

**NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY
MTH 151 - MATHEMATICS FOR THE LIBERAL ARTS I (3 CR.)**

Course Description

Presents topics in sets, logic, numeration systems, geometric systems, and elementary computer concepts. Lecture 3 hours per week.

General Course Purpose

The general purpose of this course is to give the student an appreciation for the uses of mathematics in the contemporary world and to develop ability by the student to solve certain mathematical problems in a logical manner.

Course Prerequisites/Corequisites

Prerequisites: Competency in Math Essentials Units MTE 1-5 as demonstrated through the placement and diagnostic tests, or by completion through unit 5 in an MTT course. A student who provides official evidence of a minimum mathematics score of 520 on the SAT or a minimum score of 22 on the ACT taken within the last two years may register for this course without taking the math placement test. MTH 151 and MTH 152 do not have to be taken in sequence

General Education Goals

- Students will develop college-level communication skills
 - Students will write about and discuss the concepts introduced in this course. They will also learn to present problem solutions so that others can understand their work
- Students will develop critical thinking and problem solving skills
 - This will happen throughout the course
- Students will develop quantitative skills and computer proficiency
 - Quantitative skills will be developed through such activities as calculations of geometric properties, and conversion between different number bases. Computer skills will be developed by using a software package or the Internet
- Students will develop a knowledge of science and technology
 - Student will solve problems dealing with scientific and technological topics throughout the course

Course Objectives

Upon the completion of the course, the student should be able to:

- perform operations on sets and Venn diagrams and solve problems utilizing set operations
- analyze a statement for logical structure and truth value
- discern the validity of arguments
- demonstrate the relationship between place values and number bases
- distinguish between Euclidean geometry, non-Euclidean geometry
- apply topological concepts
- apply computer concepts

Major Topics to be Included

- A. Sets
 - 1. Set notation

2. Relations-equality, subset, disjoint sets
 3. Operations-union, intersection, complement
 4. Venn diagrams
 5. Applications-survey problems
- B. Logic
1. Statements
 2. Connectives
 3. Propositions (negation, conditional, converse, inverse, contrapositive)
 4. Truth tables
 5. Validity of arguments
 6. Logical equivalence
- C. Numeration Systems
1. Historical perspective of numerical systems
 2. Place value systems
 - a. Binary
 - b. Octal
 - c. Decimal
 - d. Hexadecimal
 3. Conversion between bases
 4. (optional) Computation in bases other than decimal
- D. Geometry
1. Euclidean geometry - concepts such as area, perimeter, and volume
 2. Non-Euclidean geometry
 3. Topology - concepts such as genus, networks, tiling, and the four color theorem
- E. Computer concepts - required use of one or more of the following:
1. Mathematics software package
 2. Spreadsheet
 3. Database
 4. Mathematical applications of the Internet
- E. Consumer Mathematics
1. Simple and compound interest
 2. Consumer credit
 3. Mortgages
- F. Optional topics
1. Sequences and Series
 2. Chaos
 3. Fractals
 4. Metric system
 5. Number Theory