College of San Mateo
Official Course Outline

1. **COURSE ID:** BIOL 145 **TITLE:** Plants, People, and Environment
   Semester Units/Hours: 3.0 units; a minimum of 48.0 lecture hours/semester
   Method of Grading: Letter Grade Only
   Recommended Preparation:
   Eligibility for ENGL 838 or 848.
   And any READ 400 level course.

2. **COURSE DESIGNATION:**
   Degree Credit
   Transfer credit: CSU; UC
   AA/AS Degree Requirements:
   CSM - GENERAL EDUCATION REQUIREMENTS: E5a. Natural Science
   CSU GE:
   CSU GE Area B: SCIENTIFIC INQUIRY AND QUANTITATIVE REASONING: B2 - Life Science
   IGETC:
   IGETC Area 5: PHYSICAL AND BIOLOGICAL SCIENCES: B: Biological Science

3. **COURSE DESCRIPTIONS:**
   Catalog Description:
   Introduction to plants and their functions as they apply to people. Principles of living organisms, their structure-functions, evolution, and ecology. Emphasizes the role of plants in the development of human civilization and considers their impact as a primary food source for human population. One or more field trips may be required.

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**
   Upon successful completion of this course, a student will meet the following outcomes:
   A. Describe plant structure and its relationship to function at all levels, cellular, tissue, organ, population, community, and ecosystem.
   B. Explain the role of plants in the development of human civilization, including the role of plants as primary food source for humans, and their role in ecosystem services.
   C. Explain life plant processes at all levels, from plant metabolism to evolution.
   D. Use critical thinking and logical reasoning skills in the study of plants, and be able to follow directions when completing course assignments.
   E. Apply the scientific method to investigate biological phenomena, and evaluate current issues related to plants.
   F. Understand and explain the role of plants in ecology, evolution, and the diversity of life.

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**
   Upon successful completion of this course, a student will be able to:
   A. Describe plant structure and its relationship to function at all levels, cellular, tissue, organ, population, community, and ecosystem.
   B. Explain the role of plants in the development of human civilization, including the role of plants as primary food source for humans, and their role in ecosystem services.
   C. Explain life plant processes at all levels, from plant metabolism to evolution.
   D. Use critical thinking and logical reasoning skills in the study of plants, and be able to follow directions when completing course assignments.
   E. Apply the scientific method to investigate biological phenomena, and evaluate current issues related to plants.
   F. Understand and explain the role of plants in ecology, evolution, and the diversity of life.

6. **COURSE CONTENT:**
   Lecture Content:
   1. Introduction to plant biology
   The relationship of humans to their environment
   Human and animal dependence on plants
   Scientific experimentation and plant science inquiry

2. The nature of plant life and Plant cells
Attributes of living organisms
Plant cells and tissues
Edible plant tissues and nutrient content.
3. Leaves' structure and function
Human and ecological relevance of leaves
4.Stems structure and development
External and internal stem structure and function
Wood structure, uses and properties
5. Root structure and development
Mycorrhizae; root nodules; soil ecology and roots
Plants and the nitrogen cycle: ecological importance
Human relevance of roots
6. Flowers, Fruits and Seeds
Structure and types of flowers
Structure and types of fruits
Fruit and seed dispersal
Seed structure, germination, and longevity
Human relevance of flowers, fruits, and seeds
7. Water in plants
Molecular movement, diffusion, osmosis, imbibition, plasmolysis, active transport
Plants and the water cycle
8. Plant metabolism
Photosynthesis: major steps, C3, C4, and CAM processes
Other significant processes that occur in chloroplasts
Respiration: major steps; factors affecting the rate of respiration
Additional metabolic pathways; assimilation and digestion
Secondary metabolites: their human impact
Plants and the carbon cycle
9. Plant growth, breeding, and propagation
Nutrients, vitamins, plant hormones
Crop plant evolution
Plant breeding: using compatible and incompatible germplasm
Methods of plant propagation: agricultural and human relevance
10. Plant Genetics
Genetically Modified Plants
Ecological and human relevance of plant modification
11. Plant Evolution
The study of evolutionary biology
Charles Darwin; evidence for evolution
Artificial and natural plant selection
The role of hybridizations in evolution; apomixis; polyploidy
12. Plant names and classification
Development of the classification systems
The species concept; the future of plant classification
Relevance of Plant biodiversity
13. Survey of Protista and Fungi
Relationships of plants to other kingdoms
Human and ecological relevance of photosynthetic Protista and fungi
14. Survey of Plant Phyla
Human and ecological relevance of plant phyla
15. Flowering plants and civilization
Origin of cultivated plants
Selected families of flowering plants
16. Ecology and Biomes
Plants and the environment; life histories; natural cycles
Ecological succession; global warming; erosion; biodiversity
Impact of humans on plant communities
Restoration biology
Major biomes of North America: tundra; taiga; temperate deciduous forests; grasslands; deserts; mountain

and coastal forests; intertidal zone (tide pools), and tropical rain forests.
Study of tide pool algae and survey of plant cover; survey of plant cover and diversity of species in a chaparral biome; survey of plant cover and ecology of the redwood forest.

Lab Content:
This is a lecture class with no labs.
TBA Hours Content:
This class has no TBA

7. **REPRESENTATIVE METHODS OF INSTRUCTION:**
Typical methods of instruction may include:
A. Lecture
B. Critique
C. Activity
D. Discussion
E. Field Experience
F. Field Trips
G. Guest Speakers
H. Individualized Instruction
I. Service Learning
J. Other (Specify): Documentaries and or research papers may be assigned for a in depth study of a particular topic. Papers from botanical journals may be assigned as examples of how to apply the scientific method to botanical research.

8. **REPRESENTATIVE ASSIGNMENTS**
Representative assignments in this course may include, but are not limited to the following:
Writing Assignments:

1. Homework assignments related to readings and supplemental to textbook readings. Some of the assignments may include answering review questions, short essays, or a report on a plant product.
2. Term paper that includes a library search of appropriate valid scientific sources, and proper citation of sources.
3. Report based on a visit to a botanical garden to study plant biomes.
4. Report based on a visit to a farmers' market to study local produce sources.

Reading Assignments:
1. Reading assignments for each of the textbook chapters.
2. Reading selected papers from the library journal database.

Other Outside Assignments:
1. Review several botanical videos housed in the library database collection.
2. Review of appropriate documentary from the Nature or Nova PBS website.
3. Visit to a local botanical garden and farmer's market.

To be Arranged Assignments (if applicable):
None

9. **REPRESENTATIVE METHODS OF EVALUATION**
Representative methods of evaluation may include:
A. Class Participation
B. Class Performance
C. Class Work
D. Exams/Tests
E. Field Trips
F. Final Class Performance
G. Homework
H. Papers
I. Projects
J. Quizzes
K. Research Projects
L. Written examination
M. Objective exams (true/false, multiple choice, fill-in blanks), essay, term paper, take-home exams, and oral

presentations.

10. **REPRESENTATIVE TEXT(S):**
    Possible textbooks include:
    A. Bidlack, J. and S. Jansky. *Stern's Introductory Plant Biology*, 13th ed. McGraw Hill, 2013

Origination Date: November 2012
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Course Originator: Tania Beliz