Course Code: ZOO 331 **Course Title: Neurophysiology**
Number of Credits: 3
Effective from AY: 2020 -21

Prerequisite for the Course:	Basic knowledge on Non-chordate and Chordate anatomy and Physiology is prerequisite for this course.	
Objectives:	1. To develop knowledge about fundamental Neurophysiological concepts in animal models and in humans. 2. To be aware of electrophysiology techniques involved in recording neurological parameters.	
Content	**Module 1:**	
	Review of classification of neurons and their functions. Blood-brain barrier and its physiological importance, CSF composition, formation and drainage.	03Hrs
	Physiological characteristics of neuronal cell membrane components for impulse conduction.	03 Hrs
	Electrophysiology of neuron. Comparison of action potentials of Giant axon of Squid and mammalian neuron, Voltage and Cell-Patch Clamp Techniques.	04Hrs
	Myelin ultrastructure and Nodes of Ranvier, Nerve impulse conduction in Myelinated and Unmyelinated neurons.	02Hrs
	Module 2	
	Types of synaptic connection and their conduction physiology: Axosomatic, axodendritic, Dendrodendritic and Axoaxonal synapses. Chemical and electrical sysnapse.	03 Hrs
	Axonal impulse conduction-excitatory and inhibitory synaptic transmission. Properties of Synapse.	03 Hrs
	Effect of Acidosis & Alkalosis, Effect of Hypoxia on Synaptic Transmission, Effect of Narcotic drugs on Synaptic Transmission.	04 Hrs
	Basic concept of Neural integration: Diverging, Converging and Reverberating circuits.	02Hrs

	Module 3 Learning and Memory types and its Neural and Cellular basis in Aplysia, Drosophila, Honey bee and Humans. Cognition and its major domains. Mechanoreception, Photoreception, Chemoreception. Neurophysiology of Balance and Posture.	 06 Hrs 04 Hrs 02 Hrs
Pedagogy:	Lectures/ tutorials/Group discussions/PBL/self-study	
Learning Outcome:	1. Understanding of Neurophysiological concepts. 2. Understanding of learning, memory formation and cognition.	
References /Reading	1. Siegel, G. J.; Agranoff, B. W.; Albers, R. W., et al., (2011). Basic Neurochemistry: Molecular, Cellular and Medical Aspects. Academic Press. 2. Hammond, C. (2008). Cellular and Molecular Neurophysiology. Academic Press. 3. Carpenter, R; Reddi, B. (2012). Neurophysiology: A Conceptual Approach,. Hodder and Arnold. UK. 4. Purves, D.; Augustine, G. J.; Fitzpatrick, D.; et al. (2018). Neuroscience. Oxford University Press. 5. Menzel, R.; Benjamin, P. (2013). Invertebrate Learning and Memory, Volume 22. Academic Press. 6. Gazzaniga, M. S. (2009). The Cognitive Neurosciences. A Bradford Book the MIT Press Cambridge , Massachusetts London, England.	