COURSE SYLLABUS

Syllabus: College Algebra
Course Number: MATH 1314
Semester & Year: Fall 2020
Instructor Information
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Textbook Information
College Algebra 12 edition by Lial, Hornsby, Schneider & Daniels
ISBN-13: 0-13-421745-4

A Graphing Calculator (preferably a TI-84+ CE)

Catalog Description: Topics include graphs, function and their inverses; data analysis and modeling; polynomial and rational functions; roots of polynomial equations, exponential and logarithmic functions; linear and non-linear systems of equations and inequalities, determinants, matrices; binomial theorem, sequences and series, permutations and combinations.

Prerequisite(s): MATH 0033 or satisfactory placement scores (THEA Scores 270 or above)

Semester Credit Hours: 3

Lecture Hours / Week: 3

Contact Hours / Semester: 48

State Approval Code: 16777215

Core Curriculum: State Criteria

Basic Intellectual Competencies (The following reflect the state-mandated competencies taught in this course.):

- Reading
- Listening
- Critical Thinking

Perspectives (The following reflect the state-mandated perspectives taught in this course.):

- Use logical reasoning in problem solving.

Exemplary Objectives (The following reflect the state-mandated exemplary objectives taught in this course.):

Mathematics: The objective of the mathematics component of the core curriculum is to develop a quantitatively literate college graduate. Every college graduate should be

able to apply basic mathematical tools in the solution of real-world problems.

- To apply arithmetic, algebraic, geometric, higher-order thinking and statistical methods to modeling and solving real-world situations.
- To represent and evaluate basic mathematical information verbally, numerically, graphically, and symbolically.
- To expand mathematical reasoning skills and formal logic to develop convincing mathematical arguments.
- To use appropriate technology to enhance mathematical thinking and understand and to solve mathematical problems and judge reasonableness of the results.
- To interpret mathematical models such as formulas, graphs, tables and schematics, and draw inferences from them.
- To develop the limitations of mathematical and statistical models.
- To develop the view that mathematics is an evolving discipline interrelated with human culture, and understand its connections to other disciplines.

General Course Objectives:

Successful completion of this course will promote the general student learning outcomes listed below. The student will be able

1. To apply problem-solving skills through solving application problems.
2. To demonstrate arithmetic and algebraic manipulation skills.
3. To read and understand scientific and mathematical literature by utilizing proper vocabulary and methodology.
4. To construct appropriate mathematical models to solve applications.
5. To interpret and apply mathematical concepts.
6. To use multiple approaches - physical, symbolic, graphical, and verbal - to solve applications problems.

Specific Course Objectives:

Upon successful completion of the course, the student will be able

1. To evaluate a function from its graph, formula, or equation.
2. To determine if a relation is a function and state its domain and range given the graph or equation.
3. To perform algebraic operations and compositions with functions.
4. To categorize basic functions given their graphs or equations.
5. To graph the inverse of a function whose graph is given.
6. To solve linear, quadratic, logarithmic, exponential, absolute value, radical and miscellaneous higher order equations.
7. To solve polynomial and rational inequalities.
8. To graph linear, quadratic, absolute value, radical, polynomial, piecewise, exponential and logarithmic functions and selected inverses.
9. To use symmetry and transformations to sketch graphs.
10. To solve linear and nonlinear systems of equations.
11. To set up and solve applications involving functions and relationships.
12. To identify and apply sequences and series.

Course Content:

Students will be required to do the following:

FUNCTIONS AND GRAPHS

1. Define a relation.
2. Define a function.
3. Evaluate functions.
4. Determine domain and range.
5. Use the vertical line test.
6. Graph functions and relations.
7. Identify increasing or decreasing functions.
8. Graph transformations of functions.
9. Form combinations of functions.
10. Form the compositions of functions.
11. Find and give definition of the inverse of functions.

LINEAR AND QUADRATIC FUNCTIONS

1. Graph linear and quadratic functions
2. Identify the vertex of a parabola
3. Solve linear and quadratic equations
4. Calculate and apply slope
5. Write equations of lines
6. Apply concepts of parallel and perpendicular lines
7. Perform operations with complete numbers

Students will be required to do the following:

POLYNOMIAL AND RATIONAL FUNCTIONS

1. Analyze graphs of polynomials using end-behavior, leading coefficient test.
2. Perform synthetic division and long division.
3. State and use the Remainder Theorem.
4. State and use the Factor Theorem.
5. State and use the Rational Zero Theorem.
6. Solve polynomial equations.
7. Find vertical, horizontal and slant asymptotes.
8. Graph rational functions.

EXPONENTIAL AND LOGARITHMIC FUNCTIONS

1. Define the exponential function.
2. Graph exponential functions.
3. Use exponential models to solve problems.
4. Define the logarithmic function.
5. Use logarithmic models to solve problems.
6. Solve logarithmic or exponential equations.

MATRICES, LINEAR AND NON-LINEAR SYSTEMS

1. Solve Linear and Non-Linear systems using substitution.
2. Solve a Linear System using elimination.
3. Define a matrix.
4. Solve a linear system using the Gauss-Jordan Method.
5. Model stated problems using matrices.
6. Find solutions to dependent systems.
7. Perform operations on matrices.
8. Find the inverse of a matrix.
9. Solve a linear system using the inverse.
10. Evaluate determinants.
11. Solve a linear system using Cramer's Rule.

SEQUENCES AND SERIES

1. Define a sequence.
2. Define an arithmetic sequence.
3. Find the nth term and the nth partial sum of an arithmetic sequence.
4. Model problems using arithmetic sequences.
5. Define a geometric sequence.
6. Find the nth term and the nth partial sum of a geometric sequence.
7. Find the sum of certain infinite geometric series.

Methods of Instruction/Course Format/Delivery:

Faculty may choose from but are not limited to the following methods of instruction: lecture, discussion, Internet, video, television, demonstrations, field trips, collaboration, and readings.

Assessment:

Faculty may assign both in- and out-of-class activities to evaluate students; knowledge and abilities. Faculty may choose from the following methods

1. Attendance
2. Class preparedness and participation
3. Collaborative learning projects
4. Exams/tests/quizzes
5. Homework
6. Readings
7. Student-teacher conferences
8. Written assignments

Course Grade:

Students' final grades are determined by:

A   90 +
B   80 - 89
C   70 - 79
D   60 - 69
F   0 - 59

Evaluation of Learning Outcomes

METHODS TO EVALUATE LEARNING OUTCOMES:

1. Standardized tests given in college algebra
2. Pass rates in college algebra - minimum of 55%
3. Anecdotal reports letters from transfer students
4. Student satisfaction of course, survey - minimum of 80%
5. Course testing on key learning objectives developed into courses
6. Retention - minimum of 75%

Other:

- Class Absences
- Academic Dishonesty

Grade Weights:

- Attendance   10%
- Exams/tests/quizzes
-      Quizzes   20%
-      Tests   45%
-      Final Exam   25%

A Comprehensive Final provided by the college will be taken at NBHS but graded at TC.