SAGRADO
Universidad del Sagrado Corazón

SCHOOL OF HEALTH AND SCIENCES

SYLLABUS

TITLE:	Zoology
CODE:	BIO 203
PREREQUISITE:	BIO 112
CO-REQUISITE:	BIO 203L
CREDITS:	4 credits | 45 contact hours | 45 lab hours | 1 term

DESCRIPTION

Study of the anatomy, physiology, taxonomy, and phylogeny of animals. Aspects relevant to life cycles and ecological relationships are discussed. Emphasis on the study of representative forms and the usefulness or potential harm of some species to mankind. The discussion of topics is supported by conferences, the examination, and dissection of organisms, and the highlighting of endemic, native, and exotic species of Puerto Rico. The reflective approach and practical experiences of the course provide the university student with the acquisition of holistic, fundamental, and useful knowledge about the animal kingdom, its current diversity, and its study.

JUSTIFICATION

Since prehistoric times, animals have shared human habitats and niches. This relationship has made it possible for us humans to use animals beyond their consumption to their domestication and the obtaining of multiple goods. The discovery of parasitic animals, which cause diseases and are vectors of pathogenic organisms, increased the interest in knowing the structure, physiology, and habits of these organisms. The study of the different ways in which animals have solved physiological and environmental problems to achieve survival is an important element in the training of a biologist. An inquisitive and rational approach to the discipline contributes to the development of professionals with greater capacity and analytical breadth.

COMPETENCES

The course develops the following competences in students:

- **Critical questioning**
- **Entrepreneurship and innovation**
- **Research and exploration**

OBJECTIVES

After completion of the course, students will be able to:

1. Discuss the criteria used in the classification of animals.
2. Outline the animal kingdom's taxonomic system and its evolutionary history.
3. Recognize the characteristics of the main phyla of the animal kingdom.
4. Identify representative organisms of each class of the studied phyla and their main characteristics.
5. Discuss the structure and function of the different organ systems present in the main phyla of invertebrates.
6. Compare the major vertebrate groups in terms of skeletal, digestive, respiratory, circulatory, excretory, reproductive, and nervous systems.

CONTENTS

I. General Concepts
   A. Branches of Zoology
   B. Criteria for the classification of animals
II. Taxonomic Principles
   A. Binomial nomenclature system
   B. Nomenclature rules
   C. Main taxonomic categories
III. Protist Kingdom
   A. Phylum Sarcomastigophora
      1. Subphylum Mastigophora
         a. Morphology and structure
         b. Main genera
         c. Study of *Euglena*
         d. Flagellate parasites
      2. Subphylum Sarcodina
         a. Morphology and structure
         b. Main genera
         c. Study of *Amoeba*

            d. Sarcodine parasites
        3. Subphylum Opalinata
            a. Morphology and structure
            b. Study of *Opalina*
    B. Phylum Apicomplexa
        1. Class Sporozoa
            a. Morphology and structure
            b. Main genera
            c. Life cycle of *Plasmodium*
    C. Phylum Ciliophora
        1. Morphology and structure
        2. Main genera
        3. Study of *Paramecium*
        4. Conjugation
    D. Phylogeny of the Kingdom
IV. Phylum Mesozoa
    A. Morphology and structure
    B. Study of dicyemids
    C. Phylogeny of the Phylum
V. Phylum Porifera
    A. Main characteristics
    B. Types of sponges
        1. Asconoid
        2. Syconoid
        3. Leuconoid
    C. Classes
        1. Calcarea (Calcispongiae)
        2. Hexactinellida (Hyalospongiae)
        3. Demospongiae
        4. Sclerospongiae
    D. Main genera of the previous Classes
    E. Phylogeny of the Phylum
VI. Phylum Cnidaria
    A. Main characteristics
    B. Polyps and medusa
    C. Class Hydrozoa
        1. Morphology and structure
        2. Main genera
        3. Study of *Hydra*, *Obelia*, and *Physalia*
    D. Class Cubozoa

        1. Morphology and structure
    E. Class Scyphozoa
        1. Morphology and structure
        2. Main genera
        3. Study of *Aurelia*
    F. Class Anthozoa
        1. Anemone
            a. Morphology and structure
            b. Main genera
            c. Study of *Metridium*
        2. Corals
            a. Morphology and structure
            b. Main genera
            c. Types of coral reefs
            d. Origin of coral reefs
    G. Phylogeny of the Phylum
VII. Phylum Ctenophora
    A. Main characteristics
    B. Morphology and structure
    C. Main genera
    D. Study of *Pleurobrachia*
    E. Phylogeny of the Phylum
VIII. Phylum Platyhelminthes
    A. Main characteristics
    B. Class Turbellaria
        1. Morphology and structure
        2. Main genera
        3. Study of *Dugesia*
    C. Class Monogenea
        1. Morphology and structure
    D. Class Trematoda
        1. Morphology and structure
        2. Main genera
        3. Study of *Clonorchis*, *Fasciola*, and *Schistosoma*
    E. Class Cestoda
        1. Morphology and structure
        2. Main genera
        3. Study of *Taeniarhynchus* and *Taenia*
    F. Phylogeny of the Phylum
IX. Phylum Nematoda
    A. Main characteristics

B. Morphology and structure
C. Study of *Ascaris*
D. Phylogeny of the Phylum

X. Other phyla of pseudocoelomates
A. Main characteristics
B. Study of phyla *Rotifera, Gastrotricha, Nematomorpha, Kinorhyncha, Priapulida,* and *Entoprocta*

XI. Phylum Mollusca
A. Main characteristics
B. Class Monoplacophora
1. Morphology and structure
2. Study of *Neopilina*
C. Class Polyplacophora
1. Morphology and structure
2. Main genera
3. Study of *Chiton*
D. Class Gastropoda
1. Morphology and structure
2. Main genera
3. Study of pulmonate snails
E. Class Bivalvia (Pelecypoda)
1. Morphology and structure
2. Main genera
3. Study of clams
F. Class Cephalopoda
1. Morphology and structure
2. Main genera
3. Study of *Loligo*
G. Class Scaphopoda
1. Morphology and structure
H. Phylogeny of the Phylum

XII. Phylum Annelida
A. Main characteristics
B. Class Polychaete
1. Morphology and structure
2. Main genera
3. Study of *Nereis*
C. Class Oligochaeta
1. Morphology and structure
2. Main genera
3. Study of *Lumbricus*

D. Class Hirudinea
    1. Morphology and structure
    2. Main genera
    3. Study of *Hirudo*
E. Phylogeny of the phylum

XIII. Phylum Arthropoda
A. Main characteristics
B. Subphylum Trilobita
    1. Morphology and structure
C. Subphylum Chelicerata
    1. Class Merostomata
        a. Morphology and structure
        b. Study of *Limulus*
    2. Class Pycnogonida
        a. Morphology and structure
    3. Class Arachnida
        a. Morphology and structure
        b. Main Orders and Genera
        c. Study of spiders
        d. Study of scorpions
D. Subphylum Crustacea
    1. Morphology and structure
    2. Main genera
    3. Study of Cambarus
E. Subphylum Mandibulata
    1. Class Chilopoda
        a. Morphology and structure
        b. Main genera
        c. Study of *Scolopendra*
    2. Class Diplopoda
        a. Morphology and structure
        b. Main genera
        c. Study of *Orthocricus*
    3. Class Insecta
        a. Morphology and structure
        b. Main genera
        c. Study of grasshoppers
F. Phylogeny of the phylum

XIV. Phylum Onycophora
A. General characteristics
B. Study of *Peripatus*

C. Phylogeny of the Phylum

XV. Phylum Echinodermata

A. General characteristics

B. Class Crinoidea

1. Morphology and structure
2. Main genera

C. Class Asteroidea

1. Morphology and structure
2. Main genera
3. Study of *Asterias*

D. Class Echinoidea

1. Morphology and structure
2. Main genera
3. Study of sea urchins

E. Class Ophiuroidea

1. Morphology and structure
2. Main genera

F. Class Holothuroidea

1. Morphology and structure
2. Main genera
3. Study of sea cucumbers

G. Phylogeny of the Phylum

XVI. Phylum Hemichordata

A. General characteristics

B. Main genera

C. Phylogeny of the Phylum

XVII. Phylum Chordata

A. General characteristics

B. Class Chondrichthyes

1. Morphology and structure
2. Main genera

C. Class Osteichthyes

1. Morphology and structure
2. Main genera

D. Class Amphibia

1. Morphology and structure
2. Main genera

E. Class Reptilia

1. Morphology and structure
2. Main genera

F. Class Aves

1. Morphology and structure
2. Main genera

G. Class Mammalia
1. Morphology and structure
2. Main genera

H. Phylogeny of the Phylum

LABORATORY EXPERIENCES

A. Operation of the microscope
B. Protists: Pond water
C. Phylum Sarcomastigophora
D. Phylum Ciliophora
E. Phylum Porifera
F. Phylum Cnidaria
G. Phylum Platyhelminthes
H. Phylum Nematoda
I. Phylum Mollusca
J. Phylum Annelida
K. Phylum Echinodermata
L. Taxonomic classification

METHODOLOGY

The following strategies from the active learning methodology are recommended:

- Lectures using audiovisual resources
- Lab exercises
- Study trips
- Specimen collection

EVALUATION

Partial assignments	40%
Immersion experience	30%
Final project or exam	20%
Participation	10%
Total	100%

LEARNING ASSESSMENT

The institutional assessment rubric is applied to the course's core activity.

BIBLIOGRAPHY

TEXTBOOK

Adams, B. J., Crawley, J. L. (2018). Van de Graaff's Photographic Atlas for the Zoology Laboratory (8th ed.). Morton Publishing Co.

Hickman, C., Keen, S., Eisenhour, D., Larson, A., l'Anson, H. (2019). *Integrated Principles of Zoology* (18th ed.). McGraw Hill. New York.

LABORATORY MANUAL

Ferrer, F. J. (2000). *Ejercicios de Laboratorio de Zoología* [separatas]. Universidad del Sagrado Corazón.

REFERENCES

Biaggi, V. (1998). *Las aves de Puerto Rico*. Editorial UPR.

Departamento de Recursos Naturales. (2008). *Compendio Enciclopédico de los Recursos Naturales de Puerto Rico*. Editorial Librotex, Inc.

Joglar, R. L. (1998). *Los Coquíes de Puerto Rico su historia natural y conservación*. Editorial UPR.

Joglar, R. L. (Ed.). (2005). *Biodiversidad de Puerto Rico: Vertebrados Terrestres y ecosistemas*. Editorial del Instituto de Cultura Puertorriqueña, Proyecto Coquí y Conservación, Editorial UPR.

Joglar, R. L., Flores, C., & Torres Pérez, J.L. (Eds.). (2015). *Biodiversidad de Puerto*

Rico: Invertebrados. Proyecto Coquí y Conservación. Editorial UPR.

Raffaele, H.A., House, C.J., Wiessinger, J. (1998). *Una guía a las aves de Puerto Rico y las Islas Vírgenes*. Princeton University.

Rivero, J. A. (1998). *Los anfibios y reptiles de Puerto Rico*. Editorial UPR.

ELECTRONIC LINKS

Water Resources of Puerto Rico - http://www.recursosaguapuertorico.com/

Caribbean Ecological Services Field Office; US Fish & Wildlife - http://www.fws.gov/southeast /caribbean/

Para la Naturaleza; Fideicomiso de Conservación de Puerto Rico - http://www.paralanaturaleza.org/

For more information resources related to the course's topics, access the library's webpage http://biblioteca.sagrado.edu/

REASONABLE ACCOMMODATION

For detailed information on the process and required documentation you should visit the corresponding office. To ensure equal conditions, in compliance with the ADA Act (1990) and the Rehabilitation Act (1973), as amended, any student in need of reasonable accommodation or special assistance must complete the process established by the Vice Presidency for Academic Affairs.

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This policy applies to all students enrolled at Universidad del Sagrado Corazón to take courses with or without academic credit. A lack of academic integrity is any act or omission that does not demonstrate the honesty, transparency, and responsibility that should characterize all academic activity. Any student who fails to comply with the Honesty, Fraud, and Plagiarism Policy is exposed to the following sanctions: receive a grade of zero in the evaluation and / or repetition of the assignment in the seminar, a grade of F (*) in the seminar, suspension, or expulsion as established in the Academic Integrity Policy effective in November 2022.

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