COLLEGE ALGEBRA
MATH 1130

Class Hours: 3.0   **Credit Hours: 3.0**

Laboratory Hours: 0.0   **Date Revised: Fall 2016**

Catalog Course Description

This course is designed for students who are not in University Parallel/College Transfer programs of science, mathematics, engineering, or computer science. Topics include linear, polynomial, rational, exponential, and logarithmic functions and their graphs and applications; linear and nonlinear regression models.

Prerequisites

High school algebra I and algebra II and ACT math score of at least 21 and an ACT reading score of at least 19 or equivalent math and reading placement scores or MATH 1030 or equivalent

Textbook and Other Reference Materials Basic to the Course

Textbook:
Rockswold, Gary. College Algebra with Modeling & Visualization, 5th Edition, Customized Book; Pearson Learning Solutions, ISBN 1269203061, published 2013.

References:
Blitzer, Robert; College Algebra: An Early Functions Approach, 2nd Edition, Prentice Hall, 2010.
Blitzer, Robert; College Algebra Essentials; 4th Edition; Pearson Education; Published 2014.

Supplements:
MyMathLab.

Technology Requirement:
A non-symbolic graphing calculator is required; the TI-84 Plus is preferred but a TI-83 may also be used.

Week/Unit/Topic Basis

Week	Topic
1	Numbers, Data, and Problem Solving 1.1; Visualizing and Graphing Data 1.2; Functions and Their Representations 1.3; Types of Functions 1.4
2	Functions and Their Rates of Change 1.4; Linear Functions and Models 2.1; Equations of Lines 2.2
3	Linear Equations 2.3; Linear Inequalities 2.4; Absolute Value Equations and Inequalities
4	Chapter 1, 2 Test; Quadratic Functions and Models 3.1
5	Factoring R.4, R.6; Quadratic Equations and Problem Solving 3.2; Quadratic Inequalities 3.4
6	Difference Quotient 1.4; Chapter 3 Test
7	Combining Functions 5.1; Inverse Functions and Their Representations 5.2
8	Review of Exponents; Exponential Functions and Models 5.3
9	Logarithmic Functions and Models 5.4; Properties of Logarithms 5.5
10	Exponential and Logarithmic Equations 5.6
11	Chapter 5 Test; More Nonlinear Functions and Their Graphs 4.1; Polynomial Functions and Models 4.2
12	Real Zeros of Polynomial Functions 4.4; Regression; Rational Expressions R.5
13	Rational Functions and Models 4.6, More Equations 4.7; Radical Equations 4.8
14	Chapter 4 Test; Review for Exam

Course Goals

The goal of MATH1130 College Algebra is to extend the algebraic skills of the students that are necessary for success in their educational goals beyond the high school level. The course will focus on the tools of problem solving, critical thinking and the appropriate use of modeling and technologies to expand the student's knowledge of mathematics and its applications. (Roman numerals after course goals reference TBR's general education goals.)

    A.   Find appropriate regression equations to model real data using statistical analysis. VI.1-6

    B.   Master the use of a graphing utility to solve problems and to check solutions. VI.1-6

C.   Construct and analyze graphs of linear, quadratic, polynomial, rational, radical, exponential and logarithmic functions. VI.1-6

D.   Construct appropriate mathematical models to solve applications. VI.1-6

E.   Interpret and apply functional notation and concepts. VI.1-6

F.   Analyze and explore linear, quadratic, polynomial, piecewise, rational, radical, exponential and logarithmic functions and their applications. VI.1-6

G.   Solve and check the solutions of linear, absolute value, piecewise, quadratic, polynomial, rational, radical, exponential and logarithmic equations analytically and graphically. VI.1-6

H.   Solve and check variation application problems. VI.1-6

Expected Student Learning Outcomes

Upon successful completion of this course, the student should be able to: (Letters after performance expectations reference the course goals listed above.)

1. Determine the slope of a line and explain its meaning numerically, graphically and analytically. A, C, F

2. Determine the equations of all lines, including parallel and perpendicular, numerically, graphically and analytically using the point-slope or slope-intercept forms. C, F

3. Determine if a relation is a function and work with functional notation. C, E

4. Evaluate the difference quotient for a polynomial function of degree one or higher. E

5. Sketch careful graphs of functions by hand and find suitable windows to create comprehensive graphs of functions on a graphing utility: linear, absolute value, piecewise, quadratic, polynomial, radical, rational, exponential, and logarithmic. A, B, C

6. Find the real zeros of functions analytically and graphically. B, C, E

7. Analytically and graphically analyze graphs and determine domain, range, intercepts, extrema, increasing/decreasing intervals, continuity, end behavior, and asymptotes. B, C

8. Interpret linear, piecewise, quadratic, polynomial, rational, exponential, and logarithmic models to solve applications. D

9. Use transformations to build new functions from basic functions; determine domain and range of new functions. B, C, E

10. Use statistical regression on a graphing utility to find linear, quadratic, cubic, exponential, and logarithmic models and use them to make meaningful predictions. A, B, D

11. Use the quadratic formula to find exact solutions to quadratic equations. F

12. Optimize quadratic functions. B, F

13. Make a reasonable sketch of a polynomial function based on an analysis of its degree, leading coefficient, zeros and end behavior. C

14. Write a polynomial function given its real zeros and their multiplicities and determine the real zeros and their multiplicities for a polynomial function. E, F

15. Find the equations of the horizontal and vertical asymptotes of rational functions. C

16. Solve linear, quadratic, polynomial, and rational inequalities analytically or graphically. B, C

17. Use the zeros of a function and its graph to solve related inequalities. B, C

18. Determine if a function is one-to-one and find formulas for inverses of one-to-one functions. E

19. Use the graph of a one-to-one function to draw the graph of its inverse function. B, C

20. Convert between exponential and logarithmic notation. E

21. Use the change of base formula to evaluate logarithms. B

22. Use the properties of logarithms to rewrite and simplify expressions. E, F

23. Solve equations analytically: linear, absolute value, quadratic, rational, radical, special polynomials, exponential, and logarithmic. G

24. Solve equations on a graphing utility using the intersection of graphs method. B

25. Solve exponential growth and decay applications analytically using statistical regression or algebraic methods. A, B, D

Evaluation

Testing Procedures:
Testing Procedures: Students are evaluated primarily on the basis of tests, projects, homework, quizzes, and a required comprehensive final exam. A minimum of four major exams is recommended.

Laboratory Expectations:
As assigned by instructor.

Field Work:
As assigned by instructor.

Other Evaluation Methods:
As assigned by instructor.

Grading Scale:
93-100%   A
88-92   B+
83-87   B
78-82   C+
70-77   C
60-69   D
Below 60 F

Policies

Attendance Policy:
Pellissippi State expects students to attend all scheduled instructional activities. As a minimum, students in all courses (excluding distance learning courses) must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. Individual departments/programs/disciplines, with the approval of the vice president of Academic Affairs, may have requirements that are more stringent. In very specific circumstances, an appeal of the policy may be addressed to the head of the department in which the course was taken. If further action is warranted, the appeal may be addressed to the vice president of Academic Affairs.

Academic Dishonesty:
Academic misconduct committed either directly or indirectly by an individual or group is subject to disciplinary action. Prohibited activities include but are not limited to the following practices:
- Cheating, including but not limited to unauthorized assistance from material, people, or devices when taking a test, quiz, or examination; writing papers or reports; solving problems; or completing academic assignments.
- Plagiarism, including but not limited to paraphrasing, summarizing, or directly quoting published or unpublished work of another person, including online or computerized services, without proper documentation of the original source.
- Purchasing or otherwise obtaining prewritten essays, research papers, or materials prepared by another person or agency that sells term papers or other academic materials to be presented as one's own work.
- Taking an exam for another student.
- Providing others with information and/or answers regarding exams, quizzes, homework or other classroom assignments unless explicitly authorized by the instructor.
- Any of the above occurring within the Web or distance learning environment.

Please see the Pellissippi State Policies and Procedures Manual, Policy 04:02:00 Academic/Classroom Conduct and Disciplinary Sanctions for the complete policy.

Accommodations for disabilities:
Students that need accommodations because of a disability, have emergency medical information to share, or need special arrangements in case the building must be evacuated should inform the instructor immediately, privately after class or in her or his office. Students must present a current accommodation plan from a staff member in Disability Services (DS) in order to receive accommodations in this course. Disability Services (http://www.pstcc.edu/sswd/) may be contacted via email or by visiting Alexander 130.

Other Policies

Cell Phones: Cell phones are to be turned off or put in vibration mode while in class. Instructor discretion as to penalty.