BIOL R155: PRINCIPLES OF BOTANY

Originator
mnicholson

College
Oxnard College

Discipline (CB01A)
BIOL - Biology

Course Number (CB01B)
R155

Course Title (CB02)
Principles of Botany

Banner/Short Title
Principles of Botany

Credit Type
Credit

Start Term
Fall 2021

Catalog Course Description
This course is intended for biology majors and covers comparative diversity, structure, and function of plants. Topics include development, morphology and physiology, taxonomy and systematics. Principles of population and community ecology and ecosystem interactions are emphasized.

Taxonomy of Programs (TOP) Code (CB03)
0402.00 - Botany, General

Course Credit Status (CB04)
D (Credit - Degree Applicable)

Course Transfer Status (CB05) (select one only)
A (Transferable to both UC and CSU)

Course Basic Skills Status (CB08)
N - The Course is Not a Basic Skills Course

SAM Priority Code (CB09)
E - Non-Occupational

Course Cooperative Work Experience Education Status (CB10)
N - Is Not Part of a Cooperative Work Experience Education Program

Course Classification Status (CB11)
Y - Credit Course

Educational Assistance Class Instruction (Approved Special Class) (CB13)
N - The Course is Not an Approved Special Class

Course Prior to Transfer Level (CB21)
Y - Not Applicable

Course Noncredit Category (CB22)
Y - Credit Course

Funding Agency Category (CB23)
Y - Not Applicable (Funding Not Used)

Course Program Status (CB24)
1 - Program Applicable

General Education Status (CB25)
Y - Not Applicable

Support Course Status (CB26)
N - Course is not a support course

Field trips
May be required

Faculty notes on field trips; include possible destinations or other pertinent information
Possible field trip destinations include local parks, beaches, natural areas, botanical gardens, harbors, islands, natural history museums, and aquaria.

Grading method
Letter Graded

Does this course require an instructional materials fee?
No

Repeatable for Credit
No

Is this course part of a family?
No

Units and Hours

Carnegie Unit Override
No

In-Class

Lecture
Minimum Contact/In-Class Lecture Hours
52.5
Maximum Contact/In-Class Lecture Hours
52.5

Activity

Laboratory

Total in-Class

Total in-Class
Total Minimum Contact/In-Class Hours
52.5
Total Maximum Contact/In-Class Hours
52.5

Outside-of-Class

Internship/Cooperative Work Experience

Paid

Unpaid

Total Outside-of-Class

Total Outside-of-Class
Minimum Outside-of-Class Hours
105
Maximum Outside-of-Class Hours
105

Total Student Learning

Total Student Learning
Total Minimum Student Learning Hours
157.5
Total Maximum Student Learning Hours
157.5

Minimum Units (CB07)
3
Maximum Units (CB06)
3

Prerequisites
BIOL R101 or BIOL R120 and MATH R005 or MATH R015

Entrance Skills

Entrance Skills
Understand and be able to apply the scientific method and be familiar with cellular structures, metabolism, and reproduction.

Prerequisite Course Objectives
BIOL R101-Describe the scientific method of inquiry as it relates to biological organisms.
BIOL R101-Describe the structure and function of cells and common organelles and their relationship to tissues, organs, and organ systems.
BIOL R101-Explain energy flow through the biological world with reference to photosynthesis, cellular respiration, and ecological cycles.

Entrance Skills
Understand and be able to apply the scientific method and be familiar with cellular structures, metabolism, and reproduction.

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

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Entrance Skills
Convert and graph mathematical data.

Prerequisite Course Objectives
MATH R005-Solve linear equations.
MATH R005-Solve linear inequalities and graph solutions on a number line.
MATH R005-Graph linear equations by plotting points and using intercepts.
MATH R005-Simplify rational expressions and solve rational equations.
MATH R005-Graph systems of inequalities in two (2) variables.
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

Convert and graph mathematical data.

Prerequisite Course Objectives

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

Requisite Justification

Requisite Type

Prerequisite

Requisite

BIOL R101

Requisite Description

Course 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

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

Student Learning Outcomes (CSLOs)

	Upon satisfactory completion of the course, students will be able to:
1	Classify plants, fungi, and photosynthetic protists based on their main identifying characteristics.
2	Diagram alternation of generations of flowering and non-flowering plants.
3	Discuss plant adaptations that are specific for different physical environments.

Course Objectives

	Upon satisfactory completion of the course, students will be able to:
1	Demonstrate an understanding of characteristics of plants, fungi, and photosynthetic protistans, and their phylogenetic relationships.
2	Recognize, interpret, and be able to construct phylogenies.
3	Describe and contrast life cycles within and among major plant, fungal, and photosynthetic protistan taxa.
4	Describe the structural organization of major plant, fungal, and photosynthetic protistan taxa.
5	Identify and describe plant structures and relate them to their functions, including transpiration, photosynthetic pathways, and energy and nutrient acquisition.
6	Describe how organisms are organized into and interact within and among populations and communities
7	Describe the processes that occur within ecosystems including flow of energy, and the role of nutrient cycling in maintaining ecosystem integrity.
8	Describe evidence for evolution in plants and photosynthetic protistans.
9	Acquire, use and cite scientific literature for scientific writing.
10	Demonstrate critical thinking and scientific reasoning skills.

Course Content

Lecture/Course Content

1. Overview of the tree of life, and position of plant, fungal, and photosynthetic protistan taxa
2. Plant systems structure: anatomy (cell, tissue, organ)
3. Plant systems functions: physiology (including C3, C4 and CAM photosynthesis)
4. Plant development, hormones, regulation, reproduction and life cycles
5. Systematics and Taxonomy: classification schemes and plant speciation
6. Phylogeny/Evolutionary History of plant, fungal and photosynthetic protistan taxa
7. Introduction to Ecosystems, Population and Community Ecology
    a. Population Ecology
        i. Population structure, growth, regulation, and fluctuation
        ii. Intraspecific interactions
    b. Community Ecology
        i. Interspecific interactions: Predator-prey relations, competition, symbiosis
        ii. Community structure and succession
        iii. Ecosystem diversity (Biomes)
    c. Ecosystems ecology
        i. Trophic structure
        ii. Energy flow
        iii. Nutrient cycling and ecosystem integrity
    d. Conservation and human interactions

Laboratory or Activity Content
No laboratory or activity content.

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):

Essay exams
Essays
Group projects
Individual projects
Objective exams
Oral presentations
Problem-solving exams
Quizzes
Reports/papers
Research papers
Simulations

Instructional Methodology

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

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

Describe specific examples of the methods the instructor will use:

1. The instructor will present relevant explanations of botanical subjects and phenomena (e.g., photosynthesis, plant growth and development, etc.) using a variety of media, including video and computer.
2. The instructor will guide student interactions activities (e.g., discussions, computer simulations, games, etc.) to explore botanical processes, research and interpret botanical data, and solve problems of botanical relevance.
3. Demonstrations with easily-handled, minimum-prep, plant biology subjects; will provide students with a hands-on opportunity in the lecture section of the course. Demonstrations may include the use of models or live material.

Representative Course Assignments

Writing Assignments

1. Students will demonstrate knowledge and comprehension of plant biological logical processes and phenomena in written and illustrated answers to question prompts in homework assignments and on quizzes and exams.
2. Students will summarize published reports on plant biological subjects relevant to current course material.

Critical Thinking Assignments

1. Students will demonstrate their ability to analyze and evaluate complex plant biological subject matter (e.g., disease resistance, development of certain crop cultivars, a medicine derived from a plant) with at least one presentation that summarizes information from several published primary sources and synthesizes a cohesive explanation of the subject (e.g., a term paper).

Reading Assignments

1. Students will be assigned regular readings from the required text for the course and from specific scientific articles identified by the instructor.

2. Students will be required become familiar with primary sources published in professional journals and will be tasked with finding and evaluating recently published articles.

Other assignments (if applicable)

1. Students will engage in online computer-based simulations and exercises relevant to the plant biological processes and subjects in the course.
2. For purposes of preparation for a short oral/visual presentation related (or not) to the semester assignment, students may opt to develop slide or video shows, posters, or other multi-media devices.

Outside Assignments

Representative Outside Assignments

1. Students will prepare written essays and a term paper to summarize and describe plant biological processes and phenomena.
2. Students will sketch and/or diagram representative plant biological processes to summarize individual processes (e.g., photosynthesis, shikimate pathway, fermentation) and to combine separate processes in a meaningful and instructive way (e.g., overview of production of a chemical or a pigment).
3. Students will be assigned regular readings from the required text for the course and from specific scientific articles identified by the instructor.
4. Students will be required become familiar with primary sources published in professional journals and will be tasked with finding and evaluating recently published articles.
5. Students will engage in online computer-based simulations and exercises relevant to the plant biological processes and subjects in the course.
6. Students will regularly read the text materials as assigned for the different plant biological subjects in the course.
7. Students will research recent primary resources (published papers) for information relevant to the different biological subjects in the course and for information supporting a presentation on a specific plant biological subject.
8. Students will engage with computer-based simulations and tutorials to reinforce and expand understanding of plant biological subject material being discussed in class.
9. Students will be required to complete or solve various kinds of plant biological written problems (e.g., plant breeding problems).

Articulation

C-ID Descriptor Number
BIOL 155

Status
Approved

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

Course is CSU transferable
Yes

CSU Baccalaureate List effective term:
Fall 2015

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:

UC TCA

UC TCA
Approved

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

Description
James Bidlack & Shelley Jansky. (2021). *Stern's Introductory Plant Biology* (15th edition). McGraw-Hill. New York, NY. ISBN 978-1-260-57104-2

Resource Type
Other Instructional Materials

Description
Paul Young & Jacquelyn Giuffre. (1982). The Botany Coloring Book. HarperCollins. New York, NY. ISBN 978-0-064-60302-7

Library Resources

Assignments requiring library resources

Assignments focusing on published primary sources and research articles.

Sufficient Library Resources exist

Yes

Example of Assignments Requiring Library Resources

Term paper on a plant biological subject such as an overview of the economic or ecological importance of a particular plant.

Distance Education Addendum

Definitions

Distance Education Modalities

Hybrid (51%–99% online)
Hybrid (1%–50% online)
100% online

Faculty Certifications

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

Yes

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

Yes

Regular Effective/Substantive Contact

Hybrid (1%–50% online) Modality:

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

Hybrid (51%–99% online) Modality:

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

100% online Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Discussions focusing on a subject for which students will make an original post and then thoughtfully respond to other student postings; may also allow instructor and students to address miscellaneous questions and related subjects.
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Examinations

Hybrid (1%–50% online) Modality
Online
On campus

Hybrid (51%–99% online) Modality
Online
On campus

Primary Minimum Qualification
BIOLOGICAL SCIENCES

Review and Approval Dates

Department Chair
09/16/2020

Dean
09/16/2020

Technical Review
10/14/2020

Curriculum Committee
10/14/2020

DTRW-I
MM/DD/YYYY

Curriculum Committee
12/09/2020

Board
MM/DD/YYYY

CCCCO
MM/DD/YYYY

Control Number
CCC000563010

DOE/accreditation approval date
MM/DD/YYYY