

# BIOL 110L - Introduction to Biology Laboratory

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## General Information

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<b>Author(s):</b>	Sara Malmquist-West
<b>Proposal Start:</b>	Fall 2025 Credit/Noncredit
<b>Distance Education Approved:</b>	No
<b>TOP Code:</b>	0401.00
<b>TOP Code Name:</b>	Biology, General
<b>CIP Code:</b>	26.0101
<b>CIP Code Name:</b>	Biology/Biological Sciences, General
<b>SAM Code:</b>	E = Non-occupational
<b>Course Control Number:</b>	CCC000358304
<b>Curriculum Committee Approval Date :</b>	July 19, 2022
<b>Board of Trustees Approval Date :</b>	July 19, 2022
<b>External Review Approval Date:</b>	July 19, 2022
<b>Course Description:</b>	(Prerequisites: Eligibility for college-level composition, ENGL C1000/ ENGL C1000H/ ENGL C1000E/C-ID ENGL 100 or equivalent; and Completion of Basic and Intermediate Math Skills or the equivalent or placement based on AB 705 Mandates. Advisory: BIOL 110 or concurrent enrollment. May require field trips to local destinations.) A hands-on course designed to develop basic laboratory skills and techniques and to illustrate basic biological concepts and principles for majors and non-majors. Essential skills include use of lab and field equipment and recording and interpretation of observations. Subjects in ecology, evolution, genetics, anatomy, physiology, cell biology and molecular biology are investigated through observations and experiments in the laboratory and in the field. Sequence of topics is synchronized with that of BIOL 110. (CSU/UC) Cal-GETC 5C (formerly AA/AS Area A, CSU Area B-3, IGETC Area 5C)

**Submission Rationale:**

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## Faculty Minimum Qualifications

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<b>Master Discipline Preferred:</b>	No value
<b>Alternate Master Discipline Preferred :</b>	No value
<b>Bachelor's Discipline Preferred :</b>	No value

Alternative Master's Discipline Allowed with Preferred Bachelor's: No value

### Course Development Options

Course Basic Skill Status	Allowed Number of Retakes	Grade Options
Course is not a basic skills course.	0	Letter Grade Methods Pass/No Pass

#### Allow Students to Gain Credit by Exam/Challenge

No

Rationale For Credit By Exam/Challenge	Retake Policy Description	Allow Students To Audit Course
No value	No value	No

#### Course Prior to College Level

Not applicable.

### Associated Programs

Associated Program	Award Type	Active
A.A. in Liberal Arts: Natural Science Emphasis	A.A. Degree Major	Fall 2024 Credit/Noncredit
AS-T Nutrition and Dietetics	A.S. Degree for Transfer	Fall 2024 Credit/Noncredit
Certificate of Achievement, Cal-GETC (In Development)	Certificate	Fall 2025 Credit/Noncredit
Certificate of Achievement: CSU GE Breadth (In Development)	Certificate of Completion	Fall 2024 Credit/Noncredit
Certificate of Achievement: IGETC GE for UC or CSU (In Development)	Certificate of Completion	Fall 2024 Credit/Noncredit

### Transferability & Gen. Ed. Options

Request for Transferability	Transferability Status
Transferable to both UC and CSU	Approved

Cal-GETC	Categories	Transferability Status	Comparable Course
AREA 5C - LABORATORY	LABORATORY	Approved	No Comparable Course defined

### Units and Hours

Summary	
Minimum Credit Units	1
Maximum Credit Units	1
Total Course In-Class (Contact) Hours	52.5
Total Course Out-of-Class Hours	0
Total Student Learning Hours	52.5

## Detail

## Weekly Student Hours

	In Class	Out of Class
Lecture Hours	0	0
Laboratory Hours	3	0
Activity Hours	0	0

## Course Student Hours

Course Duration (Weeks)	17.5
Hours per unit divisor	52.5

## Course In-Class (Contact) Hours

Lecture Hours	0
Laboratory Hours	52.5
Activity Hours	0
<b>Total</b>	<b>52.5</b>

## Course Out-of-Class Hours

Lecture Hours	0
Laboratory Hours	0
Activity Hours	0
<b>Total</b>	<b>0</b>

## Units and Hours - Weekly Specialty Hours

Activity Name	Type	In Class	Out of Class
No value	No value	No value	No value

## Requisites

## Advisory

BIOL110 - Introduction to Biology

**BIOL110 Introduction to Biology**

## Entrance Skills

## Skill Rationale

## Math skills

1. Know how to use rulers and measure objects correctly
2. Able to do basic arithmetic
3. Able to understand place-value
4. Able to calculate percentages, rates, area, volume and averages.
5. Able to convert fractions to decimal form to percentages
6. Able to read graphs and figure out slopes of linear lines
7. Able to do metric system conversions
8. Evaluate mathematical expressions using the order of operations.
9. Solve equations in one variable.
10. Solve applications involving signed numbers.
11. Find the perimeter of a polygon. Find the area of a rectangle, square, parallelogram, triangle, trapezoid, and circle. Find the volume of a rectangular solid, cylinder, cone, pyramid, and sphere.
12. Solve applications involving ratios, proportions, and percentages.
13. Use the order of operations to evaluate expressions involving fractions and decimals. Solve equations and applications involving addition, subtraction, multiplication, and division of fractions and decimals. Simplify complex fractions.

## English Skills

1. Be able to read and comprehend dense scientific writing in textbooks and other supplemental readings

Skill	Rationale
	2. Develop organized essays (500 words) with thesis statements and topic sentences, providing relevant details and examples for support; 3. Identify main points and supporting information needed to summarize, synthesize, and make inferences from appropriately leveled texts 4. Recognize and/or use a variety of sentence structures to express relationships among ideas, the rules of grammar, punctuation, and usage.

Limitations on Enrollment	
Limitation	Provide Rationale
No value	No value

## Specifications

Methods of Instruction	Methods of Instruction Rationale
Lab	1. Instructors provide introductory mini-lectures explaining theory, context and methodology of each lab; these, at times, include multimedia supplementation. 2. Students conduct exercises involving observation and experimentation in the laboratory and field, using appropriate tools and equipment.
Assignments	Reading of lab procedure and answering of pre-lab questions are done before each exercise. Laboratory reports based on results of each exercise are prepared at its conclusion. Time usually permits completion of much of this work within lab period if students are well-organized.
Methods of Evaluation	<b>Methods of Evaluation Rationale</b> Laboratory reports and quizzes on the lab exercise are graded. Several lab practical examinations are given and graded objectively throughout the semester.
Equipment	No value

## Textbooks

Author	Title	Publisher	Date	Extra Info
COM Life and Earth Department	BIOL 110L Laboratory Manual	College of Marin	2022	
Darrell Vodopich and Randy Moore	Biology Laboratory Manual, 12th edition	McGraw Hill	2019	

## Other Instructional Materials

Description	Author	Citation
No value	No value	No value

## Learning Outcomes and Objectives

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## Course Objectives

- ✓ 1. Use and apply ecological measuring equipment appropriately, safely, and effectively.
  - ✓ 2. Carry out random sampling procedures of large populations.
  - ✓ 3. Produce simple, well-labeled scientific diagrams.
  - ✓ 4. Make simple mathematical summaries of data.
  - ✓ 5. Draw and interpret simple graphs and construct and interpret data tables.
  - ✓ 6. Produce coherent written records of laboratory work.
  - ✓ 7. Work effectively in small groups.
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## CSLOs

**Perform observations, construct hypotheses, perform experiments and interpret them in the context of important biological theories.**

Expected SLO  
Performance: 70

**Use correctly the international system (SI or metric system) of measurement.**

Expected SLO  
Performance: 70

**Select correct kind of microscope for viewing small specimens, prepare specimens for viewing and bring them into good focus with optimum illumination.**

Expected SLO  
Performance: 70

**Use laboratory equipment appropriately, safely, and effectively.**

Expected SLO  
Performance: 70

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## Course Outline

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### Course Outline

N/A

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### Lab Outline

1. Qualitative Description in Biology
  - A. Use of Dichotomous Identification Keys
  - B. Use of Microscopes (compound and dissecting)
  - C. Laboratory Sketches
2. Quantitative Description in Biology
  - A. Logic and Use of the Metric System
  - B. Graphing
  - C. Sampling
3. Field Description and Analysis of Ecosystems
  - A. Species Identification
  - B. Sampling
  - C. Measurement of Significant Biotic and Abiotic Variables
4. Use of Summary Statistics and Graphical Methods of Analyzing and Synthesizing Information
4. Laboratory Description and Analysis of Community Samples
  - A. Morphospecies separation and recognition
  - B. Counts of Individuals per Species per Sample
  - C. Calculation of Richness, Evenness, and Diversity Index
  - D. Comparison of Communities
5. Properties of Water and Methanol and Their Importance for Living Systems
  - A. Molecular Structure
  - B. Cohesion, Adhesion and Capillarity
  - C. Boiling Point Tests
  - D. Solubility Tests
  - E. Density Tests
  - F. Comparisons of Water and Methanol
6. Nutrient Cycling between Producers and Consumers
  - A. Experimental Design (Controls and Replications)
  - B. Oxygen Consumption/Production
  - C. Carbon Dioxide Consumption/Production
  - D. Change in pH

- 7. Isolation of DNA, Transcription, and Translation
  - A. Isolation of DNA from Living Tissue
  - B. Modeling/Simulation of Transcription and Translation
- 8. Mitosis and Meiosis
  - A. Microscopic Observation of Mitosis
  - B. Modeling/Simulation of Mitosis and Meiosis
- 9. Catalysts
  - A. Spontaneous and Non-Spontaneous Reactions
  - B. Inorganic and Organic Catalysts
  - C. Different Sources of Organic Catalysts
  - D. Catalytic Activity in Different Environments
- 10. Human Inheritance
  - A. Meiosis and Fertilization and Genotypes and Phenotypes in Punnett Squares
  - B. Simulation/Modeling of Inheritance of Human ABO Blood Types
  - C. Survey of Frequencies of Simple Mendelian Traits
- 11. Tissues, Cells and Organelles
  - A. Microscopic Observation of Tissues, Cells and Organelles
  - B. Use of Preserved Slides of Animal and Plant Tissue
  - C. Preparation of Wet Mounts of Animal and Plant Tissue
  - D. Observation of Cell Models
  - E. Calculation of Magnification
- 12. Observation and Dissection of Worms
  - A. Acoelomate, Pseudocoelomate and Coelomate Animals
  - B. Observation of Prepared Slides
  - C. Dissection of Selected Preserved Specimens
- 13. Evolution and Natural selection
  - A. Class activity that demonstrates Natural selection
  - B. Problem solving and discussion or how the Natural selection process leads to evolution
- 14. The Human Nervous System
  - A. Microscopic Observation of Neurons
  - B. Tests of Sense Organs and Their Sensitivity
    - i. Taste
    - ii. Touch
    - iii. Sight
  - C. Interpretation of Conscious Perception
- 15. Human Circulation and Breathing
  - A. Simulation/Modeling of Lung Operation
  - B. Measurements of Respiratory Capacity
  - C. Study of Heart Model
  - D. Finding valves in veins
  - E. Measurement of Blood Pressure
  - F. Interpretation of Results

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### Workflow Step for Additional Course Information/Goals

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<b>Maximum Enrollment: Answer with a number. If changing the maximum, provide a rationale.</b>	24
<b>What is the justification for the new/revised course?</b>	Mandatory revision
<b>What is the primary course goal?</b>	Transfer
<b>What is the justification for the Service Unit(s)? (e.g. lecture, lab, activity, etc.)</b>	Aligned with CBA contract
<b>Does this new or revised course represent Substantive Change? Answer YES or NO.</b>	no
<b>What are the Critical Thinking expectations? Answer this question for UC transferable courses.</b>	In following scientific methodology, students will be able to: analyze and interpret graphic materials, deduce valid conclusions from recorded data and evaluate ability of laboratory procedures to show cause and effect relationships.

What is the level of Information Competency expected by this course? No value

Is this a Stand Alone Course? No

What is the course start date? Ongoing

Accessibility: Are all course materials, including videos, webcasts, podcasts, audio, and visual, accessible to students (per The Americans with Disabilities Act of 1990, section 508 of the Rehabilitation Act of 1973, and California Government Code section 11135)? Answer YES or NO. Yes

For Approvers ONLY: Do you certify that the following requirements have been met? Answer YES or NO to each. o Accessibility (Title 5, section 55200): Course content and delivery is accessible to all students. o Course Quality: The course meets a "3" on the OEI rubric (Accomplished). o Evidence of instructor contact: Regular and effective contact is demonstrated between the instructor and students and students with other students. No value

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#### Workflow step for Library Resources/Textbooks

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Does this course include online library resources? Y or N No value

Does this course include periodicals as library resources? Y or N No value

Does this course include reference books as library resources? Y or N No value

Does this course include data base(s) as library resources? Y or N No value

Are there assigned textbooks for this course? (If so, list full reference.) No value

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#### Workflow Step for Special Materials

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Are any Special Materials required? No value

Materials Fee Effective Term? No value

What is the justification for the Materials Fee? No value

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#### Workflow Step for Distance Education Course (if applicable)

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Have you reviewed the current policy on Distance Education courses? YES

<http://policies.marin.edu/sites/policies/files/AP4105-DistanceEducation.pdf> Respond YES or NO.

Delivery Mode: Is this course Hybrid (a minimum of one mandatory face-to-face meeting) OR Online (no face-to-face meetings required)? Choose either HYBRID or ONLINE.

What type of HYBRID contact (if applicable) will be incorporated into this course? Examples include: o Orientation sessions o In-person group meetings o In-person review sessions o In-person exams o Other (please describe):

How will course objectives and student learning outcomes be adapted to an online or hybrid format? Please describe activities, enhanced lecture materials, discussions, forums, etc.

Please provide a description of activities in this course that demonstrate instructor-to-student contact and student-to-student contact. Examples of activities: o Announcements o Course materials o Modules o Customized and personalized audio and video content o Online videos that are annotated and contextualized o Internet resources o Library and database resources o Webcasts o Web Conferencing o Podcasts o Discussion forms o Listserv o Other (please describe):

How will regular and effective instructor-to-student contact and student-to-student contact be demonstrated in this course? o Messages via the LMS o Telephone and office hours o Regular announcements in LMS o Chat rooms o Video messages o Timely feedback and return of student work in LMS o Discussion forums that are facilitated and engage students in regular dialogue o Roster management to ensure that every enrolled student is fully participating in course o E portfolios, blogs, etc. o Orientation and review sessions o Field trips o Library workshops o Webcasts o Podcasts o Other (please describe):

Please specify the expected course hours for students: this includes content delivery, instructor-student interaction, student-student interaction, and out-of-class hours. Ratio: 1 Lecture unit = 1 hour weekly of class time + 2 hours out-of-class time weekly. 1 Laboratory unit = 3 hours weekly of class time + 1.5 hour out-of-class weekly. Please also specify the students activities that take place to fulfill in-class time. Activities may include reading modules, quizzes, exams, participation in discussion forums, etc. In-class activities do not include

This course will only be taught as either hybrid or online in an emergency only.

Scheduled in-person group sessions or labs  
Optional :  
Orientation meeting  
In-person exam

Online quizzes and exams  
Written lectures  
PowerPoint presentations  
Zoom meetings  
Discussion forums  
Recorded lectures  
Video Demonstrations of Labs  
Virtual labs  
Group projects

Announcements reminding students of the weekly content, activities and assessments  
Feedback on assignments  
Zoom meetings  
VoiceThread discussions  
Flipgrid activities  
Email correspondence  
Responds to student Q&A forum, discussions and emails  
Students can post and respond to other students in the Q&A forum.  
Students respond to each other's discussion posts.

Weekly announcements reminding students of the unit objectives and content, activities and pending assessments  
Feedback on assignments via Canvas gradebook  
Uses announcements as reminders, post additional readings or resources and clarifications.  
Has scheduled office hours and provides students with a communication policy so students know how long to expect a reply after being emailed  
Instructor responds to student Q&A forum and discussions.  
Students can post and respond to other students in the Q&A forum.  
Students respond to each other's discussion posts.  
Group projects  
Email correspondence  
VoiceThread discussions  
Flipgrid activities

Students should expect to spend about 3 hours a week on this 1 unit online lab course.

Students will be required to be active in the course for about 3 hours a week by:  
Preparing for the lab by reading the introductions and procedures  
Completing the labs at home as typed up in our lab manual.  
Doing practice sheets  
Participating in the discussions and answering the discussion questions  
Watching video mini-lectures and other videos related to each lab  
Joining or viewing Zoom meetings  
Responding to VoiceThread and or Flipgrid activities

homework that may include reading the textbook  
and preparing and studying for exams.

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