Laboratory Contact Hours: 48-54, Homework Hours: 0, Total Student Learning Hours: 48-54

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

KUMEYAAY STUDIES 135 – ETHNOBOTANY/ETHNOECOLOGY LAB

3 hours laboratory, 1 unit

Catalog Description
Laboratory experiments to complement KUMY 133/BIO 133: Ethnoecology and KUMY 134/BIO 134: Ethnobotany. Basic concepts in cell biology, plant taxonomy/identification, plant anatomy, plant physiology, and ecology will be covered. Students will utilize the tools of scientific inquiry to examine the relationship between plants, people and the environment using hands-on experiences. The labs will feature lessons in plant morphology, plant ecology, phytochemistry, and traditional preparation and uses of plants. Particular attention will be paid to the plants and plant communities within the Kumeyaay/Diegueño ethnobotanical region of Southern California. *Also listed as BIO 135. Not open to students with credit in BIO 135.*

Prerequisite
"C" grade or higher or "Pass" in either BIO 133 or BIO 134 or KUMY 133 or KUMY 134 or concurrent enrollment

Entrance Skills
Without the following skills, competencies and/or knowledge, students entering this course will be highly unlikely to succeed:
1) Knowledge of the environmental history of the Kumeyaay/Diegueño People of Southern California and Northern Baja California.
2) Basic principles of plant taxonomy and phylogenetic systematics.
3) Differentiate between the structure and functions of the different plant cells, tissues and organs.
4) Demonstrate an understanding of biodiversity and stability of an ecosystem.
5) Compare and contrast the differences between modern and traditional land management techniques.

Course Content
1) Microscopy
    a. Care and use of a binocular compound microscope
    b. Care and use of a dissecting scope
2) Scientific classification and identification of different plant taxa
    a. Phylogenetic systematics approach
    b. Anatomical features and adaptations useful in species determination
3) Identification of plant cellular and anatomical structures
    a. Components of a plant cell
    b. Meristems and their derivatives
        1. RAM and SAM
        2. Three tissue systems
            (1) Dermal tissue (epidermis, periderm)
            (2) Ground tissue (parenchyma, collenchyma, sclerenchyma)
            (3) Vascular tissue (xylem, phloem)
    c. Organ structure, development and function
        1. Root system
        2. Shoot system (stem and leaves)
        3. Reproductive systems (flower, fruit, seeds, cones)

4) Ethnobiological classification of plants, animals and landforms
5) Organic constituents of plant life including both primary and secondary metabolites
   a. Role of carbohydrates, lipids, proteins and nucleic acids
   b. Role of secondary metabolites in the plant and their medicinal value
   c. Bioassays of plant extracts
6) Ecosystem function, sustainability and restoration
   a. Ecological services
   b. Drivers of ecological change
   c. Developing a conceptual ecological model of a disturbed habitat
   d. Utilizing an ecological model to develop a restoration plan
7) Survey of local plant communities and associated habitats
   a. Endangered habitats
      1. Coastal sage scrub
      2. Riparian habitat and local tree frog populations
   b. Biodiversity and stability
   c. Intermediate disturbance hypothesis
   d. Fire mosaics
8) Data collection, analysis and presentation
9) Population ecology
   a. K-selected versus r-selected species
   b. Carrying capacity
   c. Endangered species management
10) Energy flow/matter cycling in and ecosystem
   a. Abiotic and biotic components of ecosystems
   b. Energy flow in the ecosystem: food webs
   c. Succession in ecosystems
   d. Biogeochemical cycles and human impacts
11) Ethnobiological land management strategies and techniques for gathering, harvesting and preparing medicinal and utilitarian plants

Course Objectives

Students will be able to:

1) Describe the various methods and components of scientific inquiry, and use these methods to assess traditional uses of plants.
2) Demonstrate correct use and care of the compound binocular and dissecting microscope.
3) Identify cellular structures within different types of plant cells.
4) Identify and describe the anatomy of different types of reproductive structures including cones, seeds, and flowers. Discuss the evolutionary advantage of each.
5) Identify and classify different plants and plant communities using scientific and ethnobiological classification.
6) Demonstrate the ability to gather, harvest and prepare medicinal and utilitarian plants utilizing traditional techniques.
7) Understand how bioassays can be used to evaluate medicinal effects of plants.

Method of Evaluation

A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in the subject matter determined by multiple measurements for evaluation, one of which must be essay exams, skills demonstration or, where appropriate, the symbol system.

1) Lab practical exams that demonstrate proficiency in specific laboratory skills and knowledge
2) Written and oral lab quizzes
3) Formal and informal lab reports that demonstrate the student's ability to recognize and perform the various activities of scientific inquiry

4) Group discussions and projects that demonstrate ability to construct experiments and analyze data to answer scientific questions

Special Materials Required of Student
Plant press, hand lens, botanical keys/field guides

Minimum Instructional Facilities
1) Smart classroom laboratory facilities with writing board, overhead projection system, utilities including hot/cold/DI water
2) Microscopes, both compound and binocular dissecting scopes
3) Computers with software for construction of charts and graphs
4) Equipment including balances, glassware, measuring devices, computer-based data acquisition system

Method of Instruction
1) Integrated laboratory exercises, discussion and demonstration
2) Small and large group work and discussion
3) In-class activities and independent homework/research projects
4) Field trips designed to link course material to real world phenomena
5) Instructional slides, video presentations
6) Use of study groups, peer tutoring and instructional office hours

Out-of-Class Assignments
1) Herbarium project in which students are required to gather, press, and catalog wild plants using traditional and scientific methods for harvesting, preserving, and naming their collections.
2) Ecology project in which students use traditional and scientific methods to assess the biodiversity and health of native southern California ecosystems.

Texts and References
1) Required (representative example): Garcia, M. *Laboratory Manual for Ethnobiology/Ethnoecology*. Blackboard, 2015.
2) Supplemental: as assigned by instructor

Student Learning Outcomes
Upon successful completion of this course, students will be able to:
1) Apply the methods and components of scientific inquiry to the traditional practices of the Kumeyaay people in the gathering, harvesting and preparing of plants for medicinal and utilitarian uses.
2) Use compound binocular microscopy to identify cellular structures in plant cells and animal cells.
3) Using a stereo microscope, identify different floral and vegetative structures to classify Southern California flora utilizing both modern and traditional scientific strategies.