RARITAN VALLEY COMMUNITY COLLEGE
ACADEMIC COURSE OUTLINE

BIOL 133: Principles of Microbiology

I. Basic Course Information

A. Course Number and Title: BIOL 133 – Principles of Microbiology

B. New or Modified Course: Modified Course

C. Date of Proposal: Semester: Spring Year: 2014

D. Sponsoring Department: Science & Engineering

E. Semester Credit Hours: 4

F. Weekly Contact Hours: Lecture: 3
Laboratory: 3

G. Prerequisites: MATH 020 - Elementary Algebra and one of the following: BIOL 124 - Human Anatomy & Physiology I, BIOL 101 - General Biology I, or BIOL 111 - Principles of Biology

H. Laboratory Fees: Yes

I. Name and Telephone Number or E-Mail Address of Department Chair:
Dr. Margaret Czerw, mczerw@raritanval.edu

II. Catalog Description

Prerequisite: MATH 020 - Elementary Algebra and one of the following: BIOL 124 - Human Anatomy & Physiology I, BIOL 101 - General Biology I, or BIOL 111 - Principles of Biology. This course focuses on the interrelationship between the host and microorganisms. Emphasis is placed on the causative agents of disease and their identification, pathogenesis, transmission, and control in laboratory, clinical and residential settings. The fundamental concepts of microbial evolution, genetics, and metabolism will be covered as well as an overview of virology, protozoology, mycology and immunology. Fundamental microbiological methods such as aseptic technique, culture methods, microscopy, metabolic and physiological tests, bacterial isolation and identification, and molecular analysis will be covered. (Biology majors should take BIOL 221 - Microbiology. Credit will not be granted for both courses.) Three hours of lecture and a three hour laboratory session per week.

III. Statement of Course Need

A. This course serves as a pre-requisite for nursing and various allied health programs, and is a lab science general education elective.

B. The laboratory component allows students to develop basic techniques including microbial identification, microscopy, biochemical testing, serology, immunology and develop aseptic technique.

C. This course will generally transfer as a non-science laboratory course. It serves as prerequisite for allied health programs such as nursing, dental hygiene, physician assistant and respiratory care programs. It is not designed for transfer to Biology degree programs at four-year institutions. (Biology majors should take BIOL 221 - Microbiology).

IV. Place of Course in College Curriculum

A. Free Elective.
B. This course serves as a General Education course in Science.
C. This course meets a program requirement for Nursing (RN & PNAD) and Dental Hygiene AAS degrees.
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. History and general applications of microbiology.

B. Chemistry including atomic structure and bonding, enzymes, major macromolecules and inorganic compounds relevant to microbial life.

C. Classification of microorganisms: Taxonomy, Phylogeny and Nomenclature.

D. Observing microorganisms utilizing microscopy and staining methods.

E. Comparison of prokaryotic and eukaryotic cells.

F. Factors affecting microbial growth, culturing microorganisms, aseptic techniques, antibiotics and bactericidals to control microbial growth.

G. Microbial metabolism and enzymatic activities.

H. Microbial genetics and biotechnology as related to medicine and human health.

I. Bacterial pathogens.

J. Acellular pathogens including viruses and prions.

K. Eukaryotic pathogens including fungi, protozoa and helminthes.

L. Epidemiology and pathology related to microbial diseases, immunology of host organism, vaccinations.

VI. General Education and Course Learning Outcomes

A. General Education Learning Outcomes:

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

1. Utilize appropriate techniques, apply the scientific method to analyze and evaluate data to identify microbes (GE-NJ 3, *);
2. Research an infectious disease and present the findings. (GE-NJ1 IL);
3. Identify and discuss ethical issues in biomedical sciences (GE-NJ1- ER, *)
4. Produce accurate lab reports. (GE-NJ1)

(* Embedded Critical Thinking)

B. Course Learning Outcomes:

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

1. Compare and contrast the characteristics of pathogens including bacteria, protozoans, viruses, prions and parasitic worms.
2. Evaluate and determine the appropriate treatment and disinfectant based on the characteristics of the microbe.
3. Describe microbial metabolism and evolution and evaluate the effect on human disease.

VII. Modes of Teaching and Learning

Given the goals and outcomes described above, the primary formats, modes, and methods for teaching and learning that may be used in the course are:

A. lecture/discussion
B. small-group work
C. computer-assisted instruction
D. laboratory
E. student oral presentations
F. student collaboration
G. independent study

VIII. Papers, Examinations, and other Assessment Instruments

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

A. performance of laboratory techniques
B. presentation of research findings
C. analysis of reading assignments

D. analysis of clinical case studies
E. quizzes
F. semester examinations
G. cumulative final examination

IX. Grade Determinants

The following may be used to determine the final grade:

A. Semester examinations
B. Cumulative final exam
C. Quizzes
D. Student presentation
E. Laboratory notebooks & reports, including identification of unknown microbe

X. Texts and Materials

The following types of course materials may be used:

- textbooks
- primary sources
- student writing
- web sources
- databases

Samples of specific text that may be featured:

- *Microbiology: RVCC Laboratory Manual*. (Most Recent Edition).
- *Microbiology: An Introduction* by Tortora, Benjamin-Cummings 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.)

XI. Resources

Students may need to use library databases and other library resources for critical research assignments and/or computers. Students will utilize the microscope and laboratory equipment available in the RVCC Microbiology laboratory.