

Name of the Programme: M. Sc. Zoology

Course Code: ZOO-502

Title of the Course: Comparative Physiology of Animals

Number of Credits: 03

Effective from AY: 2023-24

Pre-requisites for the Course:	Elementary knowledge on animal anatomy and basic physiology	
Course Objectives:	1. To reveal animal body system having physiological homologies and patterns of physiological adaptation to various environments 2. To analyze aspects related to nutrition, excretion, circulation, respiration and reproductive physiology 3. To introduce various principles that underlies higher level integrative bodily functions. 4. To provide a comprehensive knowledge of functional physiological pathways comparing different animals.	
Content:	Module 1 Nutrition (Feeding and digestion) in Non-chordates and chordates. Metagenome of mammalian gut, concept of gut-brain axis, rumen fermentation. Movements of gastrointestinal tract, control and reflexes. General view of excretion and osmoregulation in non-chordates and chordates in freshwater, marine water and terrestrial environment. Contributions of Crustacean antennal glands and Molluscan mantle to acid-base regulation. Urine formation in Metanephros kidney, Nephrolithiasis-mechanism of renal stone formation.	15 hours
	Module 2 General composition of coelomic fluid and hemolymph of Non- chordates, formation of lymph in humans. Physiological difference between pulmonary and systemic circulation of higher vertebrates and changes during pregnancy. Lung volumes and their physiological interpretations and changes in lung volumes during pregnancy. Ventilation perfusion physiology. Conducting system of heart, regulation of heart beat, cardiac	15 hours

	output and blood pressure, comparison of action potentials of Pacemaker cell and cardiomyocyte, effect of exercise on cardiovascular physiology: A human perspective. Module 3 Various types of reproductive modes in non-chordates and chordates. Uterine physiology, implantation, delayed implantation/embryonic diapause and its regulation, estrous cycles and types of anestrus periods. Gestation, prenatal development and placentation in humans.	15 hours
Pedagogy:	Lectures/tutorials/self-study/videos/presentations/mini projects/Group activities	
References/Readings:	1. R. S. K. Barnes, P. Calow, P. J. W. Olive, D. W. Golding and J. I. Spicer, The Invertebrates: A Synthesis, (Third edition), Blackwell Science, 2001. 2. C. Moyes and P. Schulte, Principles of Animal Physiology, Second Edition, Pearson International Edition, USA, 2013. 3. C. L. Prosser, Comparative Animal Physiology, Part A, Environmental and Metabolic Animal Physiology (Fourth Edition), Oxford, John Wiley & Sons Publication, 1991. 4. D. Randall, W. Burggren and K. E. French, Animal Physiology, (Fifth edition), New York, WH Freeman and Co, 2001. 5. K. Schmidt-Nielsen, Animal Physiology: Adaptation and Environment, (Fifth Edition), Cambridge University Press, 2001. 6. P. C. Withers, Comparative Animal Physiology, (First Edition), Fort Worth, Saunders College Publication, 1992.	
Course Outcomes:	The learner will 1. Explain the basic concepts and processes of physiological regulation, from cell to organ to organism level. 2. Appraise the functions of important physiological systems 3. Value how separate systems interact to yield interacted physiological responses to challenges such as exercise, kidney stones and pregnancy. 4. Report different physiological parameters with respect to any alterations and diseases.	