

**Eastern Illinois University**  
**Revised Course Proposal**  
**BIO 1004G, Practical Microbiology**

**1. Catalog Description**

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|-----------------------------|--|
| a. Course level:            | BIO 1004G  |
| b. Title:                   | Practical Microbiology   |
| c. Credits:                 | 2-2-3  |
| d. Term to be offered:      | (F, S, Su)   |
| e. Short title:             | Pract Microbio   |
| f. Course description:      | Using practical laboratory experiences students learn characteristics and activities of microorganisms with special emphasis on their significance to society. This course targets students majoring in Family and Consumer Sciences, Pre- Nursing, and Health Studies. Does not count in the Biological Sciences major or minor. Credit for BIO 1004G will not be granted if the student already has credit for or registration in BIO 1094G or BIO 3300. L1 903L |
| g. Prerequisites:           | none   |
| h. Course is writing active |  |

**2. Student Learning Objectives**

Students will:

- participate in class discussions and give oral presentation of experimental data and results to practice effective speaking skills. (effective speaking)
- convey their understanding of microbiology through various writing assignments such as laboratory reports and essay-type exam questions. (effective writing)
- sharpen their reasoning abilities as they interpret and analyze data collected in laboratory experiments. (critical thinking)
- develop an understanding for the vital ecological, applied, and infectious roles that microorganisms have on the planet Earth. (global citizenship)
- perform numerical calculations as they analyze laboratory data. (critical thinking)
- discuss ethical issues related to microbiology, for example the responsible use of antibiotics or genetic engineering. (responsible citizenship)
- develop an understanding of the scientific method and learn to use the “method” as a problem solving tool that can be used in many situations. (critical thinking)

**3. Course Outline**

<b>Week</b>	<b>Lecture Topics</b>	<b>Laboratory Topics</b>
1-2	<b>Introduction to Microbiology:</b> History; Morphology, Structure and Composition of Microorganisms	<b>Introduction:</b> Handling and Culturing Microorganisms (Aseptic Technique); Microscopic Techniques; Laboratory Safety
3	<b>Microbial Diversity:</b> Prokaryotes; Eukaryotic Microbes; Viruses	<b>Morphology and Staining:</b> Wet Mounts; Simple, Gram, Acid-Fast, and Spore Stains
<b>Week</b>	<b>Lecture Topics</b>	<b>Laboratory Topics</b>

4-5	<b>Microbial Growth and Metabolism:</b> Nutrition; Growth; Control of Growth; Physiology	<b>Laboratory and Culture Techniques:</b> Media Preparation; Plating, Isolation, and Enumeration  <b>Environmental Factors Affecting Growth:</b> Temperature; pH; Osmotic Pressure; Oxygen
6-7	<b>Microbial Genetics:</b> Molecular and Genetics; Recombinant DNA	<b>Molecular and Physiological Cellular Characteristics:</b> Enzymological and Technology Biochemical Activities of Microorganisms; Bacterial Unknown Identification
8-10	<b>Medical Microbiology:</b> Human Infectious Diseases; Antimicrobial Drugs	<b>Medical Microbiology:</b> Effects of Antiseptics, Disinfectants, and Antibiotics on Bacteria; Hemolysis of Red Blood Cells; Normal Flora of Humans
11-13	<b>Food Microbiology:</b> Human Foodborne Pathogens  Industrial Food Preservation; Role of Microorganisms in Food Spoilage and Production; Fermentation Technology	<b>Food Microbiology:</b> Enumeration of Microorganisms in Food and Dairy Products; Methods for the Rapid Detection of Foodborne Pathogens; Selective Preparation of Fermented Food Products
14-15	<b>Environmental Microbiology:</b> Soil, Water, and Wastewater Microbiology	<b>Environmental Microbiology:</b> Detection of Pathogens in Recreational and Drinking Water

#### 4. Evaluation of Student Learning

- a. Three hourly exams and a final exam (50%): Exams will cover material from both lectures and laboratories. Exams will include objective, short answer and essay types of questions.

Quizzes (10%): Quizzes will include short answer type questions that assess students' comprehension of weekly reading assignments.

Laboratory reports (20%): Laboratory reports will include specific essay type questions that require proficient writing skills and critical thinking. Some of the reports will require simple mathematical analysis of data and possibly graphing of analyzed data.

Laboratory practicals (20%): Laboratory practical examinations will be included to assess students' ability to apply theory learned in the classroom and laboratory.

- b. This course meets the criteria of a writing active course because it requires the students to complete frequent, brief writing activities as mentioned in the description for a writing active course. These writing activities include weekly lab reports and short essay questions on the exams. These activities require students to demonstrate the ability to organize information, to analyze experimental data, to apply theories, and discuss conclusions.

## 5. Rationale

- a. This course meets the requirements of the biological sciences component of the Scientific Awareness segment of the General Education core. Students will learn basic facts and principles of microbiology, including cell structure, classification, growth, physiology, and molecular biology. This information will help them understand the applied aspects of microbiology as they relate to medical, food, and environmental microbiology. Course content will also include discussion of possible career opportunities in microbiology. During the hands-on laboratory experiments, students will learn how the scientific method is used to aid in our understanding of microbiology and science in general.
- b. This is an introductory course with no prerequisites so it is appropriate for a freshman level course.
- c. This is a revision of BIO 1004C and should maintain the same curriculum ID as BIO 1004C. Topics may overlap slightly with BIO 3300 (General Microbiology). However, General Microbiology is a majors' course with detailed information and a prerequisite of BIO 1100.
- d. This course is required for the Dietetics Option of the Family and Consumer Sciences major. It may also be used to satisfy the microbiology requirement in the Teacher Certification Option of the Biological Sciences major.

## 6. Implementation

- a. Faculty members to whom the course will be assigned initially: Any qualified Biological Sciences faculty
- b. Textbook: *Microbiology: An Introduction* (2000) by G. J. Tortora, B. R. Funke, and C. L. Case. 7<sup>th</sup> edition, Benjamin/Cummings Publishing Company. Laboratory handouts or manual will be prepared by the instructor.
- c. Lab fee - \$10.00 (previously approved by the President's Council)
- d. Course will be offered first time: Spring 2001

## 7. Community College Transfer

A community college course may be judged equivalent to this course.

8. Date approved by the department: April 5, 2000

9. Date approved by the COSCC: April 14, 2000

10. Date approved by the CAA: October 19, 2000

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