RARITAN VALLEY COMMUNITY COLLEGE
ACADEMIC COURSE OUTLINE

PHYS 112 – Concepts of Physics

I. Basic Course Information

A. Course Number and Title: Phys112 – Concepts of Physics

B. New or Modified Course: Modified

C. Date of Proposal: Semester: Fall Year: 2020

D. Effective Term: Fall 2021

E. Sponsoring Department: Science and Engineering

F. Semester Credit Hours: 4

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

H. Prerequisites/Corequisites: MATH 030 Intermediate Algebra or MATH 106 Technical Math.

I. Laboratory Fees: NO

J. Name and Telephone Number or E-Mail Address of Department Chair and Divisional Dean at time of approval:
Department Chair: Ed Carr, Edward.Carr@raritanval.edu
Divisional Dean: Sarah Imbriglio, sarah.imbriglio@raritanval.edu

II. Catalog Description

Prerequisites: MATH 030 Intermediate Algebra or MATH 106 Technical Math.

Description: This course is an introduction to the concepts of physics and their application to real-world phenomena. Emphasis is on understanding the phenomena through demonstrations, experience, and experiments in physics and not through mathematical manipulations. This course may be used as a science elective for non-science majors and is required for students majoring in many of the medical and technology programs. It is also recommended for those taking General Physics without a strong high school science background. Topics include classical mechanics, properties of matter, heat and the laws of thermodynamics, electricity and magnetism, vibration and

waves, sound, and optics. Credit towards graduation will not be given for both Concepts of Physics and General or Engineering Physics.

III. Statement of Course Need

A. This course is a requirement for students in several technology programs and is recommended for individuals without a strong high school science background in preparation to take General Physics.

B. The course has a lab component to provide students with additional learning opportunities by using hands-on experimentation.

C. This course generally transfers as a program requirement, elective, and/or a Lab science general education course.

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 meets a program requirement for:
- Electrical Utility Technology AAS
- Ophthalmic Science AAS
- Commercial Energy Management Technology, AAS
- This course fulfills a program option in Education P-12, AA

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

A. Newton's First Law of Motion - Inertia
B. Linear Motion – One Dimensional Kinematics
C. Newton's Second Law of Motion
D. Newton's Third Law of Motion
E. Momentum
F. Energy
G. Rotational Motion
H. Gravity
I. Projectile and Satellite Motion
J. The Atomic Nature of Matter
K. Solids, Liquids, and Gasses

L. Temperature, Heat, and Expansion
M. Heat Transfer
N. Change of Phase
O. Thermodynamics
P. Vibrations and Waves
Q. Sound
R. Electrostatics
S. Electric Current
T. Magnetism
U. Electromagnetic Induction
V. Properties of Light and Color
W. Reflection and Refraction

VI. General Education and Course Learning Outcomes

A. General Education Learning Outcomes:

At the completion of the course, students will be able to:
1. Classify and interpret scientific data and information (GE-NJ 2,3)
2. Analyze and solve appropriate physics problems (GE-NJ 2,3,*).
3. Apply basic laboratory techniques to physics experiments and report on their results (GE-NJ 1,2,4,*)

(* embedded critical thinking)

B. Course Learning Outcomes:

At the completion of the course, the student will be able to:
1. Demonstrate a basic understanding of physics concepts.
2. Apply basic conceptual and quantitative reasoning to understand and solve physics problems.
3. Summarize experimental procedure, data, results, and conclusions in written Lab reports.

C. Assessment Instruments

A. HW assignments (required)
B. Quizzes and Exams (required)
C. Lab Reports (required)

VII. Grade Determinants

A. HW assignments (required)
B. Quizzes and Exams (required)

C. Lab Reports (required)
D. Discussions/Participation

Primary formats, modes, and methods for teaching and learning that may be used in the course:
A. lecture/discussion
B. small-group work
C. demonstrations
D. laboratory
E. computer-assisted instruction

VIII. Texts and Materials

A. Hewitt, Conceptual Physics, Pearson/Addison Wesley Publishers, (Most recent edition)
B. Hewitt, Laboratory Manual, Conceptual Physics, Pearson/Addison Wesley Publishers, (Most recent edition)

(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. Physics Laboratory with experimental apparatus.

X. Honors Options [if relevant]: no honors option