AGRI 20 Course Outline as of Fall 2024

CATALOG INFORMATION

Dept and Nbr: AGRI 20 Title: INTRO TO PLANT SCIENCE
Full Title: Introduction to Plant Science
Last Reviewed: 4/11/2022

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	4.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	4.00	Lab Scheduled	3.00	17.5	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	6.00		Contact Total	105.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00 Total Student Learning Hours: 210.00

Title 5 Category:	AA Degree Applicable
Grading:	Grade or P/NP
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	AG 51

Catalog Description:
In this introductory plant science course, students will explore the structure, physiology, tissue and organ systems, growth, propagation, metabolic processes, plant hormones, mineral nutrition, biological competitors, mendelian genetics, crop improvement techniques, post-harvest practices as they relate to production of food, fiber, and ornamental plants. In addition, students will be exposed to basic laboratory techniques including microscopy and sterile techniques. Laboratory required.

Prerequisites/Corequisites:

Recommended Preparation:
Eligibility for ENGL 1A or equivalent

Limits on Enrollment:

Schedule of Classes Information:
Description: In this introductory plant science course, students will explore the structure, physiology, tissue and organ systems, growth, propagation, metabolic processes, plant hormones, mineral nutrition, biological competitors, mendelian genetics, crop improvement

techniques, post-harvest practices as they relate to production of food, fiber, and ornamental plants. In addition, students will be exposed to basic laboratory techniques including microscopy and sterile techniques. Laboratory required. (Grade or P/NP)
Prerequisites/Corequisites:
Recommended: Eligibility for ENGL 1A or equivalent
Limits on Enrollment:
Transfer Credit: CSU;UC.
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**		Effective:	Inactive:
	C	Natural Sciences	Fall 2025	
	L5	Physical and Biological Sciences		
	C	Natural Sciences	Fall 1981	Fall 2025
CSU GE:	**Transfer Area**		Effective:	Inactive:
	B2	Life Science	Fall 1981	
	B3	Laboratory Activity		
IGETC:	**Transfer Area**		Effective:	Inactive:
	5B	Biological Sciences	Fall 2019	
	5C	Fulfills Lab Requirement		

CSU Transfer:	Transferable	Effective:	Fall 1981	Inactive:
UC Transfer:	Transferable	Effective:	Fall 1981	Inactive:

CID:
CID Descriptor: AG - PS 106L Introduction to Plant Science (with Laboratory)
SRJC Equivalent Course(s): AGRI20

Certificate/Major Applicable:
Both Certificate and Major Applicable

COURSE CONTENT

Student Learning Outcomes:
At the conclusion of this course, the student should be able to:
1. Discuss different methods of plant reproduction and propagation.
2. Describe the structure and functions of plant organs.
3. Explain the relationship between plant physiology, genetics and crop yield.
4. Describe the relationships between plants, soils, and climates.
5. Analyze and compare plants, growing conditions, and types of crop production.

Objectives:
At the conclusion of this course, the student should be able to:
1. Categorize the roles of higher plants in the living world.
2. Describe the structural components of higher plants.
3. Explain the standard plant propagation methods.
4. Describe sexual and asexual reproduction in higher plants.
5. Explain photosynthesis, respiration, and translocation in higher plants.

6. Describe the physical and chemical properties of soils.
7. Hypothesize solutions for soil erosion problems.
8. Describe the climatic influences on plant growth and development.
9. Categorize the biological competitors of higher plants.
10. Discuss the basic principles of Mendelian Genetics.
11. Identify the parts of plant tissue and organ system and discuss their associated functions.
12. Explain different methods for enhancing plant growth.
13. Demonstrate effective use of a compound light microscope.
14. Discuss the basic steps in micropropagation (Tissue Culture).
15. Describe the scientific method and explain its application in solving problems in plant and soil science.

Topics and Scope:

I. The Role of Higher Plants in the Living World
- A. Fossil fuels
- B. Food chains
- C. Industrial products
- D. Lower forms of plant life

II. Structure of Higher Plants
- A. The life cycle of a plant
- B. The cell
- C. Cell structure
- D. The plant body

III. Plant Organ System
- A. Leaves
  1. Functions and structure (internal & external)
  2. Leaf arrangements
  3. Specialized leaves
- B. Stems
  1. Functions and structure (internal & external)
  2. Specialized stems
- C. Stems
  1. Functions and structure (internal & external)
  2. Specialized roots
- D. Flowers
  1. Functions and structure (internal & external)
  2. Flower arrangements and classifications
- E. Fruits and Seeds
  1. Type of fruits and seeds
  2. Fruit and seed classification

IV. Naming and Classifying Plants
- A. Climate
- B. Botanical names
- C. Botanical classifications
- D. Plant taxonomy

V. Origin, Domestication, and Improvement of Cultivated Plants
- A. Origin of cultivated plants
- B. Domestication of plants
- C. Crop plants
- D. Germplasm
- E. Genetic concepts in plant improvement

- F. Mendelian genetics and crop improvement
- G. Principles of plant breeding

VI. Propagation of Plants
- A. Propagation methods
- B. Sexual propagation
- C. Vegetative propagation
- D. Micropropagation (Tissue Culture)

VII. Vegetative and Reproductive Growth and Development
- A. Vegetative growth and development
- B. Reproductive growth and development
- C. Plant growth regulators

VIII. Photosynthesis, Respiration, and Translocation
- A. Photosynthesis
- B. Plant respiration
- C. Electron transport system
- D. Assimilation

IX. Soil and Soil Water
- A. Factors involved in soil formation
- B. Physical properties of soil
- C. Chemical properties of soil
- D. Soil organisms
- E. Soil organic matter
- F. Soil water
- G. Water quality

X. Soil and Water Management and Mineral Nutrition
- A. Land preparation
- B. Irrigation
- C. Mineral nutrition and nutrient deficiencies
- D. Soil conservation

XI. Climatic Influences on Crop Production
- A. Climatic factors affecting plant growth
- B. Climatic requirements of some crop plants
- C. Weather and climate
- D. Climatic influences on plant diseases and pests

XII. Crop Improvement and Environmental Conditions
- A. Carbondioxide enrichment and crop enhancement
- B. Supplemental lighting and crop yield
- C. Light quality and quantity
- D. Temperature, humidity, and plant growth
- E. Measuring supplemental light and humidity

XIII. Harvest and Post-Harvest Practices
- A. Major crops grown in region
- B. Harvest practices
- C. Post-harvest practices

XIV. Biological Competitors of Useful Plants
- A. Weeds
- B. Plant diseases
- C. Plant pests
- D. Nematodes
- E. Rodents
- F. Pesticide impacts on the environment

XV. Microscopy

A. Uses of a compound and dissecting microscope
B. Parts of a compound light microscope and a dissecting microscope
C. Techniques for the effective use of a compound light microscope and a dissecting microscope

XVI. The Scientific Method
A. Developing a hypothesis
B. Scientific design
C. Application to plant/soil problems

All topics listed above are covered in both the Lecture and Lab portions of the course.

Assignment:

Lecture-related Assignments:
1. Weekly reading (20-30 pages)
2. Weekly textbook homework (1-2 pages)
3. Crop report on the history, cultivation, harvesting, processing and uses of selected a crop (6-8 pages)
4. Quizzes (4-6)
5. Midterms (1-2)
6. Final exam

Lab-related Assignments:
1. Lab quizzes (4-6)
2. Weekly lab reports (1-3 pages each)
3. Invasive weed collection, pressing and mounting project (10-15 plants)

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Lab reports, crop report, textbook homework	Writing 25 - 35%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Lab quizzes and invasive weed collection project	Problem solving 15 - 25%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None	Skill Demonstrations 0 - 0%

Exams: All forms of formal testing, other than skill performance exams.

Quizzes, midterms and final exam	Exams 45 - 55%

Other: Includes any assessment tools that do not logically fit into the above categories.

None	Other Category 0 - 0%

Representative Textbooks and Materials:
Botany: An Introduction to Plant Biology (7th). Mauseth, James D.. Jones & Bartlett Learning: 2019
Stern's Introductory Plant Biology (14th). Bidlack, James and Jansky, Shelley. McGraw-Hill Education: 2017 (classic)
Plant Science: Growth, Development, and Utilization of Cultivated Plants (6th). McMahon, Margaret and Kofranek, Anton and Rubatzky, Vincent. Prentice Hall: 2019
Instructor-prepared lab manual