

**POST GRADUATE DEPARTMENT OF ZOOLOGY**  
**UNIVERSITY OF KASHMIR**

**CHOICE BASED CREDIT SYSTEM (CBCS) SCHEME FORMAT SEMESTER-4<sup>th</sup>**

Course Code	Course Title	Paper Category	Hours/Week			Credits	Theory Marks		Practical Marks	
			L	T	P		Ext.	Int.	Ext.	Int.
Zoo-401-CR	Ecology	Core	3	0	2	4	60(24)	15(6)	20	5
Zoo-402-CR	Biological Techniques and Immunology	Core	3	0	2	4	60(24)	15(6)	20	5
Zoo-403-CR	Biogeography, Wildlife Ecology and Natural Resource Management	Core	3	0	2	4	60(24)	15(6)	20	5
Zoo-404-DCE	Parasitology and Immunology	Discipline Centric	2	0	2	3	40(16)	10(4)	25 (Project)	
Zoo-405-DCE	Fish Biology and Culture Techniques	Discipline Centric	2	0	2	3	40(16)	10(4)	25 (Project)	
Zoo-406-DCE	Insect Pest Management	Discipline Centric	3	0	0	3	60(24)	15(6)	—	—
Zoo-407-DCE	Conservation Genetics, Techniques and Methods of Wildlife Study	Discipline Centric	2	0	2	3	40(16)	10(4)	20	5
Zoo-408-GE	Applied Entomology and Pest Management	Generic Elective	2	0	2	3	40(16)	10(4)	20	5
Zoo-409-GE	Fish Ecology and Limnology	Generic Elective	2	0	2	3	40(16)	10(4)	20	5
Zoo-410-OE	Parasitology in relation to Public Health	Open Elective	2	0	0	2	40(16)	10(4)	—	—
Zoo-411-OE	Biodiversity, Wildlife Biology & Techniques	Open Elective	2	0	0	2	40(16)	10(4)	—	—
Total credits= 34			Contact hours= 42			34				

**GENERAL INSTRUCTIONS FOR THE CANDIDATES**

1. A candidate has to obtain a minimum of 24 credits per semester i.e., 96 credits in two year programme (4 semesters).
2. Out of 24 credits in a semester a candidate has to obtain 12 credits compulsorily from “**Core Courses**” while the remaining 12 credits can be obtained from the “**Electives**” in the following manner:
  - ▶ A candidate can obtain a maximum of 6 credits within his/her own Department out of the specializations offered by the Department as **Discipline Centric Electives**.

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► 6 credits shall be obtained by a candidate from the **Electives** offered by the Departments other than his/her own. The candidate shall be free to obtain these 6 credits from the **Generic** or **Open Electives** or a combination of both.

3. A candidate can go with a slow pace and obtain only 20 credits in a semester or 32 credits at a high pace per semester, so as to maintain a total score of 96 credits or above in a 2-year programme (4 semesters).

**ZOO-401-CR: ECOLOGY**

Total Credits: 4 (3 Lecture + 0 Tutorial +1 Practical)

Maximum Marks: 100 (25/Credit)\* [Marks Distribution: 20% Internal Assessment & 80% End Semester Exam.]

Minimum Marks: 40% (Internal Assessment and End Semester Exam. to be Qualified Separately, not in Aggregate)

\*Note: One unit is equivalent to one credit.

**UNIT I: ECOSYSTEM ECOLOGY**

- 1.1 Ecosystem: Structure and function; energy flow and mineral cycling (CNP); structure and function of some ecosystems: terrestrial (forest) and aquatic (fresh water)
- 1.2 Habitat and niche: Concept of habitat and niche; niche width and overlap; fundamental and realized niche
- 1.3 Species interactions: Types of interactions, interspecific competition, herbivory, carnivory, symbiosis
- 1.4 Ecological succession: types; mechanisms; changes involved in succession; concept of climax

**UNIT II: POPULATION ECOLOGY**

- 2.1 Demography: Life tables, survivorship curves and net reproductive rate
- 2.2 Population growth– Exponential and logistic growth patterns, growth models- (time lag models)
- 2.3 Life history strategies: r and k selection, clutch size and sex ratio
- 2.4 Population regulation– Extrinsic and intrinsic mechanisms

**UNIT III: COMMUNITY ECOLOGY**

- 3.1 Nature of communities; community structure and attributes
- 3.2 Major biomes and biological communities
- 3.3 Environmental pollution; global environmental change
- 3.4 Bioaccumulation, and bioremediation and biomagnifications

**UNIT IV: PRACTICAL WORK**

- 4.1 To determine the frequency of various species occurring in a given area
- 4.2 To determine the density and abundance of various species occurring in a given area
- 4.3 Estimation of biomass
- 4.4 To study the vegetation by line transects method
- 4.5 To study the soil texture, moisture and pH
- 4.6 Test for the presence of carbonate and nitrate in soil

**SUGGESTED BOOKS/READING MATERIAL**

1. *Textbook of Limnology* by **Goldman and Horne** McGraw Hill Higher Education
2. *Limnology: Lake and River Ecosystems* by **Robert G. Wetzel** Academic Press
3. *Fundamentals of Limnology* by **Arvind Kumar** Ashish Publishing House
4. *Advances in Limnology* by **H.R. Singh** Narendra Publishing House
5. *Ecology and Field Biology* Robert by **Leo Smith** Harper & Row, Publisher

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**ZOO-402-CR: BIOLOGICAL TECHNIQUES AND IMMUNOLOGY**

Total Credits: 4 (3 Lecture + 0 Tutorial +1 Practical)

Maximum Marks: 100 (25/Credit)\* [Marks Distribution: 20% Internal Assessment & 80% End Semester Exam.]

Minimum Marks: 40% (Internal Assessment and End Semester Exam. to be Qualified Separately, not in Aggregate)

\*Note: One unit is equivalent to one credit.

**UNIT I: BIOLOGICAL TECHNIQUES-1**

- 1.1 Electron Microscopy: SEM & TEM
- 1.2 Histological Techniques
- 1.3 Principles and uses of pH meter and Spectrophotometer
- 1.4 Electrophoresis

**UNIT II: BIOLOGICAL TECHNIQUES-2**

- 2.1 Microtomy and micrometry
- 2.2 Sub-cellular fractionation and centrifugation
- 2.3 PCR, Blotting techniques; cytogenetic techniques: FISH & GISH
- 2.4 Chromatography

**UNIT III: TUMOUR IMMUNOLOGY**

- 3.1 Introduction to tumors and their immune surveillance
- 3.2 Host immune response to tumors
- 3.3 Tumor escape mechanisms
- 3.4 Tumor immune therapy: Non-Specific and antigen Specific treatment

**UNIT IV: PRACTICAL WORK**

- 4.1 Working of different Microscopes
- 4.2 Preparation of Histological sections of vertebrate tissues viz. liver, gut, lungs
- 4.3 Location of nucleic acids and proteins in tissue sections
- 4.4 Separation of mitochondria through centrifugation
- 4.5 Gel Electrophoresis
- 4.6 Thin layer chromatography

**SUGGESTED BOOKS/READING MATERIAL**

1. *Biotechniques Theory and Practice* by **S. V. S. Rana** Rastogi publishers
2. *Molecular Biology of the Cell* by **Alberts et al.** Garland Science
3. *Immunology* by **Kuby, J., Goldsby, R., Kindt, T.J. and Osbourne, B.A., W.H. Freeman**
4. *Medical Immunology for Students* by **Playfair, J.H.L. and Lydyard, P.M. Churchill**

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**ZOO-403-CR: BIOGEOGRAPHY, WILDLIFE ECOLOGY AND NATURAL RESOURCE MANAGEMENT**

Total Credits: 4 (3 Lecture + 0 Tutorial +1 Practical)

Maximum Marks: 100 (25/Credit)\* [Marks Distribution: 20% Internal Assessment & 80% End Semester Exam.]

Minimum Marks: 40% (Internal Assessment and End Semester Exam. to be Qualified Separately, not in Aggregate)

\*Note: One unit is equivalent to one credit.

**UNIT I: BIOGEOGRAPHY AND WILDLIFE ECOLOGY**

- 1.1 Biogeographic realms of the world and their fauna
- 1.2 Island Biogeography, Biological dispersal: mechanisms and barriers
- 1.3 Biogeographical zones of India with special reference to distribution of wild fauna
- 1.4 Predation- concept, problems and principles

**UNIT II: WILDLIFE HEALTH AND MANAGEMENT OF NATURAL RESOURCES**

- 2.1 Major diseases of wild fauna (Viral, Bacterial and Protozoan)
- 2.2 Important conservation projects in India, National and international wildlife organizations, National Board of Wildlife, BNHS, WWF, IUCN, CITES
- 2.3 Wildlife Protection Act (1972), its brief structure and recent amendments
- 2.4 Wildlife protection act of J & K- an overview

**UNIT III: FOOD AND COVER**

- 3.1 Components of Wildlife habitat
- 3.2 Food components selection and management implications
- 3.3 Wildlife habitat types and their significance
- 3.4 Prey base of carnivores in wild habitat

**UNIT IV: PRACTICALWORK**

- 4.1 Study of important museum specimens (distribution of stuffed mammals)
- 4.2 Reference slide preparation of hair samples of different wild and domestic mammals
- 4.3 Study of wetland avifauna through preserved museum specimens
- 4.4 Diet analysis of wild carnivores through scat analysis
- 4.5 Visit to important wildlife habitats of J & K to study different habitat aspects and to identify the animals in the field
- 4.6 Examination of faecal matter of wild and domestic animals for helminth infection

**SUGGESTED BOOKS/READING MATERIAL**

1. *Wildlife Ecology and Management* by Bolen and Robinson Printice Hall International (UK)
2. *Animal Ecology and Distribution of Animals* by Rastogi and Jayaraj
3. *Animal Ecology and Environmental Biology* by H. R. Singh
4. *Indian mammals a field guide* by Vivek Menon

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5. *Wildlife in India* by V. B. Saharia
6. *Managing our Wildlife Resources* by S. A. Anderson
7. *Manual of Wildlife Techniques for India* by Sale and Berkmuller
8. *Concepts in Wildlife Management* by B.B. Hosti
9. *Fundamentals of Wildlife Management* by Rajesh Gopal Natraj Publishers, Dehradun India
10. *Important Bird Areas of Jammu and Kahmir* by A. R. Rahmani, Khurshid A., I. Suhail, P. chandan and Ashfaq A. Zarri
11. *Biodiversity Perception Pearl and Preservation* by Maiti and Maiti
12. *Biogeography*, Fourth Edition by Mark V. Lomolino , Brett R. Riddle , Robert J. Whittaker , James H. Brown (2010) Sinauer Associates, Inc.; Fourth edition
13. *Zoogeography: The Geographic Distribution of Animals*, Philip J. Darlington (1957)
14. *Basics of Wildlife Health Care and Management*, Rajesh Jani (2012) Narendra Publishing House Delhi
15. *An Introduction to Applied Biogeography* Ian F. Spellerberg, John W. D. Sawyer ( 1999) Cambridge University Press

**ZOO-404-DCE: PARASITOLOGY AND IMMUNOLOGY**

Total Credits: 3 (2 Lecture + 0 Tutorial +1 Practical)

Maximum Marks: 75 (25/Credit)\* [Marks Distribution: 20% Internal Assessment & 80% End Semester Exam.]

Minimum Marks: 40% (Internal Assessment and End Semester Exam. to be Qualified Separately, not in Aggregate)

\*Note: One unit is equivalent to one credit.

**UNIT I: COMPLIMENT SYSTEM**

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

**UNIT II: DAMAGING AND DEFECTIVE IMMUNE SYSTEM**

- 2.1 Types of hypersensitivity reactions
- 2.2 Mechanism of type I and type II hypersensitivity reactions
- 2.3 Introduction to autoimmunity: Theories of breakdown in self-tolerance
- 2.4 Classification of autoimmune diseases with some important examples

**UNIT III: PROJECT WORK**

A survey project will be allotted to each student for visiting different places like fish farms, poultry farms, sheep farms, grazing fields, high altitude pastures etc. for collection of vectors, parasites and eggs; which are mandatory and have to be submitted at the end of the semester.

**SUGGESTED BOOKS/READING MATERIAL**

1. *Introduction to Parasitology* by **ASA C. Chandler & Clark P. Read**
2. *Parasitology* by **Elmer R. Nobel and Glenn A. Noble**
3. *Animal Parasitology* by **J. D. Smyth**
4. *Parasitology (Protozoology & Helminthology)* by **K. D. Chatterjee**
5. *Foundations of Parasitology* by **Gerald D. Schmidt and Larry S. Roberts**
6. *General parasitology* by **Thomas C. Cheng**
7. *Foundations of Parasitology* by **Larry S. Roberts, John Janovy and Steve Nadler**
8. *Immunology* by **Kuby, J., Goldsby, R., Kindt, T.J. and Osbourne, B.A., W.H. Freeman**
9. *Medical Immunology for Students* by **Playfair, J.H.L. and Lydyard, P.M. Churchill**

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10. *Immunology* by **Roitt, I.M., Brostoff, J. and Male, D. Mosby**
11. *Basic Immunology* by **Sharon, J. William and Wilkins**
12. *Immunology* by **P. M. Lydyard, A. Whelan And M. W. Fanger**

**ZOO-405-DCE: FISH BIOLOGY AND CULTURE TECHNIQUES**

Total Credits: 3 (2 Lecture + 0 Tutorial +1 Practical)

Maximum Marks: 75 (25/Credit)\* [Marks Distribution: 20% Internal Assessment & 80% End Semester Exam.]

Minimum Marks: 40% (Internal Assessment and End Semester Exam. to be Qualified Separately, not in Aggregate)

\*Note: One unit is equivalent to one credit.

**UNIT I: FISH BIOLOGY**

- 1.1 Methods of fishing: Fish nets and gears with special emphasis on local fishing gears and nets
- 1.2 Estimation of fish population, population structure and dynamics
- 1.3 Age determination: Length frequency analysis, model progression methods, growth check, scale and otoliths
- 1.4 Fish migration and types of migration (European eel, Atlantic salmon and Hilsa)

**UNIT II: CULTURE TECHNIQUES**

- 2.1 Trout and carp culture
- 2.2 Prawn and pearl culture
- 2.3 Brackish water fish culture
- 2.4 Integrated fish farming, Composite/ Polyculture in fishes

**UNIT III: PROJECT WORK**

A survey project related to identification, culture, reproduction, feeding, limnology and population of fishes along with pathological, nutritional and biochemical parameters will be allotted to each student which is mandatory and have to be submitted by the students at the end of the semester.

**SUGGESTED BOOKS/READING MATERIAL**

1. A Text Book of Fish Biology & Fisheries by **S S Khanna and H R Singh** Narendra Publishing House
2. An Introduction to Fishes by **H.S. Bhamrah, Kavita Juneja** Anmol Publications Pvt Ltd
3. Fish and Fisheries by **Yadav, B N** Daya Publishing House
4. Fishes: An Introduction to Ichthyology by **Peter B. Moyle Joseph J. Cech Jr.**, Prentice Hall India Learning Private Limited
5. Aquaculture - Principles and Practices by **T. V. R. Pillay** Wiley-Blackwell; New edition edition
6. Fish and Fisheries of India by **V. G. Jhingram** Hindustan Publishing Corporation

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**ZOO-406-DCE: INSECT PEST MANAGEMENT**

Total Credits: 3 (3 Lecture + 0 Tutorial +0 Practical)

Maximum Marks: 75 (25/Credit)\* [Marks Distribution: 20% Internal Assessment & 80% End Semester Exam.]

Minimum Marks: 40% (Internal Assessment and End Semester Exam. to be Qualified Separately, not in Aggregate)

\*Note: One unit is equivalent to one credit.

**UNIT I: CHEMICAL CONTROL**

- 1.1 Chemical insecticides– organochlorines and organophosphates
- 1.2 Insecticides of plant origin
- 1.3 Insect chemosterilization– types of chemosterilants and mode of action
- 1.4 Mode of action of insecticides

**UNIT II: CULTURAL, BIOLOGICAL AND LEGISLATIVE CONTROL**

- 2.1 Cultural control of insects– principles, methods and techniques with examples
- 2.2 Biological control with successful examples of parasites/parasitoids and predators
- 2.3 Microbial control of insect pests
- 2.4 Legislative control (quarantine regulation)

**UNIT III: PHEROMONES, INSECT RESISTANCE AND PEST MANAGEMENT**

- 3.1 Pheromones– types and uses
- 3.2 Insect resistance to chemical pesticides
- 3.3 Genetical control of insects– methods and successful examples
- 3.4 IPM: Concept, strategies and tools in pest management

**SUGGESTED BOOKS/READING MATERIAL**

1. *A text book of Applied Entomology –vol. I* by **K.P. Srivastava** Kalyani Publishers
2. *Modern Entomology* by **D. B. Tembhare** Himalaya Publishing House

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3. *Handbook of Entomology* by **M.R. Dhingra**
4. *A Text book of Entomology* by **R. Mathur**

**ZOO-407-DCE: CONSERVATION GENETICS, TECHNIQUES AND METHODS OF WILDLIFE STUDY**  
Total Credits: 3 (3 Lecture + 0 Tutorial +0 Practical)

Maximum Marks: 75(25/Credit)\* [Marks Distribution: 20% Internal Assessment & 80% End Semester Exam.]

Minimum Marks: 40% (Internal Assessment and End Semester Exam. to be Qualified Separately, not in Aggregate)

\*Note: One unit is equivalent to one credit.

**UNIT I: CONSERVATION GENETICS**

- 1.1 Genetic diversity– gene frequencies in populations and loss of genetic diversity
- 1.2 Molecular techniques (protein electrophoresis, mt. DNA & PCR, analyses and comparisons of mitochondrial DNA's) for studying genetic diversity in the wild
- 1.3 Pedigree analysis, inbreeding and out breeding depressions
- 1.4 Non-invasive techniques in wildlife conservation

**UNIT II: TECHNIQUES AND PRACTICES**

- 2.1 Remote sensing: Principles and applications
- 2.2 Geographic information system and its application in wildlife
- 2.3 Use of radio-transmitters in wildlife study
- 2.4 Environmental impact assessment: purpose and procedure

**UNIT III: METHODS OF STUDYING WILDLIFE**

- 3.1 Methods of studying wildlife census
- 3.2 Capture of wildlife: live trapping, mist netting, rocket netting
- 3.3 Chemical capture of wild animals: equipments, drugs and plan of operation
- 3.4 Bird ringing and migration study

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**SUGGESTED BOOKS/READING MATERIAL**

1. *Wildlife Ecology and Management* by Bolen and Robinson
2. *Animal Ecology and Distribution of Animals* by Rastogi and Jayaraj
3. *Indian mammals a field guide* by Vivek Menon
4. *Wildlife in India* by V. B. Saharia
5. *Managing our Wildlife Resources* by S. A. Anderson
6. *Manual of Wildlife Techniques for India* by Sale and Berkmuller
7. *Concepts in Wildlife Management* by B.B. Hosti
8. Remote Sensing and Image Interpretations , Lillesand, T.M.; Kiefer, R.W.; Chipman, J.W. (2004) John wiley and Sons, Inc
9. Manual of Wildlife Techniques for India, J. B. Sale and K. Berkmuller (1988) WII, Dehradun India

**ZOO-408-GE: APPLIED ENTOMOLOGY AND PEST MANAGEMENT**

Total Credits: 3 (2 Lecture + 0 Tutorial +1 Practical)

Maximum Marks: 75(25/Credit)\* [Marks Distribution: 20% Internal Assessment & 80% End Semester Exam.]

Minimum Marks: 40% (Internal Assessment and End Semester Exam. to be Qualified Separately, not in Aggregate)

\*Note: One unit is equivalent to one credit.

**UNIT I: APPLIED ENTOMOLOGY**

- 1.1 Insects as pollinators– general account
- 1.2 Role of insects in medicine and forensic science
- 1.3 Insects in industry– Sericulture and Apiculture
- 1.4 Insects as biocontrol agents

**UNIT II: INSECT PEST MANAGEMENT**

- 2.1 Cultural control of insect pests
- 2.2 Role of IPM in insect pest control
- 2.3 Legislative control of insects
- 2.4 Insecticides of plant origin

**UNIT III: PRACTICAL WORK**

- 3.1 Collection and identification of major insect pests damaging economically important crops and fruits in Kashmir

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- 3.2 Study of biological control agents viz. parasites/ parasitoids and predators on economically important insect pests
- 3.3 Permanent mount preparation of important biocontrol agents (Parasitoids)
- 3.4 Stock solution preparation of various botanicals viz. *Artemisia* sp. and *Datura* sp.
- 3.5 Study of leg modifications of honey bees

**SUGGESTED BOOKS/READING MATERIAL**

1. *A text book of Applied Entomology –vol.I & II* by **K.P. Srivastava** Kalyani Publishers
2. *Modern Entomology* by **D. B. Tembhare** Himalaya Publishing House
3. *Handbook of Entomology* by **M.R. Dhingra**
4. *A Text book of Entomology* by **R. Mathur**

**ZOO-409-GE: FISH ECOLOGY AND LIMNOLOGY**

Total Credits: 3 (2 Lecture + 0 Tutorial +1 Practical)

Maximum Marks: 75 (25/Credit)\* [Marks Distribution: 20% Internal Assessment & 80% End Semester Exam.]

Minimum Marks: 40% (Internal Assessment and End Semester Exam. to be Qualified Separately, not in Aggregate)

\*Note: One unit is equivalent to one credit.

**UNIT I: ECOLOGY**

- 1.1 Adaptation in Hill stream fishes
- 1.2 Adaptation in deep sea and cave dwelling fishes
- 1.3 Cold adaptation; Freeze tolerance
- 1.4 Fish migration and types of migration (European eel, Atlantic salmon and Hilsa)

**UNIT II: LIMNOLOGY**

- 2.1 High altitude lakes of Jammu and Kashmir– general account
- 2.2 Eutrophication in valley lakes
- 2.3 Macro and micro nutrients in water bodies
- 2.4 Planktonic and benthic communities in inland water bodies

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**UNIT III: PRACTICALS**

- 3.1 Morphological adaptations in hill-stream fishes
- 3.2 Determination of temperature, pH and transparency of water bodies
- 3.3 Determination of dissolved oxygen, free carbon dioxide, total alkalinity of water bodies/ water sample
- 3.4 Qualitative and quantitative analysis of zooplankton local water bodies
- 3.5 Permanent slide preparation of planktons from local water bodies

**SUGGESTED BOOKS/READING MATERIAL**

1. *Textbook of Limnology* by **Goldman and Horne** McGraw Hill Higher Education
2. *Limnology: Lake and River Ecosystems* by **Robert G. Wetzel** Academic Press
3. *Fundamentals of Limnology* by **Arvind Kumar** Ashish Publishing House
4. *Advances in Limnology* by **H.R. Singh** Narendra Publishing House
5. *Ecology and Field Biology* Robert by **Leo Smith** Harper & Row, Publisher

**ZOO-410-OE: BASIC PARASITOLOGY AND DEFENCE MECHANISM**

Total Credits: 2 (2 Lecture + 0 Tutorial +0 Practical)

Maximum Marks: 50 (25/Credit)\* [Marks Distribution: 20% Internal Assessment & 80% End Semester Exam.]

Minimum Marks: 40% (Internal Assessment and End Semester Exam. to be Qualified Separately, not in Aggregate)

\*Note: One unit is equivalent to one credit.

**UNIT I: BASIC PARASITOLOGY**

- 1.1 Host-Parasite interactions– general account
- 1.2 Parasitic adaptations
- 1.3 Zoonotic diseases
- 1.4 Anthelmintics– elementary idea

**UNIT II: GENERAL DEFENCE MECHANISM**

- 2.1 Introduction to innate immunity

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- 2.2 Elementary idea about adaptive immunity
- 2.3 Immunization: active and passive immunization
- 2.4 Important immune-deficiency diseases

**SUGGESTED BOOKS/READING MATERIAL**

1. *Animal Parasitology* by **J. D. Smyth**
2. *Basic Immunology* by **Sharon, J. William and Wilkins**
3. *Foundations of Parasitology* by **Gerald D. Schmidt and Larry S. Roberts**
4. *Foundations of Parasitology* by **Larry S. Roberts, John Janovy and Steve Nadler**
5. *General Parasitology* by **Thomas C. Cheng**
6. *Helminthes Arthropods and Protozoa of Domesticated Animals* by **EJL Soulsby**
7. *Immunology* by **F. M. Burnet**
8. *Immunology* by **Kuby, J., Goldsby, R., Kindt, T.J. and Osbourne, B.A., W.H. Freeman**
9. *Immunology* by **Roitt, I.M., Brostoff, J. and Male, D. Mosby**
10. *Introduction to Parasitology* by **ASA C. Chandler & Clark P. Read**
11. *Medical Immunology for Students* by **Playfair, J.H.L. and Lydyard, P.M. Churchill**
12. *Monning's Veterinary Helminthology and Entomology* by **Geoffreng Lapage**
13. *Parasitology (Protozoology & Helminthology)* by **K. D. Chatterjee**

**ZOO-411-OE: BIODIVERSITY, WILDLIFE BIOLOGY AND TECHNIQUES**

Total Credits: 2 (2 Lecture + 0 Tutorial +0 Practical)

Maximum Marks: 50 (25/Credit)\* [Marks Distribution: 20% Internal Assessment & 80% End Semester Exam.]

Minimum Marks: 40% (Internal Assessment and End Semester Exam. to be Qualified Separately, not in Aggregate)

\*Note: One unit is equivalent to one credit.

**UNIT I: BIODIVERSITY: CONCEPT AND STATUS**

- 1.1 Biodiversity: concept and levels, reasons for extinction of biodiversity
- 1.2 Biogeographical zones of India with special reference to distribution of wild fauna
- 1.3 Biodiversity hotspots, national & international conservation organizations (BNHS, WWF, IUCN)

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1.4 IUCN red list categories and criteria

**UNIT II: WILDLIFE BIOLOGY AND TECHNIQUES**

2.1 Biology of Indian snakes and crocodiles

2.2 Adaptation and thermoregulation in mammals: hibernation, aestivation, ectothermy, homeothermy

2.3 Bird ringing and migration studies

2.4 Techniques for capture of wild animals– live trapping, mist netting and chemical capture

**SUGGESTED BOOKS/READING MATERIAL**

1. *Wildlife in India* by **V. B. Saharia**
2. *Managing our Wildlife Resources* by **S. A. Anderson**
3. *Manual of Wildlife Techniques for India* by **Sale and Berkmuller**
4. *Concepts in Wildlife Management* by **B.B. Hosti**
5. *Fundamentals of Wildlife Management* by **Rajesh Gopal**
6. *Important Bird Areas of Jammu and Kahmir* by **A. R Rahmani, Khurshid A., I. Suhail, P . chandan and Ashfaq A. Zarri**
7. *Biodiversity Perception Pearl and Preservation* by **Maiti and Maiti**