

**CENTRAL TEXAS COLLEGE  
SYLLABUS FOR MATH 1314  
COLLEGE ALGEBRA**

**Semester Hours Credit: 3**

**INSTRUCTOR: Dr. Word, Ms. Davis, Mrs. Cabaniss, Mrs. Prescott, & Mr. Shea**

**I. INTRODUCTION**

- A. College Algebra, Math 1314, is a three semester hour course which covers such topics as logarithms, elementary theory of equations, sequences, series, mathematical induction, matrices, and determinants.
- B. This course satisfies the mathematics requirement in most curricula. Please, check your degree plan to determine the status of this course in your program of study.
- C. This course is occupationally related and serves as preparation for careers in sciences, social sciences, and business.
- D. Prerequisites: DSMA 0303 or equivalent, or acceptable placement test score.

**II. Learning Outcomes**

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

- A. Define relations and function. (F1, F2, F5, F6)
- B. Identify relations that are functions graphically and analytically. (F1, F8, F9)
- C. Evaluate functions. (F3, F8, F9)
- D. Construct graphs of functions by plotting points. (F2, F10)
- E. Construct graphs of functions using transformations. (F9, F8)
- F. Analyze graphs of functions. (F8, F10)
- G. Define one-to-one and inverse functions. (F1, F2, F5, F6)
- H. Identify functions that are one-to-one. (F1, F8)
- I. Calculate the inverse of a given function. (F3, F4, F9)
- J. Verify that two functions are inverses. (F3, F4, F9)
- K. Define the basic functions, polynomial functions, rational functions, exponential functions, and logarithmic functions. (F1, F2, F5, F6)
- L. Express functions rules using sum, difference, product, quotient, and compositions of functions. (F8, F7, F4)
- M. Use properties and theorems involving all types of functions. (F7, F8)
- N. Solve equations involving different types of functions. (F3, F4)
- O. Solve application problems. (F1, F3, F4, F9)
- P. Solve systems of equations using matrices and determinants. (F3, F4, F8, F9)

- Q. Use matrix operations. (F3, F4)
- R. Evaluate determinants. (F3, F4, F9)
- S. Identify types of sequences and series. (F1, F8)
- T. Use sequences and series to solve problems. (F3, F4, F9)
- U. Apply the principle of mathematical induction. (F7, F8, F9)
- V. Apply the Binomial Theorem. (F3, F4)

### **III. INSTRUCTIONAL MATERIALS**

- A. The Instructional materials identified for this course are viewable through [http://www.ctcd.edu/im/im\\_main.asp](http://www.ctcd.edu/im/im_main.asp)
- B. Other Materials: A TI-83, TI-83+, TI-84, or TI-84+ Graphing Calculator is required; however, if the student plans on continuing onto Calculus he or she should purchase the TI-89 or TI-89 Titanium. The calculator is required for graphing calculator exercises. TI Graphlinks are available in the CTC Advanced Mathematics Lab.
- C. Required: MyMathLab Online Learning System.

### **IV. COURSE REQUIREMENTS**

- A. Assignments will be made daily. All assignments are to be completed by the following class meeting. Assignments may be collected and examined at any time.
- B. Students are expected to attend every class and to arrive at each class on time and remain in class for the entire class period. Students who are absent from class 12.5% of the number of class meetings for any reason will be dropped from the class with a grade of "F". Instructors may choose to lower a student's grades because of tardiness.
- C. The instructor will post office hours after the semester commences. Consult the instructor during office hours. If your visit may tend to be lengthy, make an appointment with the instructor so that he may set aside some time for you.

### **V. EXAMINATIONS**

- A. Examinations will be given at the end of each unit. If a unit is short and simple, it might be included with another short, simple unit for one exam. A final exam will be given and students must take the final exam in order to pass the course. The final exam date is announced about two weeks prior to the examination week.
- B. Students who miss an exam should discuss with the instructor the circumstances surrounding the absence. The instructor will determine whether a make-up exam is to be given. Make-up examinations are given by appointment only.

## VI. SEMESTER GRADE COMPUTATIONS

- A. Your point total is determined by adding the points earned on each unit examination. Your letter grade for the course is then determined by the following formula:

$$\frac{\text{Your Point Total}}{\text{Total Points Possible}} \times 100$$

If the result is between	90 and 100	your grade is a(n)	A
	80	89	B
	70	79	C
	60	69	D
	0	59	F

\*\* NOTE: Grade Computation is determined by instructor. Please see your instructor for how your grade will be determined. This is just an example.

## VII. NOTES AND ADDITIONAL INSTRUCTIONS FROM COURSE INSTRUCTOR

- A. Withdrawal from Course: It is the student's responsibility to officially drop a class if circumstances prevent attendance. Any student who desires to, or must, officially withdraw from a course after the first scheduled class meeting must file an Application for Withdrawal or an Application for Refund. The withdrawal form must be signed by the student.

Application for Withdrawal will be accepted at any time prior to Friday of the 12th week of classes during the 16 week fall and spring semesters. The deadline for sessions of other lengths is as follows.

Friday of 3<sup>rd</sup> week for 5-week courses  
Friday of 4<sup>th</sup> week for 6-week courses  
Friday of 6<sup>th</sup> week for 8-week courses  
Friday of 7<sup>th</sup> week for 10-week courses  
Friday of 9<sup>th</sup> week for 12-week courses  
Friday of 12<sup>th</sup> week for 16-week courses

The equivalent date (75% of the semester) will be used for sessions of other lengths. The specific last day to withdraw is published each semester in the Schedule Bulletin.

Students who officially withdraw will be awarded the grade of "W," provided the student's attendance and academic performance are satisfactory at the time of official withdrawal. Students must file a withdrawal application with the college before they may be considered for withdrawal.

A student may not withdraw from a class for which the instructor has previously

issued the student a grade of "F" or "FN" for nonattendance.

- B. An Administrative Withdrawal: An administrative withdrawal may be initiated when the student fails to meet the College attendance requirements. The instructor will assign the appropriate grade on the Administrative Withdrawal Form for submission to the registrar.
- C. An Incomplete Grade: The College catalog states, "An incomplete grade may be given in those cases where the student has completed the majority of the course work but, because of personal illness, death in the immediate family, or military orders, the student is unable to complete the requirements for a course..." Prior approval from the instructor is required before the grade of "I" is recorded. A student who merely fails to show for the final examination will receive a zero for the final and an "F" for the course.
- D. Cellular Phones and Beeper: Cellular phones and beepers will be turned off while the student is in the classroom or laboratory.
- E. Americans With Disabilities Act (ADA): Students requiring accommodations for disabilities are responsible for notifying the instructor. Reasonable accommodations will be granted in full compliance with federal and state law and Central Texas College policy.
- F. Instructor Discretion: The instructor reserves the right of final decision in course requirements.
- G. Civility: Individuals are expected to be cognizant of what a constructive educational experience is and respectful of those participating in a learning environment. Failure to do so can result in disciplinary action up to and including expulsion.
- H. The Math Department operates an Advanced Mathematics Lab in Building 152, Room 145. All courses offered by the Math Department are supported in the lab with appropriate tutorial software. Walk-in tutoring is also available in Building 152, Room 236. Calculators and Graphlink are available for student use in the lab. Students are encouraged to take advantage of these opportunities. See posted hours for the Walk-in tutoring and Math Lab.

## VIII. COURSE OUTLINE

- A. Unit One: Functions and Graphs (Chapter 2)
  - 1. Learning Outcomes: Upon successful completion of this unit, the student will be able to:
    - a. Define a relation.
    - b. Define a function.

- c. Evaluate functions.
- d. Determine domain and range.
- e. Use the vertical line test.
- f. Graph functions and relations.
- g. Identify increasing or decreasing functions.
- h. Graph transformations of functions.
- i. Form combinations of functions.
- j. Form the composition of functions.
- k. Find and give definition of the inverse of functions.

2. Learning Activities:

- a. Listen to classroom lecture and discuss exercises. (F5, F6, F7, F8)
- b. Read pages of assigned chapter. . (F1)
- c. Work problems as assigned by the instructor. (F2, F7, F8, F9, F10, F11, F12)

3. Unit Outline:

- a. Section.2.3 (Introduction to Functions)
- b. Section 2.4 (Graphs of Functions)
- c. Section 2.5 (Transformations and Combinations of functions)
- d. Section 2.6 (Composite and Inverse Functions)
- e. Section 2.7 (Inverse Functions)

**B. Unit Two: Polynomial and Rational Functions (Chapter 3)**

1. Unit Objectives: Upon successful completion of this unit, the student will be able to:

- a. Analyze graphs of polynomials using end-behavior, leading coefficient test.
- b. Perform synthetic division.
- c. State and use the Remainder Theorem.
- d. State and use the Factor Theorem.
- e. State and use the Rational Zero Theorem.
- f. State and use Descartes Rule of Signs.
- g. Find bounds on the roots of a polynomial equation.
- h. State and use the Intermediate value theorem.
- i. Solve Polynomial Equations.
- j. Graph rational functions (optional).

2. Learning Activities:

- a. Listen to classroom lecture and discuss exercises. (F5, F6, F7, F8)

- b. Read pages of assigned chapter. (F1)
- c. Work problems as assigned by the instructor. (F2, F7, F8, F9, F10, F11, F12)

3. Unit Outline:

- a. Section 3.2 (Polynomial Functions and their graphs)
- b. Section 3.3 (Dividing Polynomials: Remainder and Factor Theorem)
- c. Section 3.4 (Zeros of Polynomial Functions)
- d. Section 3.5 (More on Zeros of Polynomial Functions)
- e. Section 3.6 (Rational Functions and Their Graphs)

C. **Unit Three:** Exponential and Logarithmic Functions (Chapter 4)

1. Unit Objectives: Upon successful completion of this unit, the student will be able to:

- a. Define the exponential function
- b. Graph exponential functions.
- c. Use exponential models to solve problems.
- d. Define the logarithmic function.
- e. Identify properties of the logarithmic function.
- f. Graph the logarithmic function.
- g. Use logarithmic models to solve problems.
- h. Solve logarithmic or exponential equations.

2. Learning Activities:

- a. Listen to classroom lecture and discuss exercises. (F5, F6, F7, F8)
- b. Read pages of assigned chapter. (F1)
- c. Work problems as assigned by the instructor. (F2, F7, F8, F9, F10, F11, F12)

3. Unit Outline:

- a. Section 4.1 (Exponential functions)
- b. Section 4.2 (Logarithmic functions)
- c. Section 4.3 (Properties of logarithmic functions)
- d. Section 4.4 (Exponential and logarithmic equations)
- e. Section 4.5 (Modeling with exponential and logarithmic functions)

D. **Unit Four:** Matrices and Linear Systems (Chapter 6)

1. Unit Objectives: Upon successful completion of this unit, the student will be able to:

- a. Define a matrix.
- b. Solve a linear system using the Gauss-Jordan Method.
- c. Model stated problems using matrices.
- d. Find solutions to dependent systems.
- e. Perform operations on matrices.
- f. Find the inverse of a matrix
- g. Solve a linear system using the inverse.
- h. Evaluate determinants.
- i. Decompose rational expressions into partial fractions (optional).

2. Learning Activities:

- a. Listen to classroom lecture and discuss exercises. (F5, F6, F7, F8)
- b. Read pages of assigned chapter. (F1)
- c. Work problems as assigned by the instructor. (F2, F7, F8, F9, F10, F11, F12)

3. Unit Outline:

- a. Section 6.1 (Matrix Solutions to Linear systems)
- b. Section 6.2 (Inconsistent and Dependent Systems and their Applications)
- c. Section 6.3 (Matrix Operation and their Applications)
- d. Section 6.4 (Multiplicative Inverses of Matrices and Matrix Equations)
- e. Section 6.5 (Determinants and Cramer's Rule)

E. Unit Five: Sequences and Series (Chapter 8)

1. Unit Objectives: Upon successful completion of this unit, the student will be able to:

- a. Define a sequence.
- b. Define an arithmetic sequence.
- c. Find the nth term and the nth partial sum of an arithmetic sequence.
- d. Model problems using arithmetic sequences.
- e. Define a geometric sequence.
- f. Find the nth term and the nth partial sum of a geometric sequence.
- g. Find the sum of certain infinite geometric series.
- h. State and use the principle of mathematical induction.
- i. Perform proof by mathematical induction.
- j. State and use the Binomial Theorem.

2. Learning Activities.

- a. Listen to classroom lecture and discuss exercises. (F5, F6, F7, F8)
- b. Read pages of assigned chapter. (F1)
- c. Work problems as assigned by instructor. (F2, F7, F8, F9, F10, F11, F12)

3. Unit Outline:

- a. Section 8.1 (Sequences and Summation Notation)
- b. Section 8.2 (Arithmetic sequences)
- c. Section 8.3 (Geometric sequences)
- d. Section 8.4 (Mathematical Induction)
- e. Section 8.5 (Binomial Theorem)