Glendale College

Course Outline of Record Report

Course ID 010547

Revision - November 2025

BIOL140 : Introduction to Biotechnology

General Information

Author:	• Karoline Rostamiani
Attachments:	DE Addendum_BIOL_140 COR_05:24:2023 CoDE_11:28:2023.pdf
Course Code (CB01) :	BIOL140
Course Title (CB02) :	Introduction to Biotechnology
Department:	BIOL
Proposal Start:	Fall 2026
TOP Code (CB03) :	(0430.00) Biotechnology and Biomedical Technology*
CIP Code:	(15.0401) Biomedical Technology/Technician.
SAM Code (CB09) :	C - Clearly Occupational
Distance Education Approved:	Yes
Will this course be taught asynchronously?:	No
Course Control Number (CB00) :	CCC000624420
Curriculum Committee Approval Date:	11/26/2025
Board of Trustees Approval Date:	01/13/2026
Last Cyclical Review Date:	02/01/2021
Course Description and Course Note:	BIOL 140 is a general introduction of biology as it relates to the field of biotechnology. Students explore topics including the fundamental chemical processes common in prokaryotic and eukaryotic biology, chemistry of bio-molecules (proteins, enzymes, nucleic acids and lipids), cellular and molecular biology, basic immunology, and classical and molecular genetics with an emphasis on gene expression and genetic engineering. Lecture content also includes the history, business and ethics of biotechnology. The laboratory addresses basic skills and techniques common to the biotechnology industry. Laboratory topics include the measurement of activity and quantity of proteins, growth and manipulation of bacteria, genetic engineering and antibody methods. This course is intended for, but not limited to, students majoring in biotechnology and as a general education option for all students, including non-majors. Note: A material/lab fee may be required for this course.
Justification:	Content Change
Academic Career:	• Credit
Mode of Delivery:	No value
Author:	No value
Course Family:	No value

Academic Senate Discipline

Primary Discipline:	• Biological Sciences
Alternate Discipline:	• Biotechnology

Alternate Discipline: No value

Course Development

Basic Skill Status (CB08)

Course is not a basic skills course.

Allow Students to Gain Credit by Exam/Challenge

Course Special Class Status (CB13)

Course is not a special class.

Pre-Collegiate Level (CB21)

Not applicable.

Grading Basis

- Grade Only

Course Support Course Status (CB26)

Course is not a support course

General Education and C-ID

General Education Status (CB25)

Not Applicable

Transferability

Transferable to both UC and CSU

Transferability Status

Approved

Cal-GETC	Area	Status	Approval Date	Comparable Course
Area 5B: Biological Science	Biological Science	Approved	09/02/2025	No Comparable Course defined.
Area 5C: Laboratory	Laboratory	Approved	09/02/2025	

GCC General Education Requirements	Area	Status	Approval Date	Comparable Course
Area 5: Natural Sciences	Natural Sciences	Approved	09/02/2025	No Comparable Course defined.

C-ID	Area	Status	Approval Date	Comparable Course
BIOT	Biotechnology	Approved	08/30/2021	BIOT 101 B X - Introductory Biotechnology with Laboratory

Units and Hours

Summary

Minimum Credit Units (CB07)	4
Maximum Credit Units (CB06)	4
Total Course In-Class (Contact) Hours	108
Total Course Out-of-Class Hours	108

Total Student Learning Hours 216

Credit / Non-Credit Options

Course Type (CB04)

Credit - Degree Applicable

Noncredit Course Category (CB22)

Credit Course.

Noncredit Special Characteristics

No Value

Course Classification Code (CB11)

Credit Course.

Funding Agency Category (CB23)

This course was primarily developed using Economic Development funds.

☐ Cooperative Work Experience Education Status (CB10)

☐ Variable Credit Course

Weekly Student Hours

	In Class	Out of Class
Lecture Hours	3	6
Laboratory Hours	3	0
Studio Hours	0	0

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	0
Course In-Class (Contact) Hours	
Lecture	54
Laboratory	54
Studio	0
Total	108
Course Out-of-Class Hours	
Lecture	108
Laboratory	0
Studio	0
Total	108

Time Commitment Notes for Students

No value

Units and Hours - Weekly Specialty Hours

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

Prerequisites, Corequisites, Recommended Corequisites, and Recommended Preparation

Advisory

CHEM110 - Elements Of General Chemistry

Objectives

- Perform laboratory experiments correctly using appropriate techniques and safety procedures.

OR

Advisory

CHEM120 - Fundamentals Of College Chemistry (Inorganic)

Objectives

- Identify and describe basic chemical data, rules, and laws.

AND

Advisory

ENGLC1000 - Academic Reading and Writing

Objectives

- Analyze stylistic choices in their own writing and the writing of others and the context in which readings were produced.
- Write timed, in-class essays exhibiting acceptable college-level control of mechanics, organization, development, and coherence.
- Integrate the ideas of others through paraphrasing, summarizing, and quoting without plagiarism.
- Find, evaluate, analyze, and interpret primary and secondary sources, incorporating them into written essays using appropriate documentation format.
- Proofread and edit essays for presentation so they exhibit no disruptive errors in English grammar, usage, or punctuation.

OR

Advisory

ENGLC1000H - Academic Reading and Writing - Honors

Objectives

- Analyze stylistic choices in their own writing and the writing of others and the context in which readings were produced.
- Write timed, in-class essays exhibiting acceptable college-level control of mechanics, organization, development, and coherence.
- Integrate the ideas of others through paraphrasing, summarizing, and quoting without plagiarism.
- Proofread and edit essays for presentation so they exhibit no disruptive errors in English grammar, usage, or punctuation.
- Find, evaluate, analyze, and interpret primary and secondary sources, incorporating them into written essays using appropriate documentation format.

OR

Advisory

ENGLC1000E - Academic Reading and Writing

Objectives

- Analyze stylistic choices in their own writing and the writing of others and the context in which readings were produced.
- Write timed, in-class essays exhibiting acceptable college-level control of mechanics, organization, development, and coherence.
- Integrate the ideas of others through paraphrasing, summarizing, and quoting without plagiarism.
- Find, evaluate, analyze, and interpret primary and secondary sources, incorporating them into written essays using appropriate documentation format.
- Proofread and edit essays for presentation so they exhibit no disruptive errors in English grammar, usage, or punctuation.

AND

Advisory

Satisfactory completion of a course taught at or above the level of intermediate algebra.

Entry Standards

Entry Standards	Description
No value	No value

Course Limitations

Cross Listed or Equivalent Course	Description
No value	No value

Requisite Validation

Upload Statistical Validation and/or other documents (if necessary)

No Value

Specifications

Methods of Instruction

Methods of Instruction	Lecture
Methods of Instruction	Laboratory
Methods of Instruction	Discussion
Methods of Instruction	Multimedia
Methods of Instruction	Collaborative Learning
Methods of Instruction	Demonstrations

Methods of Instruction	Field Activities (Trips)
Methods of Instruction	Guest Speakers
Methods of Instruction	Presentations

Out of Class Assignments

- Field trip
- Reading assigned chapters in course textbook(s), laboratory manual, and/or relevant scientific articles
- Maintaining lab notebook that contains laboratory protocols (e.g. a written protocol that includes the title, purpose, materials needed, procedures, and expected results)
- Homework assignment aimed at explaining and understanding major concept (e.g. problem solving on concept of protein synthesis, metabolism, and DNA replication)
- Pre-lab quizzes

Methods of Evaluation	Description of Activity/Interaction
Presentation (group or individual)	Class presentation on relevant topics in biotechnology.
Activity (answering journal prompt, group activity)	Regular class and laboratory activities, experiments related to course topics.
Writing Assignment	Writing assignments that assess the ability to apply the theory of Good Laboratory Practices to reports and lab notebooks.
Activity (answering journal prompt, group activity)	Laboratory practica that assess the ability to prepare and analyze graphs, follow a protocol, demonstrate basic lab skills and workplace competency, and explain deviations from the protocol.
Exam/Quiz/Test	In class objective written examinations and quizzes that test for definitions and application of major biological concepts.

Textbook Rationale

Newer updates of the books are not available.

Textbooks

Author	Title	Publisher	Date	ISBN
Thienman, Willian J.	Introduction to Biotechnology	Pearson	2018	978-0134650197
Simon, Eric J	Campbell Essential Biology	Pearson	2018	978-0134812946
Simon, Eric J.				

Campbell Essential Biology with Physiology	Pearson	2018	321602072	
Seidman, Lisa A.	. Basic Laboratory Methods for Biotechnology	Pearson	2009	9780321570147

Other Instructional Materials (i.e. OER, handouts)

Description	Introduction to Biotechnology
Author	Orange County Biotechnology Education Collaborative
Citation	No value
Online Resource(s)	No value

Learning Outcomes

Course Objectives

List the morphologic and chemical differences between prokaryotic and eukaryotic cells.

Define and distinguish among atoms, molecules, compounds, chemical bonds, mechanisms of chemical bond formation, and components of biological molecules.

Construct the flow diagram of gene expression from DNA to protein.

Translate the triplet code of DNA into primary protein structure.

Assess the role of basic Mendelian genetics.

Compare and contrast current applications of biotechnology to the areas of medicine, agriculture, diagnostics, and the environment.

Explain evolution from a genetic perspective.

Evaluate a recent development in the field of biotechnology from an ethical perspective.

Demonstrate pipetting skills.

Explain the importance of Good Laboratory Practices and record keeping.
Explain how an antibody-based assay works (e.g. ELISA).
Perform bacterial transformation.
Use of aseptic techniques in lab procedures, such as handling of bacteria, microbiology and molecular biology work..
Demonstrate proficiency in basic molecular techniques (e.g. DNA and protein analysis techniques).
Identify parts of a microscope.
Use a microscope to view specimens.
Employ a lab protocol and explain deviations from the protocol.

SLOs

Analyze the differences between eukaryote and prokaryote cell structures and the importance of the four biomolecules.

Expected Outcome Performance: 70.0

BIOL Biotechnology Research Lab Assistant Certificate	Acquire work-readiness skills
	Learn skills necessary for a manufacturing or biomanufacturing technician job
	Master basic biotechnology laboratory skills and good documentation practices in biomanufacturing
BIOL Biotechnology A.S. Degree	Acquire work-readiness skills
	Fulfill requirements for transfer to a college with a BS in Biotechnology
	Learn skills necessary for a lab technician job
	Master advanced biotechnology laboratory skills and good documentation practices
BIOL Biotechnology Research Lab Technician Certificate	Acquire work-readiness skills
	Learn necessary skills for a lab technician job
	Master advanced biotechnology laboratory skills and good documentation practices
ILOs Core ILOs	Analyze and solve problems using critical, logical, and creative thinking; ask questions, pursue a line of inquiry, and derive conclusions; cultivate creativity that leads to innovative ideas.
BIOL Biotechnology Certificate	Master basic biotechnology laboratory skills

ILOs General Education	analyze, interpret, and present research evidence
	apply reasoning to evaluate hypotheses and theories
	examine causality or associations between or among variables of the natural world

Apply the concepts of genetics and gene expression to applications in biotechnology and biomanufacturing. Expected Outcome Performance: 70.0

BIOL Biotechnology A.S. Degree	Acquire work-readiness skills
	Fulfill requirements for transfer to a college with a BS in Biotechnology
	Learn skills necessary for a lab technician job
	Master advanced biotechnology laboratory skills and good documentation practices
BIOL Biotechnology Research Lab Technician Certificate	Acquire work-readiness skills
	Learn necessary skills for a lab technician job
	Master advanced biotechnology laboratory skills and good documentation practices
BIOL Biotechnology Certificate	Acquire work-readiness skills
	Learn skills necessary for a manufacturing technician job
	Master basic biotechnology laboratory skills
BIOL Biotechnology Research Lab Assistant Certificate	Acquire work-readiness skills
	Learn skills necessary for a manufacturing or biomanufacturing technician job
	Master basic biotechnology laboratory skills and good documentation practices in biomanufacturing
ILOs Core ILOs	Analyze and solve problems using critical, logical, and creative thinking; ask questions, pursue a line of inquiry, and derive conclusions; cultivate creativity that leads to innovative ideas.
ILOs General Education	apply reasoning to evaluate hypotheses and theories
	examine causality or associations between or among variables of the natural world

Demonstrate basic laboratory and safety skill, good Laboratory Practices as defined by industry standards, and record keeping.
Expected Outcome Performance: 70.0

BIOL Biotechnology Research Lab Assistant Certificate	Acquire work-readiness skills
	Learn skills necessary for a manufacturing or biomanufacturing technician job
	Master basic biotechnology laboratory skills and good documentation practices in biomanufacturing
BIOL Biotechnology A.S. Degree	Acquire work-readiness skills
	Fulfill requirements for transfer to a college with a BS in Biotechnology
	Learn skills necessary for a lab technician job
	Master advanced biotechnology laboratory skills and good documentation practices
BIOL Biotechnology Certificate	Acquire work-readiness skills
	Learn skills necessary for a manufacturing technician job
	Master basic biotechnology laboratory skills

BIOL Biotechnology Research Lab Technician Certificate	Acquire work-readiness skills
	Learn necessary skills for a lab technician job
	Master advanced biotechnology laboratory skills and good documentation practices
ILOs Core ILOs	Practice ethical and responsible behavior within personal, academic, professional, social, and societal contexts; recognize and welcome diverse lifestyle choices that promote physical, intellectual, psychological, and social well-being.
ILOs General Education	apply reasoning to evaluate hypotheses and theories
	examine causality or associations between or among variables of the natural world

Demonstrate basic molecular biology techniques in protein, antibodies, and DNA analysis pertaining to biotechnology.

Expected Outcome Performance: 70.0

BIOL Biotechnology Certificate	Acquire work-readiness skills
	Learn skills necessary for a manufacturing technician job
	Master basic biotechnology laboratory skills
BIOL Biotechnology Research Lab Assistant Certificate	Acquire work-readiness skills
	Learn skills necessary for a manufacturing or biomanufacturing technician job
	Master basic biotechnology laboratory skills and good documentation practices in biomanufacturing
BIOL Biotechnology Research Lab Technician Certificate	Acquire work-readiness skills
	Learn necessary skills for a lab technician job
	Master advanced biotechnology laboratory skills and good documentation practices
BIOL Biotechnology A.S. Degree	Acquire work-readiness skills
	Fulfill requirements for transfer to a college with a BS in Biotechnology
	Learn skills necessary for a lab technician job
	Master advanced biotechnology laboratory skills and good documentation practices
ILOs Core ILOs	Analyze and solve problems using critical, logical, and creative thinking; ask questions, pursue a line of inquiry, and derive conclusions; cultivate creativity that leads to innovative ideas.
ILOs General Education	apply reasoning to evaluate hypotheses and theories
	examine causality or associations between or among variables of the natural world

Additional SLO Information

Does this proposal include revisions that might improve student attainment of course learning outcomes?

No Value

Is this proposal submitted in response to learning outcomes assessment data?

No Value

If yes was selected in either of the above questions for learning outcomes, explain and attach evidence of discussions about learning outcomes.

No Value

SLO Evidence

No Value

Course Content

Lecture Content

Overview of biotechnology (7 Hours)
- History of biotechnology
- GMOS and ethical aspects of biotechnology (e.g. gene manipulation)
- Careers in biotechnology

Techniques in biotechnology (6 Hours)
- Cloning, recombinant DNA technology
- PCR (polymerase chain reaction)
- Gel electrophoresis
- Enzymes

Applications (2 Hours)
- Medicine
- Agriculture
- Diagnostics
- Environment/Energy
- Fuels

Biomolecules and atomic structure (6 Hours)
- Atoms
- Molecules
- Compounds
- Mechanisms of chemical bond formation
- Biomolecule structures and features: carbohydrates, lipids, proteins, nucleic acids

Cell biology (prokaryotic/eukaryotic) (6 Hours)
- Morphologic differences
- Differences in DNA
- Differences in gene expression

Double-stranded DNA molecule (5 Hours)
- Alpha-helix
- DNA replication
- Meiosis and mitosis

Gene expression and the genetic code (7 Hours)
- Transcription from DNA to mRNA
- Translation from mRNA to a protein

Basic Mendelian genetics including inheritance of traits (4.5 Hours)

- Dominant and recessive traits
- Inheritance of traits
- Autosomal and sex-linked disorders

Evolution from the genetic perspective (3 Hours)
Basic physiology such as (3 Hours)
- Homeostasis
- The immune system

Introduction to Energy/Metabolism (4.5 Hours)
- Photosynthesis
- Cellular respiration

Total Hours: 54

Laboratory/Studio Content

Introduction to biotechnology and laboratory (3 Hours)
- Good manufacturing practices (aseptic and sterile techniques)
- Introduction to laboratory equipment and laboratory safety

Protein techniques (5 Hours)
- Protein assays
- Introduction to enzymes

DNA techniques (7 Hours)
- DNA electrophoresis
- Bacterial transformation
- Isolation of plasmid DNA/restriction digestion

Antibody methods (3 Hours)
- ELISA assay
- Home pregnancy test

Microbiology techniques (8 Hours)
- Streaking bacteria
- Use of microscope
- Streaking bacteria
- Gram staining

Basic lab skills (8 Hours)
- Laboratory measurements (including accuracy versus precision)
- The pH meter, working safely with acids and bases)
- Pipetting skills

Basic lab skills (6 Hours)
- Good Laboratory Practices (record keeping, following protocols)
- Laboratory notebook documentation

Basic lab skills (8 Hours)
- Lab safety guidelines
- Aseptic and sterile techniques
- Disposal of hazardous materials, use of MSDS (Material Safety Data Sheets)

Basic lab skills (6 Hours)
- The metric system
- Graphs

Total Hours: 54

Additional Information

Repeatability

Not Repeatable

Justification (if repeatable was chosen above)

No Value

Is it possible this course will have a material fee?

Yes

I have contacted my library liaison (https://campusguides.glendale.edu/faculty/liaisons):

No

What term(s) will this course be offered?

Fall/Spring

Will any additional resources be needed for this course? (Click all that apply)

- No

If additional resources are needed, add a brief description and cost in the box provided.

No Value