MTH 152

MATHEMATICS FOR THE LIBERAL ARTS II

COURSE OUTLINE

Course Prerequisites:
MTE 1,2,3,4, and 5 or a placement recommendation for MTH 152

Course Description:
Presents topics in functions, combinatorics, probability, statistics, and algebraic systems.

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Course Outcomes

At the completion of this course, the student should be able to:

1.   confide and believe in mathematical reasoning when the truth has been reached through undeniable demonstrations,
2.   appreciate of the evolution of mathematical ideas that define the subject,
3.   understand the foundations of mathematics which involve (i) the fundamental concepts of algebraic systems; (ii) the properties of modern geometry including Non-Euclidean Geometry; (iii) the algorithms of Combinatorics; and (iv) the mathematical theory of probability and statistics which provides for the interpretation of data to intelligently predict future events,
4.   independently inquire and research that which enhances mathematical knowledge, and
5.   appreciate the aesthetic nature of mathematics.

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Required Materials:

Mathematical Ideas. Miller, Heeren, & Hornsby, 13th Edition, Pearson Publishing Company, ISBN: 9780321977076

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Topical Description: (Outline chapters and sections to be covered in the book – may include timeline)
Note: Optional topics are denoted by an *.

The Basic Concepts of Algebra

7.1 Linear Equations
7.2 Application of Linear Equations
7.3 Ratio, Proportion, and Variation*
7.4 Linear Inequalities
7.5 Properties of Exponents and Scientific Notation
7.6 Polynomials and Factoring
7.7 Quadratic Equations and Applications

Extension: Complex Solutions of Quadratic Equations

Functions, Graphs, and Systems of Equations and Inequalities

8.1 The Rectangular Coordinate System and Circles
8.2 Lines, Slopes, and Average Rate of Change
8.3 Equations of Lines and Linear Models
8.4 An Introduction to Functions: Linear Functions, Applications, and Models
8.5 Quadratic Functions, Applications, and Models
Research Option*: Properties of Mathematical Systems, Theory of Groups
8.6 Exponential and Logarithmic Functions, Applications, Models*
8.7 Systems of Equations*
8.8 Applications of Systems*
8.9   Linear Inequalities, Systems, and Linear Programming*
Geometry

9.1   Points, Lines, Planes, and Angles
9.2   Curves, Polygons, and Circles

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9.3 The Geometry of Triangles: Congruence*, Similarity*, and the Pythagorean Theorem.
9.4   Perimeter, Area, and Circumference*
9.5   Volume and Surface Area*
9.6   Transformational Geometry*
9.7   Non-Euclidean Geometry, Topology*, and Networks*
9.8   Chaos and Fractal Geometry*

Counting Methods

10.1 Counting by Systematic Listing
10.2 Using the Fundamental Counting Principle
10.3 Using Permutations and Combinations
10.4 Using Pascal's Triangle
           The Binomial Theorem*
10.5 Counting Problems Involving with "Not" and "Or"
Probability

11.1 Basic Concepts
11.2 Events Involving "Not" and "Or"
11.3 Conditional Probability: Events Involving "And"
11.4 Binomial Probability*
11.5 Expected Value
Statistics

12.1 Visual Displays of Data
12.2 Measures of Central Tendency
12.3 Measures of Dispersion
12.4 Measures of Position
12.5 The Normal Distribution
Extension: Regression and Correlation*

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Notes to Instructors
(List information about optional topics, departmental exams, etc)

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