COMMON COURSE OUTLINE: Course discipline/number/title: MATH 1111: Contemporary Concepts in Mathematics

A. CATALOG DESCRIPTION
   1. Credits: 3
   2. Hours/Week: 3
   3. Prerequisites (Course discipline/number): Successful completion of MATH 0098 (or equivalent) with a grade of C or better or appropriate score on RCTC placement test and college level reading.
   4. Co-requisites (Course discipline/number): None

A problem-solving based Liberal Arts course for the student who wishes to acquire a broad background in mathematics. These topics will be covered: Geometry, Logic, Finance Mathematics, Probability, and Statistics. Other topics may be selected from the following list: Numeration Systems, Trigonometry, Voting Methods, Apportionment, Graph Theory, Sets, Discrete Mathematics, Number Theory, Game Theory, and GIS.

B. DATE LAST REVISED (Month, year): February, 2014

C. OUTLINE OF MAJOR CONTENT AREAS:
   1. Geometry
   2. Logic
   3. Finance Mathematics
   4. Probability
   5. Statistics

(Instructor's choice) TO BE SELECTED FROM:
   1. Numeration systems
   2. Trigonometry
   3. Voting Methods
   4. Apportionment
   5. Graph Theory
   6. Sets
   7. Discrete Mathematics
   8. Number Theory
   9. Game Theory
   10. Geographic Information Systems (GIS)

D. LEARNING OUTCOMES (GENERAL): The student will be able to:
   1. Demonstrate an understanding of the difference between Euclidean and non-Euclidean geometries and apply the principles of each.
   2. Demonstrate an understanding of the difference between inductive and deductive reasoning and apply each to problem solving (may include the scientific method).
   3. Apply the principles of symbolic logic.
      a) Recognize a statement in logic.
      b) Find the negation, the inverse, the converse, and the contrapositive of a given statement.
      c) Apply DeMorgan’s laws.
      d) Translate English statements to symbolic form.
      e) Apply the basic syllogistic forms to determine whether an argument is valid.
      f) Make truth tables to determine if two statements are logically equivalent.
      g) Make truth tables to determine if an argument is valid.
   4. Apply the formulas of finance to real world problems.
      a) Apply the simple and compound interest formulas.
      b) Apply the formula for ordinary annuities.
      c) Apply the formula for loans.
      d) Use algebra, including rational exponents and logarithms, to solve for any of the variables in the finance formulas.
      e) Demonstrate an understanding of the difference between nominal and effective rates.
D. LEARNING OUTCOMES (GENERAL): Continued. . . The student will be able to:

5. Calculate probabilities and analyze games of chance.
   a) Apply counting methods (listing, multiplication rule, combinations, and permutations) to determine possible outcomes.
   b) Calculate probability and odds, and understand their difference.
   c) Calculate probabilities of compound events.
   d) Calculate conditional probabilities.
   e) Calculate expected value.
   f) Determine if a game is fair.

6. Interpret data and its presentation.
   a) Interpret data that is presented in any of the types of graphs, charts, or frequency distributions.
   b) Calculate measures of central tendency (mean, median, mode).
   c) Calculate measures of dispersion (range and standard deviation).
   d) Apply the concepts of normal distribution.

E. LEARNING OUTCOMES (MNTC): Competencies from the Minnesota Transfer Curriculum (MNTC):

   Goal 2: Critical Thinking: The student will be able to:
   a) Gather factual information and apply it to a given problem in a manner that is relevant, clear, comprehensive, and conscious of possible bias in the information selected.
   b) Imagine and seek out a variety of possible goals, assumptions, interpretations, or perspectives, which can give alternative meanings or solutions to given situations or problems.
   c) Analyze the logical connections among the facts, goals, and implicit assumptions relevant to a problem or claim; generate and evaluate implications that follow from them.
   d) Recognize and articulate the value assumptions, which underlie and affect decisions, interpretations, analyses, and evaluations made by ourselves and others.

   Goal 4: Mathematics/Symbolic Systems: The student will be able to:
   a) Illustrate historical and contemporary applications of mathematics/logical systems.
   b) Clearly express mathematical/logical ideas in writing.
   c) Explain what constitutes a valid mathematical/logical argument (proof).
   d) Apply higher-order problem solving and/or modeling strategies.

F. METHODS FOR EVALUATION OF STUDENT LEARNING:

   1. Tests
   2. Quizzes
   3. Homework
   4. Cooperative group work
   5. Writing assignments
   6. Portfolios

G. RCTC CORE OUTCOME(S) ADDRESSED:

   - Communication
   - Critical Thinking
   - Global Awareness/Diversity
   - Civic Responsibility
   - Personal/Professional Accountability
   - Aesthetic Response

H. SPECIAL INFORMATION (if any):

   A scientific or graphing calculator is required.