BROWARD COLLEGE
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Course Outline

Course Title: Foundations Of Mathematical Reasoning
Common Course Title: MGF1106
Effective Term: Fall 2020 (Aug 22, 2020)
Credit Hours: 3 Units

Next Review : Aug 6, 2025
Contact Hour Breakdown: *(Per 16 week Term)*

Total: 48	
Lecture:	Lab:
Clinic:	Other:

Requirements

This course does not have any required pre-requisites or co-requisites.

Course Description:

This general education course will include topics in logic, geometry, set theory, probability, and statistics. This course will also emphasize applications to real-world situations and the integration of topics from other disciplines, including, but not limited to, business and the physical sciences. Meets Area 5a of the General Education Requirements for the A.A. degree and for the A.S. degree

Course Outline

UNITS

Unit 1 : Sets

General Outcome
1.0 Demonstrate an understanding of sets, their properties, and some of their many uses.

Specific Learning Outcomes
1.1 Classify and denote sets by lists, by descriptions, or by set-builder notation, and distinguish between equal and equivalent sets.
1.2 Discriminate accurately between correct and incorrect notational usage.
1.3 Identify subsets, proper subsets, and the cardinality of the power set.
1.4 Determine the complement, union, intersection, difference, and Cartesian product of sets.
1.5 Demonstrate understanding of and be able to apply the algebraic properties of set operations, including the commutative, associative, and distributive properties and DeMorgan's Laws.
1.6 Use Venn diagrams and cardinal number formulas to determine set relationships, to deduce facts of set inclusion or non-inclusion, to draw logical conclusions from data, and to solve applied word problems.

Unit 2 : Logic

General Outcome
2.0 Demonstrate an understanding of logic concepts and apply the precepts of logic to problems.

Specific Learning Outcomes
2.1 Recognize, symbolize, and determine truth values of simple and compound statements.
2.2 Use the truth tables to determine the conditions under which statements (conjunction, disjunction, conditional, biconditional) are true or false.
2.3 Determine the negation of simple and compound statements.
2.4 Write the converse, inverse, and contrapositive of conditional statements.
2.5 Determine if two logical statements are equivalent or non-equivalent.

2.6 Apply logically valid reasoning techniques to determine when sentential and syllogistic arguments are valid and invalid.
2.7 Use laws of logic to draw valid conclusions.
2.8 Recognize that the validity or non-validity of an argument does not affect the truth of its conclusions.
2.9 Identify fallacies in everyday life (e.g., the fallacies of false cause and hasty generalization).
2.10 Demonstrate a knowledge of the life of Charles Dodgson.

Unit 3 : Geometry

General Outcome
3.0 Demonstrate knowledge of plane and solid geometry, and identify and apply geometric principles to solve problems.

Specific Learning Outcomes

3.1 Review solving linear equations and proportions that include combining like terms and the distributive property.
3.2 Review solving quadratic equations involving the square root property only.
3.3 Identify points, lines, rays, line segments, angles, and planes and be able to classify angles.
3.4 Demonstrate knowledge of the area and circumference of a circle.
3.5 Use degree and radian measures of angles to solve problems involving linear equations or quadratic equations involving only the square root property.
3.6 Classify pairs of lines as parallel, skewed, intersecting, or perpendicular.
3.7 Classify plane figures (triangles, polygons, common curves), and recognize and use their properties to solve problems involving linear equations or quadratic equations involving the square root property only. Use the Pythagorean Theorem to solve right triangle problems.
3.8 Use concepts of similar and congruent triangles to solve problems involving linear equations or quadratic equations involving the square root property only.
3.9 Apply the concepts of perimeter, area, and volume to solve problems involving linear equations or quadratic equations involving the square root property only.

Unit 4 : Systematic Counting and Probability

General Outcome
4.0 Understand counting techniques and apply methods for computing probabilities.

Specific Learning Outcomes
4.1 List and count by using systematic methods (product tables, tree diagrams).
4.2 Apply the Fundamental Counting Principle.
4.3 Apply the Factorial Formula.
4.4 Recognize the difference between a permutation and a combination.
4.5 Use permutations and combinations to solve counting problems.
4.6 Apply counting techniques to real world problems.
4.7 Recognize a probability experiment and list the sample space (possible outcomes) associated with such an experiment.
4.8 Determine the probability of a specific outcome in an experiment using simple, compound, and conditional probabilities.
4.9 Compute odds, and relate odds to probability.

Unit 5 : Statistics

General Outcome
5.0 Apply basic statistical principles in various ways with the aid of a calculator or appropriate statistical software.

Specific Learning Outcomes

5.1 Compute the mean, median, and mode of a data set, and then recognize and interpret the meaning of these measures of central tendency along with their relationship to each other in various types of distributions.
5.2 Demonstrate an understanding of percentiles and quartiles, and interpret the meaning of these measures of position.
5.3 Compute the range, variance, and standard deviation for a set of data, and then interpret the meaning of these measures of dispersion.
5.4 Recognize the normal distribution curve and its properties, and then use these properties to interpret data, make predictions, and solve problems.
5.5 Recognize random and representative sampling techniques and apply an appropriate procedure for selecting a sample from a given population.

5.6 Demonstrate basic knowledge and use of the z-score.