# RARITAN VALLEY COMMUNITY COLLEGE
# ACADEMIC COURSE OUTLINE

# MATH 116H INTRODUCTION TO LIMITS – HONORS

## I. Basic Course Information

A. Course Number and Title: MATH 116H Introduction to Limits - Honors

B. New or Modified Course: Modified

C. Date of Proposal: Spring 2015

D. Effective Term: Fall 2015

E. Sponsoring Department: Mathematics

F. Semester Credit Hours: 1

G. Weekly Contact Hours: 1 Lecture: 1
Laboratory: 0

H. Prerequisites: GPA 3.5 or permission of instructor

Corequisites: MATH 112 Precalculus I, or
MATH 113 Precalculus II, or
MATH 114H: Precalculus Honors

I. Laboratory Fees: None

J. Name and Telephone Number or E-Mail Address of Department Chair:
Rosemarie Gorini (908) 526-1200 extension 8546, rgorini@raritanval.edu

## II. Catalog Description

Prerequisites: GPA 3.5 or permission of instructor. Corequisite: MATH 112 Precalculus I, or MATH 113 Precalculus II, or MATH 114H: Precalculus Honors. This course is designed as an honors component to supplement existing courses at the precalculus level. The course is intended to provide students with exposure to relevant ideas for future courses in Calculus. Topics include intuitive concept of the limit of a function, introduction to the delta epsilon definition, limits at infinity, continuity, and the Intermediate Value Theorem.

## III. Statement of Course Need

A. Enrollment History: In the spring 2014 semester we have approximately 18 students who registered for Introduction to Limits Honors.

B. Honors courses in mathematics were developed to provide mathematically talented students the opportunity to obtain a level of rigor not currently available in existing courses. Topics in this course were selected to supplement and enrich the curriculum of precalculus courses by providing additional theory and applications of the fundamental concept of limit as it was used by Newton and Leibniz in the development of calculus. This course has been designed as an additional one credit component to the existing precalculus courses.

C. Transferability.
    1. This course generally transfers as a free elective.
    2. This course generally transfers as a mathematics free elective.

## IV. Place of Course in College Curriculum

A. This course serves as a free elective.
B. This course serves as an Honors program math course.
C. Course transferability: for New Jersey schools go to the NJ Transfer website, www.njtransfer.org. For all other colleges and universities go to their individual websites.

## V. Outline of Course Content

A. Intuitive and Formal Definition of the Limit of a Function
B. Limits of Functions: Polynomials, Rational, Radical and Trigonometric
C. Multi-representation of Limits: Numerical, Graphical, and Algebraic
D. One Sided Limits and Limits at Infinity
E. Properties of Limits and their Proofs
F. Application of Limits: Continuity

## VI. Educational Goals and Learning Outcomes

### A. General Education Learning Outcomes

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

1. prove one or more properties of limits of functions. (GE – NJ 2)
2. define the limit of a function at a point both intuitively and formally. (GE – NJ 2)
3. evaluate the limit of a polynomial, rational, radical, and trigonometric function. (GE – NJ 2)
4. find the limit of a function numerically, graphically, and algebraically. (GE – NJ 2)
5. evaluate one-sided limits, two-sided limits, and limits at infinity.
6. state the relationship between continuity and the limit of a function at a point. (GE – NJ 2)

7. solve application problems that require the concept of a limit. (GE – NJ 2)

**B. Course Learning Outcomes**

See above

**C. Assessment Instruments**

A. Teacher written exams
B. In-Class quizzes
C. Labs and/or Projects
D. Student Oral Presentation
E. Final examination

## VII. Grade Determinants

A. Tests
B. Quizzes
C. Projects
D. Laboratory products
E. Homework
F. Final exam

Primary formats, modes, and methods for teaching and learning that may be used in the course:

A. Lecture/discussion
B. Small-group work
C. Graphing Calculator assisted instruction
D. Student oral presentations
E. Student Collaboration
F. Independent study

## VIII. Texts and Materials

The following text and materials are required for the course:

A. Suggested Textbook: *Precalculus* by Blitzer, published by Pearson Prentice Hall
A. Graphing calculator is required. TI-84 is recommended.

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.

## XI. Resources

No additional resources are needed.