RARITAN VALLEY COMMUNITY COLLEGE
ACADEMIC COURSE OUTLINE

MATH 107 MATHEMATICAL REASONING FOR EDUCATORS: LOGIC AND NUMERATION

I. Basic Course Information

A. Course Number and Title:	MATH 107 Mathematical Reasoning for Educators: Logic and Numeration
B. New or Modified Course:	Modified
C. Date of Proposal:	Fall 2025
D. Effective Term:	**Fall 2026**
E. Sponsoring Department:	Mathematics
F. Semester Credit Hours:	3
G. Weekly Contact Hours: 4	Lecture: 3 Laboratory: 1 Out of class student work per week: 6.5

H. Prerequisite: MATH 030 Intermediate Algebra (*or MATH 030R Intermediate Algebra)*.

I. Additional Fees: none

II. Catalog Description

Prerequisites: MATH 030 Intermediate Algebra or MATH 030R Intermediate Algebra with Review.

This course is designed as a transfer course for students seeking degrees in Elementary & Middle School Education and Early Childhood Education. Emphasis is placed on computational skills, problem solving and teaching via a hands-on approach. Topics include problem solving strategies, number theory, and algebraic structures.

III. Statement of Course Need

A. This course is part of a two-course sequence which serves students in the education program who will be transferring to a four-year college to complete a teaching certification program. This course is aligned with the topics on the PRAXIS Core and the Common Core State Standards for Mathematics (very similar to the NJ Student Learning Standards). This course prepares the students with the content they need for the classroom, the state exam, and the subsequent courses they will be taking at their transfer school.
B. The one-hour lab component allows students to work collaboratively using manipulatives and technology to solve problems.
C. This course generally transfers as a Mathematics general education course dependent on the transfer institution.

IV. Place of Course in College Curriculum

A. Free elective.

B. This course serves as a General Education Elective in Mathematics for Education Majors.

C. This course meets a mathematics requirement for the AA in Education P-12 for those students pursuing P-3, K-6, K-6 with 5-8 Endorsement and/or K-12 certification.

D. To see course transferability: a) for New Jersey schools, go to the NJ Transfer website, www.njtransfer.org; b) for all other colleges and universities, go to the individual websites.

V. Outline of Course Content

Prospective teachers need a solid understanding of mathematics so that they can teach it as a coherent, reasoned activity and communicate its elegance and power.

In this course, students will work cooperatively to explore different ways of solving problems, build connections among concepts, and solve problems growing out of their explorations. They will use physical materials to explore properties of number systems, model algorithms and algebraic structures.

They will be expected to reason mathematically using the laws of logic, set theory and algebraic structures. They will be expected to communicate mathematical ideas effectively using the language of mathematics.

This course will address the fundamental principles that underlie elementary school mathematics from advanced viewpoint.

Topics addressed include:

A. Problem Solving
   1. Strategies and processes
   2. Set Theory
   3. Logic and Problem Solving

B. Number Theory
   1. Place Value
   2. Whole Numbers/Integers/Rational Numbers
      i. Operations
      ii. Field axioms

      iii. Standard and non-standard algorithms for multi-digit operations and the reasoning behind them

   3. Divisibility theorems
   4. Fundamental Theorem of Arithmetic
   5. Order of Operations
   6. Prime and Composite numbers

C. Algebraic Structure and Thinking
   1. Ratios & Proportional reasoning
   2. Percent's
   3. Variables, Algebraic Expressions & Equations, Functions

VI. Course Learning Outcomes

A. At the completion of the course, students will be able to:

1. Solve mathematical application problems using problem solving strategies learned. (GE - 2)

2. Gather information and analyze data using set theory and logic. (GE - 2)

3. Solve mathematical problems involving various operations of numbers and concepts such as least common multiple and greatest common factor. (GE - 2)

4. Solve mathematical application problems using percent and proportional reasoning where appropriate. (GE - 2)

5. Translate application problems to algebraic equations for solving (GE - 2)

B. Assessment Instruments

The following assessment methods may be used.

A. laboratory reports
B. research papers
C. presentations
D. math games
E. quizzes, tests, cumulative exams

VII. Grade Determinants

A. lab reports resulting from work with manipulatives and problem solving activities
B. oral presentations
C. creative math games
D. tests or midterm
E. cumulative final exam

Given the goals and outcomes described above, LIST the primary formats, modes, and methods for teaching and learning that may be used in the course:

A. lecture/discussion
B. small-group work
C. computer-assisted instruction
D. guest speakers
E. laboratory
F. student oral presentations
G. student collaboration
H. paper or computer homework
I. independent study

VIII. Texts and Materials

A. suggested textbook
B. paper and/or online homework assignments to accompany textbook
C. film and video
D. web sources
E. other computer-based sources
F. manipulatives

(Please Note: The course outline is intended only as a guide to course content and resources. Do not purchase textbooks based on this outline. The RVCC Bookstore is the sole resource for the most up-to-date information about textbooks.)

IX. Resources

A. student computer labs
B. fraction bars
C. base ten blocks
D. Cuisenaire rods
E. counters
F. Unifix cubes