Department of Biology

College of Science

Salahaddin University

Subject: Animal physiology 1+2

Course Book – 3

1. **Lecturer's name: Asst. Prof. Dr. Edrees Mohammad Ameen**
2. **Lecturer's name: Practical Lecturer. Firas Khalid Qasim**
3. **Academic Year: 2022/2023**

Course Book

1. Course name	**Animal Physiology 1 + Animal Physiology 2**
2. Lecturer in charge	**Edrees Mohammad Ameen**
3. Department/ College	**Biology department/ college of science**
4. Contact	**e-mail: edrees.ameen@su.edu.krd** **firas.qasim@su.edu.krd**
5. Time (in hours) per week	**Theory: 2** **Practical: 6**
6. Office hours	**17 hours per week**
7. Course code	
8. Teacher's academic profile	I was awarded an M.Sc. in animal physiology in 1996 and pursuit in the biology department, college of science, Salahaddin university in 1996 as an assistant lecturer. Then, I started to work in the same department, as an assistant lecturer. Then I finished the Ph.D. at Babylon- university and then upgrading to lecturer in 2007 and assistant professor in 2011.

The teaching experience is both theoretical and practical including:

Undergraduate:

1- Animal physiology.
2- Hematology.
3- Ecophysiology.
4- Histology and embryology.
5- Cell biology.
6- General biology.
7- Invertebrate.
8- Biostatistics.
9- Endocrinology.

Postgraduate:

1- Reproductive physiology.
2- Endocrinology.
3- Advanced Hematology.

2013-2014 Supervising MSc Student.
2013-2016 Supervising Ph.D. Student.
2018-2020 Supervising MSc Student.
2020-2022 Supervising Ph.D. Student.

Administration:

In 2013 I become the supervisor of the library of the college of science.

List of Publications

1. Physiological responses to thyroxine (T4) and hydrocortisone (cortisol) in adult domestic pigeon Columba livia. (3rd Scientific Conference of Salahaddin Univ. Erbil (1997).
2. Effects of jaundice on some hematological and biochemical parameters in humans. IBN AL-HAITHAM J. FOR PURE & APPL. SCI, 19 (2), 2006.
3. A diagnostic study of some causes of male infertility in Kurdistan region of Iraq. 10th Scientific Conference of Babylon Univ. 16 (1), 2008.
4. Effect of stress on semen quality in a population of infertile human. Kufa Med.Journal. 12 (1), 2009.
5. Comparison between hypo-osmotic swelling and staining tests for determination of human sperm viability. Journal of Duhok

	University. 12 (1), 2009. 6. Effect of Iron Overload on Malondialdehyde Level in Beta-Thalassaemia patients. Zanco journal of pure and applied sciences of Salahaddin University. 21(5), 2009. 7. Relationships between ages, days of abstinence, and semen quality of infertile men. Journal of Duhok University. 13(1), 2010. 8. Effect of Ginseng Root on Some Reproductive Parameters in Normal and Cyclophosphamide Treated Male Albino Mice. Zanco journal of pure and applied sciences of Salahaddin University. 22 (4), 2010. 9. IN VITRO Human Sperm Activation Using Simple Layer and Centrifugation-Swim Up Single Layer Techniques. 6th conference of Diyala medical Science. 2010. 10. Effect of Smoking and Varicocele on Fertility and Semen Quality in Infertile Men. 1st conference of biological sciences of Kirkuk University. 2011. 11. Effect of Osmolality on Semen Quality and Using Endtz Method for Determination of Semen Leucocytes. 4th international conference of Salahaddin University. 2011. 12. Effect of viscosity and leucocytospemia on semen quality of infertile men. 4th conference of biological sciences of Duhok University. 2012. 13. Study the role of obesity and oxidative stress as factors of type 2 diabetes. World Journal of Pharmaceutical Research, Volume 4 issue 10: 90-98. 2015. 14. Study the role of Obesity and Pancreatic insufficiency as factors of type 2 diabetes. Online International Interdisciplinary Research Journal, Volume-V: 13-27. 2015. 15. Effect of Some Factors on Respiratory rate and Vital Capacity in human. 1st International Scientific Conference of Kirkuk University. 2015. 16. Effect of Polycystic Ovarian Syndrome and Obesity on Women Fertility in Erbil Governorate. 6th International Conference and Workshop on Basic and Applied Sciences, Salahaddin University, Erbil, 2017. 17. Impact of Diabetes and Obesity on Human Fertility and Semen Quality. 18. Arterial blood gases and some blood parameters in Tetralogy of Fallot patients. Zanco journal of pure and applied sciences of Salahaddin University. 33 (3), 2021. 19. Relationships of Osmolality and Oxidative Stress with Semen Quality and Their Effects on Male Fertility. Ibn Al-Haitham Journal for Pure and Applied science.2021. 20. REPRODUCTIVE, BIOCHEMICAL, AND HORMONAL TRAITS OF LOCAL QUAIL IN RESPONSE TO DIETARY SUPPLEMENTATION OF DRIED GARLIC POWDER. Iraqi Journal of Agricultural Sciences. 53(2):278-287. 2022. 21. REPRODUCTIVE, SERUM BIOCHEMICAL AND

	HORMONAL TRAITS OF LOCAL QUAIL IN RESPONSE TO DIETARY SUPPLEMENTATION OF GREEN TEA POWDER.Iraqi Journal of Agricultural Sciences. 53(1):57-66. 2022. 22.Correlation between Tumor Necrosis Factor–Alfa and Anti-tyrosine Phosphatase with Obesity and Diabetes Type 2. Iraqi Journal of Science. Vol. 63, No. 8, pp: 3322-3331.2022 **Further academic training and Participation in Conferences** 1. Teaching Mode Training held at Salahaddin University (College of Education, Salahaddin University) (1997). 2. 3rd Scientific Conference of Salahaddin Univ. Erbil (1997). 3. 10th Scientific Conference of Babylon Univ. (2008). 4. 6th conference of Diyala medical Science. (2010). 5. 1st conference of biological sciences of Kirkuk University. (2011). 6. 4th international conference of Salahaddin University. (2011). 7. 4th conference of biological sciences of Duhok University. (2012). 8. 1st International Scientific Conference of Kirkuk University. 2015. 9. 6th International Conference and Workshop on Basic and Applied Sciences, Salahaddin University, Erbil, 2017.
9. Keywords	Physiology, Muscular system, physiology of digestion…..

10. Course overview:

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 the natural history, morphology, behavior, and environment of an animal is necessary to fully appreciate the importance of its physiological mechanisms.

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.

11. Course objective:

Animal physiology is the study of how animals function. Our understanding of animal function requires that we integrate our knowledge of biological processes across many levels from the molecular and cellular level through tissues and organ systems and ultimately to the whole

animal itself. Physiological mechanisms by which animals acclimatize, adapt, and survive in varying environments are exquisitely regulated. All animals share the challenge of acquiring resources (e.g. nutrients, oxygen, water) and removing waste (e.g. unused food, carbon dioxide) to maintain homeostasis, but there are many different pathways to achieve these needs. Animal physiology will compare how different animal taxa achieve homeostasis by studying diverse physiological adaptations in a variety of environments.

12. Student's obligation

- Students should attend all lectures and not miss any lecture time.
- Additionally, for each lecture, the student should prepare and follow up with sufficient studying time to cover the material presented in the class during that lecture.
- It is highly advised not to accumulate material until before the examination time. Cramming will weaken the student's ability to understand and retain valuable information.
- Students prefer to attend all the seminars on time which are held in our department especially the seminar about animal physiology

13. Forms of teaching

- Teaching with technology can deepen student learning by supporting instructional objectives.
- Data Show Projector
- Blackboard
- Video

14. Assessment scheme

Breakdown of overall assessment and examination

Grading System:

Exam No. 1 (Theory): 15%
Exam No.2 (Theory): 15%
Mean Examination (Theory): 15 %
Practical Examination: 35%
Total =50 %
Final examination: 50 theory

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. Movement of water and solutes between the fluid compartments.
3. The concept of homeostasis, including setpoint, negative and positive feedback loops, and compensatory responses.
4. Structure of biological membranes. The function of biological membranes including the role of membrane proteins in catalysis, recognition, and transport.
5. Demonstrate an understanding of the components of human blood and characteristics, functions, and abnormalities, and disease states of each.
6. Demonstrate proficiency in the skills necessary to perform blood cell counts and evaluation of blood elements within stated limits of accuracy.
7. Motility, secretion, digestion, absorption in the gastrointestinal system.
8. 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.
9. Structure and function of skeletal muscle, including excitation-contraction coupling, sliding filament mechanism, force generation, and isometric versus isotonic contractions.
10. Structure and functions of the cardiovascular system, including the mechanical and electrical properties of cardiac muscle function.
11. Reflex regulation of blood pressure.
12. 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.
13. Structure and functions of the kidney nephrons, including glomerular filtration, tubular reabsorption, tubular secretion, and excretion.

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.
3. Essentials of animal physiology by S. C. Rastogi, 4th edition, 2007.
4. Essentials of human anatomy and physiology by Elaine N. Marieb, 5th edition, 2012.

- **Magazines and review (internet):**

17. The Topics:	**Lecturer's name**
Week 1: Animal physiology General information about the physiology	
Week 2: Introduction to animal physiology Definition of physiology, branches of physiology	
Week 3: Cellular transport mechanism Passive transport mechanisms, active transport mechanisms	
Week 4: Membrane potential Resting membrane potential, action potential	
Week 5: What is a synapse? Types of the synapse, synaptic properties, neurotransmitters	
Week 6: Muscular system Properties of muscle, muscle tissue types, skeletal muscle	
Week 7: Muscular system Muscle twitch, smooth muscle, cardiac muscle	
Week 8: Examination First examination	
Week 8: Digestive system Digestive processes, salivary glands, digestion in the mouth	
Week 9: Digestive system Stomach, stomach glands, protection of the stomach	
Week 10: Digestive system The small intestine, absorption by the small intestine, liver function	
Week 11: The nervous system	

Neurons, neuroglia, functions of the nervous system	
Week 12: The nervous system The central nervous system, peripheral nervous system	
Week 13: Reflex physiology Reflex arc, types of reflexes, visceral reflex	
Week 14: Human respiratory system Organs of the respiratory system, lungs	
Week 15: Examination Second examination	
Week 15: Human respiratory system Breathing, respiratory cycle, regulation of breathing	
Week 16: The circulatory system Division of circulation, the heart, the heartbeat cycle **Week 17: The circulatory system** Circulatory system and blood cells in humans, birds, and fish	
Week 18: Electrical activity of the heart Division of circulation, the heart, the heartbeat cycle	
Week 19: Urinary system Kidneys, kidney function, nephron	
Week 20: Urinary system Distal tubule, collecting duct, the formation of urine	
Week 21: Endocrine system General features, classes of hormones, hormone actions	
Week 22: Sensation Sensory receptors, classification, microscopic features	
18. Practical Topics (If there is any)	

19. Examinations:

1. **Examples of Semester Examinations**

Q1: Define the following

Nephron, Muscle Twitch, Tetanus, Chemical digestion, Extrinsic glands, Sublingual gland, Homeostasis. The Respiratory Zone.

Q2: Complete the following sentences with suitable words:

1- ---------- is the junction between 2 neurons. There is a very narrow gap of about 20nm between neurons called the ----------
2- The Components of cardiovascular system are ----------, ---------- and ----------
3- ---------- is th the flow of blood between the heart and lungs.
4- ---------- is the random movement of particles from an area of high concentration to an area of low concentration.

Q3: Explain the following:

1- Operation of the Sodium Potassium Pump.
2- Glomerular filtration rate (GFR).

3- Protection of the stomach from the acidic enzymes.

4- Function of cardiovascular system.

Q4: Write the reasons of the following:

Active transport mechanisms involve the cell to use cellular energy usually in the form of ATP to power special protein pumps to bring material into the cell.

Q5: Draw and labels the following:

1- Chemical synapse.

2- Gas exchange between the blood and alveoli.

Q6: Write the differences bewtween the following:

1- Chemical synapse and electrical synapse.

2- Active transport and diffusion.

3- Skeletal muscle and cardiac muscle function.

18. Practical Topics (If there is any)

Week 1	Introduction to basic concepts in animal physiology lab
Week 2	Homeostasis
Week 3	Diffusion and Osmosis , Osmosis in Biological Membrane, EGG OSMOSIS and Tonicity
Week 4	Twich via nerve and twitch via muscle , frog dissection , Single Muscle Twitch via nerve and direct muscle stimulation
Week 5	Summation , tetanusand fatigue in the gastroenemius,
Week 6	The study of basic physiological properties of nerve impulses
Week 7	Study the effects of pancuronium on muscle contraction response induced by direct electrical stimulation of sciatic nerve.
Week 8	The study of reflex
Week 9	Examination 1
Week 10	Cardiovascular Physiology of the Frog
Week 11	Physiological effects of chemicals and physicals factors on heart rhythm
Week 12	Drugs effects on frog heart beat
Week 13	Study of Smooth Muscle Contraction in Unstimulated Rabbit Jejunum
Week 14	The Measurement of Blood Pressure
Week 14	The Electrocardiogram (ECG) and Heart conductivity
Week 16	Rodent : Anesthesia and Blood Collection
Week 17	examination 2 ORAL
Week 18	Respiratory systems Pulmonary Function Tests
Week 19	The study of Brain (Electroencephalograph) EEG
Week 20	The study of Sensory organs
Week 21	The Digestive System
Week 22	The Study of pancreas function
Week 23	The study of adrenal function
Week 24	The Study liver function on lipid metabolism
Week 25	The study of male and female organs

Week 26	examination 3
Week 27	The Study of Renal Physiology
Week 28	Course seminar submission and discussion

21. Peer review **پێداچوونەوەی هاوەڵ**