

COMMON COURSE OUTLINE: Course discipline/number/title: MATH 2218: Discrete Mathematics

A. CATALOG DESCRIPTION

1. Credits: 4

2. Hours/Week: 4

3. Prerequisites (Course discipline/number): Successful completion of MATH 1115 or equivalent with a grade of better or appropriate score on RCTC placement test; College level reading

C or

4. Co-requisites (Course discipline/number): None

5. MnTC Goals (if any): NA

This is a course for mathematics and/or computer science majors. Topics include sets, relations, symbolic language, graph theory, matrices, and Boolean algebra.

B. DATE LAST REVISED (Month, year): January, 2011

C. OUTLINE OF MAJOR CONTENT AREAS:

1. The representation of numbers in Binary, Octal, Decimal, and Hexadecimal
2. Formal Logic, Truth Tables, and Argument Forms
3. Set Theory and Venn Diagrams
4. Direct and Indirect (Contradiction and Contrapositive) Proof Forms
5. Divisibility, Cardinality, and Basic Number Theory
6. Sequences, Series, and Mathematical Induction
7. Relations, Equivalence Relations, and Partial Order Relations
8. Combinatorics (Counting, Permutations, Combinations) and Elementary Probability
9. Expected Values, Conditional Probability, and Bayes's Theorem
10. Graph Theory, Circuits, and Trees

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

1. Convert between each of the number representations used for computer science.
2. Create truth tables to demonstrate logical equivalence
3. Verify an argument's validity by means of truth tables or established theorems.
4. Illustrate Set Theoretical relationships via Venn Diagrams
5. Construct direct proofs of ideas from set theory, analysis, elementary number theory, and other relevant mathematical fields.
6. Reproduce proofs of classic results such as the irrationality of root two and the proof that cardinality the prime numbers is infinite.
7. Construct proof by the methods of contrapositive and contradiction.
8. Create and verify formulas by using mathematical induction.
9. Represent relations with set theory, functional notations, or directed graphs.
10. Construct and interpret equivalence classes and partial order relations.
11. Compute combinations and permutations by use of mathematical formulas.
12. Model random experiments and analyze the related probabilities of each event.
13. Construct the necessary diagrams required to solve Conditional Probabilities and Bayes's theorem questions and solve the underlying problems.
14. Reproduce significant graphs, circuits, and trees related to computer science problems.
15. Develop a working knowledge of the terminology and methods of Graph Theory needed for future coursework in related areas.
16. Understand and apply the concepts of Big-O and Big-Q to functions and algorithms.

E. LEARNING OUTCOMES (MNTC): NA

F. METHODS FOR EVALUATION OF STUDENT LEARNING:

1. Homework
2. Quizzes
3. Group Projects
4. Exams
5. Final Comprehensive Exam



G. RCTC CORE OUTCOME(S) ADDRESSED:

- | | |
|---|---|
| <input type="checkbox"/> Communication | <input type="checkbox"/> Civic Responsibility |
| <input checked="" type="checkbox"/> Critical Thinking | <input type="checkbox"/> Personal/Professional Accountability |
| <input type="checkbox"/> Global Awareness/Diversity | <input type="checkbox"/> Aesthetic Response |

H. SPECIAL INFORMATION (if any):

A scientific calculator is necessary for many of the topics in this course.