MASTER SYLLABUS

MATH 111 – SURVEY OF MATHEMATICS

Created by: Alice K. Reed

Updated by: Claire Medve

CANINO SCHOOL OF ENGINEERING TECHNOLOGY
MATHEMATICS DEPARTMENT
Spring 2018
A. **TITLE:** Survey of Mathematics

B. **COURSE NUMBER:** MATH 111

C. **CREDIT HOURS:** (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)

- # Credit Hours: 3
- # Lecture Hours: 3 per week
- # Lab Hours: 0 per week
- Other: 0 per week

Course Length: 15 Weeks

D. **WRITING INTENSIVE COURSE:** Yes ☒ No ☐

E. **GER CATEGORY:** None: ☐ Yes: GER 1 Mathematics

*If course satisfies more than one:

F. **SEMESTER(S) OFFERED:** Fall ☐ Spring ☐ Fall & Spring ☒

G. **COURSE 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.

H. **PRE-REQUISITES:** None ☐ Yes ☒ If yes, list below:

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.

**CO-REQUISITES:** None ☒ Yes ☐ If yes, list below:
I. **STUDENT LEARNING OUTCOMES**: (see key below)

By the end of this course, the student will be able to:

<table>
<thead>
<tr>
<th>Course Student Learning Outcome [SLO]</th>
<th>Program Student Learning Outcome [PSLO]</th>
<th>GER If Applicable</th>
<th>ISLO &amp; SUBSETS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use inductive and deductive reasoning to predict patterns or sequences and prove conjectures.</td>
<td></td>
<td>1 3 Foundational Skills</td>
<td>QTR</td>
</tr>
<tr>
<td>Solve real life applications using set operations and Venn diagrams.</td>
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<td>1 3 Foundational Skills</td>
<td>QTR</td>
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<tr>
<td>Determine the validity of symbolic and syllogistic arguments.</td>
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<td>1 3 Foundational Skills</td>
<td>QTR</td>
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<tr>
<td>Find expected value in real life applications.</td>
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<td>1 3 Foundational Skills</td>
<td>QTR</td>
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<tr>
<td>Use permutations, combinations, and compound, conditional, and binomial probabilities to solve real life applications.</td>
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<td>1 3 Foundational Skills</td>
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<tr>
<td>Find angle measurement to solve real life applications.</td>
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<td>1 3 Foundational Skills</td>
<td>QTR</td>
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<tr>
<td>Solve applications using area, volume, and the Pythagorean Theorem.</td>
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<td>1 3 Foundational Skills</td>
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<td>Construct and analyze transformations of objects in two dimensional space.</td>
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<td>1 3 Foundational Skills</td>
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<tr>
<td>Use basic graph theory to determine if a network is traversable.</td>
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<td>1 3 Foundational Skills</td>
<td>QTR</td>
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**KEY**

<table>
<thead>
<tr>
<th>ISLO #</th>
<th>Institutional Student Learning Outcomes [ISLO 1 – 5]</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Communication Skills</td>
</tr>
<tr>
<td></td>
<td>Oral [O], Written [W]</td>
</tr>
<tr>
<td>2</td>
<td>Critical Thinking</td>
</tr>
<tr>
<td></td>
<td>Critical Analysis [CA], Inquiry &amp; Analysis [IA], Problem Solving [PS]</td>
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<tr>
<td>3</td>
<td>Foundational Skills</td>
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<tr>
<td></td>
<td>Information Management [IM], Quantitative Lit./Reasoning [QTR]</td>
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<tr>
<td>4</td>
<td>Social Responsibility</td>
</tr>
<tr>
<td></td>
<td>Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]</td>
</tr>
<tr>
<td>5</td>
<td>Industry, Professional, Discipline Specific Knowledge and Skills</td>
</tr>
</tbody>
</table>

*Include program objectives if applicable. Please consult with Program Coordinator*
J. **APPLIED LEARNING COMPONENT:** Yes ☐ No ☒

If YES, select one or more of the following categories:

☐ Classroom/Lab
☐ Internship
☐ Clinical Placement
☐ Practicum
☐ Service Learning
☐ Community Service
☐ Civic Engagement
☐ Creative Works/Senior Project
☐ Research
☐ Entrepreneurship (program, class, project)

K. **TEXTS:**

Currently using: *A Survey of Mathematics with Applications*

L. **REFERENCES:** None

M. **EQUIPMENT:** None ☐ Needed:

Smart classroom (computer projection and access to the internet). A scientific calculator is required for this course.

N. **GRADING METHOD:** A – F

O. **SUGGESTED MEASUREMENT CRITERIA/METHODS:**

- Homework
- Quizzes
- Exams

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
   1. 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: None ☒ Yes ☐