Department of Biology

College of Science

University of Salahaddin/Erbil

Subject: Invertebrate Zoology

Course Book – Year 2 (General biology)

Theory Lecturer's name:

Assist. Prof. Dr. Sherwan T. Ahmed

Practical Lecturer's name:

Dr. Fenik Sherzad Husein

Academic Year: 2021/2022

Course Book

1. Course name	**Invertebrate Zoology**
2. Lecturer in charge	**Assist. Proff. Dr. Sherwan T. Ahmed**
3. Department/ College	**General Biology/Science**
4. Contact	**e-mail: sherwan.ahmed@su.edu.krd** **Tel: (optional)**
5. Time (in hours) per week	**Theory: 2 Practical: 2**
6. Office hours	**6hrs**
7. Course code	**SBIO 201**
8. Teacher's academic profile	**Assist. Proff. Dr. Sherwan T. Ahmed** - 1978-1979 Bachelor in Biological Science from university of Sulaimanya/Iraq - 1993-1994 MSc.degree in Medical Microbiology from university of Salahaddin/Iraq -2009-2010 PhD. In Invertebrate Zoology from University of Salahaddin/Iraq -2002 submitting of Duhok University Confrence/College of Medicine -2011 submitting of Kerkuk University Confrence/College of Science – Department of Biology -2011 submitting of 1st international Confrence in Applied Science/Malaysia -2015 Quality Assurance committee/College of Science-Department of Biology - During 1995-2015 Teaching (Medical Microbiology,General Microbiology, Human Biology, Parasitology, Invertebrate Zoology) in College of Pharmacy & College of Science-Department of Biology/University of Salahaddin/Kurdistan Region-Iraq -2011-2015 Supervising of Postgraduate students.

9. Keywords	**Parasitology, protozoa, helminthes, ectoparasites, epidemiology, pathogenicity. lifecycle, treatment, prevention.**

10. Course overview:

This object of this course is to survey the major invertebrate phyla, classes and orders. We begin with the simplest, single celled organisms, and finish with the most complex. For each group we will explore internal and external anatomy, feeding, and reproduction, and relate these anatomical and morphological features to the invertebrate's mode of life.

Laboratory work involves examining live and prepared specimens and field trips to local habitats. It is hoped that by the end of the course you will be familiar with the common taxa and understand the relationship between the form and function for each.

11. Course objective:

Most of the animal species on planet Earth are invertebrates! In this course, we study the taxonomy, anatomy, physiology, feeding habits, ecology, behaviour, and reproductive strategies of major invertebrate groups, with the exception of insects. We emphasize the evolutionary relationships between the different invertebrates.

12. Student's obligation

In the performance of all work in this course each student is expected to adhere to the standards of ethical behavior as stated in the University Undergraduate Catalog. The following are expected:

1. students neither give nor receive assistance on exams
2. each report is the students own work
3. students avoid plagiarism in their written work
4. students deal forthrightly and honestly when consulting with faculty

If there is any reason to suspect that you have violated the University honor code, you will automatically receive a zero for the work in question. Your violation will be reported to the Office of the Dean of Students and will probably result in an Honor Council hearing. Any student found guilty and sanctioned by the Honor Council is entitled to an appeal.

13. Forms of teaching

A- Lecture
B. Demonstration
C. Laboratory Practice
D. Audio-Visual programs

14. Assessment scheme

1st exam ……..12.5marks 2nd exam ……..12.5 marks

Practical exam ……10 marks

Quizzes ……5marks

Final exam (Theoritical)……..40 marks Final exam (Practical)……20 marks

Total……100 marks

15. Student learning outcome:

Students should be able to:

- appreciate the importance, value, and diversity of the invertebrates.
- understand the diversity, evolution and relationships between major groups of invertebrates
- knowledge of concepts in animal taxonomy
- study the anatomy and physiology of different invertebrate groups
- understand structure/function relationships
- find out where different animals live and how their body designs evolved to adapt to new environments (marine, fresh water, land)
- identify the major phyla and classes of invertebrates (in the laboratory)
- study the different reproductive strategies of invertebrates
- learn about interesting behaviour of the higher invertebrates

16. Course Reading List and References:

1. "Biology of the Invertebrates" by J.A. Pechenik, 6th Edition, William C. Brown Publishers, 2009

2-Invertebrate Zoology.2004. Ruppert, Fox, and Barnes, 7th edition.

17. The Topics:

Date Lecture Reading **16.**
The Topics:
Week Lecture Topic Readings
10/10 : Introduction: definitions; principles and concepts 10/17: Intestinal protozoa : Amoebiasis, other amoebic protozoa 10/24: Intestinal protozoa : other amoebic protozoa ,Giardiasis.
10/31: Trichomoniasis , Balantidiasis,
11/07 : Blood and tissue protozoa, Apicomplexa: Malaria 11/14 : Apicomplexa: Toxoplasmosis, Blood and tissue protozoa: Kinetoplasta:
Leishmania.
1st Exam (10:15 a.m.)
11/21: Blood and tissue protozoa: Kinetoplasta: Trypanosoms

11/27: Introduction to phylum Platyhelminthes;
Class Trematoda: General characteristics.
Subclass Digenea and Subclass Monogenea: form and function, life cycle, morphology and mode of infection.

Habitat, Geographical distribution, Morphology, Life cycle, Disease, Prevention for all the following members in Class Trematoda Sub Class Digenea : order:Prosostomata, Family: Fasciolidae:
Fasciola hepatica
12/5: *Fasciola gigantica*
Family:Opisthorchidae: *Clonorchis sinensis*
Family: Dicrocoelidae: *Dicrocoelium lanceolatum*
Family Fasciolidae*: Fasciolopsis buski*
Family:Hrterophyidae: *Heterophyes heterophyes* 12/12: Family:Troglotrematidae *:Paragonimus westermani*
Family:Schistosomatidae:
Schistosoma haematobium
Schistosoma mansoni
Schistosoma japonicum

12/19: Class Cestoda (Tapeworm): General characteristics.
Order Cyclophyllidea and Order: Pseudophyllidea form and function.

Habitat, Geographical distribution, Morphology,Life cycle,Disease,Prevention for all the following members in
Class: Cestoda
Family: Taeniidae:
Taenia saginata
Taenia solium

Family: Hyminolepididae ***Hyminolepis nana*** **12/26: *Hyminolepis diminuta*** **Family: Taeniidae:*Echinococcus granulosus*** **Family: Dilepididae*: Dipylidium caninum*** **Family: Diphylobothriidae*:Diphylobothrium latum*** **1/02: Phylum Nemathelminthes: Class: Nematoda: General characteristics** **Sub class Aphasmidia,** **Sub class Phasmidia,** **Habitat, Geographical distribution, Morphology, Life cycle, Disease, Prevention for all the following members in** **Class Nematoda** **1-Intestinal nematodes** **A: Intestinal nematodes with tissue stage*:*** ***Ascaris lumbricoides*** **1/09: *Ancylostoma duodenale,*** ***Necator americanus*** ***Strongyloides stercoralis*** **B: Intestinal nematodes without tissue stage:** ***Trichuris trichiura,*** **1/16: *Enterobious vermicularis*.** **2: Tissue and blood dwelling nematodes: *Trichenella spiralis*,** **Filarial worms:** ***Wuchereria bancrofti,*** ***Loa loa*** **1/23:2nd Exam (10:15 a.m.)** **2/2: Orientation/Generalities, Protozoans** **9/2: Protozoans (2)** **16/2: Porifera** **23/2: Hydrostatic Skeleton & Cnidaria** **2/3: Platyhelminthes** **Spring holiday**	

23/3: 1st EXAM **30/4: Rotifera, Nemertea** **7/5 : Mollusca** **14/5: Mollusca** **21/4: Annelids** **28/4: Arthropoda: chelicerata** **5/5: Arthropoda: crustacea** **12/5: 1st EXAM** **17/5: Echinodermata**	

18. Practical Topics (If there is any)

Department of Biology

College of Sciences

University of Salahaddin

Subject: Practical invertebrate 1st Semester

Course Book – (Year 2) (General biology)

Dr. Fenik Sherzad Husein

Academic Year: 2021/2022

Course Book

1. Course name	**General parasitology**
2. Lecturer in charge	**Dr, Fenik Sherzad Huseen**

3. Department/ College	**Biology/Sciences**
4. Contact	**Fenik.hussen@su.edu.krd** **fenik_aya@yahoo.com** **Tel: 009647504862671**
5. Time (in hours) per week	**Practical: 2**
6. Office hours	**20-25 hrs.**
7. Course code	**SBio110**
8. Teacher's academic profile	• **I (Fenik Sherzad Hussen) graduate from Salahaddin University in2000 (Ranked 8th in collage) worked as assistant biology for 2 years and assist in practical microbial physiology lab., practical medical microbiology lab., practical food microbiology lab. In 2006 I finished my MSc degree and start as Assistant Lecturer Teaching Practical parasitology, invertebrate, zoology and microbial physiology.** • **In I have starting teaching invertebrate, I have 7 published paper** • **I am starting PhD study in 2017 in biology department** • **I have PhD in 2021**

9. Keywords	Invertebrate ,general phylum ,zoology

10. Course overview:

The invertebrates are a medically, economically and ecologically important group of animals. A number of invertebrates act as pathogens or vectors of disease. Malaria is one of the most important diseases in the world and is caused by a protozoan that is transmitted by anopheles mosquitoes. Economically speaking, invertebrates can be detrimental, serving as pests that destroy crops, but can also benefit us by serving as sources of food (eg. shrimp, lobster). Ecologically, invertebrates are an integral part of the food chain and can be utilized as bio indicators. Therefore it is in our best interest to study and understand the unique physiological processes of each phylum. In addition to lectures, students will write a concise 1 page review of an article published in a peer reviewed journal on a physiologically relevant topic and will present the hi-lights of this paper to the class. The laboratories will consist of hands-on experiments which demonstrate physiological mechanisms in the invertebrates. The majority of lab exercises will utilize insects because they are cheap to obtain and make convenient models for studying these processes.

11. Course objective:

The course will cover different invertebrates including: Phylum (Protozoa, Porifera, Cnidaria, Platyhelminthes, Nemathelminthes, Annelida, Mollusca, Arthropoda and Echinodermata). Including every necessary information on invertebrates, geographical distribution of them, nomenclature, classification, morphology and their life cycle.

12. Student's obligation

The student’s attendance the class, exams and seminars and other activity like collecting samples .

13. Forms of teaching

Several type of teaching will be used:

2. **Giving an abstract of the former lab lecture with daily/weekly quizzes.**
3. **Teacher notes including all information on the studied invertebrate and also labelled morphological and life cycle line diagrams on the board.**
4. **Power point lectures to:**

e. **Acquiring information on invertebrates morphology and structure...**

f. **To get best knowledge on the invertebrate life cycle and their habitat.**

5. **Classroom discussion will done about the studied invertebrate including structure, morphology, habitat, life cycle, information about the methods of invertebrate diagnosis,**

14. Assessment scheme

I assessments the student through attendance in the class, course exams, quizzes and seminars or presentation the subjects that have relations with the invertebrate.

15. Student learning outcome:

This course is designed to provide students with a basic understanding of biology, evolution, morphology, anatomy and physiology of the more common invertebrate phyla. The taxonomy, distribution, diversityand economical, medical and ecological importance of invertebrates will be presented. After finishing the course students will be able to explain the main principles of the body plan of each major taxon of invertebrates and to explain importance of invertebrates animals

16. Course Reading List and References:

To prepare the subjects I using Laboratory Studies in Integrated Principles of Zoology, Text Book of invertebrate Practical Animal Biology…..etc.,journals about the subjects by using internets.

17. The Topics:	**Lecturer's name**

-**introduction to the invetebrate phylum: protozoa.** **-super class: opalinata, ciliophora and sporozoa.** **-phylum porifera** **- Phylum: Cnidaria (Coelentrata).** **- Phylum: Nemathelminthes** **- Phylum: Annelida (segmented worm).** **- Phylum:Mollusca** **- class: Lamellibranchiata**	**Dr. Fenik Sherzad Huseen** **(2 hrs) for each class** **2nd stage**
- Phylum*:* Arthropoda -**Sub phylum: Chelicerata** **-Phylum: Echinodermata** ***-Practical methods in invertebrate***	
18. Practical Topics (If there is any)	
-Preparing slid for searching invertebrate **-identification of land invertebrate and fresh water invertebrate.** **-using scientific key for classification of invertebrate.**	**Dr. Fenik Sherzad Huseen** **(2 hrs) for each class** **2nd stage**
19. Examinations: **For the exam uses move system, and include different questions as true and false, blanks, define, describe and identify the slides and parasite specimens.**	
20. Extra notes: **This subjects need field trips to see some fresh water and land sample and learing identification of the invertebrate and fine the new record of invertebrate especially in our city.**	
21. Peer review **This course book has to be reviewed and signed by:** **Dr. Sherwan T. Ahmad**	