RARITAN VALLEY COMMUNITY COLLEGE
ACADEMIC COURSE OUTLINE
MATH 108
MATHEMATICAL REASONING FOR EDUCATORS II

I. Basic Course Information

A. Course Number and Title:	MATH 108 Mathematical Reasoning for Educators II
B. New or Modified Course:	Modified
C. Date of Proposal:	Fall 2016
D. Effective Term:	**Fall 2017**
E. Sponsoring Department:	Mathematics
F. Semester Credit Hours:	3.0
G. Weekly Contact Hours:	Lecture: 2.0 Laboratory: 2.0 Out of class student work per week: 8
H. Prerequisites:	MATH 107 Mathematical Reasoning for Educators I with a grade of C or better.
I. Laboratory Fees:	none

J. Name and Telephone Number or E-Mail Address of Department Chair at time of approval: Rosemarie Gorini (908-526-1200 ext. 8546) rosemarie.gorini@raritanval.edu

II. Catalog Description

Prerequisites: MATH 107, Mathematical Reasoning for Educators I with a grade of C or better.

This course, the second in a sequence, 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 Probability, Statistics and Geometry.

III. Statement of Course Need

Background:

The Mathematical Reasoning for Educators I and II sequence is a result of a dialogue which began fall 2009 and has continued through and probably beyond 2015. Representatives from two and four year schools in New Jersey (members of the New Jersey Association of Mathematics Teacher Educators, NJAMTE) met several times to discuss appropriate teacher preparation courses in Mathematics. Discussions and presentations revolved around a comprehensive aligned curriculum that would prepare students to successfully complete the Mathematics portion of the Praxis Core and ensure that teachers at the elementary and middle school levels are well prepared to teach Common Core Mathematics in their classrooms. During the 2013 Mathematics Program Review, external consultant, Bonnie Gold recommended a two course sequence "to do a better job of preparing future elementary teachers to teach the new standards". Several of the four year colleges have moved to a two course sequence aimed at eliminating redundancy and fostering a more in-depth study of the concepts relative to the K-6 curriculum. This is consistent with a report issued by the Conference Board of Mathematical Sciences entitled ***The Mathematical Education of Teachers***. This report which was done in conjunction with the American Mathematical Society and the Mathematical Association of America makes two major recommendations:

- Future teachers need mathematics courses that develop an in-depth understanding of the mathematics they will teach
- Elementary and middle school programs should include at least 9 semester hours in the mathematical knowledge needed to teach school mathematics well.

MATH-108 Mathematical Reasoning for Educators II is second course in that sequence. It is designed to provide students with an in-depth understanding of elementary mathematics while providing content knowledge for the Praxis Core exam.

IV. Place of Course in College Curriculum

A. Free elective. (This applies automatically to all credit courses in the College.)
B. The 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 and use physical materials to explore geometric concepts, spatial reasoning and measurement. They will become aware of the relationship of mathematics to other disciplines and its applications in society by solving problems involving data analysis, statistics and probability.

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

Topics addressed include:

A. Probability
   1. Properties of probability
      i. Measure of likelihood
      ii. Randomness
      iii. Mutual exclusivity
   2. Counting Principles
   3. Empirical and theoretical probability
   4. Simulations

B. Data Analysis and Statistics
   1. Random Sampling
   2. Data Organization, Representation and Interpretation
   3. Measures of Central Tendency and Dispersion
   4. Statistical Inference

C. Geometry Basics
   1. Two and Three-dimensional Geometry
   2. Graphing points, lines & functions on the coordinate plane
   3. Connections between Algebra and Geometry
   4. Measurement
      i. Units of measure
      ii. Comparison and conversion from one unit to another
      iii. Derive and use formulas for Perimeter/Area/Volume/Surface Area for basic shapes
   5. Lines and Angles
   6. Congruence and Similarity
   7. Symmetry
   8. Tessellations and Transformations

VI. General Education and Course Learning Outcomes

A. General Education Learning Outcomes:

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

1. Gather information, use a variety of data representation techniques and analyze data using measures of central tendency and dispersion. (GE - NJ2)
2. Apply principles of probability to determine likelihood of outcomes. (GE - NJ2)
3. Solve mathematical application problems utilizing the Euclidean geometry of points, lines, planes, and angles. (GE - NJ2)
4. Construct various types of patterns using tessellations, transformations, rotations and reflections. (GE - NJ2)

B. Course Learning Outcomes:

See above

C. Assessment Instruments

1. Gather information, use a variety of data representation techniques and analyze data using measures of central tendency and dispersion.
2. Apply principles of probability to determine likelihood of outcomes.
3. Solve mathematical application problems utilizing the Euclidean geometry of points, lines, planes, and angles.
4. Construct various types of patterns using tessellations, transformations, rotations and reflections.

Given the outcomes described above, LIST which of the following assessment methods may be used; please note any instruments that will be ***required*** to assess outcomes as listed above (e.g., research papers for information literacy):

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. cards & dice
C. compass & protractor
D. Unifix cubes
E. tangrams/polydrons/geometric shapes

X. Honors Option

There is no Honors Option for this course.