

Format CO
COURSE OUTLINE

Principles of Biology II
Course Title

Science SC 110
Dept. & Course No.

I. Course Description:

This is the second of a two semester course that covers the classification, diversity, structure, physiology, and ecology of living organisms.

II. Semester Credits: 4

III. Contact hours Per Week: 3 3 6
Lecture Lab Total

IV. Prerequisite: SC109

V. Student Learning Outcomes

Upon completion of this course, the student will be able, with a minimum of 65% accuracy, to:

1. Explain the hierarchy of taxonomy from the most general to the most specific taxa.
2. Explain the five kingdom system of classification.
3. Describe similarities and differences between viruses and cellular organisms.
4. Describe how the structure, reproduction, and metabolism of bacteria are related to their ways of life.

VI. Course content

A. Classification of Living Organisms

1. Kingdom
2. Phylum
3. Class
4. Order
5. Family
6. Genus
7. Species

B. The Five Kingdoms

1. Prokaryotae
2. Protista
3. Fungi
4. Plantae
5. Animalia

C. Differences between viruses and bacterial cells

1. Structure
2. Nucleic acids
3. Enzymes
4. Metabolism
5. Reproduction

D. Prokaryotic Cells

1. Structure
2. Behavior
3. Reproduction
4. Metabolism
5. Classification
6. Diseases

5. Explain the major steps in the evolution of life.

6. Describe the major characteristics of fungi, and explain how they differ from plants and animals.

7. Describe the major groups of living plants and their adaptations to life on land.

8. Describe the structures and classification of lower invertebrates animals.

9. Explain coelom and its evolutionary importance.

10. Describe the classification of vertebrates.

11. Name the major classes of macronutrients and micronutrients, and list the general functions of each class.

12. Identify the parts of the human digestive tract and describe what happens to food in each part of the tract.

E. Protista and the origin of multicellularity

1. Eukaryotes
2. Multicellularity
3. Physiology
4. Protozoans
5. Fungus-like protists
6. Algae

F. The Fungal Way of Life

1. Nutrition
2. Body Plan
3. Reproduction
4. Life Cycles

G. The Plant Kingdom

1. General features
2. Classification
3. Nonvascular plants
4. Seedless vascular plants
5. Gymnosperms
6. Angiosperms

H. Lower Invertebrates

1. Structure
2. Classification

I. Higher Invertebrates

1. Coelom
2. Protostomes
3. Deuterostome

J. Vertebrates

1. Fish
2. Amphibians
3. Reptiles
4. Birds
5. Mammals

K. Animal Nutrition

1. Macronutrients
 - a. carbohydrates
 - b. lipids
 - c. proteins
2. Micronutrients
 - a. vitamins
 - b. minerals

L. The Human Digestive Tract

1. Mouth
2. Esophagus
3. Stomach
4. Small & large intestine
5. Rectum

13. List the functions of the mammalian liver, and explain the importance of this organ.
14. Describe the most common arrangements for gas exchange in animals
15. Describe how vascular systems transport substances in animals.
16. Describe defenses of animals against disease.
17. Describe animals specialized mechanisms that maintain homeostasis of their body fluids.
18. Explain how and where fertilization occurs.
19. Describe the structure and function of animal nervous system.
20. Describe the importance of sense organs to an animal.

M. The Mammalian Liver

1. glycogen storage
2. synthesizes blood proteins
3. converts nitrogenous waste

N. Gas Exchange in Animals

1. Supplying Oxygen
2. Problems of Gas Exchange
3. Respiratory Surfaces and Ventilation
4. Respiratory Pigments
5. Carbon Dioxide Transport
6. Regulation of Ventilation
7. Swimbladder Physiology

O. Animal Transport Systems

1. Transport in Invertebrates
2. Circulation in Vertebrates
3. Human Circulation
4. The Lymphatic System
5. Temperature Regulation

P. Defenses Against Disease

1. Nonspecific Defenses
2. Overview of Immune Responses
3. The Immune System
4. Medical Aspects of Immune Responses

Q. Excretion

1. Substances Excreted
2. Osmoregulation
3. Excretory Organs
4. Regulation of Kidney Function

R. Sexual Reproduction

1. Reproductive Patterns
2. Human Reproductive Organs
3. Hormones and Reproduction
4. Fertilization and Implantation

S. Nervous Systems

1. Cells of the Nervous System
2. The Vertebrate Nervous System
3. The Spinal Cord
4. Learning and Memory
5. Attention and Sleep

T. Sense Organs

1. Sense Organs and their Functions
2. Mechanoreceptors
3. Photoreceptors
4. Thermoreceptors
5. Chemoreceptors
6. Electroreceptors

21. Describe the function of muscles and skeletons in animals.

22. Describe the three main types of chemical messengers in animals and their functions.

23. Explain the theoretical difference between innate and learned behavior.

24. Explain how the basic structure and growth pattern of vascular plants are adapted to their functions.

25. Describe the structure and function of two conducting tissues in plants.

26. Describe how roots take in water and minerals and how plants use these mineral nutrients.

27. Identify the five types of plant hormones and discuss their roles.

28. Explain how pollination and fertilization occur in flowering plants.

U. Muscles and Skeletons

1. Muscle Tissue
2. The Vertebrate Skeleton
3. Connective Tissue

V. Animal Hormones and Chemical Regulation

1. Hormones
2. Cytokines
3. Pheromones

W. Animal Behavior

1. Immediate and Ultimate Causes
2. Development of Behavior
3. Instinct versus Learning
4. The Neural basis of Behavior
5. Learning

X. Structure and Growth of Vascular Plants

1. Plants Growth
2. Plant Tissues and Cells
3. Seeds
4. The Root System
5. Stems
6. Leaves
7. Secondary Growth

Y. Transport in Vascular Plants

1. Structure of Xylem
2. Transport in Xylem
3. Phloem Structure
4. Transport in Phloem

Z. Plant Nutrition

1. Plant Nutrients
2. Soil
3. Absorption by the Roots
4. Nutritional Adaptations
5. Food Storage

AA. Plant Hormones

1. Auxin
2. Cytokinins
3. Gibberellins
4. Absciscic Acid
5. Ethylene

BB. Reproduction in Flowering Plants

1. Pollen
2. Preparation of the Ovule
3. Fertilization
4. Seed Development
5. Fruit Growth
6. Germination
7. Breeding Programs
8. Vegetative Reproduction

VII. MATERIALS AND EQUIPMENT

- A. Palau Community College Science Laboratory and related equipment
- B. Standard Classroom Materials
- C. Handouts
- D. Video Tapes
- E. Slides
- F. Slide Projector
- G. Digital Projector

VIII. TEXT

Freeman, S., Quillin, K., and Allison, L. Biological Science, 5th ed. Glenview, IL: Pearson Education, Inc., 2014.

IX. METHODS OF INSTRUCTION

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Audio-Visuals
- E. Laboratory Work
- F. Field Trips

X. METHOD OF EVALUATION

The components with the corresponding weight in percent included in the computation of the final grade are:

Participation	10%
Quizzes & Homework	10%
Laboratory Work	25%
Research paper	10%
Section Tests	20%
Final Exam	25%

The conversion of percent rating to letter grade is as follows:

90% to 100%	A
80% to 89%	B
70% to 79%	C
65% to 69%	D
64% and below	F

Form NC-2
TASK LISTING SHEET

SC 110 Principles of Biology II	Credits: 3	1	48
Course No. & Title	Lec.	Lab	Total lab hrs.

Laboratory objective and tasks	Total hours for each objective and task(s)
1. Demonstrate the proper practices of working safely in the laboratory.	.5
a. Demonstrate an understanding of laboratory safety guidelines.	
b. Identify the safety symbols used in the laboratory.	
c. Locate and describe the use of laboratory safety.	
d. Explain proper procedures to follow in case of an accident.	
2. Identify different forms of bacteria, and perform basic culturing method.	2.5
a. Examine a drop of <i>Anabaena</i> (a cyanobacteria) culture	
b. Examine prepared slides of bacteria with different forms: coccus, bacillus, spirillum, and vibrio.	
c. Culture of airborne bacteria	
d. Culture bacteria from a cough	
e. Test for the presence of <i>Lactobacillus</i> in the mouth.	
3. Observe and record the diversity of forms and structures found in the Kingdom Protista.	3
a. Prepare a slide from flagellated symbionts found in the gut of termites and determine the most prevalent form of protests present.	
b. Examine prepared slides of dinoflagellates and note the presence of flagella.	
c. Make a wet mount of Euglena culture and locate the eyespot.	

4. Observe and record the diversity of forms and structures found in the Kingdom Fungi. 6
 - a. Examine a culture of Rhizopus, noting the asexual spores, sporangia, and sporangiospores.
 - b. Make a wet mount of mycelium with sporangia and note the rhizoids and stolons.
 - c. Make a wet mount of a drop of actively growing yeast culture and note the cells that are producing smaller buds or short-chains of buds.
 - d. Observe a preserved specimen of a cup fungus, examine a cross section of a cup fungus under high power, and locate an ascus.
 - e. Obtain a common mushroom and make a cross section, note the stalk and the cap that bears the gills and examine the gills with a dissecting microscope.

5. Observe and record the diversity of forms and structures found in plant leaves, roots, and stems. 6
 - a. Classify leaves according to leaf type, venation, leaf margin, and leaf arrangement
 - b. View a prepared cross section slide of a leaf and identify the various tissues and structures observed.
 - c. Prepare a longitudinal and a cross section of a carrot
 - d. Observe prepared slides of roots, stems and leaves and note the contrast between monocots and dicots

6. Observe and describe the major groups in the Kingdom Animalia and some of their adaptations and structures. 15
 - a. Study a specimen of a sponge and draw the following: osculum, base, spongocoel, and incurrent canals
 - b. Examine a specimen of a live coral and noting the following: mouth, polyps and tentacles.
 - c. Examine a specimen of a clam and draw the following structures: mantle, mouth, reproductive organs, intestines, stomach, foot, gill, anus posterior and anterior abductor muscles.

- d. Examine a specimen of a fish and noting the following: heart, blood vessels, liver, spleen, air bladder, and kidneys. Distinguish ovaries from testes and trace the reproductive tubes into the urogenital opening. Also examine the respiratory system and note the paired gills and the branchial filaments.
 - e. Examine a specimen of a frog and identify each organ system: respiratory, digestive, circulatory, excretory, and reproductive.
7. Observe and record the diversity of forms and structures found in flowering plants. 6
- a. Prepare slides of pollen grains and observe the variety of shapes and patterns.
 - b. Examine under low power for evidence of extensions growing out of germinating pollen grains.
 - c. Examine the texture and patterns of pigmentation in petals, the sticky or feathery stigma, and the powdery pollen that covers the stamens.
 - d. Identify the parts of the pistil. Make a transverse cut through the ovary to examine the number of locules holding ovules.
 - e. Collect fruits and seeds for identification.
8. Observe and record the diversity and distribution of population associated with gradients in physical factors using different monitoring techniques. 9
- a. Lay a transect with stakes marking at regular intervals.
 - b. Throw a quadrat and observe and record the kinds and number of animals
 - c. Count and record the names and height of all plants in a 10m x 10m square along the side of the transect.
 - d. Record the physical factors at the site.
 - e. Prepare a table listing for each station the name, density, height and observable characteristics of animal and plant.
 - f. Make a table of physical factors.
 - g. Discuss the impacts of different disturbance.
 - h. Review the value of mangroves and the importance of conservation.

PALAU COMMUNITY COLLEGE
SC110 Principles of Biology II
COURSE LEARNING OUTCOMES

During the course experience, the **course learning outcomes (CLOs)** will be assessed through the use of signature assignments. A rating scale will be used to determine the students' proficiency level of each CLO using specifically aligned assignments. The numerical ratings of 4, 3, 2, and 1 are not intended to represent the traditional school grading system of A, B, C, D, and F. The descriptions associated with each of the numbers focus on the level of student performance for each of the course learning outcomes listed below.

RATING SCALE:

4 – Accomplished

3 – Competent

2 – Developing

1 – Beginning

Course Learning Outcome # 1: The student will be able to explain the five kingdom system of classification

4	Explain all five kingdom system of classification
3	Explain at least four kingdom system of classification
2	Explain at least three kingdom system of classification
1	Explain less than three kingdom system of classification

Course Learning Outcome # 2: The student will be able to compare eukaryotic and prokaryotic microorganisms.

4	The student is able to compare eukaryotic and prokaryotic microorganisms clearly and accurately
3	The student is able to compare eukaryotic and prokaryotic microorganisms, however shows minor evidences of unclear and inaccurate interpretations.
2	The student is able to do only a few comparisons of eukaryotic and prokaryotic microorganisms
1	The student is unable to compare eukaryotic and prokaryotic microorganisms

Course Learning Outcome # 3: The student will be able to identify the major groups of plants.

4	The student is able to identify the major groups of plants clearly and accurately
3	The student is able to identify the major groups of plants, however shows minor evidences of unclear and inaccurate interpretations.
2	The student is able to identify only a few major groups of plants
1	The student is unable to identify the majors groups of plants

Course Learning Outcome # 4: The student will be able to examine specimens in the Kingdom Plantae.

4	The student is able to examine specimens in the Kingdom Plantae clearly and accurately
3	The student is able to examine specimens in the Kingdom Plantae, however shows minor evidences of unclear and inaccurate interpretations.
2	The student is able to examine only a few specimens in the Kingdom Plantae
1	The student is unable to examine specimens in the Kingdom Plantae

Course Learning Outcome # 5: The student will be able to distinguish the major groups in the Kingdom Animalia

4	The student is able to distinguish the major groups in the Kingdom Animalia clearly and accurately
3	The student is able to distinguish the major groups in the Kingdom Animalia, however shows minor evidences of unclear and inaccurate interpretations.
2	The student is able to distinguish only a few major groups in the Kingdom Animalia
1	The student is unable to distinguish the major groups in the Kingdom Animalia

Course Learning Outcome # 6: The student will be able to examine specimens in the Kingdom Animalia

4	The student is able to examine specimens in the Kingdom Animalia clearly and accurately
3	The student is able to examine specimens in the Kingdom Animalia, however shows minor evidences of unclear and inaccurate interpretations.
2	The student is able to examine only a few specimens in the Kingdom Animalia
1	The student is unable to examine specimens in the Kingdom Animalia