

**CUYAMACA COLLEGE**  
**COURSE OUTLINE OF RECORD**

**BIOLOGY 134 – ETHNOBOTANY**

3 hours lecture, 3 units

**Catalog Description**

Ethnobotany is the scientific study of the relationships that exist between peoples and plants, from the perspective of their traditional medicinal, cultural and utilitarian uses. Focusing on the Kumeyaay/Diegueño people of southern California, students will utilize the principles of scientific inquiry and modern plant biology to classify native plants, identify their anatomical structures and phytochemical composition and to relate this information to how plants were woven into the culture of indigenous populations and how plants were used to sustain, heal and protect their people. The historical uses and modern applications of this knowledge will be evaluated. Local field trips will provide opportunities for identification and scientific study of the plants in their natural habitats. *Also listed as KUMY 134. Not open to students with credit in KUMY 134.*

**Prerequisite**

None

**Course Content**

- 1) Introduction to the Kumeyaay/Diegueño People of southern California and northern Baja California
  - a. Environmental history
  - b. Introduction to the tools of scientific inquiry and its applications to plant biology
- 2) Basic principles of plant biology
  - a. What is biology? What is botany? What is indigenous science?
  - b. Evolution and Kingdom Plantae
    1. Phylogenetic systematics
      - (1) Basis for scientific classification
      - (2) Family and species determination
    2. Botanical and traditional plant identification
    3. Natural selection versus artificial selection
    4. Different phyla of Kingdom Plantae
      - (1) Evolutionary relationships
      - (2) Key adaptations to survive a changing world
    5. Coevolution
      - (1) Relationships and adaptations with pollinators
      - (2) Relationships and adaptations with humans
- 3) Plant anatomy and development
  - a. Identification of plant tissues and organs
    1. Plant vasculature
    2. Roots, stems and leaves
    3. Flower physiology
  - b. Plant life cycle
    1. Identifying different stages of plant development
    2. Plant harvesting based on stage of development
  - c. Primary versus secondary growth
    1. Lineages that show secondary growth and develop woody tissue
    2. Traditional and modern uses of plants for utilitarian uses

- 4) Plants as food and medicine
  - a. Primary metabolites
    1. Biomolecules: Carbohydrates, lipids, proteins and nucleic acids
    2. Utilization by the plant
    3. Utilization by humans
  - b. Secondary metabolites
    1. Three classes: terpenes, nitrogen-containing, phenolic
    2. Purpose within the plant
    3. Utilization by humans
    4. Important medicinal plant families
      - (1) Compounds made
      - (2) Characteristics used for identification
- 5) Plant gathering and harvesting techniques
  - a. Sustainable land management
  - b. Promotion of biodiversity and community health
- 6) Adaptations and identification of chaparral, woodland and riparian plants from San Diego County

### **Course Objectives**

Students will be able to:

- 1) Use the tools of scientific inquiry to analyze and resolve botanical issues including the identification and classification of plants into different taxa including family, genus and species.
- 2) Identify different anatomical structures of different plant phyla, how these structures change through the life of the plant, and how these structures are utilized by indigenous people.
- 3) Demonstrate an understanding of the evolutionary basis for scientific classification and how this compares to traditional methods of classification.
- 4) Compare and contrast primary and secondary metabolites, and discuss how each is used in the plant and by humans.
- 5) Discuss and demonstrate traditional and modern gathering and harvesting techniques. Determine the effect of these techniques on the promotion of biodiversity and community health.

### **Method of Evaluation**

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

- 1) Quizzes and exams that measure students' ability to identify common plants within the Kumeyaay ethnobotanical region, and explain traditional and modern plant uses in Kumeyaay culture.
- 2) Written student analysis examining the differences between scientific and indigenous classification of plants including plant Family identification.

### **Special Materials Required of Student**

Plant press, hand lens, botanical keys/field guides

### **Minimum Instructional Facilities**

- 1) Smart classroom with writing board
- 2) Wall maps illustrating regional scale spatial distributions of physical features at Earth's surface (e.g., physiography, geology, plant communities, etc.)

### **Method of Instruction**

- 1) Integrated classroom lecture, discussion and demonstration
- 2) Small and large group discussion
- 3) In-class activities and independent homework/research projects
- 4) Field trips designed to link course materials to real world phenomena
- 5) Instructional slides and audio/video presentations

- 6) Auxiliary use of study groups, peer tutoring and/or 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) Cultural ethnobotany research paper in which students are required to analyze, interpret and draw conclusions from scientific and traditional ethnobotanical resources.

### **Texts and References**

- 1) Required (representative examples):
  - a. Anderson, Kat M. *Tending the Wild: Native American Knowledge and the Management of California's Natural Resources*. University of California Press, 2013.
  - b. Keater, Glen. *California Plant Families*. University of California Press, 2009.
  - c. Bugbee, Richard and Jane Dumas. *Kumeyaay Ethnobotany Compiled Reader*, 2011.
- 2) Supplemental: As assigned by instructor

### **Exit Skills**

Students having successfully completed this course exit with the following skills, competencies and/or knowledge:

- 1) Knowledge of the environmental history of the Kumeyaay/Diegueño People of Southern California and Northern Baja California.
- 2) Understand and utilize the tools of scientific inquiry.
- 3) Basic principles of plant taxonomy and phylogenetic systematics.
- 4) Differentiate between the structure and functions of the different plant cells, tissues and organs.

### **Student Learning Outcomes**

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

- 1) Apply the methods and components of both traditional and modern scientific inquiry to identify and categorize Southern California flora.
- 2) Identify phytochemicals and botanical structures, their functions in plants, and how they are utilized by the Kumeyaay for medicinal and utilitarian purposes.
- 3) Explain the difference between traditional and modern gathering and harvesting techniques. Determine the effect of these techniques on the promotion of biodiversity and community health.