# General Electives

(GEC offered by the Dep. Of Zoology for students studying with honours level core courses other than offered by the Dep. Of Zoology)

Same as offered as core courses for the BSc general students

ZOOHGEC01T: Animal Diversity		
Theory (Credits 4)	Class	
Unit-1 Kingdom Protista		
General characters and classification of Subkingdom Protozoa up to Phylum (Levine et al.,	3	
1980); Locomotory Organelles and locomotion in Protozoa		
Unit-2 Phylum Porifera		
General characters and classification up to classes; Canal System in Sycon	3	
Unit-3 Phylum Cnidaria		
General characters and classification up to classes; Polymorphism in Hydrozoa	3	
Unit-4 Phylum Platyhelminthes		
General characters and classification up to classes; Life history of <i>Taenia solium</i>	3	
Unit-5 Phylum Nematoda		
General characters and classification up to classes; Life history of Ascaris lumbricoides and its	3	
parasitic adaptations		
Unit-6 Phylum Annelida		
General characters and classification up to classes; Nephridia in Annelida	3	
Unit 7 Phylum Arthropoda		
General characters and classification up to classes; Vision in insect, Metamorphosis in Insects	5	
Unit-8 Phylum Mollusca		
General characters and classification up to classes; Respiration in <i>Pila</i>	3	
Unit-9 Phylum Echinodermata		
General characters and classification up to classes; Water-vascular system in <i>Asterias</i>	4	
Unit-10 Protochordates		
General features; Feeding in Branchiostoma	2	
Unit-11 Agnatha		
General features and classification up to classes (Young, 1981)	2	
Unit-12 Pisces		
General features and Classification up to Subclasses (Romer, 1959); Osmoregulation in Fishes	3	
Unit-13 Amphibia		
General features and Classification up to living orders (Duellman & Trueb, 1986);	3	
Metamorphosis in Toad		
Unit-14 Reptiles		
General features and Classification up to living Subclass (Young, 1981); Poisonous and non-	4	
poisonous snakes, Biting mechanism in snakes		
Unit-15 Aves		
General features and Classification up to orders (Young, 1981); Flight adaptations in birds	3	
Unit-16 Mammals		
Classification up to Subclasses (Young, 1981); Origin & distribution of Cranial nerves in <i>Cavia</i>	3	
Suggested Readings [Consult Latest Editions]	1 5	

# **Suggested Readings [Consult Latest Editions]**

- 1. Barnes, R. D. & Ruppert, E. E., (1994). Invertebrate Zoology. 6thEd. Brooks Cole.
- 2. Brusca, R. C. & Brusca, G. J. (2002). Invertebrates. 4th Ed. Sinauer Associates.
- 3. Kardong, K.V. (2002). Vertebrates: Comparative anatomy, function evolution. Tata McGraw Hill.
- 4. Kent, G.C. & Carr, R.K. (2001). Comparative anatomy of the Vertebrates. 9thEd. McGraw Hill.
- 5. Romer, A.S. & Parsons, T.S. (1986). The vertebrate body. 6thEd. Saunders College Pub.
- 6. Ruppert E. E., Fox, R. & Barnes R. D. (2003). Invertebrate Zoology: a Functional Evolutionary Approach. 7th Ed. Brooks Cole.
- 7. Young, J. Z. (2004). The Life of Vertebrates. III Edition. Oxford university press.

#### **ZOOHGEC01P:** Animal Diversity Lab (Credits 2)

#### 1. Spot identification of the following specimens:

Amoeba, Euglena, Plasmodium, Paramecium, Sycon, Euspongia,, Obelia, Physalia, Aurelia, Tubipora, Metridium, Taenia solium, Male and female Ascaris lumbricoides, Aphrodite, Nereis, Pheretima, Hirudinaria, Palaemon, Cancer, Limulus, Palamnaeus, Scolopendra, Julus, Periplaneta, Apis, Chiton, Dentalium, Pila, Unio, Loligo, Sepia, Octopus, Pentaceros, Ophiura, Echinus, Cucumaria and Antedon, Balanoglossus, Herdmania, Branchiostoma, Petromyzon, Sphyrna, Pristis, Torpedo, Labeo, Exocoetus, Anguilla, Ichthyophis/Ureotyphlus, Salamandra, Bufo, Hyla, Chelone, Hemidactylus, Chamaeleon, Draco, Vipera, Naja, Crocodylus, Gavialis, Passer, Psittacula, Alcedo, Sorex, Pteropus, Funambulus, Suncus

- 2. Study of the following permanent slides: Transverse section of male and female Ascaris
- 3. Identification of poisonous and non-poisonous snakes
- 4. An "animal album" containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose.

#### Suggested Readings:

N.Delhi

Ltd/ W.B. Saunders Company

- 1. Chatterjee and Chatterjee: Practical Zoology
- 2. Ghosh, K.C. and Manna, B. (2015): Practical Zoology, New Central Book Agency, Kolkata

Clast   Structure of a neuron, Resting membrane potential, Graded potential, Origin of Action potential and its ropagation in myelinated and non-myelinated nerve fibres.  - Ultra-structure of skeletal muscle, Molecular and chemical basis of muscle contraction.    Unit-2 Digestion	ZOOHGEC02T, Physiology and Biochemistry	-
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Inzyme Kinetics, Inhibition and Regulation  uggested Readings	Introduction, Classification of Enzymes, Mechanism of action,	<u> </u>
uggested Readings	Enzyme Kinetics, Inhibition and Regulation	
	Suggested Readings	
		& Co.

2. Chatterjea, MN and Shinde, R (2012). A Textbook of Medical Biochemistry. 8th Edn. Jaypee Pub.,

3. Guyton, A.C. and Hall, J.E. (2011). Textbook of Medical Physiology, XII Edition, Harcourt Asia Pvt.

4. Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2009). Harper's Illustrated Biochemistry.

XXVIII Edition. Lange Medical Books/Mc Graw3Hill.

- 5. Nelson, D. L., Cox, M. M. and Lehninger, A.L. (2009). Principles of Biochemistry. IV Edition. W.H. Freeman and Co.
- 6. Sherwood, L. (2013). Human Physiology from cells to systems. 8th Edn., Brooks & Cole
- 7. Tortora, G.J. and Derrickson, B.H. (2009). Principles of Anatomy and Physiology, XII Edition, John Wiley & Sons, Inc.
- 8. Widmaier, E.P., Raff, H. and Strang, K.T. (2008) Vander's Human Physiology, XI Edition., McGraw Hill
- 9. Elaine N. Marieb, 2006. Human Anatomy & Physiology, Pearson Education.

# **ZOOHGEC02P:** Physiology and Biochemistry Lab (Credits 2)

- 1. Preparation of haemin crystals
- 2. Identification of permanent histological sections of mammalian pituitary, thyroid, pancreas, adrenal gland, small intestine, liver, lung, kidney
- 3. Qualitative tests to identify functional groups of carbohydrates in given solutions: Glucose (Benedict's test), Sucrose (Iodine test)
- 4. Quantitative estimation of total protein in given solutions by Lowry's method.
- 5. Study of activity of salivary amylase under optimum conditions.

ZOOHGEC03T: Insect, Vectors and Diseases		
Theory (Credits 4)	Class	
Unit-1 Introduction to Insects	6	
General Features of Insects, Morphological features, Head – Eyes, Types of antennae, Mouth parts with respect to feeding habit		
Unit-2 Concept of Vectors	6	
Brief introduction to Vectors (mechanical and biological), Reservoirs, Host-vector relationship, A as vectors, Host specificity	daptations	
Unit-3 Insects as Vectors	8	
Detailed features of insect orders as vectors – Diptera, Siphonoptera, Siphunculata, Hemiptera		
Unit-4 Dipteran as Disease Vectors	14	
Study of important Dipteran vectors – Mosquitoes, Sand fly, Houseflies Study of mosquito-borne diseases – Malaria, Dengue, Chikungunya, Viral encephalitis, Filariasis Control of mosquitoes		
Unit-5 Siphonaptera as Disease Vectors	6	
Fleas as important insect vectors; Host-specificity, Study of Flea-borne diseases – Plague, Typhus Control of fleas	fever;	
Unit-6 Siphunculata as Disease Vectors	4	
Human louse (Head, Body and Pubic louse) as important insect vectors; Control of human louse		
Ùnit-7 Hempitera as Disease Vectors	6	
Bugs as insect vectors; Blood-sucking bugs; Chagas disease, Bed bugs as mechanical vectors, Con prevention measures	trol and	

### **ZOOHGEC03P:** Insect Vectors and Diseases Lab (Credits 2)

#### **List of Practical**

- 1. Mounting and Study of different kinds of mouth parts of insects
- 2. Spot identification of following insect vectors through permanent slides/photographs: *Aedes, Culex, Anopheles, Pediculus humanuscapitis, Pediculus humanuscapitis, Pediculus humanuscapitis, Musca domestica*Phlebotomus argentipes, Musca domestica
- 3. Study of different diseases transmitted by above insect vectors
- 4. Submission of a project report on any one of the insect vectors and disease transmitted

# **Suggested Readings**

- 1. Anathakrishnan: Bio resources Ecology 3rdEdition
- 2. Goldman: Limnology, 2ndEdition
- 3. Odum and Barrett: Fundamentals of Ecology, 5thEdition
- 4. Pawlowski: Physicochemical Methods for Water and Wastewater Treatment, 1stEdition

5. Trivedi and Goyal: Chemical and biological methods for water pollution studies

6. Welch: Limnology Vols. I-II7. Wetzel: Limnology, 3rdedition

ZOOHGEC04T, Environment and Public Health		
Theory (Credits 4)	Class	
Unit 1: Introduction		
Sources of Environmental hazards, Hazard identification and accounting, Fate of toxic and	10	
persistent substances in the environment, Dose response evaluation, Exposure assessment		
Unit 2: Climate Change		
Greenhouse gases and global warming, Acid rain, Ozone layer destruction, Effect of climate	10	
change on public health		
Unit 3: Pollution		
Air, water, noise pollution sources and effects, Pollution control	5	
Unit 4: Waste Management Technologies		
Sources of waste, types and characteristics, Sewage disposal and its management, Solid waste	15	
disposal, Biomedical waste handling and disposal, Nuclear waste handling and disposal, Waste		
from thermal power plants.		
Unit 5: Diseases		
Causes, symptoms and control of tuberculosis, Asthma, Cholera, Minamata disease, typhoid,	10	
filariasis		

# **Suggested Readings [Consult Latest Editions]**

- 1. Cutter, S.L., Environmental Risk and Hazards, Prentice-Hall of India Pvt. Ltd., New Delhi, 1999.
- 2. Kolluru Rao, Bartell Steven, Pitblado R and Stricoff "Risk Assessment and Management Handbook", McGraw Hill Inc., New York, 1996.
- 3. Kofi Asante Duah "Risk Assessment in Environmental management", John Wiley and sons, Singapore, 1998.
- 4. Kasperson, J.X. and Kasperson, R.E. and Kasperson, R.E., Global Environmental Risks, V. N. University Press, New York, 2003.
- 5. Joseph F Louvar and B Diane Louver Health and Environmental Risk Analysis fundamentals with applications, Prentice Hall, New Jersey 1997.

### **ZOOHGEC03P:** Environment and Public Health Lab (Credits 2)

1. To determine pH, Cl, SO4, NO3 in soil and water samples from different locations.