Course Code: ZOC 102 **Course Title: Anatomy of Non-Chordates**
Number of Credits: 3
Effective from AY: 2020 -21

Prerequisite for the Course:	Basic knowledge on Non-chordate anatomy, taxonomy and systematics is prerequisite for this course.	
Objectives:	To develop knowledge about fundamental anatomical principles among non-chordates. To understand the adaptive changes anatomical structures have undergone in the course of evolution.	
Content:	**Module 1** Skeletal system types: Endoskeleton-like (Poriferans), Exoskeleton (Arthropods) and Hydrostatic skeleton (Cnidarians, Molluscs and Echinoderms). Annelid Locomotory organs involved in Simple propulsion, Burrowing, Peristaltic waves, Sinusoidal and Inchworm type of locomotion. Primitive and advanced flight muscles of insects. Diffused, Simple ganglionic, Cycloneuralian, Heteroganglionic types of non-chordate Nervous system. Tetraneury plan of molluscan nervous system, Streptoneury, Euthyneury and centralization in molluscs. **Module 2** Digestive system types: Channel-network systems, Coelenteronic, Saccular and Tubular systems. Radula of Molluscs and various types of mouthparts in Arthropods. Coelomoduct derived, Gut derived and other excretory organs of non chordates. Calciferous Gland of Earthworms. Reproductive system in arthropods with Gonad-Gonoduct-Gonopore concept with addition of adjunctive organs. **Module 3** Respiratory organs and specialized respiratory structures of Annelids, Molluscs and Arthropods.	**4 hours** **4 hours** **6 hours** **4 hours** **4 hours** **3 hours** **5 hours**

	Open and Closed circulatory system concept of Invertebrates. Circulatory system in Annelids, Arthropods and Molluscs. Hearts of Oligochaetes and Bivalves.	**6 hours**
Pedagogy:	Lectures/ tutorials/ online teaching mode/self-study.	
Learning Outcome:	1. Understand the basic concepts associated with each system of the body. 2. Identify structures that are in place in the body systems to perform the functions according to the habits or habitats of the animals.	
References /Reading:	1. Hymen LH (1951), The invertebrates (all volumes), McGraw Hill, Philadelphia, USA. 2. Barnes RD and Ruppert EE (1994), Invertebrate Zoology, Saunders College Publishing. 3. Barrington EJW (1972), Invertebrate Structure and Function, Thomas Nelson and Sons, USA. 4. Marshall AJ and Williams WD (2004), Textbook of Zoology (vol 1). CBS Publishers & Distributors. 5. Jurd RD (2004), Animal Biology, BIOS Scientific Publishers, USA. 6. Cleveland P, Hickman CP, Roberts LS and Larson A (2001), Integrated Principles of Zoology, McGraw-Hill, NY. 7. Barnes RSK, Calow P, Olive PJW, Golding DW and Spicer JI (2001), The Invertebrates: A Synthesis. Blackwell Science 8. Schmidt-Rhaesa A (2007), The Evolution of Organ Systems, Oxford University Press. 9. Gangully BB, Shina AK and Adhikary S (2011), Biology of Animals vol. 1, New Central Agency, Kolkata.	