



**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 with a grade of C or better or appropriate score on RCTC placement test.
4. **Co-requisites (Course discipline/number):** None
5. **MnTC Goals (if any):** CT, MA

A Liberal Arts course for the student who wishes to acquire a broad background in mathematics without taking the usual sequences of specialized courses. These topics will be covered: Geometry, Logic, Finance Mathematics, Probability, Statistics, and Problem Solving. Other topics will be selected from the following list and may vary, depending on the instructor and/or the text: Numeration Systems, Trigonometry, Voting Methods, Apportionment, Graph Theory, Sets, Discrete Mathematics, Number Theory, and Game Theory. Grading is A-F.

**B. DATE LAST REVISED (Month, year):** April, 2005

**C. OUTLINE OF MAJOR CONTENT AREAS:**

1. Geometry
2. Logic
3. Finance Mathematics
4. Probability
5. Statistics
6. Problem Solving

**(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

**D. LEARNING OUTCOMES (GENERAL):** The student will be able to:

1. Understand the difference between Euclidean and non-Euclidean geometries and apply the principles of both.
2. Understand the difference between inductive and deductive reasoning and apply both to problem solving.
3. Understand and apply the principles of symbolic logic.
  - a) Recognize a statement in logic.
  - b) Negate a statement in logic.
  - c) Find the inverse, the converse, and the contrapositive of a given statement.
  - d) Apply DeMorgan's laws.
  - e) Translate English statements to symbolic form.
  - f) Understand and apply the basic syllogistic forms to determine whether an argument is valid.
  - g) Make truth tables to determine if two statements are logically equivalent.
  - h) Make truth tables to determine if an argument is valid.
4. Apply the formulas of finance to real world problems.
  - a) Apply the simple interest formulas.
  - b) Apply the compound interest formula.
  - c) Apply the formula for ordinary annuities.
  - d) Apply the formula for loans.
  - e) Solve any of the finance formulas for any of the variables.
  - f) Understand 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 all of the four counting methods (listing, multiplication rule, combinations, and permutations) to determine possible outcomes.
  - b) Understand the difference between probability and odds.
  - c) Calculate probability and odds.
  - d) Calculate probabilities of compound events.
  - e) Calculate conditional probabilities.
  - f) Understand the definition of a *fair* game.
  - g) Calculate expected value.
  
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) Understand and solve problems involving the normal distribution.
  - e) Understand the application of inferential statistics in society.
  - f) Calculate margin of error, confidence intervals, and confidence levels.
  
7. Apply common strategies for problem solving.

**Other Content Areas** – (these will vary depending on the topics selected.)

1. Apply the basic principles of trigonometry to real world problems.
2. Use set theory notation and apply the operations of sets and Venn diagrams.
3. use some of the voting methods such as majority rule, the plurality method, binary voting, Condorcet winner, and the Forda method.
4. Apply the basic principles of graph theory.
5. Apply and analyze game strategies.
6. Illustrate historical and contemporary applications of numeration systems.

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

Goal 2: Critical Thinking (CT): The student will be able to:

1. 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.
2. 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.
3. 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.
4. 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 (MA): The student will be able to:

1. Illustrate historical and contemporary applications of mathematics/logical systems.
2. Clearly express mathematical/logical ideas in writing.
3. Explain what constitutes a valid mathematical/logical argument (proof).
4. 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. SPECIAL INFORMATION (if any):**

A scientific calculator is required.