

BIOL R122: PRINCIPLES OF BIOLOGY II

Originator

snewby

College

Oxnard College

Discipline (CB01A)

BIOL - Biology

Course Number (CB01B)

R122

Course Title (CB02)

Principles of Biology II

Banner/Short Title

Principles of Biology II

Credit Type

Credit

Start Term

Fall 2021

Catalog Course Description

This course, intended for biology majors, includes a survey of the basic biology and diversity of unicellular and multicellular organisms and examines the basic principles governing evolution of organisms and interactions between organisms and the environment. It emphasizes general biological principles, classification, structure, function and evolutionary adaptations of organisms (including plants, fungi, animals, and unicellular organisms) to their environments, and ecological principles.

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

Local parks, beaches, harbors, islands, and natural history museums or 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

Minimum Contact/In-Class Lecture Hours

70

Maximum Contact/In-Class Lecture Hours

70

Activity

Laboratory

Total in-Class

Total in-Class

Total Minimum Contact/In-Class Hours

70

Total Maximum Contact/In-Class Hours

70

Outside-of-Class

Internship/Cooperative Work Experience

Paid**Minimum Paid Internship/Cooperative Work Experience Hours**

0

Maximum Paid Internship/Cooperative Work Experience Hours

0

Unpaid**Minimum Unpaid Internship/Cooperative Work Experience Hours**

0

Maximum Unpaid Internship/Cooperative Work Experience Hours

0

Total Outside-of-Class**Total Outside-of-Class****Minimum Outside-of-Class Hours**

140

Maximum Outside-of-Class Hours

140

Total Student Learning**Total Student Learning****Total Minimum Student Learning Hours**

210

Total Maximum Student Learning Hours

210

Minimum Units (CB07)

4

Maximum Units (CB06)

4

Prerequisites

MATH R005 or MATH R015; BIOL R120 and BIOL R120L; ENGL R097 or ENGL R100; or ENGL R101 or ENGL R101H or concurrent

Entrance Skills**Entrance Skills**

Ability to simplify mathematical equations and graph data sets

Prerequisite Course Objectives

MATH R005-Simplify algebraic expressions

MATH R005-Solve linear equations.

MATH R005-Solve linear inequalities and graph solutions on a number line.

MATH R005-Simplify rational expressions and solve rational equations.

MATH R005-Solve problems and applications involving systems of equations in three (3) variables.

MATH R005-Graph systems of inequalities in two (2) variables.

MATH R005-Simplify expressions involving positive, negative, and rational exponents.

MATH R005-Solve quadratic equations and their applications using multiple methods.

MATH R005-Graph and evaluate elementary functions.

MATH R005-Use definitions, domain and range, algebra and composition of functions on related applications.

MATH R005-Solve elementary exponential and logarithmic equations and related applications.

Entrance Skills

Ability to simplify mathematical equations and graph data sets

Prerequisite Course Objectives

MATH R015-Evaluate and simplify algebraic expressions.

MATH R015-Solve linear equations.
MATH R015-Solve linear inequalities on a number line and represent solution in interval notation.
MATH R015-Simplify expressions with positive and negative exponents.
MATH R015-Convert decimals to scientific notation and vice versa.
MATH R015-Solve systems of two (2) variable linear equations by graphing and algebraic methods, and three (3) variable linear equations by algebraic methods.
MATH R015-Solve quadratic equations by factoring, the square root method, and the quadratic formula.
MATH R015-Add, subtract, multiply, divide and simplify rational expressions.
MATH R015-Solve rational equations.
MATH R015-Graph linear functions and write using function notation.
MATH R015-Simplify radical expressions including those with rational exponents.
MATH R015-Solve radical equations and applications.
MATH R015-Graph exponential and logarithmic functions.
MATH R015-Solve elementary exponential and logarithmic equations.

Entrance Skills

Familiarity with cellular biology including cellular composition, components, functions, inheritance patterns, and current techniques in biotechnology.

Prerequisite Course Objectives

BIOL R120-Explain the chemical and molecular aspects of living systems
BIOL R120-Identify subcellular structures and describe their functions
BIOL R120-Explain the components of cellular metabolism
BIOL R120-Describe the process of cell reproduction and relate it to the process of neoplasm
BIOL R120-Discuss and compare classical Mendelian genetics and Non-Mendelian genetics
BIOL R120-Compare and contrast viral and bacteriophage genetics
BIOL R120-Describe the current hypotheses for the origin of life and biological change
BIOL R120-Analyze current methods of recombinant DNA and biotechnology

Entrance Skills

Familiarity with laboratory safety, equipment, and techniques

Prerequisite Course Objectives

BIOL R120L-Apply standard lab protocols in a safe and conscientious manner while working cooperatively with other students.
BIOL R120L-Demonstrate critical thinking skills as applied to scientific reading and the ability to report data in a scientific format.
BIOL R120L-Exhibit an ability to utilize the light, phase contrast and fluorescence microscope.
BIOL R120L-Operate a centrifuge properly with balanced samples.
BIOL R120L-Compute optical densities with a spectrophotometer using a control and test samples.
BIOL R120L-Measure weights and volumes using electronic scales, micropipetors, pipettes and graduated cylinders.
BIOL R120L-Operate DNA and/or protein electrophoresis equipment to determine molecular weight.
BIOL R120L-Amplify DNA and synthesize proteins in vitro (PCR) or in vivo (transfection/transformation expression).
BIOL R120L-Analyze routine DNA sequencing data from sources including lab experiments, simulations, and published research.

Entrance Skills

Ability to write at a college level

Prerequisite Course Objectives

ENGL R097-Write short essays of at least five paragraphs with effective introductory paragraphs; well-organized, coherent, and detailed support of thesis; and effective conclusions
ENGL R097-Write essays with acceptable college-level grammar, syntax, spelling, and idiomatic usage
ENGL R097-Analyze essay exam questions and organize and write effective responses
ENGL R097-Demonstrate familiarity with the principles of research and documentation
ENGL R097-Write a short paper incorporating documentation

Entrance Skills

Ability to write at a college level

Prerequisite Course Objectives

ENGL R100-Employ logical organizational strategies in writing essays.
ENGL R100-Write short (500-word) essays with effective introductory paragraphs; well-organized, coherent, and detailed support of thesis; and effective conclusions.
ENGL R100-Write essays with acceptable college-level grammar, syntax, spelling, and idiomatic usage.

ENGL R100-Analyze essay exam questions and organize and write effective responses.
 ENGL R100-Successfully use principles of research and documentation systems.

Entrance Skills

Ability to write at a college level

Prerequisite Course Objectives

ENGL R101-Demonstrate college-level control of mechanical elements of writing such as grammar, syntax, spelling, vocabulary, and idiomatic usage
 ENGL R101-Research a topic, analyze and synthesize information, and report findings in a properly documented essay
 ENGL R101-Demonstrate critical thinking skills and rhetorical awareness in analyzing others' non-fiction writing and in developing essays

Entrance Skills

Ability to write at a college level

Prerequisite Course Objectives

ENGL R101H- Demonstrate college-level control of mechanical elements of writing such as grammar, syntax, spelling, vocabulary, and idiomatic usage
 ENGL R101H- Research a topic, analyze and synthesize information, and report findings in a properly documented essay
 ENGL R101H-Demonstrate critical thinking skills and rhetorical awareness in analyzing others' non-fiction writing and in developing essays

Requisite Justification

Requisite Type

Prerequisite

Requisite

MATH R005

Requisite Description

Course not in a sequence

Level of Scrutiny/Justification

Required by 4 year institution

Requisite Type

Prerequisite

Requisite

MATH R015

Requisite Description

Course not in a sequence

Level of Scrutiny/Justification

Required by 4 year institution

Requisite Type

Prerequisite

Requisite

BIOL R120

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Required by 4 year institution

Requisite Type

Prerequisite

Requisite

BIOL R120L

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Required by 4 year institution

Requisite Type

Prerequisite

Requisite

ENGL R097

Requisite Description

Course not in a sequence

Level of Scrutiny/Justification

Content review

Requisite Type

Prerequisite

Requisite

ENGL R100

Requisite Description

Course not in a sequence

Level of Scrutiny/Justification

Content review

Requisite Type

Prerequisite

Requisite

ENGL R101

Requisite Description

Course not in a sequence

Level of Scrutiny/Justification

Content review

Requisite Type

Concurrent

Requisite

ENGL R101

Requisite Description

Course not in a sequence

Level of Scrutiny/Justification

Content review

Requisite Type

Prerequisite

Requisite

ENGL R101H

Requisite Description

Course not in a sequence

Level of Scrutiny/Justification

Content review

Requisite Type

Concurrent

Requisite

ENGL R101H

Requisite Description

Course not in a sequence

Level of Scrutiny/Justification

Content review

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

- | | |
|---|--|
| 1 | Students will be able to identify characteristics common to all living organisms. |
| 2 | Students will compare and contrast methods of obtaining nutrients in different organisms. |
| 3 | Students will create a food web and calculate the amount of calories obtained by organisms within the web. |
| 4 | Students will use a phylogenetic tree to assess if a trait is homologous or analogous. |

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

- | | |
|---|--|
| 1 | Explain the essential elements of life, major hypotheses for life's history, and mechanisms for the diversification of life. |
| 2 | Compare and contrast the development, life cycles, anatomical and physiological characteristics of major taxa of organisms. |
| 3 | Evaluate the relationships of organisms to each other and their environments. |
| 4 | Describe, identify key characteristics, and classify representative specimens down to representative phyla. |
| 5 | Apply the process of scientific inquiry, phylogenetic analysis, and experimental design to the diversity of organisms. |
| 6 | Evaluate the ecological relationships of organisms at the population, community, and ecosystem level. |
| 7 | Describe the flow of energy within an ecosystem and the role of nutrient cycling in maintaining ecosystem integrity. |

Course Content**Lecture/Course Content**

1. Evolutionary theory, including mechanisms of diversification of life and evidence for evolution
2. Phylogeny of life on earth, including plants, fungi, animals, and unicellular organisms
3. Anatomy, physiology, life cycles, and development of living organisms, including plants, fungi, animals, and unicellular organisms
4. Interaction of organisms with each other and the environment, including plants, fungi, animals, and unicellular organisms.

5. Ecological principles at the population, community, and ecosystem levels
6. Ecosystem diversity

Laboratory or Activity Content

None

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
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):

Computational homework
Essay exams
Essays
Group projects
Individual projects
Journals
Objective exams
Problem-Solving Assignments
Problem-solving exams
Quizzes
Role playing
Reports/papers
Research papers

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
Group discussions
Guest speakers
Instructor-guided interpretation and analysis
Internet research
Lecture
Small group activities

Describe specific examples of the methods the instructor will use:

1. Instructor will utilize lecture, film, internet materials, models, and preserved specimens to explore and explain topics relative to the understanding and application of organismal biology, evolution, and ecology such as different mechanisms for preventing hybridization between species.
2. The instructor will lead discussions on topics that may include evolution, the development of life, developmental biology, differences and similarities of organism kingdoms, and how to calculate biodiversity.
3. Students will critically analyze primary literature on relevant topics such as the cause of the Cambrian Explosion, the effectiveness of ecological restoration techniques or evidence for pheromonal communication between members of the same species.

Representative Course Assignments

Writing Assignments

1. Paragraphs and short papers describing characteristics of specific organisms. Example: Give an overview of the biological characteristics of the selected organism and how they compare and contrast to sister taxa.
2. Paragraph or short paper based on fieldwork. Example: Conduct observations of domesticated or wild animal summarizing their interactions with other organisms and the surrounding environment.

3. Short analytic paper of primary literature. Example: Find and read three primary literature articles on the role of the microbiome in the human digestive, nervous, or immune system. Summarize the role of the microbiome in your selected system based on your readings.

Critical Thinking Assignments

1. Students identify unknown organism to the correct phylum based on visible organism characteristics.
2. Students will discuss why using modern genetic engineering techniques in plants has met with so much opposition despite the fact that humans have been manipulating plant genomes for millennia through artificial selection and hybridization.
3. Students will be asked to hypothesize whether it would be most difficult to develop drugs to combat human pathogens that are prokaryotes, protists, animals, or fungi based on a phylogenetic tree.

Reading Assignments

1. One or two chapters per week from the course textbook.
2. Scientific primary literature such as Wei, G-Y et al. 2018. *Marine redox fluctuation as a potential trigger for the Cambrian explosion*. Geology.
3. Newspaper articles discussing recent discoveries, legislation, or actions relevant to organismal, evolutionary, or ecological biology.

Skills Demonstrations

None

Other assignments (if applicable)

1. Data collection activity to determine how many kingdoms and phyla can be found in the food we eat by looking at restaurant menus, cookbooks, or what is available at the grocery store.
2. Animal observational activity to observe how animals interact with other members of their species, other species, and their environment.

Outside Assignments

Representative Outside Assignments

1. Weekly online quizzes related to the course material for that week.
2. Participate in online discussions related to the course topic for that particular week. Topics may include: can evolution and religion coexist, the beauty and diversity of plants, strange and wondrous ways of reproducing, and the interconnections between humans and the environment.
3. Weekly worksheets related to the course material. Example: Diagram the variations on alternation of generations seen in algae and plants.
4. Film or video viewing documented by completion of a worksheet or participation in a discussion specific to the assigned film or video. Example: After viewing the assigned videos on characteristics of living organisms would you classify viruses such as influenza or coronavirus as "alive"?

Articulation

C-ID Descriptor Number

BIOL 140

Status

Approved

Comparable Courses within the VCCCD

BIOL M02B - General Biology II

BIOL V03 - Introduction to Organismal Biology and Ecology

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

B2 Life Science

Approved

Area C: Arts and Humanities

Area D: Social Sciences

Area E: Lifelong Learning and Self-Development

Area F: Ethnic Studies

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 5B: Biological Science

Approved

Area 6: Languages Other than English (LOTE)

Textbooks and Lab Manuals

Resource Type

Textbook

Classic Textbook

No

Description

Reece, J.B., Urry, L.A., Cain, M.L., Wasserman, S.A., Minorsky, P.V., & Jackson, R.B. (2021). *Campbell Biology* (12th). Pearson / Benjamin Cummings. San Francisco, CA.

Library Resources

Assignments requiring library resources

Primary literature search for specific course topics

Sufficient Library Resources exist

Yes

Example of Assignments Requiring Library Resources

Short analytic paper of primary literature. Example: Find and read three primary literature articles on the role of the microbiome in the human digestive, nervous, or immune system. Summarize the role of the microbome in your selected system based on your readings.

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)	Frequent discussions will be used. Typical discussions may ask students to analyze a scientific article or discuss the results of an activity or worksheet with their fellow students or to ask for and aid fellow students with unit questions and answers.
Other DE (e.g., recorded lectures)	Frequent use of recorded lectures on biology topics such as kingdom and phylum characteristics or different types of digestive organs.
Video Conferencing	Use of video conferencing for question and answers and content delivery of specific topics such as differences between protostomes and deuterostomes. Video conferences will be recorded and posted for asynchronous viewing.
E-mail	Email will be available for student to instructor communications.

Hybrid (51%–99% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Frequent discussions will be used. Typical discussions may ask students to analyze a scientific article or discuss the results of an activity or worksheet with their fellow students or to ask for and aid fellow students with unit questions and answers.
Other DE (e.g., recorded lectures)	Frequent use of recorded lectures on biology topics such as kingdom and phylum characteristics or different types of digestive organs.

Video Conferencing	Use of video conferencing for question and answers and content delivery of specific topics such as differences between protostomes and deuterostomes. Video conferences will be recorded and posted for asynchronous viewing.
E-mail	Email will be available for student to instructor communications.
100% online Modality:	
Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Frequent discussions will be used. Typical discussions may ask students to analyze a scientific article or discuss the results of an activity or worksheet with their fellow students or to ask for and aid fellow students with unit questions and answers.
Other DE (e.g., recorded lectures)	Frequent use of recorded lectures on biology topics such as kingdom and phylum characteristics or different types of digestive organs.
Video Conferencing	Use of video conferencing for question and answers and content delivery of specific topics such as differences between protostomes and deuterostomes. Video conferences will be recorded and posted for asynchronous viewing.
E-mail	Email will be available for student to instructor communications.

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

09/15/2020

Dean

09/16/2020

Technical Review

10/14/2020

Curriculum Committee

10/14/2020

DTRW-I

MM/DD/YYYY

Curriculum Committee

12/09/2020

Board

MM/DD/YYYY

CCCCO

MM/DD/YYYY

Control Number

CCC000122713

DOE/accreditation approval date

MM/DD/YYYY