RARITAN VALLEY COMMUNITY COLLEGE
ACADEMIC COURSE OUTLINE

MATH 152 CALCULUS II

I. Basic Course Information

A. Course Number and Title: MATH 152 Calculus II

B. New or Modified Course: Modified Course

C. Date of Proposal: Spring 2020

D. Effective Term: Fall 2020

E. Sponsoring Department: Mathematics and Computer Science

F. Semester Credit Hours: 4

G. Weekly Contact Hours: 5 Lecture: 3
Laboratory: 2
Out of class student work per week: 7

H. Prerequisite: MATH 151 Calculus I or MATH 151H Calculus I Honors with grade of C or better

I. Laboratory Fees: None

J. Name and Telephone Number or E-Mail Address of Department Chair and Divisional Dean at time of approval:
Department Chair: Dr. Lori Austin, Lori.Austin@raritanval.edu, x8576
Divisional Dean: Dr. Sarah A. Imbriglio,
Sarah.Imbriglio@raritanval.edu, x8241

II. Catalog Description

A. Prerequisite: MATH 151 Calculus I or MATH 151H Calculus I Honors with a grade of C or better. The second semester of a three-semester sequence of introductory calculus with a technology- based computer laboratory. Topics include integration techniques, integration applications in various coordinate systems, indeterminate forms, improper integrals, and infinite series.

III. Statement of Course Need

A. ~~Enrollment History: In the fall 2014 semester we have approximately 70 students who registered for Calculus II.~~

B. The two-hour lab is standard for all of our Calculus I, II, and III sections. It enables the students to use technology to help them become proficient in the course material.

C. This course generally transfers as a mathematics course in the mathematics program and as a program elective in technical (physical science, computer science) fields.

IV. Place of Course in College Curriculum

A. This course is a free elective ~~and a Mathematics elective for all programs~~.
B. This course serves as a General Education requirement in Mathematics.
C. This course meets a program requirement in Chemistry, Computer Science, Engineering Science, Physics, ~~General Science~~, and Mathematics.
D. This course transfers as a second semester calculus course. Course transferability; for New Jersey schools go to the NJ Transfer website, www.njtransfer.org. For all other colleges and universities go their individual websites.

V. Outline of Course Content

A. Applications of Integration
    1. Velocity and Net Change
    2. Regions Between Curves
    3. Volume by Slicing
    4. Volume by Shells
    5. Length of Curves
    6. Surface Area
    7. Physical Applications

B. Logarithmic, Exponential, and Hyperbolic Functions
    1. Logarithmic and Exponential Functions Revisited
    2. Exponential Models
    3. Hyperbolic Functions

C. Integration Techniques
    1. Basic Approaches
    2. Integration by Parts
    3. Trigonometric Integrals
    4. Trigonometric Substitutions
    5. Partial Fractions
    6. Integration Strategies
    7. Other Methods of Integration
    8. Numerical Integration
    9. Improper Integrals

D. Differential Equations
    1. Basic Ideas
    2. Direction Fields and Euler's Method
    3. Separable Differential Equations
    4. Special First-Order Linear Differential Equations
    5. Modeling with Differential Equations

E. Sequences and Infinite Series
    1. An Overview
    2. Sequences
    3. Infinite Series
    4. The Divergence and Integral Tests
    5. Comparison Tests
    6. Alternating Series
    7. The Ratio and Root Tests
    8. Choosing a Convergence Test

F. Power Series
    1. Approximating Functions with Polynomials
    2. Properties of Power Series
    3. Taylor Series
    4. Working with Taylor Series

G. Parametric and Polar Curves
    1. Parametric Equations
    2. Polar Coordinates
    3. Calculus in Polar Coordinates
    4. Conic Sections

VI. Educational Goals and Learning Outcomes

A. General Education Learning Outcomes :

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

1. use algebraic techniques such as trigonometric substitutions, partial fractions, and by parts, to evaluate integrals (GE-NJ 2)
2. utilize integration techniques to solve problems involving volumes and surface areas of solids of revolution, centroids, and arclength (GE-NJ 2)
3. use the concept of limit to evaluate improper integrals and indeterminate forms(GE-NJ 2)
4. test sequences and infinite series for convergence (GE-NJ 2)
5. use power series to estimate functions (GE-NJ 2)
6. operate in alternate reference frames including polar and parametric coordinates (GE-NJ 2).

B. Course Learning Outcomes

See Above

C. Assessment Instruments

A. tests
B. cumulative final examination
C. projects/problems
D. laboratory products
E. quizzes

VII. Grade Determinants

Factors that may enter into the determination of the final grade:

A. homework
B. weekly problems
C. quizzes
D. laboratory products
E. projects
F. tests
G. cumulative final examination
H. individual teacher determinant

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

A. lecture

B. small groups
C. labs with technology component
D. homework
E. weekly problems
F. quizzes
G. projects
H. tests
I. cumulative Final Examination

VIII. Texts and Materials

A. Suggested Textbook: *Calculus Early Transcendentals,* latest edition, by Briggs, Cochran, Gillett, and Schulz, Pearson Addison Wesley, or similar textbook.

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.

B. A graphing calculator may be required; TI-84 is recommended

XI. Resources

This course is held in a computer lab for two hours a week. The computers need to be installed with the math software currently licensed to the math department. Contact the math department to determine which software to install.