Name of the Programme: M. Sc. Zoology

Course Code: ZOO–527 **Title of the Course:** Environmental Physiology (Theory)

Number of Credits: 03

Effective from AY: 2023-24

Pre-requisites for the Course:	Basic knowledge of Animal Physiology, environmental science and biochemistry	
Course Objectives:	1. To reflect on the nature, levels and mechanisms of adaptation 2. To categorize variations in adaptations with respect to various challenges in different environments 3. To elaborate on biological rhythms operating across the animal kingdom	
Content:	**Module 1** Nature and levels of adaptation; mechanism of adaptation; cellular metabolism, regulation and homeostasis; concept of stress and strain in animals. Thermal adaptation: biochemical and physiological effects of temperature; Regulation of heat gain and heat loss, Dubois temperature balance; role of nervous system and endocrine system in thermal biology; homeoviscous adaptation of membrane. **Module 2** Salinity adaptation: biochemical and physiological effects of salinity; regulation and movements of water and solute; osmoregulatory organs and their excretory products; Role of membranes in osmoregulation. Strategies and mechanism in physiological adaptation with reference to marine life, estuarine life, freshwater life and terrestrial life. **Module 3** Physiological and morphological adaptation of the animals living in extreme environments. Circadian rhythm: biological clock; analysis of circadian rhythmicity; ultradian and infradian rhythm; behavioural and autonomous rhythm; endogenous mechanism of rhythm.	15 hours 15 hours 15 hours

Pedagogy:	Lectures/tutorials/self-study/videos/presentations/mini projects/Group activities
References/ Readings:	1. P. W. Hochachka and G. N. Somero, Biochemical Adaptation, UK: Oxford University Press, 2002. 2. P. Wilimer, G. Stone and I. A. Johston, Environmental Physiology. of Animals, USA, Wiley Blackwell Publishing Co, 2004. 3. R. G. Foster and L. Kretzman, Circadian rhythm, A very short Introduction, UK, Oxford University Press, 2017. 4. R. Refinetti, Circadian Physiology, USA, CRC Press, 2016. 5. S. Nielsen, Animal Physiology: Adaptation and Environment, Cambridge, Cambridge University Press,1997.
Course Outcomes:	The learner will 1. Examine the functioning and control of physiological systems in a range of animals with respect to their habitats 2. Use knowledge of the physiological responses of animals to overcome a range of environmental challenges 3. Interpret the physiological data with respect to different stress environments 4. Design experiments and apply a range of practical skills relevant to the environmental physiology studies.

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