all students. When a student has been ill or absent from class for approved extracurricular activities, he or she should be allowed, as far as possible, to make up for the missed work. If a student has not actively participated by the census date, they will be dropped by the instructor for non-attendance. This policy applies to courses that are in-person, online, hybrid, and hyflex.

Attendance in online courses is determined by submission of an assignment or participation in an activity. According to federal guidelines, simply logging into a distance learning course without participating in an

academic assignment does not constitute attendance. Distance learning is defined as when a majority (more than 50%) of instruction occurs when the instructor and students are in separate physical locations. Students must engage in an academic activity prior to the course census date.

When an instructor feels that a student has been absent to such a degree as to invalidate the learning experience, the instructor may recommend to the Vice President of Instruction that the student be withdrawn from the course. Instructors may seek to withdraw students for non-attendance after they have accumulated the following number of absences:

Fall or spring semesters:

3 or more class meeting times per week - 5 absences

2 class meeting times per week - 3 absences

1 class meeting per week - 2 absences

The student is responsible for seeing that he or she has been officially withdrawn from a class. A student who stops attendance in a class without officially withdrawing from that class will be given a failing grade; consequently, the student must follow official withdrawal procedures in the Admissions/Records Office.

Please note: Health Science and Cosmetology courses may require more stringent attendance policies based on their accreditation agencies. Please see the addendum and/or program handbook for further information concerning attendance.

Pregnant/Parenting Policy

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 Student Handbook or may request the form from the course instructor.

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.

Student Learning Outcomes

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

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

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 have 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 have 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/Assessments

The following items are assigned and assessed during the semester and used to calculate the student's final grade.

Assessments

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.

Course Grade

Assignment Weights

- Daily Grades 25%
- Major Exams 50%
- Comprehensive Final Exam 25%

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

Addendum

- "Each student will adhere to the instructor's course handout presented in the Canvas Course. See link for details."
- https://docs.google.com/document/d/1wx9JMITPnz4ob3YB3HLshCf8c5Z3w5w5/edit?usp=sharing&ouid=111810652394338654755&rtpof=true&sd=true

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/studentsupport/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/studentservices/student-support/disability-support-services for more information.
- 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: https://www.panola.edu/ (located on at the bottom under student)