straighterline

Syllabus

BIO250L | **Microbiology Lab**

Course Text

Custom Lab Kit–Sold Separately

This course requires lab kit SI-11070-MB-01 from Science Interactive for $265 (plus shipping).

Course Description

This lab-only course is designed as a standalone addition to Microbiology (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 Science Interactive, a leading provider of at home lab kits and online lab instructional materials and resources.

Learning Outcomes

After completing this course, students will be able to:

1. Describe the various types of microorganisms
2. Quantify the number of microorganisms in a given sample
3. Use proper technique to culture bacteria
4. Explain the techniques used to control microbial growth
5. Discuss how microbes are used in food production
6. Describe how different types of media can be used to select for specific microorganisms
7. Explain the various nutrient sources used by microbes
8. Discuss the ecological factors involved in microbial growth

Course Prerequisites

It is suggested, but not required, 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 the Microbiology course (BIO250) is strongly encouraged.

Academic Integrity Statement

Academic integrity is the pursuit of scholarly activity in an honest, truthful and responsible manner. Violations of academic integrity include, but are not limited to, plagiarism, cheating, fabrication and academic misconduct. Failure to comply with the Academic Integrity Policy can result in a failure and/or zero on the attempted assignment/examination, a removal from the course, disqualification to enroll in future courses, and/or revocation of an academic transcript.

Course Completion Policy

In order for a course to be considered complete, **all required coursework must be attempted, submitted, and graded.** Required coursework consists of graded assignments. Any Academic Integrity Policy violations may prevent a course from being considered complete.

Assessment Types

StraighterLine courses may include any combination of the assessment types described below. Review the descriptions to learn about each type, then review the Course Evaluation Criteria to understand how your learning will be measured in this course.

Benchmarks
Benchmarks test your mastery of course concepts. You have 3 attempts, and your highest score counts.
Note: Cumulative Benchmarks (final exams) only allow 1 attempt.

Capstones
Capstones are project-based assessments that help you apply concepts to real-world scenarios. You have 2 attempts, and your highest score counts.

Checkpoints
Checkpoints are quick knowledge checks on important course concepts. All are open-book, and most have 1-3 attempts.

AI Use-Case Policies

StraighterLine Capstone assessments operate under one of three AI Use-Case Policies. These designations are selected intentionally to support learners in developing digital literacy, ethical reasoning, and authentic communication skills. Each model requires students to engage meaningfully with the course outcomes while adhering to academic standards.

Independent Work Requirement: Capstones with this designation must be completed independently without using AI tools. The goal is for learners to showcase their own understanding and skills without AI assistance. Students are expected to generate and submit original work developed solely through their own reasoning and effort.

AI-Assisted Planning Option: Capstones with this designation may allow AI tools to support brainstorming and assessment planning. If allowed, students will be asked to document any AI assistance by noting how it informed their work. Documentation must be included within the assignment or in a designated reflection field. Examples include describing how an AI tool helped organize an outline, generate ideas, or surface sources for further exploration.

AI-Integration Requirement: Capstones with this designation require AI tools as part of the learning process. Students will be asked to reflect upon their AI interactions and AI contributions to the assessment. Reflections must include which tools were used, how they were used, and what insights students gained from the process. This promotes transparency, ethical use, and metacognitive skill-building.

Course Evaluation Criteria

Your score provides a percentage score and letter grade for each course. A passing percentage is 70% or higher.

There are a total of 1000 points in the course:

Assessment	Points	Learning Outcomes
Checkpoint 1: Getting Started	1	N/a
Checkpoint 2: Lab Safety	1	N/a
Checkpoint 3: Using the V-Scope	2	N/a
Checkpoint 4: Microbiology Laboratory Prep	2	N/a
Checkpoint 5: Lab Kit Inventory	2	N/a
Capstone 1: The Scientific Method	124	2
Capstone 2: Identification of an Unknown Microbe	124	1, 6, 7, 8
Capstone 3: Biological Macromolecules	124	7
Capstone 4: Aseptic Technique and Culturing Microbes	124	1, 3, 6, 7
Capstone 5: Bacterial Morphology and Staining Techniques	124	1
Capstone 6: Selective and Differential Media Testing	124	6, 7
Capstone 7: Fomite Transmission	124	1, 4, 8
Capstone 8: Food Safety	124	1, 4, 5, 8
Total	**1000**	

Course Roadmap

This roadmap provides an overview of the checkpoints and lessons covered in this course.

Checkpoint 1: Getting Started

- The Science Interactive Cloud
- Exploration, Experimentation, and Evaluation
- Science Interactive Resources

Checkpoint 2: Lab Safety

- Safety guidelines for using Science Interactive lab kits
- Terms associated with common laboratory safety equipment

Checkpoint 3: Using the V-Scope

- Purpose and function of the SI V-Scope
- Controls of the SI V-Scope
- SI V-Scope selection, visibility, download, and reference of slides
- Special rules for using the SI V-Scope in microscopy

Checkpoint 4: Microbiology Laboratory Prep

- Common microbiology terms
- Suggested time allocations for microbiology lab completion
- Significance of the incubation environment
- Microbiology safety guidelines

Checkpoint 5: Lab Kit Inventory

- Kit contents list
- Reviewing your Science Interactive kit

Capstone 1: The Scientific Method

- Steps of the scientific method
- Hypothesis, independent variable, dependent variable, and control
- Qualitative versus quantitative data

Capstone 2: Identification of an Unknown Microbe

- How cell and colony morphologies are used to identify microbes
- How biochemical testing and functional media are used to identify the metabolic pathways of microbes

Capstone 3: Biological Macromolecules

- Macromolecule, protein, carbohydrate, lipid, and nucleic acid
- Metabolism of simple and complex carbohydrates.
- Reagents used to identify biological macromolecules

Capstone 4: Aseptic Technique and Culturing Microbes

- Aseptic techniques for culturing microbes
- Types of media used in microbiology laboratories
- Streak plate technique for isolating individual colonies
- Biology of *Bacillus subtilis, Escherichia coli, Saccharomyces cerevisiae,* and *Staphylococcus epidermidis*

Capstone 5: Bacterial Morphology and Staining Techniques

- Morphology and arrangements of bacterial cells
- Simple direct, negative, and Gram staining techniques
- Structural differences between Gram-positive and Gram-negative bacteria

Capstone 6: Selective and Differential Media Testing

- Purpose of general purpose, functional, selective, and differential media
- Functional properties of MacConkey and Levine eosin-methylene blue agars

Capstone 7: Fomite Transmission

- Disease, pathogen, and fomite
- Direct and indirect transmission of contagious disease
- Potential fomites within a household environment

Capstone 8: Food Safety

- Pathogens associated with foodborne illness
- How food becomes compromised throughout the commercial supply chain
- Safe food handling practices within the home

Related Courses

BIO250
Microbiology
View Course →

PSY101
Introduction to Psychology
View Course →

PHARM103
Pharmacology
View Course →