RARITAN VALLEY COMMUNITY COLLEGE
ACADEMIC COURSE OUTLINE

PHYS-130 Astronomy

I. Basic Course Information

A. Course Number and Title: PHYS-130 Astronomy

B. New or Modified Course: Modified

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

D. Effective Term: Fall 2020

E. Sponsoring Department: Science & 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: MATH 020 – Elementary Algebra

I. Laboratory Fees: Yes

J. Name and Telephone Number or Email 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

Pre-Requisite: MATH 020 Elementary Algebra. This course studies periodic changes in the night sky, astronomical instrumentation, the solar system, stars, nebulae and galaxies, and cosmology. Laboratory exercises will utilize simulations and night-sky observations. May be used to fulfill one semester of a laboratory science requirement for non-science majors, or as an elective for science majors.

III. Statement of Course Need

A. The course Introduction to Astronomy (PHYS-120) is essentially a non-laboratory, non-observational astronomy course. Since many lab exercises can be done with the naked eye or with simulations and images available on the Web, the opportunity exists to create a laboratory version, which can be given either as a web-based course, or as a hybrid course combining classroom, laboratory, observational, and web-based modules.

B. The lab allows students to practice and view the concepts introduced in lecture.

C. Transfers as an Astronomy survey course.

IV. Place of Course in College Curriculum

A. Free Elective
B. This course serves as a General Education lab course in Science.
C. This course not required for any academic programs.
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. Getting acquainted and organized, the nature of science, scientific method and astronomy.
B. Astronomical cycles, calendars, celestial guideposts
C. Planets, Astrology, Archaeoastronomy, Greek Astronomy
D. Renaissance Astronomy and the Copernican revolution
E. The physics of astronomy: gravitation, light, and telescopes
F. General overview of the solar system
G. Earth and moon, eclipses and tides
H. Planets, terrestrial and Jovian
I. More on planets. Also asteroids, comets and meteorites
J. The Sun
K. Stars in general. The HR diagram
L. Binaries, variables, clusters, stellar evolution
M. Galaxies
N. Modern Cosmology, and searches for extra terrestrial intelligence.

VI. General Education and Course Learning Outcomes

A. General Education Learning Outcomes:

After completion of this course, the student will be able to:

1. develop a better understanding of our place in the universe by exploring the significance of the Earth in the solar system as well as the insignificance of the Sun in our Galaxy, and the insignificance of our galaxy in the Universe by using computer programs, as well as understanding the development of technology in human history. (GE-NJ 4, 7)
2. develop a better understanding of the process of science by drawing conclusions from data and applying mathematical operations and computer simulations to interpret the visible Universe. (GE-NJ 2, 3)

B. Course Learning Outcomes:

After completion of this course, the student will be able to:

1. Analyze current events in science, as well as historical landmarks during the renaissance and other time periods in the past.
2. Demonstrate why we experience seasons, tides, eclipses, and Moon phases, and relate these events to calendars and timekeeping.
3. Describe various types of telescope technology, including how telescopes are used, and the role of spectra in their use.
4. Explain the formation and makeup of our solar system, create a scale model and relate it to our galaxy and the size of the Universe.
5. Articulate how the Sun creates energy in its core, how it is the main source of energy for the Earth and compare the Sun to other stars and how they are related to galaxies.
6. Compare and contrast the properties and life cycles of various stars within the Universe, placing emphasis on how the death of stars allows for the creation of other celestial bodies.
7. Identify and properly classify galaxies based on their physical properties.

C. Assessment Instruments:

Given the outcomes described above, the following assessment methods may be used:

1. laboratory products
2. exams and quizzes
3. final exam
4. on-line discussions

VII. Grade Determinants

A. laboratory products
B. exams and quizzes
C. midterm and final exam
D. on-line discussions

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. On-line lecture/discussion
B. Laboratory (Observations of the night sky and use of planetarium type software)
C. independent study

X. Texts and Materials

A. Suggested text: Seeds, Michael A. Horizons- Exploring the Universe, Thomson, Brooks/Cole

Software: Stellurium, Starry Night and Flash Animations from NAAP simulations from the University of Nebraska.

Web Sources such as NASA.gov

(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

None

XII. Honors Options

Not applicable.