

**J. Sargeant Reynolds Community College
Course Content Summary**

Course Prefix and Number: MTH 287

Credits: 3

Course Title: Mathematical Structures

Course Description (including lecture hours, lab hours, total contacts)

Presents topics in mathematical structures of value to students majoring in Computer Science or other disciplines requiring programming skills. Covers logic, set theory, number theory, combinatorics, functions, relations, and graph theory. Lecture 3 hours per week.

General Course Purpose

Preparation for upper level mathematics and computer science courses.

Course Prerequisites/Corequisites (*Entry-level competencies **required** for enrollment*)

MTH 166 or equivalent.

Course Objectives (Each item should complete the following sentence.)

Upon completing the course, the student will be able to:

- a. Employ the principles of mathematical logic to construct and analyze logical arguments, including proofs of mathematical properties.
- b. Apply properties of sets to perform set operations and to determine the cardinality of sets.
- c. Apply properties of number systems, including binary, octal, and hexadecimal, to perform arithmetic operations.
- d. Use counting techniques, including permutations and combinations.
- e. Recognize and identify equivalence relations, partial orderings, 1:1 functions, "onto" functions, composite functions, and inverse functions.
- f. Recognize, identify, and employ generating functions and recurrence relations.
- g. Apply properties of graphs to construct mathematical "trees", paths, and networks.

Major Topics to be Included

- a. Logic
- b. Set Theory
- c. Number Theory
- d. Combinatorics
- e. Relations and Functions
- f. Generating Functions and Recurrence
- g. Graph Theory

Effective Date of Course Content Summary (Month, Date Year): Fall 2007