COURSE NUMBER: MATH 1302
COURSE TITLE: College Algebra (27.0101.54 19)
This course satisfies the University of Texas at Arlington core curriculum requirement in mathematics.

COURSE DESCRIPTION: This course includes the study of linear, quadratic, polynomial, rational, radical, absolute value, logarithmic, and exponential functions and their graphs; characteristics of other basic functions, graphing techniques, and operations on functions; systems of equations; and matrices. Additional topics such as sequences, series, probability, and conics may be included.

PREREQUISITE: Fulfillment of TSI requirements.

ADDITIONAL SUPPLIES: Scientific calculator. No graphing calculators are allowed.

COURSE STRUCTURE/SIGNATURE ASSIGNMENTS: This course will contain three related concept assignments to be completed by every student. These assignments will count the same and be weighted as a quiz. Each of these assignments will cover two of the six learning objectives and outcomes listed below and will contain a variety of short answer and essay style questions in order to assess the following skills:

- Critical Thinking Skills - to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.
- Communication Skills - to include effective development, interpretation and expression of ideas through written, oral and visual communication.
- Empirical and Quantitative Skills - to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.

LEARNING OBJECTIVES AND OUTCOMES:
After completing the course, students should be able to demonstrate the following competencies:
1.0 Students will be able to solve algebraic equations and inequalities including linear, quadratic, radical, and absolute value relations and functions.
2.0 Students will be able to interpret equations and their graphs using the rectangular coordinate system, forms of lines, and slope.
3.0 Students will be able to use functions both in a procedural and a conceptual manner. They will be able to represent functions graphically, numerically, algebraically, and/or verbally.
4.0 Students will be able to solve, graph and determine characteristics for polynomial and rational functions.
5.0 Students will be able to transform and solve equations involving logarithmic and exponential functions.
6.0 Students will be able to solve simultaneous systems of equations and inequalities interpreting the meaning of the solution(s) and demonstrating graphical solution techniques when appropriate. They will also be able to perform matrix operations, including multiplication, inverses, and determinants.

COURSE COMPETENCIES:
1.0 To demonstrate competency in various relations and functions, a student should be able to:
   1.1 Solve linear equations and inequalities.
   1.2 Solve rational equations and inequalities.
   1.3 Solve equations involving radicals.
   1.4 Solve absolute value equations and inequalities.
   1.5 Identify characteristics, evaluate, and graph linear, nth-root, and absolute value functions.
   1.6 Solve quadratic equations and inequalities using factoring, square root property, completing the square, the quadratic formula, and substitution. Include complex solutions.
   1.7 Use the discriminant to describe solutions to quadratic equations.
1.8 Solve applied problems involving linear, rational, radical, absolute value, and quadratic equations.

2.0 To demonstrate competency in the rectangular coordinate system, a student should be able to:
   2.1 Define the parts of the rectangular coordinate system.
   2.2 Graph lines using points, intercepts, and slope.
   2.3 Find the slope of a line and interpret slope as an average rate of change.
   2.4 Use slope to determine parallel and perpendicular lines.
   2.5 Write the equation of a line given points, slope, or intercepts.
   2.6 Find the midpoint of a line segment.
   2.7 Find the distance between two points.

3.0 To demonstrate competency in basic functions and operations, a student should be able to:
   3.1 Define and identify relations and functions.
   3.2 Determine the domain and range of a function.
   3.3 Evaluate functions using function notation.
   3.4 Determine the intervals for which a function is increasing, decreasing, or constant.
   3.5 Determine the intervals for which a function is continuous.
   3.6 Find the average rate of change between two values of a function.
   3.7 Use functions to model data.
   3.8 Identify characteristics and evaluate piecewise-defined functions.
   3.9 Graph basic functions using translations.
   3.10 Identify symmetry of the graph of a function.
   3.11 Determine whether a function in even or odd.
   3.12 Find the sum, difference, product, and quotient of functions.
   3.13 Determine the difference quotient.
   3.14 Find the composition of functions and determine the effect on domain.

4.0 To demonstrate competency in polynomial and rational functions, a student should be able to:
   4.1 Determine domain and range.
   4.2 Identify increasing, decreasing, and constant functions.
   4.3 Graph quadratic functions.
   4.4 Find and use the vertex of a quadratic function in an application.
   4.5 Use long division and synthetic division algorithms for polynomials.
   4.6 Determine zeros and factors of functions using a variety of algebraic techniques.
   4.7 Determine the value of a polynomial function using the remainder theorem.
   4.8 Sketch the graph of a polynomial function.
   4.9 Use the intermediate value theorem for polynomial functions.
   4.10 Determine the asymptotes of a rational function.
   4.11 Sketch the graph of a rational function.
   4.12 Create a polynomial function given zeros of the function.

5.0 To demonstrate competency in exponential and logarithmic functions, a student should be able to:
   5.1 Identify characteristics and determine the inverse of a function.
   5.2 Evaluate exponential and logarithmic functions.
   5.3 Expand and condense expressions using logarithmic properties.
   5.4 Relate logarithmic and exponential functions.
   5.5 Determine the graph of logarithmic and exponential equations.
   5.6 Solve exponential and logarithmic equations.
   5.7 Solve problems consisting of exponential and logarithmic applications.

6.0 To demonstrate competency in systems of equations and matrices, a student should be able to:
   6.1 Solve linear and non-linear systems of equations using algebraic techniques.
   6.2 Solve systems of equations using the Gauss-Jordan elimination.
   6.3 Solve systems of equations using Cramer’s Rule and determinants.
6.4 Determine the solution of a system of inequalities.
6.5 Relate solving equations and inequalities to linear programming applications.
6.6 Solve application problems using systems of equations.
6.7 Apply properties of matrices and perform basic operations.
6.8 Determine inverse matrices and use to solve systems of equations.

EVALUATION STANDARDS: These course objectives and student learning outcomes will be assessed through the administration of 3 proctored exams (50%), quizzes and/or homework using MyLabsPlus (20%), and a comprehensive, departmental final exam (30%).

GRADING KEY:
100-90 = A  89-80 = B  79-70 = C  69-60 = D  59-below = F

GRADING STANDARDS:
A - Student’s work is exceptional and consistently above average.
B - Student’s work is above average. Required assignments were completed in a timely manner and have met at least the minimum required standards.
C - Student’s work is acceptable. Majority of assignments meet the minimum required standards.
D - Student’s work fails to meet the minimum requirements for a grade of "C." Overall performance was sub-standard in comparison to normal expectations for this class.
F - Student’s work is clearly unacceptable. Student either did not attempt the work or failed to meet any of the minimum required standards.

CAMPUS RESOURCES FOR STUDENTS:
- The Math Clinic offers free, daily tutorial services. (325 PKH)
- SOAR is a cost/share tutoring service. (205 Ransom Hall)
- A list of private tutors is available in the math department. (478 PKH)
- Maverick Resource Hotline. (817-272-6107)

ACCOMMODATIONS AND AMERICANS WITH DISABILITIES ACT: The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the Americans with Disabilities Act (ADA). All instructors at UT Arlington are required by law to provide “reasonable accommodations” to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

ACADEMIC INTEGRITY STATEMENT: This course includes a zero tolerance policy for academic dishonesty and students are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington’s tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence. I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

Instructors may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System Regents’ Rule 50101 §2.2,
suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student’s suspension or expulsion from the University.

**STUDENT INTELLECTUAL PROPERTY RIGHTS STATEMENT:** A student shall retain all rights to work created as part of instruction or using university technology resources.

**MATH 1302 - SIGNATURE ASSIGNMENTS:** This course will contain three related concept assignments to be completed by every student. Each of these assignments will cover two of the six learning objectives and outcomes listed in the master syllabus and will contain a variety of short answer and essay style questions in order to assess the following skills:

- **Critical Thinking Skills** - to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.
- **Communication Skills** - to include effective development, interpretation and expression of ideas through written, oral and visual communication.
- **Empirical and Quantitative Skills** - to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.

All MATH 1302 assignments will be completed within the MyLabsPlus program and can be accessed through [www.uta.mylabsplus.com](http://www.uta.mylabsplus.com). Each of the three signature assignments will contain questions that relate multiple concepts together in order to determine a solution. Each question will require students to think critically in order to decide a pathway for working the problem at hand. Mid-way through the set of questions, students will be required to perform mathematical operations in order to arrive at the desired conclusion. At the end of each assignment, students will write a short essay in order to state their outcome and connect all pertinent objectives in order to describe how the necessary skills were used in each instance.

The following is an example of what a student might see and be expected to analyze and answer: