

**Choice based Credit System (CBCS)  
Scheme and course structure for  
M.Sc Zoology 1<sup>st</sup> semester effective from academic session 2014 and onwards**

**Marks-100  
Max.(Min.)**

Course Code	Course Title	Paper Category	Hours/Week			Credits	Ext.	Int.
			L	T	P			
ZOO14101CR	Animal Taxonomy and Biosystematics	Core	4	0	0	4	80(32)	20(8)
ZOO14102CR	Medical Parasitology and Immunology	Core	4	0	0	4	80(32)	20(8)
ZOO14103CR	Lab. Course-1 (Based on Zoo-01-CR & Zoo-02-CR)	Core	0	0	8	4	80(32)	20(8)
ZOO14104EA	Fishery Ecology, Anatomy and Management	Elective (Allied)	3	0	1	4	80(32)	20(8)
ZOO14105EA	Ethology, Biogeography and Techniques in Wildlife	Elective (Allied)	3	0	1	4	80(32)	20(8)
ZOO14106EA	Economic Entomology	Elective (Allied)	3	0	1	4	80(32)	20(8)
ZOO14107EA	Applied Zoology	Elective (Allied)	3	0	1	4	80(32)	20(8)
ZOO14108EO	Wildlife Conservation & Management	Elec. Open)	4	0	0	4	80(32)	20(8)
<b>Credits = 32</b>	<b>Contact Hours = 32</b>		<b>24</b>	<b>0</b>	<b>12</b>	<b>32</b>		

**GENERAL INSTRUCTIONS FOR THE CANDIDATES**

1. The two year ( 4 semester) programme is of 96 credits i.e. 24 credits/semester (24x4=96)
2. A candidate has compulsorily to opt for 12 credits from the core component in each semester.
3. A candidate has a choice to opt any 12 credits (3 papers) out of minimum of 16 credits (4 papers) offered as Elective (Allied), except for a particular semester where a candidate is required to gain a minimum of 4 credits (1 paper) from Elective (Open) offered by any other Department/ Faculty.
4. A candidate has compulsorily to obtain a minimum of 4 credits (1 paper) from Elective (Open) from outside the parent Department/Faculty.
5. A candidate can earn more than the minimum required credits (i.e. more than 96 credits for four Semester programme) which shall be counted towards the final result of the candidate.

**MAX.MARKS=100** (Internal=20 + External=80)

**CREDITS =4 (4+0+0)**

**COURSE CODE: ZOO14101CR**

**COURSE TITLE: ANIMAL TAXONOMY AND BIOSYSTEMATICS**

**Unit: I PRINCIPLES AND METHODS OF ZOOLOGICAL CLASSIFICATION**

- 1.1. Introduction: Terms and definitions.
- 1.2. Taxonomic characters and collection
- 1.3. Curating process.
- 1.4. Taxonomic keys- kinds, merits & demerits.

**Unit II PRINCIPLES AND APPLICATION OF ZOOLOGICAL NOMENCLATURE**

- 2.1 Taxonomic ranks and categories.
- 2.2 Homonymy, Synonymy and Law of priority.
- 2.3 Typification and different Zoological types.
- 2.4 Systematic Literature - kinds & significance.

**Unit III DIMENSIONS OF SPECIATION**

- 3.1. Species concepts (morphological and Biological) ó their merits & demerits.
- 3.2. Intraspecific Catagories and their taxonomic status.
- 3.3. Variations (genetic & non-genetic) and their evolutionary significance.
- 3.4. Speciation : allopatric, sympatric and parapatric with examples.

**Unit IV NEW TRENDS IN BIOSYSTEMATICS**

- 4.1. Chemotaxonomy: definition and approaches.
- 4.2. Numerical taxonomy.
- 4.3. Cytotaxonomy with special reference to chromosome evolution (primates and grasshoppers).
- 4.4. Molecular taxonomy (construction of molecular phylogenetic tree- DNA, RNA, Protein (enzyme))

**MAX.MARKS=100** (Internal=20 + External=80)

**CREDITS = 4** (4+0+0)

**COURSE CODE: ZOO14102CR**

**COURSE TITLE: MEDICAL PARASITOLOGY AND IMMUNOLGY**

### **UNIT I: MEDICAL PROTOZOLOGY**

- 1.1 Morphology, life cycle, pathogenicity and control of visceral protozoans of man:  
*Entamoeba histolytica* and *Balantidium coli*
- 1.2 Opportunistic protozoans of man with special reference to *Pneumocystis carinii* and *Cryptosporidium parvum*
- 1.3 Pathology in African and American Trypanosomiasis
- 1.4 Life cycle, pathogenicity and control of *Toxoplasma* and *Babesia*.

### **UNIT II: MEDICAL HELMINTHOLOGY**

- 2.1. Trematode parasites of Man with reference to the life cycle, pathogenicity, prophylaxis and control of *Paragonimus* and *Schistosoma*.
- 2.2 Cestode parasites of Man with reference to the life cycle, pathogenicity, prophylaxis and control of *Diphyllobothrium* and *Echinococcus*.
- 2.3. Nematode parasites of Man with special reference to life cycle, pathogenicity and control of *Enterobius vermicularis* and *Ancylostoma duodenalis* .
- 2.4 Anthelmintics- Historical perspective, chemical classification and mode of action.

### **UNIT III: DEFENCE MECHANISM IN HIGHER VERTEBRATES**

- 3.1 Brief-introduction about immune system
- 3.2 Immunodeficiency Diseases
- 3.3 Immunization: Active and Passive immunization
- 3.4 Immune response in relation to protozoan and helminth infections.

### **UNIT IV: ROLE OF COMPLEMENT & PROPERDIN IN IMMUNE RESPONSES.**

- 1.1. Proteins of the classical complement pathway.
- 1.2. Proteins of properdin pathway.
- 1.3. Sequence of reactions
- 1.4. Regulation of classical & properdin complement activity.

**MAX.MARKS=100 (Internal=20 + External=80) CREDITS =4(0+0+8)**

**COURSE CODE: ZOO14103CR**

**COURSE TITLE : LAB. COURSE -1**

1. Curating techniques of taxonomic collection.
2. Identification of some common faunistic elements of Kashmir region.
3. Collection and identification of different species of animals.
4. Collection and identification of different types of insects and their larvae.
5. Chromosome study in different animal species.
6. Construction of taxonomic keys of the given specimens (Amphibians, Reptiles and Mammals).Study of prepared slides of protozoan parasites available in museum
7. Permanent slides preparation of Protozoans.
8. Study of prepared slides of Cestode and Trematode parasites available in museum
9. Collection, preservation and preparation of permanent slides of parasitic Cestodes and Trematodes collected from different hosts
10. Study of prepared slides of nematode parasites available in museum
11. Collection, preservation and preparation of permanent slides of nematodes collected from different hosts.
12. Demonstration of Phagocytosis in vivo.

**MAX.MARKS=100** (Internal=20 + External=80)    **CREDITS = 4** (3+0+1)

**COURSE CODE: ZOO14104EA**

**COURSE TITLE: FISHERY ECOLOGY, ANATOMY AND MANAGEMENT**

**UNIT I ECOLOGY AND ADAPTATION**

- 1.1. Population density and Structure
- 1.2. Pollution of Aquatic ecosystem
- 1.3. Adaptation in Hill stream fishes
- 1.4. Adaptation in deep sea and cave dwelling fishes

**UNIT II ANATOMY AND SPECIAL ORGANS**

- 2.1. Accessory respiratory organs in fishes
- 2.2. Musculature in fishes.
- 2.3. Electric organs: Location, structure, origin and functions
- 2.4. Poison and Venom in fishes.

**UNIT III: FISHERY MANAGEMENT**

- 3.1. Fish culture ponds ó types, functional classification of ponds.
- 3.2. Hatchery technology and management of fresh water fishes
- 3.3. Construction of an ideal fish culture pond.
- 3.4. Maintenance and management of fish ponds.

**UNIT IV: PRACTICALS**

- 4.1 Study of morphological adaptations in hill stream fishes.
- 4.2 Study of the electric organs and their nervous innervations in Torpedo.
- 4.3 Determination of age in fishes through operculum and otolith studies.
- 4.4 Dissecting accessory respiratory organs in fish Anabas, Clarias and Heteropneustes.
- 4.5 Age determination in fish by using scales and length frequency occurrence data.
- 4.6 Construction of fish aquaria and the material used.

**MAX.MARKS=100** (Internal=20 + External=80)      **CREDITS =4 (3+0+1)**

**COURSE CODE: ZOO14105EA**

**COURSE TITLE : ETHOLOGY, BIOGEOGRAPHY AND TECHNIQUES IN WILDLIFE**

### **Unit 1. ANIMAL BEHAVIOR**

- 1.1 Habitat selection
- 1.2 Territorial behavior in wildlife, effect of territory on the size of breeding population.
- 1.3 Reproductive behavior, sexual segregation and methods of communication in birds and mammals
- 1.4 Parental care and imprinting

### **Unit 2. BIOGEOGRAPHY**

- 2.1. Biogeographic realms of the world and their fauna.
- 2.2. Protected Area Network (PAN).
- 2.3. Applied Zoogeography.
- 2.4. Zoogeography of Indian mammals..

### **Unit 3. TECHNIQUES AND PRACTICES**

- 3.1 Remote sensing : Principles and applications
- 3.2. Geographic information system and its application in wildlife
- 3.3. Taxidermy- stuffing techniques and preservation of some birds and mammals
- 3.4. Use of radio-transmitters in wildlife study

### **Unit 4. PRACTICALS**

- 4.1. Analysis, identification and preservation of gut contents of some important wild fauna of J&K.
- 4.2. Characteristic features and ecological distribution of some important museum specimens from fish to mammals.
- 4.3. Application of GPS in wildlife study.
- 4.4. Study of characteristic features of desert animals helping them to adapt in deserts.
- 4.5 Study of characteristic features of aquatic animals helping them to adapt aquatic environment.
- 4.6 Characteristic morphological features of flightless birds.

**MAX.MARKS=100** (Internal=20 + External=80) **CREDITS =4 (3+0+1)**

**COURSE CODE: ZOO14106EA**

**Course Title: Economic Entomology**

**Unit I: ECONOMIC ENTOMOLOGY**

Occurrence, economic importance, life cycle and control of one major pest of each of the following:

- 1.1 Food crops- paddy, wheat and maize
- 1.2 Pests of Apple, Pear and Peach
- 1.3 Stored grains
- 1.4 Forest pests

**Unit II: MEDICAL ENTOMOLOGY**

- 2.1 Disease causing insects of man ó myiasis (types and causes)
- 2.2 Insect borne viral and rickettsial diseases of man
- 2.3 Insect borne protozoan and bacterial diseases of man
- 2.4 Life cycle and control of common insect vectors of human diseases
  - a. Sand fly
  - b. Tsetse fly

**Unit III: VETERINARY ENTOMOLOGY**

- 3.1 Insect causing diseases of animals, with their Pathogenicity and control.
- 3.2 Life-cycle and control of major diseases caused by *Hypoderma lineatum* and *Stomoxys calcitrans*.
- 3.3 Insects as vectors of viral, bacterial and helminth diseases of domestic animals.
- 3.4 Life-cycle and control of major vectors of animal diseases-
  - Tabanus
  - Chrysops

**Unit IV: PRACTICALS**

- 4.1 Permanent mount preparation of aphids, thrips and scale insects.
- 4.2 Collection, identification and preservation of forest pests.
- 4.3 Collection, identification and preservation of medically important insects.
- 4.4 Study of major vectors of animal diseases available in museum.
- 4.5 Collection, identification and preservation of insects of veterinary importance.
- 4.6 Museum study of economically important insects.

**MAX.MARKS=100** (Internal=20 + External=80) **CREDITS =4 (3+0+1)**

**COURSE CODE: ZOO14107EA**

**COURSE TITLE: APPLIED ZOOLOGY**

### **Unit 1. FISHERY TECHNOLOGY**

- 1.1 Principles and importance of fish preservation; disadvantages of preservation.
- 1.2 Traditional methods of sun drying, salting, pickling, smoking
- 1.3 Industrial methods of preservation-refrigeration, deep freezing, refrigeration and sublimation.
- 1.4 Processing technology of fish by-products-fish meals, fish oils, fish glue, isinglass, chitosan.

### **Unit 2. APPLIED PARASITOLOGY**

- 2.1. General account of zoonotic diseases.
- 2.2. Luminal protozoan parasites of man.
- 2.3. Control of Malaria with special reference to Immunoprophylaxis.
- 2.4. Filariasis with special reference to microfilarial periodicity.

### **Unit 3. FORENSIC ENTOMOLOGY**

- 3.1. Introduction and scope of forensic entomology.
- 3.2. Relationship of insects to dead bodies.
- 3.3. Role of insects in solving murder mysteries.
- 3.4. Shortcomings of forensic entomological techniques.

### **Unit.4. PRACTICALS**

- 4.1. Indian major carps their identification, distinguishing features and distribution.
- 4.2. Indian minor carps, identification, distinguishing features and distribution.
- 4.3. Study of available permanent slides of Zoonotic parasites.
- 4.4. Permanent preparation of vectors related to malaria and filariasis.
- 4.5. Collection, identification and preservation of insects of forensic importance.
- 4.6. Laboratory culture of some dipteran insects of forensic importance



**MAX.MARKS=100** (Internal=20 + External=80) **CREDITS =4 (4+0+0)**

**COURSE CODE: ZOO14108EO**

**COURSE TITLE : WILDLIFE CONSERVATION AND MANAGEMENT**

**Unit 1. WILDLIFE RESOURCES**

- 1.1 Conservation ethics and values of wildlife
- 1.2 Important National parks of India with the concept of their creation
- 1.3 Health care of Wild mammals and birds in captivity.
- 1.4 Status and distribution of endangered animals of India

**Unit2. WILDLIFE MANAGEMENT IN J & K**

- 2.1. Wildlife of Jammu & Kashmir
- 2.2. Measures of wildlife conservation and problems in conservation
- 2.3. Winter visiting waterfowl: threats and management
- 2.4. Pheasants of Jammu & Kashmir

**Unit3. ECOTOURISM AND CAPTIVE BREEDING**

- 3.1. Ecotourism development in India
- 3.2. Ecotourism potential of wildlife habitats of Jammu and Kashmir
- 3.3. Captive breeding: procedures and requirements
- 3.4. Captive breeding programs in India

**Unit.4. CONSERVATION STATUS AND HABITAT REQUIREMENTS**

- 4.1. Conservation status and habitat of Tiger and Lion in India
- 4.2 Conservation status and habitat of Hangul deer and Markhor.
- 4.3 Conservation status and habitat of Rhinoceros and Elephant
- 4.4 Conservation status and habitat of Tibetan antelope.