

NASSAU COMMUNITY COLLEGE
DEPARTMENT OF MATHEMATICS/COMPUTER SCIENCE/INFORMATION
TECHNOLOGY

Course Outline for

MAT 101
Concepts of Mathematics

Curriculum	Interdisciplinary
Lab hours	None
Semesters offered	Indicated in Catalog
Length of semester	15 Weeks
Class hours	3
Credits	3
Texts	Logic and Set Theory with Applications, 4th ed. by Cheifetz et al. Published by MAI; Logic, Sets and Numbers, 5 th ed. by Roethel et al. Published by Thomson "Logic and Reasoning in the 21st Century" Custom 1st ed. by Meyer, Meyer, and Feldberg.

PREREQUISITE

Satisfactory completion of MAT 002 or a working knowledge of elementary algebra.

CATALOG DESCRIPTION

Formal symbolic logic, arguments, methods of proof, basic concept of sets, set operations and probability, consideration of number systems and computers.

MATH CENTER REQUIREMENT

As part of this course, students should avail themselves of further study and/or educational assistance available in the Mathematics Center: B-130 and B-126. These activities and use of the resources provided are deemed an integral part of the course, and will help the student master necessary knowledge and skills.

OBJECTIVES

To develop the student's ability to analyze underlying mathematical structure and use logical reasoning in a variety of situations – including mathematical proof, as well as other contexts (computer circuits, probability, etc.), to develop the student's appreciation for the underlying similarities in the logical structures of superficially different situations.

TOPICS

- Introduction to symbolic logic: simple and compound statements, connectives, truth tables, types of statement relations, logically equivalent statements, converse, inverse and contrapositive and related fallacies.

Class lectures and exams: 7

- Arguments and Proofs: methods of testing for validity of an argument, valid argument forms, formal proof; direct and indirect method arguments in which conclusion is a compound statement, counterexamples.

Class lectures and exams: 8

- Set Theory: Set relations, Venn Diagrams, set operations, membership tables.

Class lectures and exams: 5

- Other Topics: at least two additional topics to be determined by each instructor from the following list.

1. Logic and Sets: truth sets of compound statements; using truth sets to determine validity of an argument
2. Computers: flowcharting, programming, and switching circuits
3. Boolean algebra: nature of mathematical systems, axioms of Boolean algebra, some theorems, and principle of duality
4. Introduction to probability of an event, mutually exclusive events, conditional probability, and independent events
5. Fuzzy logic
6. Selected topics: logic as used in artificial intelligence, expert systems and automated deduction, and game trees

Class lectures and exams: 10

NOTE TO INSTRUCTORS

Most of our students come to us knowing definitions of logical connectors and some have done simple proofs. We should adjust our topics and pacing to insure that this course is not primarily a repeat of high school material.

REFERENCES

1. Elementary Concepts of Mathematics, by Dinkines. Appleton Century Crofts.
2. An Introduction to the Elements of Mathematics, by Fujii. Wiley.
3. One, Two, Three...Infinity, by Gamow. Viking.
4. A Modern Introduction to Basic Mathematics, by Keedy. Addison-Wesley.
5. Mathematics - A Cultural Approach, by Kline. Addison-Wesley
6. From Zero to Infinity, by Reid. Crowell.
7. Insights into Modern Mathematics, 23rd Yearbook of the Council of Teachers of Mathematics.

DATE LAST REVISED

FALL, 2008