

Ministry of Higher Education and Scientific research



Department of General Science

College of Basic Education

Salahaddin University-Erbil

Subject: Practical Animal Physiology

Course Book – (Year: 3)

Lecturer's name: Gihan Hamasharif Hamad-PhD.

Academic Year: 2023/2024

Course Book

1. Course name	Practical Animal Physiology
2. Lecturer in charge	Dr. Gihan Hamasharif Hamad
3. Department/ College	General Science / Basic Education College
4. Contact	e-mail: gihan.hamad@su.edu.krd
5. Time (in hours) per week	Practical: 9 hrs.
6. Office hours	
7. Course code	
8. Teacher's academic profile	Born in 1977. She received her M.Sc. degree in 2003 (Genetics). Also, she received her Ph.D. degree in 2016 (Human Molecular Genetics), having more than 16 years of teaching experience, is working as Lecurure (Human Molecular Genetics) in Department of General Science, College of Basic Education, Salahaddin University-Erbil, Kurdistan Region of Iraq. She was participated some conferences and International conferences in Kurdistan Region of Iraq. She was teaching several topics in Department of General Science and also at Evening.
9. Keywords	Hematology, physiological experiments
10. Course overview:	
<p>Animal physiology is the study of how animals' bodies function in their environment. An understanding of the physiological problems animals face and how they solve those problems can be achieved only in an evolutionary context. Knowledge of certain aspects of an animal's natural history, morphology, behavior, and environment is necessary to fully appreciate the importance of its physiological mechanisms.</p> <p>The study of animal physiology includes topics such as gas exchange, feeding and digestion, circulation, metabolic rate, water and solute regulation, temperature regulation, excretion of wastes, and movement. 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.</p>	

This course is designed to give an overview of haematology and animal physiology at the third-year general science student level. The course consists of basic/clinical science lectures combined with relevant laboratory exercises associated with each given hematologic and physiology disorder.

11. Course objective:

To familiarize students with the principles and basic facts of Animal Physiology and with some of the laboratory techniques and equipment used in the acquisition of physiological data. The emphasis will be on mammalian physiology, but there will be some coverage of other vertebrate taxa. The course will focus on organ-system physiology; however, cellular and molecular mechanisms will be discussed in order to present a current view of physiological principles. Furthermore, emphasis will be placed on nervous, muscular, cardiovascular, respiratory, renal, digestive, and endocrine physiology. Where appropriate, basic chemical and physical laws will be reviewed in order to enhance and to promote student understanding. The laboratory component of the course is designed to reinforce the topics discussed in the lecture, as well as to familiarize students with some of the laboratory techniques and equipment used in the acquisition of physiological data.

12. Student's obligation

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

- A. Quizzes and daily activities
- B. 1st practical examination
- C. 2nd practical examination
- D. Lab activities
- E. Final practical examination

13. Forms of teaching

- Lectures (PowerPoint presentation): One lecture per week for 24 weeks is given. The students are encouraged to actively share in discussion during the session, stimulating questions are also posed by the lecturer, and short in-class tests (multiple choice quizzes) are given at regular intervals to examine factual knowledge and stimulate background revision.
- Practical sessions are arranged in the students' lab. One 3-hour practical classes/week for 24 weeks is given.
- Lectures notes and handouts are also given to the students.
- Students are also directed to the relevant primary literature, book sections, and internet resources from which they can find useful information.

14. Assessment scheme

No.	Exam (Evaluation)	Marks
1.	Quizzes and daily activities	7%

2.	1 st Practical Exam	15%
3.	2 nd Practical Exam	15%
4.	Lab Activities	3%
5.	Final Practical Exam	60%
6.	Total Scores	100%

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, including setpoint, negative and positive feedback loops, and compensatory responses.
5. Structure of biological membranes. The function of biological membranes, including the role of membrane proteins in catalysis, recognition, and transport.
6. Demonstrate an understanding of the components of human blood and characteristics, functions, and abnormalities and disease states of each.
7. Demonstrate proficiency in the skills necessary to perform blood cell counts and evaluation of 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, 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.

16. Course Reading List and References:

▪ Key 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.

▪ Useful references:

1. Experiments in physiology by Gerald D. Tharp, 5th edition, 1986.
2. A laboratory guide to human physiology by Stuart Ira Fox, 2002.

▪ Magazines and review (internet):

17. The Topics:	Lecturer's name
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18. Practical Topics (If there is any)	
1. Osmosis and cell permeability Purpose of lab, Background, Procedure Biological membrane, solutions depending on tonicity	Time: (9 hrs.) Date:
2. Blood groups and matching Purpose of lab, Background, Procedure Crossmatching, blood groups, and pregnancy	Time: (9 hrs.) Date:
3. Haemoglobin determination Purpose of lab, Background, Procedure Function, factors influencing haemoglobin levels	Time: (9 hrs.) Date:
4. Packed cell volume (PCV) Purpose of lab, Background, Procedure Relationship between haematocrit and haemoglobin	Time: (9 hrs.) Date:
5. Differential white blood cell count Purpose of lab, Background, Procedure Granulocytes, agranulocytes, Wright's stain	Time: (9 hrs.) Date:
6. Blood coagulation Purpose of lab, Background, Procedure Bleeding time, clotting time	Time: (9 hrs.) Date:
7. Blood pressure measurement Purpose of lab, Background, Procedure Systolic blood pressure, Diastolic blood pressure	Time: (9 hrs.) Date:
8. Glucose tolerance test Purpose of lab, Background, Procedure Pancreas, insulin, What is diabetes	Time: (9 hrs.) Date:
9. Gastric Digestion of Protein Purpose of lab, Background, Procedure gastric juice, protease pepsin, pH	Time: (9 hrs.) Date:
10. Insulin shock Purpose of lab, Background, Procedure Hypoglycaemia, symptoms of glucose deficiency	Time: (9 hrs.) Date:
11. Microcirculation Purpose of lab, Background, Procedure Capillary function, autoregulation	Time: (9 hrs.) Date:
12. Cardiac muscle physiology Purpose of lab, Background, Procedure Effects of drugs and temperature on the frog heart	Time: (9 hrs.) Date:
13. Reflex action Purpose of lab, Background, Procedure Reflex arc, spinal shock, crossed extensor reflex	Time: (9 hrs.) Date:
19. Examinations:	

1. Compositional:

- **What are the most common causes of low RBC count?**

Answer: Excessive bleeding, Decreased red blood cell production, Increased red blood cell destruction

- **State how each of the following conditions will affect a patient's WBC count? (1. Leukaemia, 2. allergy, 3. X-ray)**

Answer: 1. Increases 2. Increases 3. Decreases

2. True or false type of exams:

- The osmotic pressure depends on mass but not the numbers of particles per unit volume of fluids. (False)
- The coagulation system consists of a series of proteins (coagulation factors) that activate in a step-by-step process called the bleeding cascade. (False)
- Because they lack a cytoplasm, the RBCs stay viable for only about 120 days. (False)

3. Multiple choices:

- The digestion of which macronutrients occurs primarily in the stomach?
 - a. Vitamins
 - b. Proteins**
 - c. Lipids
- Using a hemocytometer, determine the dilution for a normal red blood cell count.
 - a. 20 times
 - b. 200 times**
 - c. 2000 times
- Determine the MCV mathematically, if the PCV is 35% and the RBC is 4 million per cubic millimeter.
 - a. 87.5 cubic micron**
 - b. 95 cubic micron
 - c. 48 cubic micron

20. Extra notes:

21. Peer review

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