ROWAN UNIVERSITY
Department of Mathematics

Syllabus
1701.500 - Foundations of Mathematics

CATALOG DESCRIPTION:

1701.500 Foundations of Mathematics   3 s.h..

Strategies and tools for problem solving, including computer use, will be applied to specific problems from number theory, geometry, analytic geometry, algebra, discrete mathematics, logic, and calculus.

OBJECTIVES:

The course is intended to be a first graduate course in mathematics for students in all of these programs.As such, it will provide a common mathematical foundation for students in all of the programs, drawing upon the full range of undergraduate courses in mathematics.Mathematical connection will be emphasized in the course, allowing students to relate topics studied separately to one another.Also stressed will be mathematical reasoning and communication skills, as applied to mathematics.This course will permit students to build upon and share knowledge already acquired while pointing out areas in which additional study may be needed.In addition, it will develop the communication skills and understanding of the process of doing mathematics necessary for graduate-level study.

CONTENT:
1.Logic
1.1 Introduction
1.2 And, or, not, and Truth Tables
1.3 Implication and the Biconditional
1.4 Tautologies
1.5 Arguments and the Principle of Demonstration
1.6 Quantifiers
1.7 More Quantifiers
1.8 Methods of Proof

2.Sets, Relations, and Functions
2.1 Sets
2.2 Truth Sets
2.3 Relations
2.4 More Relations
2.5 Equivalence Relations and Partitions
2.6 Functions
2.7 More Functions

3.Mathematical Induction
3.1 Introduction
3.2 The Principle of Mathematical Induction
3.3 Equivalent Forms of the Principle of Mathematical Induction

4.Continuity

4.1Introduction
4.2The Real Number System
4.3Sequences
4.4Continuous Functions

5.Groups

5.1Introduction
5.2Groups
5.3Groups and Functions

6.Cardinality

6.1Introduction
6.2Cardinal Numbers
6.3Infinite Sets
6.4Infinite Cardinal Numbers

TEXTS:
The following are texts suitable for this course:

Dunham, William, JOURNEY THROUGH GENIUS, John Wiley & Sons, Inc., NYC,1990.
Eves, Howard, FOUNDATIONS AND FUNDAMENTAL CONCEPTS OF MATHEMATICS, PWS-Kent Publishing Co., Boston, MA, 1991.
Kurtz, David, FOUNDATIONS OF ABSTRACT MATHEMATICS, McGraw Hill Publishing Co., Hightstown, NJ, 1992.
Morash, Ronald, BRIDGE TO ABSTRACT MATHEMATICS, McGraw Hill Publishing Co., Hightstown, NJ, 1991.