Department of Biology

College of Education

Salahaddin University-Erbil

Subject: **Practical Animal physiology**

Course Book – **(Year: 3)**

Lecturer's name: **Sarwar N. Jafar -Ph.D.**

Academic Year: **2024/2025**

Course Book

1. Course name	Practical Animal Physiology
2. Lecturer in charge	Sarwar N. Jafar
3. Department/ College	Biology/College of Education
4. Contact	**E-mail**: Sarwarnawzad@gmail.com **Tel**: 0750 4654287
5. Time (in hours) per week	**(6 hrs.)**
6. Office hours	
7. Course code	**EdB0303**
8. Teacher's academic profile	• I was born in Erbil in 1984 • attended to College of Education, Biology Department/Salahaddin University /Erbil during 2001-2005 • In April 2007 started working as an official employee in the biology department as an assistant biologist • I got my master's degree and animal physiology in 2012 with a grade of 83. • I got my Ph.D. in animal physiology as well in June 2020. • My academic title is Lecturer now, and I have taught various courses during my career as a lecturer, including Animal Physiology, Anatomy and Physiology, Histology, and Eco statistics.
9. Keywords	**Hematology, physiological experiments**

10. Course overview:

Physiology is the study of the normal functions of living systems. This course will introduce students to the basics of invertebrate and vertebrate physiology.

Lectures guide the student through the various body systems and their interactions that maintain homeostasis in animals. Associated practical's allow the student to explore systems in further detail and to develop relevant lab skills. Several topics are covered throughout the year, including main physiological processes including gas exchange, blood and circulation, osmoregulation, digestion, nervous and muscle systems, and endocrinology, and an understanding of the physiological problems animals face and how they solve those problems. As a branch of biology, Animal physiology is closely related to Histology and Cytology. Animal Physiology makes extensive use of the principles and methods of physics, chemistry, and mathematics. The chemical and physical processes occurring in the organism are studied in conjunction with biochemistry, biophysics, and evolutionary laws studied

in conjunction with embryology. Animal Physiology is most closely associated with medicine, which utilizes physiological achievements to diagnose, treat, and prevent a variety of diseases. Clinical medicine, in turn, provides physiology with new areas of investigation.

The comparative approach can help us to develop a general evolutionary framework in which to address physiological problems. By comparing how different animals solve related problems in various environments, we can begin to gain insight into physiological principles that apply across levels of organisms and environments.

11. Course objective:

The course has two primary objectives:

- The first is for every student to obtain a working knowledge and understanding of basic Animal physiology, including describing the systems and processes involved in and explaining the physiological processes and the major organ systems of the body, including the cardiovascular, circulatory system, gastrointestinal, muscular and nerve, endocrine systems.
- The second is to apply these physiological principles to problem-solving situations, as observed in medical situations, including cardiac problems, hypertension, acid-base balance disturbances, and endocrine imbalances. The endpoint of both objectives is to obtain a practical understanding of physiology that students can build upon.

12. Student's obligation

The role of students and their obligations throughout the academic year include:

A. Quizzes and daily activities and seminar

B. practical midterm examinations(2 exams)

13. Forms of teaching

Different forms of teaching will be used to reach the objectives of the course:
Using projectors to view PowerPoint slides and laser pointers for further explanation and using the whiteboard and colored pens to illustrate the lab notes or slide preparation, laboratory test, or experiment.

14. Assessment scheme

Course grade

The following assignments will determine the grade: Quizzes, activities, participation in lab work, daily questions, and examinations during the year.

No.	Exam (Evaluation)	Marks
1.	Quizzes and daily activities	3%
2.	1st Practical Exam	15%
3.	2nd Practical Exam	15%
4.	Lab Activities	2%
5.	**Total Scores**	**35%**

15. **Student learning outcome:**

After completing this course, students should be able to describe, identify, and/or explain:

1. The various physiological organ systems and their importance to the integrative functions of the human body.
2. Body fluid compartments and the ionic composition of body fluids.
3. Movement of water and solutes between the fluid compartments.
4. The concept of homeostasis includes setpoints, negative and positive feedback loops, and compensatory responses.
5. Structure of biological membranes. The function of biological membranes, including membrane proteins' role in catalysis, recognition, and transport.
6. Demonstrate an understanding of the components of human blood and the characteristics, functions, abnormalities, and disease states of each.
7. Demonstrate proficiency in the skills necessary to perform blood cell counts and evaluate blood elements within stated limits of accuracy.
8. Motility, secretion, digestion, absorption in the gastrointestinal system.
9. Organization structural and functional organization of the nervous system, including the central and peripheral nervous systems, the autonomic nervous system, and the enteric nervous system.
10. The resting membrane potential, the action potential, and action potential propagation along the axon.
11. Structure and function of skeletal muscle, including excitation-contraction coupling, sliding filament mechanism, force generation, and isometric versus isotonic contractions.
12. Structure and functions of the cardiovascular system, including the mechanical and electrical properties of cardiac muscle function.
13. Reflex regulation of blood pressure.
14. Principles of hormone action, including structure, mechanism of release from the endocrine cell, mode of transport in blood, mechanism of action in target cells, and systemic effects of important hormones.
15. The kidney nephrons' structure and functions including glomerular filtration, tubular reabsorption, tubular secretion, and excretion.

16-Course Reading List and References

1. Textbook of Medical Physiology by Arthur C. Guyton and John E. Hall, 11th edition, 2006.
2. Essentials of Anatomy and Physiology by Valerie C. Scanlon and Tina Sanders, 5th edition, 2007.
3. Chandrasekar, M., 2011. Practical Physiology Book. JP Medical Ltd.
4. A laboratory guide to human physiology by Stuart Ira Fox, 2002.

17. The Topics: Animal physiology lab Lecturer's name: Sarwar N. Jafar

18. Practical Topics

Topics	Weeks
1-Osmosis and cell permeability Purpose of the lab, Background, Procedure Biological membrane, solutions depending on tonicity	Sarwar N. Jafar Time: (6 hrs.)
2-Blood groups and matching Purpose of lab, Background, Procedure Crossmatching, blood groups, and pregnancy	Sarwar N. Jafar Time: (6 hrs.)
3. Hemoglobin determination Purpose of lab, Background, Procedure Function, factors influencing hemoglobin levels	Sarwar N. Jafar Time: (6 hrs.)
4. Red blood cell count Purpose of lab, Background, Procedure Mammalian erythrocytes, Data interpretation	Sarwar N. Jafar Time: (6 hrs.)
5. Packed cell volume (PCV) and Blood indices Purpose of lab, Background, Procedure Relationship between hematocrit and hemoglobin	Sarwar N. Jafar Time: (6 hrs.)
6. White blood cell count Purpose of lab, Background, Procedure Clinical significance, Causes of leucocytosis	Sarwar N. Jafar Time: (6 hrs.)
7. Differential white blood cell count Purpose of lab, Background, Procedure Granulocytes, agranulocytes, Wright's stain	Sarwar N. Jafar Time: (6 hrs.)
8. Blood coagulation Purpose of lab, Background, Procedure Bleeding time, clotting time	Sarwar N. Jafar Time: (6 hrs.)
9. Erythrocyte sedimentation rate Purpose of lab, Background, Normal values, Factors affecting the ESR	Sarwar N. Jafar Time: (12hrs.)
10. Blood pressure measurement Purpose of lab, Background, Systolic blood pressure, Diastolic blood pressure	Sarwar N. Jafar Time: (6 hrs.)
11. Digestion of carbohydrates by salivary amylase Purpose of lab, Background, Procedure physical digestion, chemical digestion, maltose test	Sarwar N. Jafar Time: (6 hrs.)

12. Gastric Digestion of Protein Purpose of lab, Background, Procedure gastric juice, protease pepsin, pH	Sarwar N. Jafar Time: (6 hrs.)
13. Glucose tolerance test Purpose of lab, Background, Procedure Pancreas, insulin, what is diabetes	Sarwar N. Jafar Time: (6 hrs.)
14. Insulin shock Purpose of lab, Background, Procedure Hypoglycaemia, symptoms of glucose deficiency	Sarwar N. Jafar Time: (6 hrs.)
15. Microcirculation Purpose of lab, Background, Procedure Capillary function, autoregulation	Sarwar N. Jafar Time: (6 hrs.)
16. Skeletal muscle physiology Purpose of lab, Background, Procedure Simple twitch, stages of a simple twitch, kymograph	Sarwar N. Jafar Time: (6 hrs.)
17. Skeletal muscle physiology Purpose of lab, Background, Procedure Effect of frequency on skeletal muscle contraction	Sarwar N. Jafar Time: (6 hrs.)
18. Cardiac muscle physiology Purpose of lab, Background, Procedure The frog heart, pacemaker, heartbeat	Sarwar N. Jafar Time: (6 hrs.)
19. Cardiac muscle physiology Purpose of lab, Background, Procedure Effects of drugs and temperature on the frog heart	Sarwar N. Jafar Time: (6 hrs.)
20. Reflex action Purpose of lab, Background, Procedure Reflex arc, spinal shock, crossed extensor reflex	Sarwar N. Jafar Time: (6 hrs.)
21. General urine examination (GUE) Purpose of lab, Background, Procedure Physical examination, Chemical, microscopic examination	Sarwar N. Jafar Time: (6 hrs.)

19. Extra notes:

20. Peer review **پێداچوونەوەی هاوەڵ**