Department of Environmental Science

College of Science

University of Salahaddin/Erbil

Subject: Biodiversity (Theory)

Course Book – Year 2

Lecturer's name: Dr. Shelan Mustafa Khudhur

Academic Year: 2022 – 2023

Course Book

1. Course name	**Biodiversity**
2. Lecturer in charge	**Theory: Shelan Mustafa Khudhur**
3. Department/ College	**Health & Environmental Sciences / Science**
4. Contact	**e-mail: shelan.khudhur@su.edu.krd**
5. Time (in hours) per week	**Theory: 2** **Practical: 2**
6. Office hours	**4hrs**
7. Course code	
8. Teacher's academic profile **Dr. Shelan**	• I am **Shelan Mustafa Khudhur**, I have PhD. in Aquatic Invertebrate/ Water Quality & Pollution. I get it during 2020 at Environmental Science and Health Department in College of Science-Salahaddin University. • I published more than 6 articles in Scientific Journals. I am working and Teaching in College of Science. **The process of teaching a joint operation between the teacher and the student, must involve them and assist them in acquiring the analytical methods and skills necessary to help them see things as they should be, and encourage them to outstanding scientific production and make the learning process more fun linking the topics Article operation life of local and international issues, and to involve students in discussions in order to encourage them to express their point of view**
9. Keywords	Biodiversity, Genetic,Species,Ecosystem, Conservation , Threats,Climate change,Protocol,Convention

11. Course objective:

This course focuses on these three different questions:

1. What is biological diversity and why should we value it?

We will talk about what distinguishes different species from each other and what mechanisms promote speciation. We will examine what early insights Charles Darwin had by reading excerpts from The Origin of Species. Biodiversity is not a topic without controversy. Substantial variation exists regarding the number of species that we know about (~1.8 million) and even more debate

exists regarding the potential number of species out there. We will begin our study of biodiversity by examining the microscopic organisms that often escape notice and continue through the world of invertebrates.

2. How is species diversity represented and how does that become evident in function?
We would like to think that we know how many animals exist (because we can usually observe them in contrast to micro-organisms). However, new species are being discovered all the time.
Because animals are mobile and capable of decision making, we often see ourselves in these creatures (called anthropomorphizing). We will use this unit to introduce the diversity of animals and discuss what adaptations allow them to survive amidst multiple stresses, be it predators, low food resources, temperature fluctuations, salinity, etc… Of course, animals do not exist in isolation.
Plants constitute the base of the food chain. Without their ability to convert sunlight into sugars that we can use for energy, life as we know it would cease to exist. We will start with the simple plants (mosses, ferns) and move into the more complex gymnosperms and angiosperms. Always be asking what new innovations we see in each group of plants (& animals too).

3. What are some profiles of interesting organisms and are there steps being taken to preserve biodiversity? Amazingly, over half of all described species are insects. However, we often focus our attention on larger, more visible or appealing organisms. In addition, certain organisms thrive in particular locales or perhaps only live in one place (i.e. endemic). Other species struggle to persist (i.e. threatened or endangered). We will focus on a particular suite of these organisms through species and habitat presentations focused on Texas flora (plants) and fauna (animals, etc…).
With every student doing a species presentation (SEPARATE INSTRUCTION GUIDE), we will profile some interesting organisms and also review the relevant phylogeny and terminology associated with different organisms. After profiling a species, each student will then do a presentation on the regional habitat or conservation area associated with that species. Part of learning biology is learning a new language and that includes scientific names of species. After these species presentations, we will scale up and look at the different reasons.

Student Learning Outcomes:

1. Students will be able to articulate clearly the relationship between the terms adaptation, fitness, natural selection and evolution.
2. Students will be able to explain the inherent difficulty involved in defining the term “species.”
3. Students will be able to engage intelligently in debates about conservation practices (i.e. do we save a “species” or focus on habitat?).
4. Students will be able to give examples of species across multiple taxonomic groups.

12. Student's obligation

A student must read the lecture hand-out before the class. Three classes in-between the semester is devote for examination, each student must prepare him/her good. Therefore, each student must have two exam marks till the end of the course; one exam per each semester.

An absence from classes should be excused according to the general regulations (i.e. sick leave) soon after coming back to college otherwise the absence is recorded as an unexcused one, and marks were subtracted from the final grade. For each class, we recommend the students to take the lecture hand-out before attending the classroom.

The questions on the test will comprise a mixture of quantitative calculations and qualitative responses that provide interpretation of the results obtained. These will require the student to demonstrate of knowledge of ecological theory and may require some additional reading beyond the lecture material.

13. Forms of teaching

A student must read the lab lectures hand-outs before the class. In the class, the lectures are power-point present at the first couple of hours of the class, inconspicuous points are clear on whiteboard, difficult idioms and tough words are also clear for the students. Finally a slide of question mark is present in order the students to ask the teacher about inconspicuous points from each lecture. The lectures will be presented mainly in English language as well as Arabic and Kurdish language will be used if it's necessary in the class.

14. Assessment scheme

One Monthly exam in biodiversity = 7.5 points

Final exam in biodiversity = 25 points

16. Course Reading List and References:

1. Hunter and Gibbs (2007), *Fundamentals of Conservation Biology*.
2. Krebs, C.J. (1999). *Ecological Methodology*. (2nd Edition). Benjamin-Cummings.
3. Sinclair, A.R.; Fryxell, T. and Caughley, G. (2006) *Wildlife Ecology, Conservation and Management*. (2nd Edition). Blackwell Publishing.

17. The Topics:

Week 1: What is biodiversity **Week 2: Taxonomy** **Week 3: Extinction** **Week 4: Patchy distribution and metapopulation** **Week 5: Rarity extinction viability** **Week 6: Ecosystem degradation and loss** **Week 7: Overexploitation** **Week 8: Invasive species** **Week 9: Conservation biodiversity** **Week 10: Indicators** **Week 11: IUCN lists** **Week 12: Biodiversity monitoring** **Week 13: Field visit** **Week 14: Monthly exam** **Week15: Class revision**	

Department of Environmental Science

College of Science

University of Salahaddin

Subject: Biodiversity

Course Book – (Second stage one course)

Lecturer's name MSc. Halala Rahman Qader

Academic Year: 2022 - 2023

Course Book

1. Course name	**Biodiversity (Practical)**
2. Lecturer in charge	**Halala Rahman Qader**
3. Department/ College	**Environmental Sciences / Science**
4. Contact	**e-mail: Halala.qader@su.edu.krd** **Mob:07504163847**
5. Time (in hours) per week	**Practical: 2 hrs per week.**
6. Office hours	**3 hours per week.**
7. Course code	
8. Teacher's academic profile	In year (2007-2008) took BSc degree in biology, salahaddin university, college of education. In 2013 got master degree in plant physiology at the same university. I was starting teaching as assistant lecturer in environmental science department since 2014.
9. Keywords	
10. Course overview:	

This course will cover the biodiversity domains (Protista, Animalia, and Plantae) and will also provide the specific information on each domain as well as phylum and species. In addition, it also will cover the classification of biodiversity species according to binomial system of Carl Linnaeus.

11. Course objective:

1. Provide information on the taxonomic diversity of plants, animals.
2. Understanding the binomial system of names for species.
3. Methods for detecting species presence in the field.

12. Student's obligation

A student must read the lecture hand-out before the class. Three classes in-between the semester is devote for examination, each student must prepare him/her good. Therefore, each student must have three exam marks till the end of the course.

An absence from classes should be excused according to the general regulations (i.e. sick leave) soon after coming back to college otherwise the absence is recorded as an unexcused one, and marks were subtracted from the final grade. For each class, we recommend the students to take the lecture hand-out before attending the classroom.

The questions on the test will comprise a mixture of quantitative calculations and qualitative responses that provide interpretation of the results obtained. These will require the student to demonstrate of knowledge of ecological theory and may require some additional reading beyond the lecture material.

13. Forms of teaching

A student must read the lab lectures hand-outs before the class. In the class, the lectures are power-point present at the first couple of hours of the class, inconspicuous points are

clear on whiteboard, difficult idioms and tough words are also clear for the students. Finally a slide of question mark is present in order the students to ask the teacher about inconspicuous points from each lecture. The lectures will be presented mainly in English language as well as Arabic and Kurdish language will be used if it's necessary in the Lab.

14. Assessment scheme

Grades are break down as follow:
First exam = 30 points
Second exam = 30 points

The mean of the two examinations will be taken. The final grade at the end of the year would be 35% of practical subject. While, the final examination would takes 35%. So the final grade would be passed upon the following criteria:

- Mean of two practical examinations: 25%
- Weekly quizzes: 3%
- Report 4 %
- Weekly homework 3%

15. Student learning outcome:

- Students will able to use of full range of sampling techniques currently available for invertebrate and vertebrate as well as plants in a terrestrial environment, as well as they will be able to explore techniques in the quantification of biodiversity and the measurement of abundance.
- Develop field skills such as surveying and monitoring.
- Develop identification skills such as bacteria, fungi, protozoa, animals and plants.

16. Course Reading List and References:

4. Hunter and Gibbs (2007), *Fundamentals of Conservation Biology*.
5. Krebs, C.J. (1999). *Ecological Methodology*. (2nd Edition). Benjamin-Cummings.
6. Sinclair, A.R.; Fryxell, T. and Caughley, G. (2006) *Wildlife Ecology, Conservation and Management*. (2nd Edition). Blackwell Publishing.

17. The Topics:	Lecturer's name

First semester Biodiversity	
18. Practical Topics (If there is any)	
Week 1: An introduction to biodiversity **Week 2: Kingdom Protista; Subkingdom protozoa** **Week 3: Kingdom Animalia; Phylum Porifera and Cnidaria** **Week 4: Phylum Platyhelminthes and Nematoda** **Week 5: Phylum Annelida** **Week 6: Phylum Mollusca** **Week 7: Phylum Arthropods (Class: Crustaceans and Class: Arachnida (Chelcirates)** **Week 8: Phylum Arthropods (Class: Insecta)** **Week 9: First exam** **Week 10: Phylum Echinodermata** **Week 11: Phylum Chordata (Class Amphibia)** **Week 12: Phylum Chordata (Class: Reptilia)** **Week 13: Phylum Chordata (Class: Aves)** **Week 14: Phylum Chordata (Class: Mammalians)** **Week 15: Kingdom Plantae; vascular plants** **Week 16: Angiosperms** **Week 17: gymnosperms** **Week 18: Second exam** **Week 19: field trip**	**Teaching staff:** **1. Halala Rahman**
19. Examinations: ***1. Compositional:*** **Q.1: Why *Euglena* is considered as both an algae and protozoans?**	

2. Multiple choices:

Q.2: Choose the correct answer from the following (two incorrect answers will cancel one correct answer):

1. Bath sponge belongs to the class

a) Porifera b) Demospongia c) Hexactinellida d) Calcarea

2. Box jellies cnidarians are the members of the class

a) Hydrozoa b) Scyphozoan c) Actinozoan d) None of these

3. Kingdom Monera consist of

a) Prokaryotes b) Eukaryotes c) Archaebacteria d) None of these

4. Fungi can be distinguished from algae in fact that

a) Cell wall is cellulosoic cell wall and chlorophyll is absent b) Nucleus is present c) Mitochondria are absent d) Cell wall is chitinous and chlorophyll is absent

5. Most common method of reproduction in bacteria is

a) Binary fission b) Budding c) Multiple fission d) Sexual reproduction

3. *Differentiation and numeration:*

1. Distinguish between diploblastic & triploblastic animals?

2. Basis of classification of animal kingdom?

4. Answer the following questions:

1. What is the method of asexual reproduction in yeast?
2. Box jellies is classified under which class?
3. Name the kingdom to which bacteria belong?
4. What is the locomotary structure of Euglena?
5. Which phylum's organisms possess nematocysts?
6. Cnidarians have two basic body forms. Name them?
7. What is the name given to fungal infection?

Typical answer:

1. Because the genus ***Euglena*** is renowned for motility like protozoans as well as photosynthesis like plants (and is considered both an alga and protozoan).
2. 1. B 2. D 3. A 4. D 5. A
3. 1/

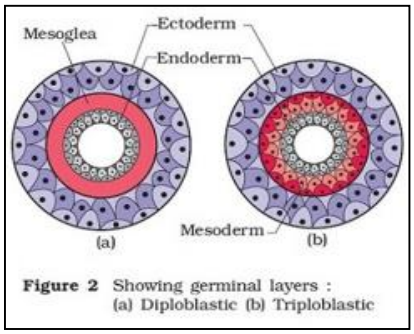

Figure 2 Showing germinal layers : (a) Diploblastic (b) Triploblastic

3. 2/ There is a difference in structure and form of different animals, there are a few fundamental characteristics that are common to various organisms. The features are:

1. Arrangement of cells,
2. Body symmetry,

3. Nature of coelom,
4. Patterns of digestive, circulatory and reproductive systems,
5. Arrangement of cells in germ layers,
6. Segmentation,
7. Notochord. These are the features that forms basis for animal classification.

4.

1. Buddying
2. Cubozoa
3. Monera
4. Flagella
5. Cnidarian
6. Polyp and Medusa
7. Mycosis

20. Extra notes:

Here the lecturer shall write any note or comment that is not covered in this template and he/she wishes to enrich the course book with his/her valuable remarks.