

Microbiology Lab (BIO250L)

Course Materials

- Custom Lab Kit from [eScienceLabs.com](https://www.escience-labs.com) (please use the “find my kit” button) which is \$230.00; please enter this code [KIT6250] to ensure that you purchase the correct Lab. This kit is required to complete the course.

Course Description

This lab-only course is designed as a standalone addition to StraighterLine’s Microbiology course (BIO250). Students will complete at-home laboratory experiments, track and record results, answer lab-based questions reflected in graded lab reports, and complete lab-based assessments to meet the lab requirement. The labs are provided by eScience Labs, a leading provider of at home lab kits and online lab instructional materials and resources.

Course Prerequisites

StraighterLine suggests, but does not require, that students complete an equivalent to Introduction to Biology (BIO101) and Introduction to Biology Lab (BIO101L) prior to enrolling in this course. Concurrent enrollment in StraighterLine’s Microbiology course (BIO250) is strongly encouraged.

Course Objectives

After completing this course, you will be able to:

- describe the various types of microorganisms
- quantify the number of microorganisms in a given sample
- use proper technique to culture bacteria
- explain the techniques used to control microbial growth
- discuss how microbes are used in food production
- describe how different types of media can be used to select for specific microorganisms
- explain the various nutrient sources used by microbes
- discuss the ecological factors involved in microbial growth

Important Terms

In this course, different terms are used to designate tasks:

- **Tutoring:** memberships include online tutoring for students to access with any content/subject related questions in the place of faculty. If your tutor is not able to answer your questions please contact a student advisor.
- **Lab Worksheets:** These are experiments that you will complete at home and be assessed on through online exercises.
- **Lab Exam:** A graded online test.

Important Note: All lab uploads must represent your own individual work. Even if you are working in a group with other students, each individual student must submit independent work. If you submit identical submissions or share submissions with another student, you will earn a zero for the assignment and will not earn credit for the course.

Course Evaluation Criteria

StraighterLine provides a percentage score and letter grade for each course. See [Academic Questions](#) section in FAQ for further details on percentage scores and grading scale. A passing percentage is **70%** or higher.

If you have chosen a Partner College to award credit for this course, your final grade will be based upon that college's grading scale. Only passing scores will be considered by Partner Colleges for an award of credit¹.

There are a total of 1000 points in the course:

Topic	Assessment	Points
Introduction	Upload Lab Kit Photos	40
1	Lab 1 Worksheet: Introduction to Science	60
1	Lab 1 Quiz	60
2	Lab 2 Worksheet: Culturing and Aseptic Technique	60
2	Lab 2 Quiz	60
3	Lab 3 Worksheet: Structure and Microscopy	60
3	Lab 3 Quiz	60

¹ Please note that all required materials (as reflected in lab instructions) must be completed to be eligible for a transcript. Required materials include lab exercises (Worksheets) and digital photographs of laboratory exercises. If these files are not submitted, StraighterLine will not be able to provide students a final grade.

4	Lab 4 Worksheet: Selective Media and Agar	60
4	Lab 4 Quiz	60
5	Lab 5 Worksheet: Eukaryotic Microbes, Parasitology, and Viruses	60
5	Lab 5 Quiz	60
6	Lab 6 Worksheet: Food Microbiology	60
6	Lab 6 Quiz	60
7	Lab 7 Worksheet: Microbial Genetics and Genetic Engineering	60
7	Lab 7 Quiz	60
8	Lab 8 Worksheet: Identifying an Unknown Organism	60
8	Lab 8 Quiz	60
Total		1000

Course Topics and Objectives

Lab	Title	Objectives
1	Introduction to Science	<ul style="list-style-type: none">• Identify and describe the steps of the scientific method• Differentiate among independent variables, dependent variables, and controls in a scientific experiment• Design an experiment with experimental and control groups.• Perform calculations to convert units and determine percent error• Describe the components of a lab report• Describe how to work safely in a microbiology lab• Describe how and when to use safety equipment in a microbiology lab• Safely perform a common microbiology lab experiment• Describe some types of microscopes most commonly used in microbiology labs• Identify the different parts of a compound microscope• Discuss how to properly use a compound microscope• Introduce different methods of microscope slide preparation
2	Culturing and Aseptic Technique	<ul style="list-style-type: none">• Identify the necessary nutrients for microbial growth media• Define proper procedure for preparing culture plates• Describe the different tools and proper technique for inoculating culture plates• Explain the phases of microbial growth in culture• Describe the difference in requirements for growth in a variety of microorganisms• Discuss methods to control the growth of microorganisms
3	Structure and Microscopy	<ul style="list-style-type: none">• Explain the difference between prokaryotic and eukaryotic cell structure• Describe the various cell shapes of prokaryotes• Discuss different staining techniques commonly used in microbiology
4	Selective Media and Agar	<ul style="list-style-type: none">• Discuss the minimal nutrient requirements for culturing microorganisms• Describe the different types of growth media• Introduce practical uses for differential and selective media
5	Eukaryotic Microbes,	<ul style="list-style-type: none">• Introduce common eukaryotic microorganisms• Discuss the properties and types of microscopic fungi and

	Parasitology, and Viruses	<p>protozoa</p> <ul style="list-style-type: none">• Explain the study of parasitic helminths in microbiology• Discuss acellular microbes such as viruses
6	Food Microbiology	<ul style="list-style-type: none">• Discuss the use of microorganisms in making food through fermentation• Describe the potential dangers of contamination of food by harmful microbes• Discuss the measures that are taken to prevent contamination of food by pathogens
7	Microbial Genetics and Genetic Engineering	<ul style="list-style-type: none">• Describe the basic structure of DNA• Differentiate between transcription and translation• Discuss the different types of mutations that can occur• Introduce the Ames test• Describe recombinant DNA and its uses in the laboratory and industrial settings
8	Identifying an Unknown Organism	<ul style="list-style-type: none">• Use a dichotomous key• Perform tests and make observations to identify an unknown organism.