MGF1100 Course Outline

Math Readiness.....(3) (P)

Description: This course includes the study of problem-solving approaches, study skills and habits, finding patterns, sets of numbers and their properties, number sense, order of operations and arithmetic with signed numbers, inequalities in one and two variables, functions and interpreting graphs, solving linear equations, solving systems of linear equations graphically, and applications.

Prerequisites: MAT0018 with a "C" or better, OR the equivalent; or a documented decision in eSantaFe by an SB1720 exempt student that states they have intentionally chosen to opt out of any recommended prerequisites.

Rationale: In order to be successful throughout their college coursework and in life beyond their studies, today's college student needs good number sense, critical-thinking and problem-solving skills, and effective study habits. The study of mathematics gives students the opportunity to learn critical thinking skills as well as a basic understanding of mathematical concepts, allowing them to function effectively, efficiently and productively in society.

This course provides students with the necessary knowledge, skills, and abilities as well as the basic mathematical foundation needed to succeed in Topics in Mathematics, Contemporary Mathematics, and Introduction to Logic, as well as be better prepared to understand the quantitative reasoning inherent in other college courses. Although this course is mathematical in nature, it will also afford students effective study habits to help achieve their academic goals.

Impact Assessment: *Math Readiness* provides students with skills for proficiency in quantitative and analytical reasoning of the above topics. The course applies as elective credit toward the General Education requirements for an Associate of Arts degree but does ***not*** satisfy a mathematics requirement. It is an alternate prerequisite for MGF1106, MGF1107, and MGF1121.

Broad Course Objectives: This course supports the following goals of the Math Department.

- Engage students in sound mathematical thinking and reasoning. This should include students finding patterns, generalizing, and asking/answering relevant questions.
- Provide a setting that prepares students to read and learn mathematics on their own.
- Explore multiple representations of topics including graphical, symbolic, numerical, oral, and written. Encourage students to make connections among the various representations to gain a richer, more flexible understanding of each concept.
- Analyze the structure of real-world problems and plan solution strategies. Solve the problems using appropriate tools.
- Develop a mathematical vocabulary by expressing mathematical ideas orally and in writing.

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As a result of successfully completing MGF1100, students should be able to demonstrate the following:

- Analyze/interpret quantitative data verbally, graphically, symbolically and numerically.
- Communicate quantitative data verbally, graphically, symbolically and numerically.
- Use mathematical concepts in problem-solving through integration of new material and modeling.

Topical Outline with Specific Course Objectives:

I. *Study Strategies and Techniques*

A. Develop critical thinking skills and techniques to become problem-solvers and logical thinkers.

B. Use number sense to determine if a proposed answer to a mathematics problem is appropriate in that context.

C. Check that a proposed answer to a problem is correct.

D. Take class notes in an efficient manner.

II. *Arithmetic*

A. Demonstrate an understanding of which numbers are in the natural numbers, whole numbers, integers, rational numbers, irrational numbers, and real numbers.

B. Round numbers to the specified place.

C. Demonstrate understanding of the relationship between fractions, decimals, and percentages.

1. Convert fractions to decimals and percentages.
2. Convert decimals to percentage and fractions.
3. Convert percentages to decimals and fractions.

D. Correctly perform the following operations with signed real numbers.

1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Use whole number exponents
6. Any combination of the above operations
7. Extra focus on arithmetic with fractions

E. Demonstrate appropriate use of order of operations in the following areas.

1. Solving linear equations
2. Arithmetic with signed numbers
3. Simplifying algebraic expressions

F. Graph inequalities on a number line.

III. Linear Patterns and Their Connection to a Graph

A. Find a pattern in a given table and fill in blanks in a table as well as write a formula representing the relation in the table.
B. Plot points given in a table on the cartesian plane. Draw a smooth curve through those points.
C. Select reasonable input values for a formula and calculate their output values.

IV. Linear Functions and Equations

A. Distinguish between algebraic expressions and equations.
B. Simplify algebraic expressions by combining like terms.
C. Determine if an equation is linear.
D. Calculate the slope of a linear equation in two variables.
    1. Including horizontal and vertical lines
E. Solve linear equations in one variable.
F. Graph linear equations (diagonal, horizontal, and vertical) in two variables on the cartesian plane in the following ways.
    1. Plotting points
    2. Plotting the intercepts
    3. Plotting by using a point and the slope
G. Find an equation of a line given a graph.
H. Make connections between the parameters of a function and the behavior of the function.
I. Recognize that a variety of problem situations can be modeled by the same type of function.
J. Apply skills to word problems involving linear equations.

V. Linear Inequalities in Two Variables

A. Graph a linear inequality on the cartesian plane.
B. Connect the solution set of a linear inequality with the graph of the linear inequality.

VI. Systems of Linear Equations and their Graphs

A. Recognize the three cases for systems of two linear equations in two variables.
B. Connect the solution set of a system of two linear equations in two variables with the graphs of the two equations.
C. Solve a system of two linear equations in two variables using a graph.

Evaluation: The common final exam will count at least 20% of the course grade. Each instructor may choose if they would also allow the final to replace a low test grade or use the final in other ways. The specific criteria for determining the final course grade must be delineated in the first day

handout provided to each student. Students should be assessed in various ways, such as class presentations; group assignments and projects; individual assignments; writing; and open-ended test questions.

Commonality: All instructors will use the same textbook and cover all topics in the topical outline. All students will take the common final for this course. Calculators will not be allowed.