BIOL-151: GENERAL BIOLOGY II

Also listed as: BIOL-151H

Effective Term
Fall 2025

BOT Approval Date
12/14/2023

Discipline
BIOL - Biology
Course Number
151

Course Title
General Biology II

Short Title
General Biology II

Credit Status (CB 04)
D - Credit - Degree applicable

Units

Lecture Units
3.00

Lab Units
1.00

Total Units
4.00

Hours

Lecture Contact Hours
48-54
Out of Class Hours Lecture
96-108

Lab Contact Hours
48-54
Out of Class Hours Lab
0.00

Total Contact Hours
96 - 108

Total Out of Class Hours
96 - 108

Total Student Learning Hours
192 - 216

Is this an existing Extensive Lab?
Yes

Distance Education
Yes

Distance Education

Distance Education Type
Both Fully Online and Hybrid Online

Does the DE also apply to the Honors section?
Yes

Honors component will meet synchronously (face-to-face or moderated through online technology such as Zoom)

Fully Online Delivery Requirements:
a. Students must be notified via the college schedule of classes and the syllabus for the class if proctored tests are required for this course
b. Any planned face-to-face meetings, such as an orientation or study session, must be optional
c. The MSJC curriculum committee requires the use of accessible, asynchronous discussion as a component of every fully online course

Are you using publisher content?
No

Regular Substantive Interaction
Instructor-to-student, student-to-student, and student-to-content contact shall be distributed in a manner that will ensure regular substantive interaction (RSI) is maintained not only weekly but also for the duration of the course. Instructor interactions should be equivalent in time, quality and consistency to the engagement students would receive in a face-to-face course—for example, through announcements, discussion participation, personalized feedback, video messages, or other instructional communications. Instructors are expected to be responsive to student inquiries within a 24-72 hour time frame excluding holidays. RSI will be maintained through a variety of methods: • Orientation - Students must be oriented to the online and face-to-face portions at the start of the course. • Announcements - Announcements using the course management system must be posted at least weekly to keep students current on course events, due dates, materials, etc. • Discussion Forums - Content-related discussion forums within the designated CMS will include appropriate instructor participation and will be initiated and maintained, with timely feedback provided. Instructors are required to monitor the discussions and related activities to provide guidance and direction. Open-ended discussion boards may be used to further learning and interaction. • MSJC Communication – Instructor will use MSJC-administered communication tools (such as email or the designated CMS communication tools) to regularly communicate with and provide ease of access to students. • Timely Feedback - Timely feedback on student work will be provided by the instructor, which may include comments and/or rubrics, within the Grades area of the designated CMS. • Scheduled Meetings – Hybrid and synchronous courses will meet at regularly scheduled times. ADA Compliance - All course interactions and content must be designed with accessibility in mind and meet ADA requirements.

Honors / Non-honors
BIOL-151H
C-ID (Admin Only)

CB 00

CCC000589925

Course Title

Honors General Biology II

Approved Cal-GETC Area

AREA-5B

Approved Second Cal-GETC Area

AREA-5C

Approved Third Cal-GETC Area

Catalog Description

This course, intended for science majors, is the second in a two-semester sequence of intensive modern biology study designed to prepare science majors for upper-division science courses. Topics include the biodiversity, phylogeny, anatomy, physiology and ecology of bacteria, archaea, simple eukaryotic organisms, plants and animals. Students will investigate these topics through laboratory activities that include extensive specimen observation, dissection, and field experiences. Field trips may be required.

Requisites

Prerequisite(s)

Prerequisite(s) (must be taken before)
BIOL-150 (with a grade of C or better).

Recommended Preparation

Recommended Preparation (note that students can enroll in the class even if they haven't take the recommended course)
ENGL-C1000.

Codes

TOP Code (CB 03)

0401.00 - Biology, General

CIP Code

26.0101 - Biology/Biological Sciences, General.

Repeatability Code

No

Grading Option

Letter grade OR P/NP

GE Information

Check GE Types Requested

AA/AS A - Natural and Physical Sciences

Cal-GETC Areas

Approved Cal-GETC Area

AREA-5B

Approved Second Cal-GETC Area

AREA-5C

Learning Objectives

Learning Objectives

Learning Objective
1. Design, perform, and evaluate experimental investigations in biology through the application of the scientific method.
2. Explain the major hypotheses for life's history, mechanisms for the diversification of life, and macroevolution.
3. Infer phylogenetic relationships using traditional taxonomic classifications and modern tools of evolutionary biology such as molecular systematics.
4. Summarize the diversity of prokaryotic organisms by arranging major taxa phylogenetically and describing their various modes of reproduction, metabolism, and cellular structure.
5. Differentiate groups of eukaryotes based on their shared derived traits.
6. Compare and contrast the traits of major lineages of plants and animals with particular emphasis on life cycles and development.

7. Relate the anatomical structures of plants and animals to their respective physiological functions with emphasis on organ systems involved in exchanges with the environment and homeostasis.
8. Analyze the biotic and abiotic factors that determine ecological interactions and cause changes in populations, communities, and ecosystems with emphasis on the impact of human activities.
9. Evaluate the roles of chemical cycling and energy flow in an ecosystem.
10. Appraise the history of biology and significant contributions of underrepresented groups in science such as women and people of color.
11. Consider the social, ethical, and equity implications of biological science.

Honors Objectives

1. Reframe thinking about the science of biology by applying rigorous critical analysis, asking questions, reflecting on and discussing the current science of biology, and exploring the scientific literature in greater depth than the regular section.
2. Develop and practice the analytical skills to understand, evaluate, and critique the range of biological topics, such as biodiversity, plant and animal structure and function, ecology, and evolution beyond those presented in the course.
3. Collaborate closely with the instructor and other honors students.
4. Plan and execute an original research project in consultation with the instructor.
5. Develop appropriate skills in presenting and defending ideas, claims, and conclusions, including through discussion, writing, and formal presentations.

Learning Outcome Information

Course Learning Outcomes

Learning Outcome
1. The student will discover that evolution is a unifying feature of life causing populations to change over time, and new species to arise, when allele frequencies change due to mutation, natural selection, gene flow, and genetic drift. (Evolution, Vision and Change: A Call to Action - AAAS, 2011)
2. The student will deduce how information flows in biology through the inheritance of genetic and epigenetic information that influences the location, timing, and intensity of gene expression. (Information Flow, Vision and Change: A Call to Action - AAAS, 2011)
3. The student will infer how a structure's physical and chemical characteristics influence its interactions with other structures, and therefore its function in cells and organisms. (Structure and Function, Vision and Change: A Call to Action - AAAS, 2011)
4. The student will evaluate the various transformations of energy and matter used by organisms to capture energy and support maintenance, growth and reproduction. (Transformations of Matter and Energy, Vision and Change: A Call to Action - AAAS, 2011)
5. The student will classify biological systems based on the interactions of biological molecules, genes, cells, tissues, organs, individuals, and ecosystems to form complex networks. (Systems, Vision and Change: A Call to Action - AAAS, 2011)

Program Learning Outcomes

Learning Outcome
1. Students through persistence will develop problem solving skills in science thinking both critically and abstractly about issues using science as the foundation for understanding.
2. Students will gain scientific awareness with a flexible approach including a willingness to change perspectives and an ability to weigh alternative options while staying rooted in the understanding of their impact as local, national, and global citizens.
3. Students will apply past knowledge to new scientific situations, being able to think abstractly regarding science and communicate this newfound knowledge in the language of science and the scientific method.
4. Students will achieve literacy in the language of science and the scientific method, demonstrating a willingness to respond with wonderment and awe with regards to the physical and biological principles of science, and gather data through all senses.
5. Students will learn hands-on skills in the laboratory, demonstrate how to measure and collect data from experiments with accuracy and precision, and think critically about the results.

Institutional Learning Outcomes

Critical Thinking: The student will analyze problems, gather and synthesize relevant information, evaluate ideas, information, and evaluate alternative points of view to create, innovate and implement effective solutions.
Scientific Awareness: The student will apply the scientific method of inquiry to assess potential solutions for real-life challenges by employing science-based knowledge and methodologies in daily life.

Social Awareness: The student will recognize and analyze the interconnectedness of global, national, and local concerns, analyzing cultural, political, social, and environmental issues from multiple perspectives and appreciate similarities and differences among cultures.
Civic
Personal
and Professional Responsibility

Content

Course Lecture Content

1. Organization and Description of Life
    a. Principles and rules of taxonomy
        i. Binomial nomenclature
        ii. Taxonomic hierarchy and Linnaean classification
        iii. Principles of systematics
            1. "Tree thinking" and phylogenetic organization of life by evolutionary relationships
                a. morphological evidence
                b. molecular data
                c. other lines of evidence for hypotheses of phylogeny
            2. Construction and interpretation of cladograms
                a. Principles of cladistics
                    i. Hypotheses of homology
                    ii. Shared derived characters (synapomorphies) vs. shared ancestral characters (symplesiomorphies)
                    iii. Sister groups
                    iv. Outgroup analysis
                    v. Identification of monophyletic, paraphyletic and polyphyletic groups
2. Evolutionary Biology
    a. Population genetics
        i. Hardy-Weinberg equilibrium
        ii. Application of Hardy-Weinberg formulas
    b. Mechanisms causing evolution
        i. Natural selection
        ii. Genetic drift
        iii. Gene flow
        iv. Assortative mating
        v. Mutation
        vi. Others
    c. Speciation
        i. Biological species concept
        ii. Other species concepts
        iii. Barriers to gene flow
    d. History of life
        i. Origin of major groups
        ii. Mass extinctions
        iii. Continental drift
        iv. Geologic time scale
    e. Evidence of evolution
        i. Fossils
        ii. Morphology and embryology
        iii. Biogeography
        iv. Molecules (DNA and others)
        v. Experiments and observations
3. Bacteria and Archaea
    a. Diversity and major lineages
    b. Metabolic Diversity
        i. Photoautotrophy
        ii. chemoautotrophy

iii. photoheterotrophy
iv. chemoheterotrophy
c. Structure
i. Capsules, membranes, cell walls, and endospores
ii. Genome and plasmids
iii. Internal structures
iv. Reproductive modes
d. Roles of bacteria in natural and human ecosystems
e. Bacteria as pathogens and mutualists in the microbiome
4. Eukaryotes
a. Origin of eukaryotic cells through endosymbiosis
b. Survey of major lineages (supergroups)
i. Current developments in eukaryote phylogeny
ii. `Shared derived traits of major lineages`
5. Protists
a. Diversity, ecological roles, and impacts on humans
b. Systematics
6. Fungi
a. Body plans, structures and function, nutritional modes
b. Systematics and major groups
c. Typical life cycles
d. Symbioses
e. Roles in ecosystems
f. Impacts on humans
7. Land Plant Diversity
a. Origin within the Archaeplastid lineage from charophytes.
b. Colonization of land and terrestrial adaptations
c. Non-vascular plants
d. Seedless vascular plant lineages (Lycophytes, Monilophytes)
i. Evolution of vascular tissues
ii. Evolution of leaves and roots
e. Seed plants and the evolution of pollen and seeds
f. Angiosperms and the evolution of flowers and fruits
i. The importance and impact of agriculture
ii. The contributions of indigenous people's to modern agriculture
8. Land Plant Form and Function
a. Plant anatomy and morphology
i. Organs, tissues, cell types
ii. Primary and secondary growth
b. Resource acquisition
c. Nutrition
d. Responses to internal and external signals
e. Transport
i. xylem and tension-cohesion model
ii. phloem
f. Alternation of generations and plant life cycles
g. Angiosperm reproduction
9. Animal Diversity
a. Overview of current conception of animal phylogeny
b. Basal lineages of metazoans (sponges)
c. Cnidarians
d. Bilaterans, with emphasis on form, life cycle, and ecological roles
i. Lophotrochozoa
ii. Edysozoa
iii. Deuterostomes

1. Echinoderms
2. Chordates
    a. Cephalochordates
    b. Urochordates
    c. Vertebrates, with emphasis on major evolutionary innovations and terrestrial adaptations
    d. Origin and evolution of humans
        i. Fossils
        ii. Genome comparisons
        iii. Origin and evolution of current and past human diversity

10. Animal Form and Function
    a. Body plans
        i. Coelom
        ii. Body symmetry
        iii. Embryonic development
    b. Tissues
        i. Epithelial
        ii. Connective
        iii. Nervous
        iv. Muscle
    c. Homeostasis
        i. Negative and positive feedback mechanisms
        ii. Circadian, seasonal, and other cycles
        iii. Thermal regulation mechanisms
        iv. Bioenergetics
    d. Organs and organ systems
        i. Circulatory systems
        ii. Gas exchange systems
        iii. Excretory systems
        iv. Reproductive systems
            1. Mammalian ovarian cycles
            2. Fertilization and development
            3. Blocks to polyspermy
            4. Early development in deuterostomes
                a. Echinoderm development
                b. Amphibian development
                c. Avian and mammalian development
        v. Immune systems
        vi. Endocrine systems
        vii. Nervous systems
            1. Neuron function
            2. Organization of nervous system
            3. Sensory reception and processing
        viii. Musculoskeletal systems
    e. Animal behavior

11. Ecology
    a. The biosphere
        i. Biomes
        ii. Ecosystems
        iii. Communities
        iv. Populations
    b. Climate patterns
    c. Biome distribution and biogeography
    d. Biotic and abiotic factors affecting distribution of organisms
    e. Population ecology

i. Life history strategies
ii. Population growth models
iii. Regulation of population growth

f. Community Ecology
i. Community structure
ii. Species interactions
1. Symbiosis and parasitism
2. Coevolution
iii. Competition theory
1. Predator-prey models
2. Lotka-Voltera
iv. Biodiversity and biogeography
1. Island biogeography theory
2. Niche theory
v. Social interactions

g. Ecosystem Ecology
i. Energy flow in ecosystems
1. Food chains and webs
2. Trophic pyramids
ii. Biogeochemical cycling
1. Water
2. Nitrogen
3. Carbon
4. Phosphorus

h. Conservation and restoration ecology
i. Value of biodiversity
ii. Human impacts on biodiversity
iii. Threatened and endangered species
iv. Regional and global threats to biodiversity
v. The contributions of Rachel Carson to the modern conservation movement

i. Global Environmental Issues
i. Global warming
ii. Ongoing mass extinction
iii. Ozone depletion
iv. Other existential risks and threats

Course Lab Content

1. Population Genetics
a. Use Hardy-Weinberg principles to solve problems
b. Use simulations of populations to test principles of population genetics
2. Phylogenetics
a. Use cladistic methods to build phylogenetic trees
b. Use cladograms to test hypotheses about evolutionary relationships, the evolution of key adaptations and biogeography
3. Evolution
a. Explore conditions causing evolution
b. Use simulations to test hypotheses and scenarios of evolution involving natural selection, genetic drift, assortative mating, gene flow and other processes
4. Survey of Biodiversity
a. Assemble a phylogeny of life on earth
b. Observe representative specimens of bacterial, protist, fungal, plant, and animal major groups
c. Identify key defining characteristics of major groups
d. Compare traditional taxonomic classifications with current phylogenetic hypotheses
5. Plant Anatomy and Physiology
a. Observe cells, tissues, and organs of representative seedless and seed plants
b. Observe reproductive structures and life stages of major groups of plants
c. Investigate primary and secondary growth

   d. Relate seed plant anatomy to physiology
   e. Measure xylem transport in living plants
6. Animal Anatomy and Physiology
   a. Observe cells, tissues, and organs using slides and dissected specimens
   b. Observe and dissect representative animals, including
      i. Sponges
      ii. Sea anemones (Cnidaria)
      iii. Earthworms (Lophotrochozoa)
      iv. Clams (Lophotrochozoa)
      v. Squids (Lophotrochozoa)
      vi. Crayfish (Ecdysozoa)
      vii. Locust (Ecdysozoa)
      viii. Sea stars (Deuterostoma)
      ix. Perch (Deuterostoma)
      x. Frogs (Deuterostoma)
      xi. Pigs (Deuterostomata)
   c. Investigate the anatomy and physiology of organ systems
      i. Digestive
      ii. Circulatory
      iii. Respiratory
      iv. Urogenital
      v. Musculoskeletal
      vi. Nervous
   d. Observe the early development of deuterostomes
   e. Investigate human physiology
      i. Respiration rates
      ii. Blood pressure
      iii. Electromyograms
      iv. Sensory responses
7. Ecology
   a. Investigate climatic and geographical features of biomes
   b. Compare representative organisms, populations, communities, and ecosystems in different biomes
   c. Measure the intrinsic growth rate and carrying capacity of a model living population or a simulation
   d. Observe interspecific interactions in a model living community or a simulation
   e. Investigate the effects of toxins on organisms
   f. Construct survivorship curves from a life table
   g. Create food webs from feeding relationships
   h. Describe the energy flow and chemical cycling in an ecosystem
   i. Conduct transect or quadrat sampling
   j. Calculate diversity, abundance, or other ecological indices

Honors Content

The topics covered in the honors section are identical to those covered in the regular section, however students are encouraged to work beyond the survey level and to explore the topic in greater depth. Honors students are encouraged to reflect on and discuss historic and current issues in biological science. In addition, honors students are introduced to research design, implementation, and analysis in the field of biology.

Honors assignments and projects will focus on specific content areas of biology, including, but not limited to:

1. conditions controlling seed germination and plant development;
2. microbiota of various habitats and their vulnerability to human activities;
3. exercise physiology and the impact of conditions on physiology;
4. public attitudes towards controversial issues such as conservation, abortion, invasive species, individual ecological footprints, and global climate change
5. scientific research methods.

Methods of Instruction

Method

Activity

Integration

Group collaborative or individual learning activities encourage a deeper understanding of the course material. Students will be given prompts or engage in hands-on activities demonstrating key aspects of the course content. Students will turn in written responses on paper or via the CMS function.

DE Adaptations for MOI

Learning activities will use the CMS tools, including accessible videoconferencing and discussion boards. Students will turn in written or recorded responses to prompts using the CMS function.

Method

Field Experience

Integration

Field experimental studies of ecological processes such as interspecific competition, population and community structure, and nutritional impacts on growth and reproduction. Students will engage in field trips to major ecosystem types in the southern California region and will engage in data gathering and interpretation exercises to strengthen their ability to apply the scientific method. They will explore their local neighborhood or park, use official state park websites and videos from state rangers to gather data and information. Reports on field experience activities can be turned in on paper or through the CMS function.

DE Adaptations for MOI

Field experiences will be conducted individually by students or virtually using accessible websites, simulations, and videos. Reports of field experiences will be submitted through CMS.

Method

Lab Activities

Integration

Study of representative biological samples, specimens, habitats, models, or simulations. Laboratory activities will explore population genetics, evolution, biodiversity, anatomy, physiology, and ecology, and will emphasize lab skills, scientific methods, representation of data in graphs and tables, analysis, critical thinking and appropriate written or oral presentations.

Hands-on activities include use of lab equipment and apparatus, (bio)chemicals, living and preserved biological specimens and/or materials. Laboratory reports will be submitted on paper or through the CMS. Laboratory assessments such as quizzes, practical exams, and essays will submitted to the instructor on paper or through the CMS.

DE Adaptations for MOI

Lab demonstration will be posted to the CMS via accessible images, video, and/or delivered live via accessible video conferencing tools. Laboratory study of the major principles of biology will use available data, simulations, recorded demonstration and other online accessible resources. Hands-on activities can also be accomplished using student-provided materials and/or laboratory kits. Laboratory reports will be submitted through the CMS. Laboratory assessments such as quizzes, practicals, and essays will be completed and submitted through the CMS.

Method

Lecture

Integration

Lectures accompanied by multimedia presentations that address the course topics. Lecture presentations will engage students in the comprehension, evaluation, and application of course content, scientific reasoning, and consideration of the social, ethical, and political aspects of biology. Diversity of people who engage in doing biology will be highlighted with adequate consideration of underrepresented groups. Lectures can be interspersed with interactive elements, such as discussions, polls, and small-group activities.

DE Adaptations for MOI

Lectures will be provided through the CMS, using accessible video conferencing platforms either asynchronously or synchronously, recorded slide presentations, or through accessible textual material.

Method

Observation and Demonstration

Integration

Instructor-guided classroom demonstrations to present biological processes, such as identification of relevant specimens, use of apparatus, or lab techniques. These may be presented through the CMS or in class, using accessible slide presentation software, websites, multimedia recordings, databases, images, and videos.

DE Adaptations for MOI

Instructor-guided classroom demonstrations will be presented through the CMS, using accessible slide presentation software, websites, multimedia recordings, databases, images, and videos.

Method

Papers and Reports

Integration

Research and development of projects on selected topics related to the anatomy, physiology, ecology, evolution, population genetics, or specific taxa. Papers and reports will explore the major course concepts incorporating analysis, critical thinking and presentation of data in graphic, tabular, or written formats. Specific instructions on length, style, number and type of sources, and other requirements will be provided. Papers and reports will be submitted to the instructor on paper or through the CMS.

DE Adaptations for MOI

Papers and reports will composed using word processing software and will be submitted to the instructor through the CMS.

Method

Discussion

Integration

Discussions on a variety of issues as they relate to the study of biology. Students will be given prompts and time to discuss relevant topics. Prompts may include basic biology content, social, ethical, and practical implications of biology, or topical and controversial areas of biology. Topics can involve historical or current misinformation or abuse of underrepresented and vulnerable groups (human and non-human), and discoveries and contributions made by underappreciated and underrepresented groups. Diversity and equity in the field of biology will be considered. Students can turn in written responses to the question prompts individual or as a group on paper or through the CMS.

DE Adaptations for MOI

Students will participate in either synchronous or asynchronous discussions through the CMS using accessible technology such as videoconferencing software, discussion boards, or similar. Students can turn in written responses to the question prompts individual or as a group through the CMS.

Additional Methods of Instruction for Honors

Method: Honors section meetings
Integration: Honors sections will meet a minimum of three times during a semester to discuss honors section content and to assess individual student work.

For distance education meetings will take place in real time using video conferencing platforms, students will turn in written responses through the CMS.

Method: Supplemental Viewing
Integration: Honors students in collaboration with the instructor will select an appropriate supplemental film. The supplemental material film will be discussed in honors section meetings and short response papers may be required.

For distance education, the planning and overseeing of the supplemental film will be done on the CMS. The discussions will be held through the CMS using an accessible video conferencing platform.

Method: Oral Presentations
Integration: These provide students an opportunity to present their research or other course or supplemental material. These presentations will be 10-15 minutes and include support from a visual medium (slides, posters, or similar).

Method: Field Trips
Integration: Students will participate in field trips to expand their awareness of applications of biology and the range of ecosystems and organisms.

Methods of Evaluation

Method

Class Work

Integration

Class work will be evaluated from written reports, responses, worksheets, tests, or other material submitted. The evaluation will be based on the number and quality of references consulted (if required), the ability to synthesize information from a multitude of sources into a coherent argument, the accuracy of content, insight and originality of the work, basic English grammar and syntax, and whether or not directions for composition and formatting were followed. Grading criteria and procedures will be informed by concern for diversity, equity, ability, fairness, and unintentional disadvantaging of underrepresented groups.

Students will receive feedback from the instructor within 2 weeks of submission on paper or on the CMS.

DE Adaptations for MOE

Class work will consist of asynchronous work or work completed during realtime video conferences. Work will be submitted and evaluated on the CMS. Grading criteria and procedures will be informed by concern for diversity, equity, ability, fairness, and unintentional disadvantaging of underrepresented groups.

Students will receive feedback from the instructor within 2 weeks of submission on the CMS.

Method

Exams/Tests

Integration

Tests and quizzes to determine the student's understanding and grasp of the relationships between structure, function, evolution, and ecology of life on earth. At least three tests will be given over the course of the semester. Test and quiz question format may include multiple choice, short and long written answer, and hands-on oral and/or written identification of models or specimens. Laboratory practicals to determine competence in laboratory methods, knowledge of prokaryotic and eukaryotic specimens, and understanding of the structure and function of animal and plant organ systems. Students receive feedback with in 2 weeks. Grading criteria and procedures will be informed by concern for diversity, equity, ability, fairness, and unintentional disadvantaging of underrepresented groups.

DE Adaptations for MOE

Hands-on oral and/or written identification of models or specimens will be submitted via as assignments in Canvas. Examinations are presented online using the course management software. There is no requirement for proctored, on campus attendance for examinations. Examination and assignment grades are delivered privately to students via the course management system. Students receive feedback with in 2 weeks via the CMS quiz or gradebook feature. Grading criteria and procedures will be informed by concern for diversity, equity, ability, fairness, and unintentional disadvantaging of underrepresented groups in the distance environment.

Method

Oral Presentation

Integration

Oral Presentations to encourage a deeper understanding of the relationship between the structure, function, evolution, and ecology of life on earth. For example, students may be asked to research one topic, in the study of biology, such as bees as a keystone species. A detailed rubric and instructions will be provided on paper of through the CMS. Presentations are evaluated using the rubric that outlines the expected requirements, such as the level of analysis of the conservation issue, depth understanding, ability to relate issues to solutions, and properly referencing relevant sources. In addition, the discussion is reflective, thoughtful and respectful. Presentations are also graded on grammar, to be formatted in a concise and direct language typically found in scientific writing and exercises standard English for punctuation, syntax, spelling, etc. Students receive feedback on paper or via the CMS gradebook within 2 weeks. Grading criteria and procedures will be informed by concern for diversity, equity, ability, fairness, and unintentional disadvantaging of underrepresented groups.

DE Adaptations for MOE

Oral presentations may be submitted using the assignment tool in conjunction with video creating tools (such as YouTube) or those provided in the CMS (such as Studio). Students receive feedback via the CMS gradebook within 2 weeks. Grading criteria and procedures will be informed by concern for diversity, equity, ability, fairness, and unintentional disadvantaging of underrepresented groups.

Method

Papers

Integration

Formal laboratory papers describing selected laboratory investigations, such as comparative anatomy of animals, will be written in standard scientific format, the proper application of the scientific method, analysis of data, and presentation of results in scientific format. A detailed rubric and instructions will be provided through the CMS or on paper. These assignments will be graded based on proper application of scientific principles and student's ability to draw valid conclusions from data. Papers are also graded on grammar, to be formatted in a concise and direct language typically found in scientific writing and exercises standard English for punctuation, syntax, spelling, etc. Students receive feedback within 2 weeks. Grading criteria and procedures will be informed by concern for diversity, equity, ability, fairness, and unintentional disadvantaging of underrepresented groups.

DE Adaptations for MOE

A detailed rubric and instructions will be provided through the CMS. Written assignments will be submitted through the CMS via document upload, using the assignment tool in the CMS. Students receive feedback via the CMS gradebook within 2 weeks. Grading criteria and procedures will be informed by concern for diversity, equity, ability, fairness, and unintentional disadvantaging of underrepresented groups.

Evaluation of Honors assignments

Students must successfully complete regular section requirements and honors supplemental assignments to receive honors credit.

Written work, including project write-ups and short response papers or reports (from supplemental readings/viewings, field trips, or other honors activities) will be assessed according to the number, type, and quality of references cited, successful synthesize information from a variety of sources to produce a coherent argument or analysis, the accuracy of content, the insight and originality of the work, and whether directions for style and format were adequately followed.

Oral presentations will be assessed for clarity, accuracy of content, organization, quality and effectiveness of visual elements, and appropriate pace, timing, and audience engagement. In addition, the outline and sources will be evaluated on the completeness of the summary and the quality and type of citations.

The service learning project will be evaluated on the completion of the agreed upon volunteer hours or services. The written report will be evaluated on the depth of reflection, the successful integration of academic sources and personal experience, the number and types of references cited, depth of analysis, the organization, grammar, syntax, style of writing.

Multimedia or similar project work products will be assessed on clarity of argument and presentation, supporting evidence, the number and types of references cited, depth of analysis, accuracy of content, writing or visual style.

Assignments

Assignment Type

Other

In-class and/or outside of class

In-class

Formative or Summative

Formative

Assignment

Generate questions, create hypotheses, and design experimental tests of the impact of light, temperature, pH and salinity on seed germination, bacterial, or fungus growth. Basic supplies will be given along with instructions on their use. Work in groups to develop testable questions and hypotheses, and to create an experimental protocol to test hypotheses. Consider appropriate measurable outcomes. Create a formal lab report presenting their hypotheses, experimental designs, materials used, results, analysis and conclusions in a standard laboratory report format.

Submit work on paper or through the CMS.

How assignment will be adapted in online format

Using accessible CMS tools such as video conferencing platforms, discussion boards, or other accessible software to collaborate synchronously or asynchronously on the design of the experiment and the composition of the final report. Use available at-home materials, lab kits, accessible online simulations, or data provided by the instructor on the CMS.

Submit work through the CMS.

Assignment Type

Reading

In-class and/or outside of class

In-class

Formative or Summative

Formative

Assignment

Read and take notes on the Scientific American article "In a First, Tiny Crustaceans Are Found to 'Pollinate' Seaweed like Bees of the Sea" during a 25 minute period in class. Discuss this article in a Think/Pair/Share fashion, with 10 minutes to think and 10 minutes to share with a classmate. You or your partner in the pair will then share conclusions with the class. Consider how this discovery relates to the ecology of communities, evaluate how this is phenomenon exemplifies certain types of species interactions, and compare the phenomenon with the evolution of pollination in land plants.

Submit written responses to the question prompts as a group on paper or through the CMS.

How assignment will be adapted in online format

The article will be provided on the CMS. The Think/Pair/Share will take place through the CMS synchronously using accessible video conferencing software, or asynchronously using the CMS discussion or peer review tools.

Turn in written responses to prompts as a group in the CMS.

Assignment Type

Writing

In-class and/or outside of class

Outside of class

Formative or Summative
Summative

Assignment
Use a descriptive scientific writing style to describe the functions of the rod and cone cells of the vertebrate eye. Provide detail on the anatomy of the eye, signal transduction pathways, the step-by-step physiological processes that allow vision (including the molecules and properties of the photoreceptors), and the conditions under which each type of photoreceptor cell is used. The paper should consist of at least two paragraphs, demonstrate a proper understanding of the scientific principles, and be written in scientific format. A detailed rubric and instructions will be provided on paper or through the CMS.

Submit work on paper or through the CMS. The assignment will be graded on grammar, syntax, and scientific writing style.

How assignment will be adapted in online format
The assignment will be provided on the CMS including the detailed rubric and the requirements for the paper.

Submit work through the CMS.

Assignment Type
Reading

In-class and/or outside of class
In-class
Outside of class

Formative or Summative
Formative

Assignment
Read the article "Racial Biology and Medical Misconceptions" by Andrea Deyrup, and Joseph L. Graves, Jr. before coming to class. The article will be provided on the CMS or in paper form in a previous class.

In class, perform a "quick-write" using an evidence chart format. Tabulate the Evidence (what was seen, heard, or read in the text), the Interpretation (what was wondered/thought about/made a connection on). Ten minutes will be given to complete the quick-write. Then in a full class discussion led by the instructor discuss the ethical and social justice consideration related to unequal access to medical care based on race, ethnicity or other identities. The goal is to demonstrate an understanding and interpretation of the contents of the article and to engage in bringing awareness to biases and equity in allocation of biology and medical goods and services, with regards to race, ethnicity, or other identities.

Submit work such as the quick-write on paper or on the CMS.

A more formal two-page analysis will be done outside of class after the in-class discussion and submitted on paper or on the CMS.

How assignment will be adapted in online format
The article will be provided on the CMS. The quick-write and discussion will be held synchronously on the CMS using an accessible video conferencing platform or asynchronously using various CMS functions.

Submit work in a formal two-page analysis on the CMS.

Assignment Type
Other

In-class and/or outside of class
In-class

Formative or Summative
Summative

Assignment

Take a short quizzes at the beginning of each class that reviews content discussed in the previous class. Each quiz will consist of 2-5 questions and will be administered at the beginning of class. Ten minutes will be allotted to the quiz, which will be taken on paper or using a device to access a digital poll or a digital version of the quiz on the CMS in-class.

The instructor will briefly go over the quiz with the whole class after students complete the quiz.

How assignment will be adapted in online format

The quiz will be provided on the CMS and set to be available only at the appropriate time. If the course is synchronous, the quiz can be presented during a real time class. If the class is asynchronous, the quiz can be presented on the CMS with appropriate availability and time limits.

Honors Assignments

Assignment

Honors students will complete all the regular course requirements and will be graded first according to the requirements and standards used for the regular section. In order to receive honors credit, students will also complete the following honors assignments, 1, 2, and 3:

1. A supplemental reading beyond the readings required for the regular section. An appropriate book or set of articles will be chosen collaboratively by the honors students and the instructor. The reading(s) will be discussed in honors section meetings or used as a basis for written or oral summaries and responses. Examples of books in include The Sixth Extinction: An Unnatural History by Elizabeth Kolbert, Evolution's Captain: The Tragic Fate of Robert FitzRoy, the Man Who Sailed Charles Darwin Around the World by Peter Nichols, and Gulp: Adventures on the Alimentary Canal by Mary Roach.

Required or Optional

Required

Honors Core Values

Engagement

Justify how the assignment reflects the Engagement Core Value

The supplemental reading will be focus on a current topic or a topic of current interest to the honors students. This supplemental reading will be discussed by the honors section. This allows engagement with a topic in biology and engagement with peers and faculty in discussing the issues and implications of the text.

Assignment

2. A 10-15 minute presentation of their main honors project to the honors section or the entire regular section class, at the discretion of the instructor. The presentation will include a summary of research and results, a discussion of the significance of the findings, and a personal reflection on the project. The presentation will be accompanied by a visual presentation, such as slides or a poster.

Required or Optional

Required

Honors Core Values

Academic Rigor and Research
Engagement
Leadership

Justify how the assignment reflects the Academic Rigor and Research Core Value

A presentation provides students the opportunity to distill their work into a concise, clear presentation and to produce easily interpretable graphs, tables and other visual aids.

Justify how the assignment reflects the Engagement Core Value

The presentation provides an opportunity for students to engage with other students and the instructors. The presentation may be given in other venues outside the class as well, allowing students to engage with a greater community of scholars or people.

Justify how the assignment reflects the Leadership Core Value

Giving a presentation requires students to lead the class through a complex topic and to answer questions.

Assignment

3. Honors students will meet regularly with the instructor, either individually or as an honors group to collaborate on the project and to receive instruction on the relevant biology, methods, and techniques. These meetings are in addition to the regular honors section meetings.

Required or Optional

Required

Honors Core Values

Academic Rigor and Research
Engagement

Justify how the assignment reflects the Academic Rigor and Research Core Value

These meetings will challenge students to develop appropriate scientific reasoning and methods.

Justify how the assignment reflects the Engagement Core Value

Interaction with the instructor (and other honors students if there are any) is a key component of an honors section for engagement with academic standards, expertise, as well as promoting collegiality.

Assignment

In addition, honors students will complete either assignment 4 or 5.

4. A research project consisting of an original contribution to the field. The project will involve choosing a topic in collaboration with the instructor; consulting the literature to find previous research relevant to the topic; formulating questions that are feasible to answer; creating a proposal for research; designing a set of systematic observations or experiments to address the questions using rigorous scientific principles; conducting the research; producing a summary and discussion of the research and a reflection of the research experience. The format of the work product will be determined in collaboration with the instructor and may consist of:
A. A 9-12 page write-up in standard scientific paper format (Introduction, Materials and
Methods, Results, Discussion) double-spaced with typical margins and fonts
B. A short film or digital story
C. An academic poster
D. Other, as determined in collaboration with the instructor

Students will submit a 250-word abstract of their work.

Background research may be conducted in a university library or the equivalent and should be based on primary and secondary sources from the scientific literature, including journals, correspondence, and academic books. A minimum of five scholarly sources must be cited in the project. The instructor may organize student peer reviews of their research proposals, and outlines, or rough drafts of their projects. Examples of topics include:
A. A comparative study of seed germination under varying environmental conditions
B. A study of exercise efficiency during running or weight-lifting under various conditions
C. A floristic analysis or comparison of one or more natural areas
D. A survey of water quality or biodiversity above and below a disturbed area in a local water course
E. A content analysis of high school biology texts to categorize and critique their presentation of a controversial topics such as the genetics of racial differences, evolution, or global warming

Students will be encouraged to apply to present their work at the UC Irvine Community College Conference.

Required or Optional

Required

Honors Core Values

Academic Rigor and Research

Engagement

Justify how the assignment reflects the Academic Rigor and Research Core Value

Proposing, designing, conducting, analyzing, and presenting an independent original research project promotes academic rigor and encourages students to improve their scientific thinking.

Justify how the assignment reflects the Engagement Core Value

The project provides an opportunity for students to engage with a number of groups of people from the public to classmates to the faculty to outside experts.

Assignment

5. A service learning project designed in consultation with the instructor. Service learning can be differentiated from other volunteer experiences by its focus on the integration of academic learning and providing a service to one's community. Students will volunteer at a local life science institution, museum, nature preserve, national park, laboratory, hospital, or similar location for a total of 10 hours over the course of the semester and enrich their volunteer experience by reading three articles related to the biology relevant to the site of service, museology, the politics of the visual representation of science, scientific practice, hospital care, or similar topics. Students will submit a four to seven-page paper that connects their volunteer experience to themes addressed in the course and assigned readings along with a log of their hours signed by an employee of the institution where they are volunteering. The paper should include a academic background or context for the focus of the experience (e.g., museology, informal nature eduction), a summary of activities undertaken during the experience, and a personal reflection on the experience. The paper will include at least 5 academic sources. Students may wish to share the content of their paper with the institution where they volunteered in the form of a lecture, presentation, or suggested action plan that the instructor and other honors students in the course are invited to attend.

Required or Optional

Required

Honors Core Values

Engagement
Holistic Well-being
Leadership

Justify how the assignment reflects the Engagement Core Value

A service learning project will engage students beyond the honors program and the college community. Students will engage with an institution or agency and in many cases the science-consuming public.

Justify how the assignment reflects the Holistic Well-Being Core Value

A service learning project focusing on an area of passionate and personal significance for a student can contribute to holistic well-being and further career or personal ambitions.

Justify how the assignment reflects the Leadership Core Value

The student will take an active role in creating their experience and then bringing their experience back to the class.

Course Materials

Textbooks

Urry, L., A., Cain, M., L., Wasserman, S., A., Minorsky, P., V., Orr, R. (2021). Campbell Biology, 12th Edition Pearson. ISBN: 9780135188743

Raven P., Johnson G., Mason K., Losos J., Duncan T. (2023). Biology McGraw-Hill. ISBN: 9781264097852

Other Resources

MSJC Biological Sciences Department. BIOL-150 Lab Manual 7th Edition. Mt. San Jacinto College , 08-01-2022.

Open Educational Resources

Biology 2e by OpenStax https://openstax.org/details/books/biology-2e
LibreTexts Biology Bookshelves https://bio.libretexts.org/Bookshelves

Class Size Information

Class Size

32

Class Size Category

G - Large lab 32

Diversity and Inclusion

Explain how diversity and inclusion(e.g., gender, culture/race, sexuality, etc.) is infused into the course.

The course content of BIOL-151 addresses topics fundamental to understanding the scientific basis of social concerns associated with DEI, and thus provides a critical foundation of science on which discussions of DEI can build. Relevant topics include biological evolution, especially the origin and evolutionary history of humans, the origin of human phenotypic variation, variation in human physiology leading to variable disease prevalence and vulnerability, the origin and impact of agriculture on humanity, the biological basis of human capacities such as intelligence, human interactions with biodiversity, competing values related to conservation of threatened or endangered species, human impacts on the biosphere, the increase in existential threats to humanity from global climate change and unsustainable resource consumption, and the history and sociology of science as including important contributions from under-appreciated and represented groups such as people of color and women.

The course has been revised to include explicit mention of diversity and inclusion concerns in the lecture content and in assignments. The honors sections includes extensive opportunities to include topics related to DEI in science.

Describe how assignments, instruction, evaluation, course content, and interactions are contextualized for diverse learners promoting an equitable course.

To support diverse learners, we have revised the course along three fronts. We have incorporated increased reflection on the process of learning to support students who may be new to academia, especially those from under-represented groups. We have made adjustments to the course to explicitly highlight contributions to biology, both historical and current, from people other than the European white males typically presented in textbooks so as to inspire students from groups that historically have not felt welcome in science courses to see science as diverse and inclusive. We have adjusted the methods of instruction and evaluation to include a diversity of modes beyond lectures and exams to encourage greater engagement, community, and support for students, and we have provided OER resources for students with financial hardship.

The lecture and lab content, objectives, MOIs and MOEs, and assignments allow students to interact with their instructor and each other, to build critical thinking skills in a community of practice, to learn and practice skills, both in and out of class, to receive feedback both informally in discussions and labs and formally through formative and summative assessments submitted in the CMS.

Interactions

Explain how the course will incorporate student-to-student interaction.

Students will engage in a variety of collaborative activities such as in-class whole class and small group discussions, labs performed in small groups, and presentations. Since our student body is diverse, students will interact with people of divergent political, social, ethnic, and socioeconomic status.

Explain how the course will incorporate instructor-to-student interaction.

The instructor will lead lectures, discussion, and labs during class time and will provide feedback and grades directly to students both in class and on the CMS.

Explain how the course will incorporate student-to-content interaction.

The course content is presented in lectures, the textbook, and third party (including OER) resources. Students will have opportunities for diverse perspectives on the range of topics in this course. Students will be challenged to go beyond comprehension to think critically about biology and to ask pertinent questions. All course materials will be ADA compliant and free or as low cost as possible. A majority of learning resources will be presented on the CMS.

Course activities include a number of possible assignments beyond procedural labs and lecture note-taking. Many of these are interactive. Assessments include a number of possibilities beyond exams, including papers, discussions, projects, and presentations.

Explain how the course will incorporate student-to-self interaction (metacognitive).

The course emphasizes critical thinking and provides opportunities for students to reflect not only on what they are learning but on the learning experience itself. Students will develop their own unique learning methods and have the opportunity to engage in discussions, collaborative lecture and lab activities, and reflective writing.

The course challenges students to grapple with their own relationship to basic biological science and how biological literacy is crucial to effective citizenship and to addressing current societal, community, and personal concerns.

Key: 485