



MAT 145 – College Algebra

MASTER COURSE SYLLABUS

****Instructors will provide students with additional course-specific information, including class meeting times [including, if applicable, a schedule of hybrid days and their corresponding online activities], attendance/makeup policies, assignment/test scheduling not already in course outline [e.g. hybrid activities; see above], class rules, and instructor contact information [name, office number, phone number, email, office hours], as necessary and appropriate.****

Credits: Lecture: 3, Lab: 0

Pre-requisite(s): MAT131 Intermediate Algebra or by Placement Exam

Course Description: Students enrolled in this course should have a strong background in basic and intermediate algebra. Topics include a more in-depth study of expressions, solving equations, solving inequalities, circles, and a detailed study of functions including polynomial, logarithmic, and exponential functions.

Course Methodology: The instructor will choose the appropriate classroom method to teach each topic including (but not limited to): lecture, discussion, question-answer, small-group problem-solving, chalkboard examples, and MyMathLab assignments.

Required Text, including ISBN:

Text with MyMathLab Access Code (Bundled):

Blitzer, Robert. College Algebra Essentials, 6e. Boston: Pearson, 2014. [Loose-leaf text plus MyMathLab access] **ISBN # 9780321900500**

- MyMathLab Access Code is needed for practice problems, student resources, homework and quizzes.
- Loose-leaf text will give you printed copies of homework and materials – access to book without computer, and no need to print out pages to study or view work. (Bookstore does not buy back the book.)

Use the correct ISBN number when ordering this bundled access package anywhere besides bookstore.

Required Course Material:

Calculator – a scientific calculator with basic arithmetic operations, exponents, fractions, logarithms, trigonometric functions, and radicals is recommended.

Course Topics:

- Radical, Rational, and Logarithmic Expressions
- Solving Equations and Inequalities
- Polynomial, Rational, Exponential, and Logarithmic Functions and Graphing
- Circles

Expected Learning Outcomes:

After successfully completing this course, students should be able to...

- 1) Demonstrate an understanding of radical, rational, and logarithmic expressions as evidenced by the following:
 - a) Given an expression involving radicals, the student will be able to perform the operations of addition, subtraction, multiplication, and division and simplify the answer at a success rate of 70%.
 - b) Given a rational expression (including complex rational expressions), the student will be able to perform the operations of addition, subtraction, multiplication, and division and simplify the answer at a success rate of 70%.
 - c) Given a logarithmic expression, the student will be able to apply the properties of logarithms to expand or condense the expression at a success rate of 70%.
- 2) Demonstrate an understanding of solving equations and inequalities as evidenced by the following:
 - a) Given a linear equation, the student will be able to solve at a success rate of 80%.
 - b) Given a quadratic equation, the student will be able to find the real or complex solutions by factoring or using the quadratic formula at a success rate of 70%.
 - c) Given a polynomial equation (degree three or higher), the student will be able to solve by factoring and applying the zero-product principle at a success rate of 70%.
 - d) Given a logarithmic or exponential equation, the student will be able to solve at a success rate of 70%.
 - e) Given other types of equations (including, but not limited to, absolute value equations, radical equations, rational equations, equations with rational exponents and equations that are quadratic in form), the student will be able to solve at a success rate of 70%.
 - f) Given a variation problem (direct, inverse, joint, or combined), the student will be able to write and solve equations that describe the variations between the given variables at a success rate of 70%.
 - g) Given a linear and absolute value inequality, the student will be able to solve for the correct range of values and use correct notation, such as inequality notation, set – builder notation, and/or interval notation, to express the solution at a success rate of 70%.
- 3) Demonstrate an understanding of functions as evidenced by the following:

- a) Given a relation, the student will be able to decide if the relation is a function at a success rate of 70%.
- b) Given a function (including piecewise functions), the student will be able to evaluate the function at a success rate of 70%.
- c) Given the graph of a function, the student will be able to determine the intervals on which the function is increasing, decreasing, or constant at a success rate of 70%.
- d) Given the graph of a function, the student will be able to determine the domain, range, and relative extrema of the function at a success rate of 70%.
- e) Given a function, the student will be able to algebraically determine if the function is even, odd, or neither at a success rate of 70%.
- f) Given the graph or equation of a function, the student will be able to graph a related function by applying the concepts of horizontal shifts, vertical shifts, and reflections across the x and y axes at a success rate of 70%.
- g) Given the equation of a function (including, but not limited to, polynomial, rational, radical, exponential, and logarithmic functions), the student will be able to find the domain at a success rate of 70%.
- h) Given two or more functions, the student will be able to combine the functions through the operations of addition, subtraction, multiplication, division, and composition at a success rate of 70%.
- i) Given the graph or equation of a function, the student will be able to find the inverse of the function at a success rate of 70%.
- j) Given the equation of a linear function, the student will be able to graph the function at a success rate of 70%.
- k) Given information about a line (such as two points on the line, one point and the slope, or a point and information about a parallel or perpendicular line), the student will be able to find the equation of the line at a success rate of 70%.
- l) Given a first or second degree polynomial function, the student will be able to find and simplify the difference quotient at a success rate of 70%.
- m) Given a quadratic function in the form $f(x) = a(x - h)^2 + k$ or $f(x) = ax^2 + bx + c$, the student will be able to find the vertex, intercepts, maximum/minimum, and graph the function at a success rate of 70%.
- n) Given a polynomial function, the student will be able to use the leading term test to predict end behavior at a success rate of 70%.
- o) Given a polynomial function, the student will be able to find the real zeros by factoring at a success rate of 70%.
- p) Given a polynomial function, the student will be able to construct the graph of the function using the zeros, multiplicities, and the leading term test at a success rate of 70%.
- q) Given a rational function, the student will be able to find the equation of the horizontal and vertical asymptotes at a success rate of 70%.

- 4) Demonstrate an understanding of circles as evidenced by the following:
- a) Given the equation of a circle in the form $(x - h)^2 + (y - k)^2 = r^2$ or $x^2 + y^2 + Dx + Ey + F = 0$, the student will be able to determine the center and radius at a success rate of 70%.
 - b) Given information about the circle (such as the center and radius, or the center and a point on the circle), the student will be able to find the equation of the circle at a success rate of 70%.
- 5) Demonstrate an understanding of exponential applications
- a) Given an exponential growth application (population, compound interest) the student will be able to solve for the unknown at a success rate of 70%

Student Evaluation:

Each student's final grade will be determined by the results of three exams, a cumulative final exam, and a combination of MyMathLab homework/quizzes and written homework. Quizzes and projects may be used at the discretion of the instructor.

At least 80% of the grade should be based on proctored, closed book/closed note activities. No extra credit will be given to any student. No assessments will be re-administered to any student.

The student's final grade will be determined using the following grading policy:

90%-100% = "A"
80% - 89% = "B"
70% - 79% = "C"
60% - 69% = "D"
below 60% = "F"

Each student must demonstrate the ability to perform all learning objectives in order to receive a minimum grade of "C" for the course.

Faculty across sections will be expected to follow the established syllabus learning outcomes, instructional objectives, and all other essential elements including common course assessments.

Course Outline:

The following is a tentative schedule for the term. Your instructor may deviate from the schedule as deemed necessary. Advance notice will be provided by your instructor if changes are made to this schedule.

Week#	Topic	Readings
1	Instructions on using MyMathLab P.3 Radicals and Rational Exponents P.6 Rational Expressions Treat this as a review and do not spend more than one week on this chapter.	Assignments: • Read the course materials • Visit the course site • Register for MyMathLab • Read sections P.3 and P.6 in the book, view MyMathLab resources, and practice problems from the book. • Submit MyMathLab homework for these sections before the due date.
2	1.1 Graphs 1.2 Linear Equations and Rational Equations 1.3 Models and Applications 1.4 Complex Numbers	• Read sections 1.1 – 1.4 in the book, view MyMathLab resources, and practice problems from the book. • Submit MyMathLab homework for these sections before the due date.
3	1.5 Quadratic Equations 1.6 Other Types of Equations 1.7 Linear Inequalities and Absolute Value Inequalities	• Read sections 1.5 – 1.7 in the book, view MyMathLab resources, and practice problems from the book. • Submit MyMathLab homework for these sections before the due date.
4	Review Chapter P and Chapter 1 Exam on Chapter P and Chapter 1	Study Chapters and Handouts
5	2.1 Basics of Functions and Their Graphs 2.2 More on Functions and Their Graphs 2.3 Linear Functions and Slope	• Read sections 2.1 – 2.3 in the book, view MyMathLab resources, and practice problems from the book. • Submit MyMathLab homework for these sections before the due date.

6	2.3 Linear Functions and Slope 2.4 More on Slope 2.5 Transformations of Functions	- Read sections 2.3 – 2.5 in the book, view MyMathLab resources, and practice problems from the book. - Submit MyMathLab homework for these sections before the due date.
7	2.5 Transformations of Functions 2.6 Combinations of Functions; Composite Functions 2.7 Inverse Functions	- Read sections 2.5 – 2.7 in the book, view MyMathLab resources, and practice problems from the book. - Submit MyMathLab homework for these sections before the due date.
8	Review Sections 2.1 – 2.7 Exam on Sections 2.1 – 2.7	Study Chapters and Handouts
9	2.8 Distance and Midpoint Formulas; Circles 3.1 Quadratic Functions 3.2 Polynomial Functions and Their Graphs	- Read sections 2.8 and 3.1 – 3.2 in the book, view MyMathLab resources, and practice problems from the book. - Submit MyMathLab homework for these sections before the due date.
10	3.2 Polynomial Functions and Their Graphs 3.3 (Optional) Dividing Polynomials; Remainder and Factor Theorems 3.4 (Optional) Zeros of Polynomial Functions 3.5 Rational Functions and Their Graphs	- Read sections 3.2 – 3.5 in the book, view MyMathLab resources, and practice problems from the book. - Submit MyMathLab homework for these sections before the due date.
11	3.5 Rational Functions and Their Graphs 3.6 Polynomial and Rational Inequalities 3.7 Modeling Using Variation	- Read sections 3.5 – 3.7 in the book, view MyMathLab resources, and practice problems from the book. - Submit MyMathLab homework for these sections before the due date.
12	Review Section 2.8 and Chapter 3 Exam on Section 2.8 and Chapter 3	Study Chapters and Handouts

13	4.1 Exponential Functions 4.2 Logarithmic Functions 4.3 Properties of Logarithms	• Read sections 4.1 – 4.3 in the book, view MyMathLab resources, and practice problems from the book. • Submit MyMathLab homework for these sections before the due date.
14	4.3 Properties of Logarithms 4.4 Exponential and Logarithmic Equations 4.5 Exponential Growth and Decay; Modeling Data Quiz on 4.1 – 4.5 (Time-permitting, if not make it part of final exam)	• Read sections 4.3 – 4.5 in the book, view MyMathLab resources, and practice problems from the book. • Submit MyMathLab homework for these sections before the due date.
15	Review for Final Exam FINAL EXAM (Cumulative)	Study chapters and handouts