COURSE OUTLINE

MATH 111 – SURVEY OF MATHEMATICS

Prepared By:  Alice K. Reed
A. **TITLE:** Survey of Mathematics  
B. **COURSE NUMBER:** MATH 111  
C. **CREDIT HOURS:** 3  
D. **WRITING INTENSIVE COURSE:** N/A  
E. **COURSE LENGTH:** 15 weeks  
F. **SEMESTER(S) OFFERED:** Fall / Spring  
G. **HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY:**  
   Three hours per week.  
H. **CATALOG DESCRIPTION:** A study of various mathematical topics including an introduction to quantitative reasoning skills, truth table logic, sets, probability, and geometry. This course is designed for non-technical oriented students. It is appropriate for students in liberal arts. Three hour lecture per week.  
I. **PRE-REQUISITES:** Intermediate Algebra (MATH 106) with a grade of C or better, or 2 NYS high school regents math courses with a grade of 75 or above on the second New York State Regents mathematics examinations, or permission of instructor.  
J. **GOALS (STUDENT LEARNING OUTCOMES):**  
   By the end of this course, the student will be able to:  

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<tr>
<th>Course Objective</th>
<th>Institutional SLO</th>
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<tr>
<td>a. Use inductive and deductive reasoning to predict patterns or sequences and prove conjectures</td>
<td>1. Communication</td>
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<td>2. Critical Thinking</td>
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<td>b. Solve real life applications using set operations and Venn diagrams</td>
<td>1. Communication</td>
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<td>2. Critical Thinking</td>
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<td>c. Determine the validity of symbolic and syllogistic arguments</td>
<td>1. Communication</td>
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<td>2. Critical Thinking</td>
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<td>d. Find expected value in real life applications</td>
<td>1. Communication</td>
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<td>2. Critical Thinking</td>
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<td>e. Use permutations, combinations, and compound, conditional, and binomial probabilities to solve real life applications</td>
<td>1. Communication</td>
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<td>2. Critical Thinking</td>
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<td>f. Find angle measurement to solve real life applications</td>
<td>1. Communication</td>
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<td>2. Critical Thinking</td>
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<td>g. Solve applications using area, volume, and the Pythagorean Theorem</td>
<td>1. Communication</td>
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<td>2. Critical Thinking</td>
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<td>h. Construct and analyze transformations of objects in two dimensional space</td>
<td>1. Communication</td>
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<td>2. Critical Thinking</td>
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<td>i. Use basic graph theory to determine if a network is traversable</td>
<td>1. Communication</td>
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<td>2. Critical Thinking</td>
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L. **REFERENCES:** None

M. **EQUIPMENT:** Smart classroom (Computer projection and access to the Internet)

N. **GRADING METHOD:** A – F

O. **MEASUREMENT CRITERIA/METHODS:**
   - Quizzes
   - Homework
   - Exams
   - Projects

P. **DETAILED COURSE OUTLINE:**

I. **Quantitative Reasoning Skills**
   1. Inductive Reasoning
   2. Deductive Reasoning
   3. Estimation

II. **Elementary Set Operations**
   1. Set Notation
   2. Finite and Infinite Sets
   3. Equal and Equivalent Sets
   4. Cardinality
   5. Empty and Universal Set
   6. Subsets and Proper subsets
   7. Complements, Intersection, and Union of Sets
   8. Venn Diagrams

III. **Elementary Truth Table Logic**
   1. Symbolic Form
   2. Statements and Logical Connectives
   3. Quantifiers
   4. Constructing Negation, Conjunction, Disjunction, Conditional and Biconditional Truth Tables
   5. Tautologies
   6. Logically equivalent statements
   7. Converse, Inverse, and Contrapositive
   8. Symbolic arguments using Laws of Inference and Proof
   9. Syllogistic arguments using Euler Diagrams

IV. **Basic Counting and Probability**
   1. Empirical and Theoretical Probability
   2. Odds and Probability
   3. Expected Value (Expectation)
   4. Tree Diagrams
   5. Basic Counting Principle
   6. Compound Probability (And/Or) With and without replacement
7. Mutually exclusive, Independent and Dependent Events
8. Conditional Probability
9. Permutations
10. Combinations
11. Binomial Probability

V. Geometry
1. Points, Lines, Planes, and Angles
2. Polygons
3. Perimeter and Area
4. Volume and Surface Area
5. Transformational Geometry, Symmetry, and Tessellations
6. Mobius Strip
7. Jordan Curve
8. Topological Equivalence
9. Graphs, Paths, and Circuits

Q. LABORATORY OUTLINE: N/A