RARITAN VALLEY COMMUNITY COLLEGE
ACADEMIC COURSE OUTLINE

PHYS 151 – ANALYTICAL PHYSICS II

I. Basic Course Information

A. Course Number and Title: PHYS 151 – Analytical Physics II

B. New or Modified Course: Modified

C. Date of Proposal: Semester: Fall Year: 2023

D. Effective Term: Fall 2024

E. Sponsoring Department: Science & Engineering

F. Semester Credit Hours**:** 4

G. Weekly Contact Hours**:** 6 Lecture**:** 3
Laboratory**:** 3
Out of class student work per week: 7.5

H. ☒ Prerequisite (s): PHYS 150 - Analytical Physics I and MATH 151 - Calculus I, or their equivalents;
☒ Corequisite (s): MATH 152 - Calculus II or its equivalent
☐ Prerequisite (s) and Corequisite (s):

I. Additional Fees**:** No

J. Name and E-Mail Address of Department Chair and Divisional Dean at time of approval**:**
Department Chair: Marianne Baricevic marianne.baricevic@raritanval.edu
Divisional Dean: Sarah Imbriglio sarah.imbriglio@raritanval.edu

II. Catalog Description

Prerequisites: PHYS 150 - Analytical Physics I and MATH 151 - Calculus I, or their equivalents; Corequisites: MATH 152 - Calculus II or its equivalent. This is the second semester of a three-semester sequence in introductory calculus-based physics, which is required for students majoring in Physics and Engineering Science. It is also highly recommended for transfer students majoring in the physical sciences. Topics include electric charge and potential, electric forces and fields, magnetic forces and fields,

capacitance, current and resistance, induction and inductance, direct and alternating current, circuit analysis, Maxwell's equations, and topics in modern physics.

III. Statement of Course Need

A. This is a standard course in any calculus-based physics course sequence.

B. This course requires a lab component for students to employ a scientific approach to the understanding of the physics principles and concepts, and obtain first-hand experience in observation, data collection, analysis, and research.

C. This course, dependent on the transfer institution, generally transfers as a program requirement, general education course in science with lab, and/or free elective.

IV. Place of Course in College Curriculum

A. Free Elective
B. This course serves as a General Education course in Science with Lab.
C. This course serves as a program requirement in Physics and Engineering Science. This course may also be used as part of a required physics or science sequence for the following programs: Chemistry, Computer Science, Mathematics, and Pre-Medicine and Pre-Pharmacy, AS.
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

This course explores the following topics:

A. Electric charge, forces, and fields
B. Electric flux and Gauss' Law
C. Electric potential energy and voltage
D. Capacitance
E. Current and resistance
F. DC and AC circuits
G. Magnetic forces and fields
H. Induction and inductance
I. Electromagnetic oscillations
J. Maxwell's equations and electromagnetic waves
K. Topics in modern physics

VI. A. Course Learning Outcomes:

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

1. Analyze and solve mathematically appropriate physics problems (**GE 2, 3***).
2. Conceive logical inferences to conceptual physics questions using scientific knowledge from the fundamental principles and laws of physics **(GE 2, 3***).
3. Use technology to identify and collect information (**GE 4**).
4. Collect and interpret data accurately.

B. Assessment Instruments

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):

1. Exams
2. Final
3. Lab reports
4. Other, as specified by instructor

VII. Grade Determinants

What factors may enter into the determination of the final? LIST the grade determinants. Please note any grade determinants that will be *required* for the course. For example:

A. exams
B. final
C. lab reports
D. extra credit assignments
E. other, as specified by instructor

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. laboratory
D. student collaboration
E. independent study
F. other, as specified by instructor

VIII. Texts and Materials

LIST which of the following types of course materials will be used. Specify title and publication information about textbooks and any other major text sources or other materials.

A. suggested textbooks
B. web sources

C. other computer-based sources
D. other, as specified by instructor

Textbook Options:

University Physics (**free online**, OpenStax)
Principles of Physics: A Calculus-Based Text (any edition, Cengage-option or Amazon-option)
Fundamentals of Physics by Halliday & Resnick (any edition) (Amazon)

The following statement should be included in the outline:
(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. Laboratory
B. Computers
C. Library

X. Honors Options: None