

MATH 106 – COLLEGE ALGEBRA

SYLLABUS 2 SEMESTER COURSE

PROGRAM:

INSTRUCTOR: Natasza Krajcovic

COURSE TITLE: College Algebra
(CDLS courses: Algebra II – Semester 1 and 2)

COURSE PREFIX: Math 106

CREDIT HOURS: 3

PREREQUISITES:

MATH 099 minimum grade: S
OR Math Placement Test minimum score: 23
OR ACT Math minimum score: 22
OR SAT Math minimum score: 530
OR ACCUPLACER Elementary Algebra minimum score: 109

COURSE MATERIALS:

Required Textbook:

All content materials for this course are included online in the course. Materials included videos, worksheets, quizzes/tests, and activities.

CATALOG DESCRIPTION:

An introduction to the basic techniques of algebra. Topics include functions (linear, quadratic, polynomial, root, rational, exponential, and logarithmic), systems of equations, matrix algebra, inequalities, and complex numbers. Optional topics include partial fractions, synthetic division, mathematical induction, sequences and series, and counting principles.

CURRICULAR RELATIONSHIPS:

This course is of interest to students in the sciences and in other fields who want or need a course at a level lower than Calculus.

STUDENT LEARNING OUTCOMES (OR COURSE OBJECTIVES):

Upon completion of this course, the student will be able to:

MATH 106 – COLLEGE ALGEBRA

- Apply the fundamental concepts of analysis to solve problems: these concepts include the natural, rational, real, and complex number systems; algebra of polynomial, exponential, and logarithmic functions; matrix algebra; and graphing.
- Think logically and to present material in a logical fashion.
- Make productive use of technology to solve problems and to gain mathematical insights.

COURSE REQUIREMENTS:

In order to receive a passing grade, the student must:

1. Engage in the online course content and activities a minimum of 8-10 hours per week throughout both semesters (17 weeks per semester).
2. Actively participate in discussions and activities related to course objectives.
3. Complete all graded assignments – including course activities, module/lesson quizzes, discussions, unit post-tests/exams, and end-of-semester assessments.

Students will be expected to read the syllabus and understand all course requirements and expectations.

The table below summarizes all assignments, assessments, discussions and exams. Brief information is included for each assignment. Assignments are downloaded from the course and submitted to the instructor within the course. Quizzes, which are completed in each lesson, and units exams are listed in order below among assignments and discussions. The timing of all assignments and quizzes/exams is included in the Course Schedule section.

Semester 1

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| Unit 1: Polynomial, Rational, and Radical Relationships <i>Lesson / Activity</i> |
| Unit 1 Pre-test |
| Discussion 1: Polynomial, Rational, and Radical Relationships |
| 1.01 Lesson 1 "Evaluating Rational Expressions" and quiz |
| 1.02 Lesson 2 "Restrictions on Rational Expressions" and quiz |
| 1.03 Lesson 3 "Equivalent Forms of Rational Expressions" and quiz |
| 1.04 Lesson 4 "Simplifying Rational Expressions" and quiz |
| 1.05 Lesson 5 "Simplifying Polynomial Expressions" and quiz |
| 1.06 Lesson 6 "Polynomial Identities and the Binomial Theorem" and quiz |
| 1.07 Lesson 7 "Sum of Rational Expressions, Part 1" and quiz |
| 1.08 Lesson 8 "Difference of Rational Expressions, Part 1" and quiz |
| 1.09 Lesson 9 "Product of Rational Expressions" and quiz |
| Graded Unit 1 Activity: Polynomial, Rational, and Radical Relationships |
| Unit 1 Post-test |

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| Unit 2: Advanced Polynomial, Rational, and Radical Relationships: <i>Lesson / Activity</i> |
| Unit 2 Pre-test |
| Discussion 2: Advanced Polynomial, Rational, and Radical Relationships |
| 2.01 Lesson 1 "Quotient of Rational Expressions" and quiz |
| 2.02 Lesson 2 "Common Denominators of Rational Expressions" and quiz |
| 2.03 Lesson 3 "Sum of Rational Expressions, Part 2" and quiz |
| 2.04 Lesson 4 "Difference of Rational Expressions, Part 2" and quiz |
| 2.05 Lesson 5 "Simplifying Algebraic Expressions" and quiz |

MATH 106 – COLLEGE ALGEBRA

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| 2.06 Lesson 6 "Review: Rational Expressions " and quiz |
| 2.07 Lesson 7 "Rewriting Rational Expressions" and quiz |
| 2.08 Lesson 8 "Factoring Algebraic Expressions" and quiz |
| 2.09 Lesson 9 "Dividing Polynomials Using Synthetic Division" and quiz |
| Graded Unit 2 Activity: Advanced Polynomial, Rational, and Radical Relationships |
| Unit 2 Post-test |

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| Unit 3 Complex Numbers: <i>Lesson / Activity</i> |
| Unit 3 Pre-test |
| Discussion 3: Complex Numbers |
| 3.01 Lesson 1 "Plotting Complex Numbers in the Plane" and quiz |
| 3.02 Lesson 2 "Adding and Subtracting Complex Numbers" and quiz |
| 3.03 Lesson 3 "Multiplying and Dividing Complex Numbers" and quiz |
| 3.04 Lesson 4 "Solving Quadratic Equations in the Complex Number System" and quiz |
| 3.05 Lesson 5 "Other Types of Equations" and quiz |
| 3.06 Lesson 6 "Polynomial Functions" and quiz |
| 3.07 Lesson 7 "Graphing Polynomial Functions" and quiz |
| 3.08 Lesson 8 "Average Rate of Change" and quiz |
| 3.09 Lesson 9 "Finite Geometric Sums" and quiz |
| Graded Unit 3 Activity: Complex Numbers |
| Unit 3 Post-test |
| End of Semester Test |

Semester 2

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| Unit 1: Trigonometric Functions <i>Lesson / Activity</i> |
| Unit 1 Pre-test |
| Discussion 1: Trigonometric Functions |
| 1.01 Lesson 1 " Angles and Their Measures " and quiz |
| 1.02 Lesson 2 " Trigonometric Functions and the Unit Circle " and quiz |
| 1.03 Lesson 3 " Trigonometric Functions " and quiz |
| 1.04 Lesson 4 "Trigonometric Graphs" and quiz |
| 1.05 Lesson 5 "Basic Trigonometric Identities" and quiz |
| Graded Unit 1 Activity: Trigonometric Functions |
| Unit 1 Post-test |

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| Unit 2: Modeling with Functions <i>Lesson / Activity</i> |
| Unit 2 Pre-test |
| Discussion 2: Modeling with Functions |
| 2.01 Lesson 1 " Creating and Solving Equations " and quiz |
| 2.02 Lesson 2 "Rewriting Formulas" and quiz |
| 2.03 Lesson 3 " Solving Linear Systems of Equations: Graphs " and quiz |
| 2.04 Lesson 4 " Classifying Linear Systems " and quiz |
| 2.05 Lesson 5 "Solving Linear Systems of Inequalities: Graphs " and quiz |
| 2.06 Lesson 6 "Solving Linear Systems of Equations: Substitution" and quiz |
| 2.07 Lesson 7 "Estimating Solutions for a System of Equations" and quiz |
| Graded Course Activity 1: Modeling with Functions |
| Unit 2 Post-test |

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| Unit 3: Graphing with Functions <i>Lesson / Activity</i> |
| Unit 3 Pre-test |
| Discussion 3: Graphing with Functions |

MATH 106 – COLLEGE ALGEBRA

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| 3.01 Lesson 1 “Graphing Linear Inequalities in 1 Variable” and quiz |
| 3.02 Lesson 2 “Graphing with Restrictions on the Variable” and quiz |
| 3.03 Lesson 3 “Graphing Solution Sets of Associated Inequalities” and quiz |
| 3.04 Lesson 4 “Operations on Functions” and quiz |
| 3.05 Lesson 5 “Solving Problems: Exponential and Logarithmic” and quiz |
| 3.06 Lesson 6 “Graphing Exponential and Logarithmic Functions” and quiz |
| 3.07 Lesson 7 “Transformation of Functions” and quiz |
| 3.08 Lesson 8 “Inverse Functions” and quiz |
| Graded Unit 3 Activity: Graphing with Functions |
| Unit 3 Post-test |

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| Unit 4: Inferences and Conclusions from Data <i>Lesson / Activity</i> |
| Unit 4 Pre-test |
| Discussion 4: Inferences and Conclusions from Data |
| 4.01 Lesson 1 “Normal Distributions” and quiz |
| 4.02 Lesson 2 “Making Inferences Based on Statistics” and quiz |
| 4.03 Lesson 3 “Evaluating the Validity of a Statistical Model” and quiz |
| 4.04 Lesson 4 “Using Statistics in Surveys, Experiments, and Studies” and quiz |
| 4.05 Lesson 5 “Analyzing a Survey” and quiz |
| 4.06 Lesson 6 “Fair Decisions with Random Variables” and quiz |
| 4.07 Lesson 7 “Evaluating Reports Based on Data” and quiz |
| 4.08 Lesson 8 “Statistically Comparing Two Treatments” and quiz |
| 4.09 Lesson 9 “Complex Decisions Using Probability” and quiz |
| Graded Unit 4 Activity: Inferences and Conclusions from Data |
| Unit 4 Post-test |
| End of Semester Test |

Pre-tests: Pre-tests are not recorded in the gradebook. However, the pre-test scores provide information to the student and instructor on what areas the student is already proficient and what areas where additional support may be needed.

Quizzes: Quizzes are used at the end of each lesson to provide an interim assessment of student understanding.

Exams (End of Unit): At the end of each unit, an exam is given. They are to be completed in the week assigned. Tests consist of multiple choice and free-response questions. Exams are weighted at 20% of the course grade.

Graded Assignment: This course focuses on application through graded assignments. At times, a discussion portion is included in the graded assignment.

GRADE DISTRIBUTION AND SCALE:

In alignment with ASU academic policies, no D may apply to a major or minor field.

Grade Distribution (Weights):

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| Discussions | 15% |
| Assignments | 20% |
| Quizzes | 20% |

MATH 106 – COLLEGE ALGEBRA

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| End of Unit Tests | 20% |
| End-of-Semester Exam | 25% |
| Total | 100% |

Grade Scale:

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| 90 – 100% | A |
| 80 – 89% | B |
| 70 – 79% | C |
| 60 – 69% | D |
| 59% and below | F |

ADA STATEMENT:

Adams State University complies with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act. Adams State University is committed to achieving equal educational opportunities, providing students with documented disabilities access to university programs. In order for a course to be equally accessible to all students, different accommodations or adjustments may need to be implemented. The Office of Disability Services (ODS) is located in Richardson Hall, Suite 3-100, by mail at 208 Edgemont Blvd., Suite 3-100, Alamosa, CO 81101, by email at odsd@adams.edu, or by calling 719-587-7746. They are your primary resource on campus to discuss the qualifying disability, help you develop an accessibility plan, and achieve success in your courses. Please communicate with them as early as possible; this can be in person, via email, or by phone. The Disability Services Coordinator shall either provide you letters to give to your professors for accommodations or email these letters out to you and your professors.

ACADEMIC INTEGRITY:

In accordance with Academic Policy 100-03-01, Adams State University, to preserve academic integrity, does not tolerate academic dishonesty (misconduct). Every student is required to practice and adhere to the principle of ACADEMIC INTEGRITY while undertaking studies at Adams State University. Students and faculty at Adams State University value academic honesty as a virtue essential to the academic process. Cheating, plagiarism, unauthorized possession or disposition of academic materials, or the falsification or fabrication of one's academic work will not be tolerated.

Any offense will result in a zero for the exam, lesson, or exercise in question and will result in failure of the course. Please refer to the ASU Extended Studies Academic Integrity website for more information including the student handbook: [Academic Integrity at Adams State University](#).

All written work is subject to plagiarism detection software review.

STUDENT IDENTITY VERIFICATION:

MATH 106 – COLLEGE ALGEBRA

Adams State University utilizes a variety of methods to verify the identity of students enrolled in courses, including but not limited to: secure logins and pass codes, proctored exams, security questions, and other technologies and practices that are effective in verifying student identity. Some of these methods may incur an extra cost to students; associated costs will be outlined in the course syllabus, other University documents, and on the University website. Adams State University reserves the right to request additional government-issued documentation of identity from students for the purpose of ensuring that the person enrolled in the course is the person completing assignments, exams, and all other course requirements. Any student engaged in incidents of student identity fraud may face reprimand, disciplinary warning, a lowered or failing grade(s), and/or probation, or suspension from the course, academic program or University, or expulsion from the University.

COURSE SCHEDULE:

Students will engage in the online course content and activities a minimum of Monday through Friday each week of the semester, which will run 17-18 weeks. The minimum time spent actively working online and on course assignments will be 1.5-2 hours per day.

In working with their school district, students will complete course content in structured time periods during the school day along with unstructured time periods decided by the student.

All course activities (along with the accompanying content) in a lesson are to be completed in the course week identified below.

Semester 1

| Unit 1: Polynomial, Rational, and Radical Relationships Lesson / Activity | Week to be Completed |
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| Unit 1 Pre-test | Week 1 |
| Discussion 1: Polynomial, Rational, and Radical Relationships | |
| 1.01 Lesson 1 "Evaluating Rational Expressions" and quiz | |
| 1.02 Lesson 2 "Restrictions on Rational Expressions" and quiz | Week 2 |
| 1.03 Lesson 3 "Equivalent Forms of Rational Expressions" and quiz | |
| 1.04 Lesson 4 "Simplifying Rational Expressions" and quiz | Week 3 |
| 1.05 Lesson 5 "Simplifying Polynomial Expressions" and quiz | |
| 1.06 Lesson 6 "Polynomial Identities and the Binomial Theorem" and quiz | Week 4 |
| 1.07 Lesson 7 "Sum of Rational Expressions, Part 1" and quiz | |
| 1.08 Lesson 8 "Difference of Rational Expressions, Part 1" and quiz | Week 5 |
| 1.09 Lesson 9 "Product of Rational Expressions" and quiz | |
| Graded Unit 1 Activity: Polynomial, Rational, and Radical Relationships | Week 6 |
| Unit 1 Post-test | |

| Unit 2: Advanced Polynomial, Rational, and Radical Relationships: Lesson / Activity | Week to be Completed |
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| Unit 2 Pre-test | Week 7 |
| Discussion 2: Advanced Polynomial, Rational, and Radical Relationships | |
| 2.01 Lesson 1 "Quotient of Rational Expressions" and quiz | |
| 2.02 Lesson 2 "Common Denominators of Rational Expressions" and quiz | Week 8 |
| 2.03 Lesson 3 "Sum of Rational Expressions, Part 2" and quiz | |
| 2.04 Lesson 4 "Difference of Rational Expressions, Part 2" and quiz | |
| 2.05 Lesson 5 "Simplifying Algebraic Expressions" and quiz | Week 9 |
| 2.06 Lesson 6 "Review: Rational Expressions" and quiz | |

MATH 106 – COLLEGE ALGEBRA

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| 2.07 Lesson 7 “Rewriting Rational Expressions” and quiz | Week 10 |
| 2.08 Lesson 8 “Factoring Algebraic Expressions” and quiz | |
| 2.09 Lesson 9 “Dividing Polynomials Using Synthetic Division” and quiz | Week 11 |
| Graded Unit 2 Activity: Advanced Polynomial, Rational, and Radical Relationships | |
| Unit 2 Post-test | |

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| Unit 3 Complex Numbers: <i>Lesson / Activity</i> | <i>Week to be Completed</i> |
| Unit 3 Pre-test | Week 12 |
| Discussion 3: Complex Numbers | |
| 3.01 Lesson 1 “Plotting Complex Numbers in the Plane” and quiz | |
| 3.02 Lesson 2 “Adding and Subtracting Complex Numbers” and quiz | |
| 3.03 Lesson 3 “Multiplying and Dividing Complex Numbers” and quiz | |
| 3.04 Lesson 4 “Solving Quadratic Equations in the Complex Number System” and quiz | Week 13 |
| 3.05 Lesson 5 “Other Types of Equations” and quiz | |
| 3.06 Lesson 6 “Polynomial Functions” and quiz | Week 14 |
| 3.07 Lesson 7 “Graphing Polynomial Functions” and quiz | |
| 3.08 Lesson 8 “Average Rate of Change” and quiz | Week 15 |
| 3.09 Lesson 9 “Finite Geometric Sums” and quiz | |
| Graded Unit 3 Activity: Complex Numbers | |
| Unit 3 Post-test | Week 16 |
| End of Semester test | |

Semester 2

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| Unit 1: Trigonometric Functions <i>Lesson / Activity</i> | <i>Week to be Completed</i> |
| Unit 1 Pre-test | Week 1 |
| Discussion 1: Trigonometric Functions | |
| 1.01 Lesson 1 “Angles and Their Measures” and quiz | |
| 1.02 Lesson 2 “Trigonometric Functions and the Unit Circle” and quiz | Week 2 |
| 1.03 Lesson 3 “Trigonometric Functions” and quiz | |
| 1.04 Lesson 4 “Trigonometric Graphs” and quiz | Week 3 |
| 1.05 Lesson 5 “Basic Trigonometric Identities” and quiz | |
| Graded Unit 1 Activity: Trigonometric Functions | Week 4 |
| Unit 1 Post-test | |

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| Unit 2: Modeling with Functions <i>Lesson / Activity</i> | <i>Week to be Completed</i> |
| Unit 2 Pre-test | Week 5 |
| Discussion 2: Modeling with Functions | |
| 2.01 Lesson 1 “Creating and Solving Equations” and quiz | |
| 2.02 Lesson 2 “Rewriting Formulas” and quiz | Week 6 |
| 2.03 Lesson 3 “Solving Linear Systems of Equations: Graphs” and quiz | |
| 2.04 Lesson 4 “Classifying Linear Systems” and quiz | |
| 2.05 Lesson 5 “Solving Linear Systems of Inequalities: Graphs” and quiz | |
| 2.06 Lesson 6 “Solving Linear Systems of Equations: Substitution” and quiz | |
| 2.07 Lesson 7 “Estimating Solutions for a System of Equations” and quiz | Week 7 |
| Graded Course Activity 1: Modeling with Functions | |
| Unit 2 Post-test | |

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| Unit 3: Graphing with Functions <i>Lesson / Activity</i> | <i>Week to be Completed</i> |
| Unit 3 Pre-test | Week 8 |

MATH 106 – COLLEGE ALGEBRA

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| Discussion 3: Graphing with Functions | |
| 3.01 Lesson 1 “Graphing Linear Inequalities in 1 Variable” and quiz | |
| 3.02 Lesson 2 “Graphing with Restrictions on the Variable” and quiz | |
| 3.03 Lesson 3 “Graphing Solution Sets of Associated Inequalities” and quiz | |
| 3.04 Lesson 4 “Operations on Functions” and quiz | Week 9 |
| 3.05 Lesson 5 “Solving Problems: Exponential and Logarithmic” and quiz | |
| 3.06 Lesson 6 “Graphing Exponential and Logarithmic Functions” and quiz | |
| 3.07 Lesson 7 “Transformation of Functions” and quiz | Week 10 |
| 3.08 Lesson 8 “Inverse Functions” and quiz | |
| Graded Unit 3 Activity: Graphing with Functions | Week 11 |
| Unit 3 Post-test | |

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| Unit 4: Inferences and Conclusions from Data <i>Lesson / Activity</i> | <i>Week to be Completed</i> |
| Unit 4 Pre-test | Week 12 |
| Discussion 4: Inferences and Conclusions from Data | |
| 4.01 Lesson 1 “Normal Distributions” and quiz | |
| 4.02 Lesson 2 “Making Inferences Based on Statistics” and quiz | |
| 4.03 Lesson 3 “Evaluating the Validity of a Statistical Model” and quiz | Week 13 |
| 4.04 Lesson 4 “Using Statistics in Surveys, Experiments, and Studies” and quiz | |
| 4.05 Lesson 5 “Analyzing a Survey” and quiz | |
| 4.06 Lesson 6 “Fair Decisions with Random Variables” and quiz | Week 14 |
| 4.07 Lesson 7 “Evaluating Reports Based on Data” and quiz | |
| 4.08 Lesson 8 “Statistically Comparing Two Treatments” and quiz | |
| 4.09 Lesson 9 “Complex Decisions Using Probability” and quiz | Week 15 |
| Graded Unit 4 Activity: Inferences and Conclusions from Data | |
| Unit 4 Post-test | |
| End of Semester Test | |