

ARIZONA WESTERN COLLEGE SYLLABUS

PLS 100 PLANT SCIENCE

Credit Hours: 4 Lec 3 Lab 3

COURSE DESCRIPTION

Provides information on the importance of plant science in agriculture. Also provides basic information on the study of germination, emergence, growth, and reproduction of important economic species; and how these plant processes are influenced by the environment, such as soil-water-plant relations.

1. COURSE GOALS

- 1.1 Describe the history of botany and the system/organization of plant classification especially angiosperms.
- 1.2 Draw the organs of a plant, integrate them into the plant body, and define their function.
- 1.3 Identify and define the function of meristems, plant cell types and their organelles, and structures associated with seedlings.
- 1.4 Define and describe roots and shoots.
- 1.5 Describe the function, forms, shapes, and modifications of leaves.
- 1.6 Explain the 5 primary functions of plants including: photosynthesis, respiration, translocation, absorption, and transpiration.
- 1.7 Describe the complexities and functions of the flower including pollination, double fertilization, embryo development and its genetic inheritance.
- 1.8 Explain the morphology of a fruit including its method of seed dispersal.
- 1.9 Describe the survival strategies of various agricultural and native plants.

2. OUTCOMES

Upon satisfactory completion of this course, students will be able to:

- 2.1 describe the history of botany and the system/organization of plant classification especially angiosperms.
 - 2.1.1 discuss the following people and place/relationship in the history of plants: Theoprastus, Carolus Linnaeus, Darwin, Mendel.
 - 2.1.2 define annuals, biennials, and perennials.
 - 2.1.3 describe and define the 8 major units of plant classification.
 - 2.1.4 define and give examples within the 4 major divisions of the plant kingdom.
 - 2.1.5 identify and define Gymnosperms and Angiosperms.
 - 2.1.6 identify and define Monocots and Dicots.
 - 2.1.7 differentiate between algae, fungi, mosses/ liverworts, ferns, gymnosperms and angiosperms.
- 2.2 draw the organs of a plant, integrate them into the plant body, and define their function.
 - 2.2.1 define photosynthesis and describe how a plant gets energy.
 - 2.2.2 explain the role of chlorophyll and chloroplasts.
 - 2.2.3 summarize how a plant gets carbon dioxide. Explain the role of stomata.
 - 2.2.4 describe water uptake.
 - 2.2.5 name the four variables that determine the amount of water a plant needs.
 - 2.2.6 describe what happens to the sugar a plant produces.
 - 2.2.7 define and describe plant mineral uptake and transport.
- 2.3 identify and define the function of meristems, plant cell types and their organelles, and structures associated with seedlings.
 - 2.3.1 identify location and function meristems including apical meristem, vascular cambium, vascular bundles, and cork cambium.

- 2.3.2 identify and define the following subcellular components including: protoplasm, cytoplasm, organelles, vacuole, cell wall, pectin, and cellulose.
- 2.3.3 define a seed--including life spans.
- 2.3.4 define viable and dormant--including seed coat scarification and stratification--cotyledons, embryo.
- 2.3.5 define germination--recall 3 environmental conditions necessary.
- 2.3.6 summarize other germination requirements--including allelopathy.
- 2.4 define and describe roots and shoots.
 - 2.4.1 differentiate between fibrous and tap roots.
 - 2.4.2 define drip zone/line and its relevancy in horticulture including watering and transplanting.
 - 2.4.3 list the 5 major functions associated with most plant roots.
 - 2.4.4 define, identify, and describe the functions of the following: apical buds, nodes, internodes, phyllotaxy, herbaceous stems, trees, shrubs, woody twig, bark, lenticels, and leaf scars.
 - 2.4.5 list the 4 major functions associated with plant stems.
 - 2.4.6 define, identify, and describe the functions of the following structures within a stem: tissues, epidermis, cuticle, cortex, pith, vascular bundles, phloem, xylem, and vascular cambium.
 - 2.4.7 differentiate between internal structure of herbaceous plants and woody plants--including definition of wood, cork cambium, sapwood, heartwood, and annual rings.
 - 2.4.8 describe the function of the vascular cambium tissue in grafting including identification of scion and stock wood.
- 2.5 describe the function, forms, shapes, and modifications of leaves.
 - 2.5.1 identify a simple leaf, compound leaves, sessile leaves, and leaflets.
 - 2.5.2 identify 7 different types of leaf margins.
 - 2.5.3 identify 9 different types of leaf shapes.
 - 2.5.4 list 4 primary leaf functions.
 - 2.5.5 list 4 secondary leaf functions.
 - 2.5.6 identify and define the internal parts of a leaf including: epidermis, mesophyll, palisade & spongy cells, cuticle, and stomata.
 - 2.5.7 identify the rachis and stipules of a leaf.
 - 2.5.8 identify 3 types of leaf venation.
 - 2.5.9 differentiate and define spines, tendrils, thorns, and prickles.
- 2.6 explain the 5 primary functions of plants including: photosynthesis, respiration, translocation, absorption, and transpiration.
 - 2.6.1 describe the relationships between photosynthesis and photorespiration.
 - 2.6.2 describe the light dependent and light independent reactions of photosynthesis.
 - 2.6.3 list the differences between light quality and light quantity.
 - 2.6.4 differentiate between the wavelength of light and energy.
 - 2.6.5 define translocation--describe the function of xylem and phloem.
 - 2.6.6 identify the 3 primary areas of sugar distribution.
 - 2.6.7 define transpiration including listing the effects of the following: temperature, humidity, wind, light intensity
- 2.7 describe the complexities and functions of the flower.
 - 2.7.1 define the function of a flower.
 - 2.7.2 identify the essential organs of a flower.
 - 2.7.3 identify the accessory organs of a flower including: perianth, sepals, petals, pedicel, and receptacle.
 - 2.7.4 demonstrate knowledge of the following terminology used in classifying flowers: complete, incomplete, perfect, imperfect, monoecious, dioecious, inferior ovary, and superior ovary.
 - 2.7.5 define pollination and double fertilization.
 - 2.7.6 define solitary vs. inflorescence--indeterminate, determinate.

- 2.7.7 identify and define the following types of inflorescences: spike, raceme, panicle, corymb, umbel, catkin, head, cyme, spathe and spadix.
- 2.8 explain the morphology of a fruit including its method of seed dispersal.
 - 2.8.1 identify the 6 types of fleshy fruit including: pome, drupe, berry, gourd, aggregate, and multiple.
 - 2.8.2 identify the 2 groups of dry fruit: split/non-splitting including the following specific types: legume, follicle, capsule and achene.
 - 2.8.3 differentiate between simple, aggregate, and multiple fruit.
 - 2.8.4 define pericarp.
 - 2.8.5 list the four means of seed dispersal.
- 2.9 the survival strategies of various agricultural and native plants.
 - 2.9.1 define climatic zones.
 - 2.9.2 identify the climatic zones that encompass Arizona.
 - 2.9.3 list the four primary factors that determine a climatic zone.
 - 2.9.4 define photoperiodism.
 - 2.9.5 differentiate between the following: short-day plants, long-day plants, and day-neutral plants.
 - 2.9.6 define and differentiate between the following tropisms: phototropism, geotropism, and thigmotropism.
 - 2.9.7 define and give examples of adventitious roots.
 - 2.9.8 define and give examples of: epiphytes, saprophytes, and parasites.
 - 2.9.9 define and give examples of the following adaptations for water storage: succulents, bulbs, corms, rhizomes, tuber, and tuberous root.

3. AWC GENERAL EDUCATION (GE) CATEGORY & CRITERIA NATURAL SCIENCES

- How to describe, explain, and predict natural phenomena using scientific, logical, and quantitative reasoning and empirical evidence from observation and experimentation
- The use of experimentation and/or observation to study natural phenomena, using the scientific method
- The history of scientific development
- The importance of investigating and understanding how natural phenomena varies by culture and location, including perspectives of indigenous peoples

4. METHODS OF INSTRUCTION

- 4.1 Lectures by the professor or invited speakers
- 4.2 Audio-visual
- 4.2 Laboratory activities
- 4.4 Greenhouse activities
- 4.5 Field Trips
- 4.6 Discussion

5. LEARNING ACTIVITIES

- 5.1 Textbook reading assignments
- 5.2 Participation in class discussions
- 5.3 Lectures, demonstrations, and visual presentations
- 5.4 Written exercises and periodic exams
- 5.5 Laboratory experiments and reports
- 5.6 Field trips and other activities involving the laboratory and/or greenhouse

6. EVALUATION

- 6.1 Written exams and quizzes
- 6.2 Class participation
- 6.3 Written assignments
- 6.4 Laboratory notebook and final

7. STUDENT RESPONSIBILITIES

- 7.1 Under AWC Policy, students are expected to attend every session of class in which they are enrolled.
- 7.2 If a student is unable to attend the course or must drop the course for any reason, it will be the responsibility of the student to withdraw from the course. Students who are not attending as of the 45th day of the course may be withdrawn by the instructor. If the student does not withdraw from the course and fails to complete the requirements of the course, the student will receive a failing grade.
- 7.3 Americans with Disabilities Act Accommodations: Arizona Western College provides academic accommodations to students with disabilities through AccessABILITY Resource Services (ARS). ARS provides reasonable and appropriate accommodations to students who have documented disabilities. It is the responsibility of the student to make the ARS Coordinator aware of the need for accommodations in the classroom prior to the beginning of the semester. Students should follow up with their instructors once the semester begins. To make an appointment call the ARS front desk at (928) 344-7674 or ARS Coordinator at (928) 344-7629, in the College Community Center (3C) building, next to Advising.
- 7.4 Academic Integrity: Any student participating in acts of academic dishonesty—including, but not limited to, copying the work of other students, using unauthorized “crib notes”, plagiarism, stealing tests, or forging an instructor’s signature—will be subject to the procedures and consequences outlined in AWC’s Student Code of Conduct.
- 7.5 Texts and Notebooks: Students are required to obtain the class materials for the course.
- 7.6 Arizona Western College students are expected to attend every class session in which they are enrolled. To comply with Federal Financial Aid regulations (34 CFR 668.21), Arizona Western College (AWC) has established an Attendance Verification process for “No Show” reporting during the first 10 days of each semester.
Students who have enrolled but have never attended class may be issued a “No Show” (NS) grade by the professor or instructor and receive a final grade of “NS” on their official academic record. An NS grade may result in a student losing their federal financial aid.
For online classes, *student attendance in an online class is defined as the following* (FSA Handbook, 2012, 5-90):
- Submitting an academic assignment
 - Taking an exam, an interactive tutorial or computer-assisted instruction
 - Attending a study group that is assigned by the school
 - Participating in an online discussion about academic matters
 - Initiating contact with a faculty member to ask a question about the academic subject studied in the course