

BIOL R101L: GENERAL BIOLOGY LABORATORY

Originator
mnicholson

College

Oxnard College

Discipline (CB01A)

BIOL - Biology

Course Number (CB01B)

R101L

Course Title (CB02)

General Biology Laboratory

Banner/Short Title

General Biology Laboratory

Credit Type

Credit

Start Term

Fall 2021

Catalog Course Description

This is a laboratory course designed to be taken in conjunction with BIOL R101 as an introduction to biology laboratory practices for non-majors as well as those considering majoring in Biology. The laboratory exercises cover the scientific method, basic biochemistry, microscopy, cellular organization, cellular energy transformation, cellular reproduction, genetics, and evolution.

Taxonomy of Programs (TOP) Code (CB03)

0401.00 - Biology, General

Course Credit Status (CB04)

D (Credit - Degree Applicable)

Course Transfer Status (CB05) (select one only)

A (Transferable to both UC and CSU)

Course Basic Skills Status (CB08)

N - The Course is Not a Basic Skills Course

SAM Priority Code (CB09)

E - Non-Occupational

Course Cooperative Work Experience Education Status (CB10)

N - Is Not Part of a Cooperative Work Experience Education Program

Course Classification Status (CB11)

Y - Credit Course

Educational Assistance Class Instruction (Approved Special Class) (CB13)

N - The Course is Not an Approved Special Class

Course Prior to Transfer Level (CB21)

Y - Not Applicable

Course Noncredit Category (CB22)

Y - Credit Course

Funding Agency Category (CB23)

Y - Not Applicable (Funding Not Used)

Course Program Status (CB24)

1 - Program Applicable

General Education Status (CB25)

Y - Not Applicable

Support Course Status (CB26)

N - Course is not a support course

Field trips

May be required

Faculty notes on field trips; include possible destinations or other pertinent information

Possible field trip destinations include local parks, beaches, natural areas, botanical gardens, harbors, islands, natural history museums, and aquaria.

Grading method

Letter Graded

Does this course require an instructional materials fee?

No

Repeatable for Credit

No

Is this course part of a family?

No

Units and Hours

Carnegie Unit Override

No

In-Class

Lecture

Activity

Laboratory

Minimum Contact/In-Class Laboratory Hours

52.5

Maximum Contact/In-Class Laboratory Hours

52.5

Total in-Class

Total in-Class

Outside-of-Class

Internship/Cooperative Work Experience

Paid

Unpaid

Total Outside-of-Class

Total Outside-of-Class

Total Student Learning

Total Student Learning

Total Minimum Student Learning Hours

52.5

Total Maximum Student Learning Hours

52.5

Minimum Units (CB07)

1

Maximum Units (CB06)

1

Prerequisites

BIOL R101 or BIOL R101H or concurrent enrollment

Advisories on Recommended Preparation

MATH R005 or MATH R015

Entrance Skills

Entrance Skills

Understand the process of the scientific method and be able to apply the same to general biology lab exercises.

Prerequisite Course Objectives

BIOL R101-Describe the scientific method of inquiry as it relates to biological organisms.

Entrance Skills

Understand the process of the scientific method and be able to apply the same to general biology lab exercises.

Prerequisite Course Objectives

BIOL R101H-Describe the scientific method of inquiry as it relates to biological organisms.

Entrance Skills

Understand the processes of cell respiration and photosynthesis.

Prerequisite Course Objectives

BIOL R101-Explain energy flow through the biological world with reference to photosynthesis, cellular respiration, and ecological cycles.

Entrance Skills

Understand the processes of cell respiration and photosynthesis.

Prerequisite Course Objectives

BIOL R101H-Explain energy flow through the biological world with reference to photosynthesis, cellular respiration, and ecological cycles.

Entrance Skills

Perform basic mathematics, including graphing and interpreting graphs.

Prerequisite Course Objectives

MATH R005-Graph linear equations by plotting points and using intercepts.
MATH R005-Graph and evaluate elementary functions.
MATH R005-Use definitions, domain and range, algebra and composition of functions on related applications.

Entrance Skills

Perform basic mathematics, including graphing and interpreting graphs.

Prerequisite Course Objectives

MATH R015-Evaluate and simplify algebraic expressions.
MATH R015-Solve linear equations.
MATH R015-Convert decimals to scientific notation and vice versa.
MATH R015-Add, subtract, multiply, divide and simplify rational expressions.
MATH R015-Graph linear functions and write using function notation.

Requisite Justification

Requisite Type

Prerequisite

Requisite

BIOL R101

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Closely related lecture/laboratory course

Requisite Type

Concurrent

Requisite

BIOL R101

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Closely related lecture/laboratory course

Requisite Type

Prerequisite

Requisite

BIOL R101H

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Closely related lecture/laboratory course

Requisite Type

Concurrent

Requisite

BIOL R101H

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Closely related lecture/laboratory course

Requisite Type

Advisory

Requisite

MATH R005

Requisite Description

Course not in a sequence

Level of Scrutiny/Justification

Required communication/computation skill

Requisite Type

Advisory

Requisite

MATH R015

Requisite Description

Course not in a sequence

Level of Scrutiny/Justification

Required communication/computation skill

Student Learning Outcomes (CSLOs)**Upon satisfactory completion of the course, students will be able to:**

- | | |
|---|--|
| 1 | Students will demonstrate proper use of compound microscopes. |
| 2 | Students will be able to identify the parts of a controlled experiment (e.g. control group, independent variable). |
| 3 | Students will be able to interpret a graph of experimental results and develop a conclusion. |
| 4 | Students will demonstrate a general knowledge of biological concepts by passing a comprehensive final exam. |

Course Objectives**Upon satisfactory completion of the course, students will be able to:**

- | | |
|---|--|
| 1 | Identify the different components of the scientific method of inquiry. |
| 2 | Recognize appropriate units of measurement in the metric system. |
| 3 | Recognize animal, plant, and bacterial cells and their sub-cellular structures. |
| 4 | Use basic laboratory equipment including a light microscope, a spectrophotometer, and different tools for measuring volume such as a beaker or graduated cylinder. |
| 5 | Describe cellular and biological processes including osmosis, photosynthesis, cellular respiration, mitosis, meiosis, and protein synthesis. |
| 6 | Describe patterns of inheritance if provided with two parent genotypes. |
| 7 | Recognize the process of natural selection. |

Course Content

Lecture/Course Content

1. Laboratory Safety
 - a. Appropriate clothing such as close-toe shoes
 - b. Safety practices such as no food or drink in laboratory classes
2. The Scientific Method
 - a. The steps of the scientific method, such as observation, hypothesis, and controlled experiments
 - b. The components of a controlled experiment such as controlled, independent, and dependent variables
 - c. Alternatives to the scientific method, such as directed observation, and when they are appropriate
3. Taxonomic Classification
 - a. The different levels of taxonomic classification, such as kingdom and phylum, and why they are used
 - b. Identification of organisms using dichotomous keys
4. Scientific Measurement
 - a. Standard metric base units of measurement for length, mass, volume, and temperature
 - b. Meaning of metric prefixes, such as centi-, milli-, and micro-
5. Microscopy
 - a. Proper handling of microscopes
 - b. Correct use of microscopes
 - c. Preparation of wet mount slides
6. Biological Macromolecules
 - a. Identify the different categories of macromolecules such as carbohydrates, lipids, proteins, and nucleic acids
 - b. Identify the proper test required to determine the presence of a specific macromolecule category, such as using Biuret's solution to test for protein presence
7. Cellular Structure
 - a. Identification of animal, plant, and bacterial cells
 - b. Identification of sub-cellular structures such as the nucleus, cytoplasm, or chloroplasts
8. Biological Processes
 - a. Passive transport across membranes such as diffusion and osmosis
 - b. Enzyme mediated reactions and influences on enzyme function such as temperature or pH
 - c. Photosynthesis and the wavelengths of light used by different photosynthetic pigments
 - d. Cellular respiration of seeds in different stages of development
9. Mitosis and Meiosis
 - a. The stages of mitosis such as prophase and metaphase
 - b. The stages of meiosis such as prophase I and prophase II
 - c. The differences between mitosis and meiosis and where these two processes occur in the body
10. Inheritance
 - a. Types of inheritance such as simple or incomplete
 - b. Use of a Punnett to determine the probability of specific offspring genotypes
 - c. External factors, such as natural selection, which may alter inheritance probabilities
 - d. Use of the Hardy-Weinberg equilibrium equation to determine the frequency of alleles within a population and the proportion of the next generation which will have a specific phenotype
11. DNA Transcription and Translation
 - a. The role of DNA within the body
 - b. The relationship between DNA codons and the building of proteins
 - c. The purpose of restriction enzymes in DNA analysis

Laboratory or Activity Content

1. Laboratory Safety
 - a. Appropriate clothing such as closed-toe shoes
 - b. Safety practices such as no food or drink in laboratory classes
2. The Scientific Method
 - a. The steps of the scientific method, such as observation, hypothesis, and controlled experiments
 - b. The components of a controlled experiment such as controlled, independent, and dependent variables
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 - b. The relationship between DNA codons and the building of proteins
 - c. The purpose of restriction enzymes in DNA analysis

Methods of Evaluation

Which of these methods will students use to demonstrate proficiency in the subject matter of this course? (Check all that apply):

Problem solving exercises
 Skills demonstrations
 Written expression

Methods of Evaluation may include, but are not limited to, the following typical classroom assessment techniques/required assignments (check as many as are deemed appropriate):

Essay exams
 Essays
 Group projects
 Individual projects
 Laboratory activities
 Laboratory reports
 Objective exams
 Projects
 Problem-Solving Assignments
 Problem-solving exams
 Quizzes
 Reports/papers
 Research papers
 Skills demonstrations
 Skill tests
 Simulations

Instructional Methodology

Specify the methods of instruction that may be employed in this course

Audio-visual presentations
Computer-aided presentations
Collaborative group work
Class activities
Class discussions
Distance Education
Demonstrations
Field trips
Group discussions
Instructor-guided interpretation and analysis
Instructor-guided use of technology
Internet research
Laboratory activities
Small group activities

Describe specific examples of the methods the instructor will use:

1. Lecture reviewing key points of laboratory topics and activities.
2. Hands on laboratory activities done individually and in groups.
3. Pre-lab worksheets, quizzes, or activities to prepare students for upcoming laboratory topic.
4. Video clips illustrating key concepts to be covered in class.

Representative Course Assignments

Writing Assignments

1. Students may be given written assignments related to reading assignments, such as summarizing a newspaper article about photosynthesis.
2. Students will complete written analysis and discussion based on the in-class lab activities, such as summarizing process involved with and data collected from a photosynthesis experiment involving light absorption by purified chlorophyll pigment.

Critical Thinking Assignments

1. Students will be required to develop hypotheses based on observations made and information that is available (e.g., yeast preferring one sugar source over another in an exercise on fermentation).
2. Students will be required to draw conclusions from results derived from their own individual work and the results from the class as a whole.

Reading Assignments

1. Students are required to read the laboratory exercises before attending class
2. Reading assignments, such as reading a scientific or newspaper article on natural selection

Skills Demonstrations

1. Students will be required to demonstrate the ability to produce and interpret graphs that display scientific data.
2. Students will be required to demonstrate the ability to use a compound light microscope (i.e., a practical exam will be given on microscope use).

Other assignments (if applicable)

1. Students may be required to find an on-line research article through the Oxnard College on-line databases such as an article about protein synthesis.
2. Students may be participate in on-line activity such as quizzes or discussion boards related to topics covered in lab class.

Outside Assignments

Articulation

Comparable Courses within the VCCCD

BIOL V01L - Principles of Biology Laboratory

District General Education**A. Natural Sciences**

A1. Biological Science

Approved

B. Social and Behavioral Sciences**C. Humanities****D. Language and Rationality****E. Health and Physical Education/Kinesiology****F. Ethnic Studies/Gender Studies****CSU GE-Breadth****Area A: English Language Communication and Critical Thinking****Area B: Scientific Inquiry and Quantitative Reasoning**

B3 Laboratory Activity

Approved

Area C: Arts and Humanities**Area D: Social Sciences****Area E: Lifelong Learning and Self-Development****CSU Graduation Requirement in U.S. History, Constitution and American Ideals:****IGETC****Area 1: English Communication****Area 2A: Mathematical Concepts & Quantitative Reasoning****Area 3: Arts and Humanities****Area 4: Social and Behavioral Sciences****Area 5: Physical and Biological Sciences**

Area 5C: Laboratory Science

Approved

Area 6: Languages Other than English (LOTE)**Textbooks and Lab Manuals****Resource Type**

Textbook

Description

Mimi Bres & Arnold Weisshaar. (2016). *Thinking About Biology: An Introductory Laboratory Manual* (5th). Pearson. Hoboken, NJ. ISBN 9780134018539

Resource Type

Other Resource Type

Description

Video presentations, video clips, and animations.

Resource Type

Other Resource Type

Description

Instructor provided handouts such as post-laboratory questions.

Resource Type

Other Resource Type

Description

Laboratory materials and equipment required for activities such as microscopes and prepared slides.

Distance Education Addendum**Definitions****Distance Education Modalities**

Hybrid (51%–99% online)

Hybrid (1%–50% online)

100% online

Faculty Certifications

Faculty assigned to teach Hybrid or Fully Online sections of this course will receive training in how to satisfy the Federal and state regulations governing regular effective/substantive contact for distance education. The training will include common elements in the district-supported learning management system (LMS), online teaching methods, regular effective/substantive contact, and best practices.

Yes

Faculty assigned to teach Hybrid or Fully Online sections of this course will meet with the EAC Alternate Media Specialist to ensure that the course content meets the required Federal and state accessibility standards for access by students with disabilities. Common areas for discussion include accessibility of PDF files, images, captioning of videos, Power Point presentations, math and scientific notation, and ensuring the use of style mark-up in Word documents.

Yes

Regular Effective/Substantive Contact**Hybrid (1%–50% online) Modality:**

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Discussions focusing on a subject for which students will make an original post and then thoughtfully respond to other student postings; may also allow instructor and students to address miscellaneous questions and related subjects.
E-mail	Communication venue to allow instructor-student and student-student dialogue for problem-solving/question/answer purposes and to submit certain types of assignments.
Other DE (e.g., recorded lectures)	Recorded tutorials, lectures, and video meetings.
Synchronous Dialog (e.g., online chat)	Instant messaging and/or chat to allow instructor-student and student-student dialogue for teaching and/or studying.
Telephone	Communication venue to allow instructor-student and student-student dialogue for problem-solving/question/answer purposes.

Video Conferencing
Video meetings to allow the instructor to highlight important information (perhaps lecture) and facilitate immediate student interaction (such as problem-solving/question/answer session). ADA compliance will be upheld with Closed Captioning during the session or of the recorded session. Recordings of all live sessions will be made available within the LMS.

Hybrid (51%–99% online) Modality:

Method of Instruction

Document typical activities or assignments for each method of instruction

Asynchronous Dialog (e.g., discussion board)

Discussions focusing on a subject for which students will make an original post and then thoughtfully respond to other student postings; may also allow instructor and students to address miscellaneous questions and related subjects.

E-mail

Communication venue to allow instructor-student and student-student dialogue for problem-solving/question/answer purposes and to submit certain types of assignments.

Other DE (e.g., recorded lectures)

Recorded tutorials, lectures, and video meetings.

Synchronous Dialog (e.g., online chat)

Instant messaging and/or chat to allow instructor-student and student-student dialogue for teaching and/or studying.

Telephone

Communication venue to allow instructor-student and student-student dialogue for problem-solving/question/answer purposes.

Video Conferencing

Video meetings to allow the instructor to highlight important information (perhaps lecture) and facilitate immediate student interaction (such as problem-solving/question/answer session). ADA compliance will be upheld with Closed Captioning during the session or of the recorded session. Recordings of all live sessions will be made available within the LMS.

100% online Modality:

Method of Instruction

Document typical activities or assignments for each method of instruction

Asynchronous Dialog (e.g., discussion board)

Discussions focusing on a subject for which students will make an original post and then thoughtfully respond to other student postings; may also allow instructor and students to address miscellaneous questions and related subjects.

E-mail

Communication venue to allow instructor-student and student-student dialogue for problem-solving/question/answer purposes and to submit certain types of assignments.

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Telephone

Communication venue to allow instructor-student and student-student dialogue for problem-solving/question/answer purposes.

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Examinations

Hybrid (1%–50% online) Modality

Online

On campus

Hybrid (51%–99% online) Modality

Online

On campus

Primary Minimum Qualification

BIOLOGICAL SCIENCES

Review and Approval Dates

Department Chair

09/16/2020

Dean

09/16/2020

Technical Review

10/14/2020

Curriculum Committee

10/14/2020

Curriculum Committee

12/09/2020

CCCCO

MM/DD/YYYY

Control Number

CCC000246113

DOE/accreditation approval date

MM/DD/YYYY