BIOL 2200

Division: Natural Science and Mathematics
Department: Biology
Course: BIOL 2200
Title: General Microbiology
Catalog Description:

This general microbiology course is designed for those with a basic understanding of biology and chemistry. The course will cover the morphology, reproduction, metabolism, microbial and molecular genetics, biotechnology, ecology, and diversity of microorganisms. An emphasis will be placed on bacteria, viruses, fungi, protists, and their role in the environment and human disease. The lecture must be taken concurrently with the lab BIO 2205. Courses must be taken together to satisfy the Life Science GE requirement.

General Education Requirements: Life Science
Semesters Offered: Spring
Credit/Time Requirement: Credit: 2; Lecture: 2; Lab: 0
Clock/Hour Requirements: 0
Offered for Non-Credit: No
Prerequisites: CHEM 1210 or CHEM 1110 and BIOL 1610 (formerly BIOL 1310) or BIOL 2420 (formerly BIOL 2610), or instructor

Corequisites: The lecture BIOL 2200 must be taken concurrently with the lab BIOL 2205.

Justification:

The course will advance the students understanding of the biology of microorganisms, and microbial and molecular genetics. The course follows the recommendations of the American Society for Microbiology and will serve as a core course for microbiology majors. In addition, it will serve as a support course for other Biology and Pre-professional majors. Many pharmacy schools and Veterinary Medicine schools now require a general microbiology course before students can be accepted. Clinical Laboratory Science majors also need a science major's microbiology course. Similar courses are taught at Utah State University (BIOL 3300) and Weber State University (MICRO 2054).

Student Learning Outcomes:

Students will know the essential and key processes commonly found in microorganisms

Students will know how to apply systematic methods to distinguish different species of microorganisms

Students will have begun to recognize the diversity of microorganisms and interrelationships in the microbiological world

Students can use microscopes, computers, and other commonly available lab equipment and techniques

Students can read the literature of life sciences flexibly, analytically and imaginatively

Students will appreciate that they have been exposed to a small number of the numerous beauties and marvels of the living world

Students will have an understanding of how microorganisms impact our daily lives

Content:

- Brief history of microbiology
- Microbial cell biology and physiology
    - information flow within a cell
    - regulation of cellular activities
    - cellular structure and function
    - cell energy metabolism)
- Microbial and molecular genetics
    - inheritance of genetic information
    - cause, consequences and uses of mutations
    - exchange and acquisition of genetic information
- Microbial growth
    - measurement and growth curves
    - mathematics of growth
    - nutrient limiting and continuous culture

    - environmental factors on growth

- Interactions and impact of microorganisms and humans
    - physical and chemical control of microorganisms
    - antibiotics and chemotherapy
    - symbiotic associations
    - microbial pathogenic mechanisms
    - disease
    - food microbiology
    - genetic engineering
    - biotechnology
- Interactions and impact of microorganisms in the environment
    - microorganisms and their role in ecosystems
    - marine and terrestrial environments
- Viruses and microbial diversity
    - microbial taxonomy
    - Archaea, bacteria, fungi, algae, protists

General Education Outcomes:

1) Read effectively, constructively, and critically.

Students will need to read the scientific literature throughout the semester to glean information and write several abstracts. Students will be instructed on scientific methods and how to read scientific literature to glean information from the primary literature. They will also be instructed to analyze and dissect the papers by stating the hypothesis being tested and whether the authors were able to reject or fail to reject the hypotheses. The students will be given a list of peer review journals from which they will choose at least three papers to read for each abstract. Abstracts will be graded with an emphasis placed on reading critically and dissecting the information. As mentioned previously, students will have several opportunities to practice and improve reading the scientific literature.

4) Retrieve, evaluate, interpret, and deliver information through a variety of traditional and electronic media.

Students will need to retrieve information from a number of computer databases. Most of these databases will be national research databases that can be accessed online. Others may be in the form of compact disks. Scientific literature for the abstracts will be acquired through many library resources, Utah Article delivery, and scientific societies that maintain their journals online. Once students retrieve this information from these databases, they will need to write an abstract on the primary science literature they have read. Several abstracts will be required throughout the semester. Students may choose their own subject to research for each abstract.

7) Apply scientific reasoning to a variety of contexts.

Many methodologies will be taught that will assist them in testing hypotheses, developing experiments, and looking critically at data. Students will demonstrate their scientific reasoning for the various topics considered in the course content by their responses to tests, quizzes projects, discussions, and case studies. Scientific reasoning will be applied as students complete each abstract.

Key Performance Indicators:

BIOL 2200 outcomes will be assessed by four midterm exams (35-45%), one exam covering diseases (5-15%), disease worksheets (5-15%), three literature reports (10-20%), and a comprehensive final exam (20-25%).

Representative Text and/or Supplies:

Microbiology. Prescott, Harley, and Klein. WCB/McGraw-Hill Publishers (current edition)

or

Brock Biology of Microorganisms. Madigan, Martinko, and Parker. Prentice Hall (current edition)

Optimum Class Size: 12
Maximum Class Size: 24

Signatures:

I hereby submit this course syllabus:

Allan Stevens, , Professor

I hereby find this course consistent with the goals and resources of the Biology Department:

Allan Stevens, , Professor, Chair

I hereby find this course consistent with the goals and resources of the Natural Science and Mathematics Division:

Dan Black, EdD, Associate Professor, Dean

I have discussed the need for library resources related to this class with the person submitting the syllabus:

Lynn Anderson, MLIS, Technical Services Librarian (Main Campus)

Michelle Olsen, MLS, Campus Librarian (Richfield Campus)