

**Shiksha Mandal's**  
**Jankidevi Bajaj College of Science, Wardha**  
**(An Autonomous College)**  
**Department of Zoology**  
**Syllabus for B.Sc. Zoology (Semester Pattern)**  
**Credit Based System**  
**With effect from Academic Year 2017-18**

# B.Sc. Semester I

## Paper I: Life and Diversity of Animals – NonChordates

### Unit I (12 Periods )

- 1.1 Animal Kingdom - Classification
- 1.2 Invertebrate - History and concept & Classification
- 1.3 Protozoa - General Characters & Locomotion
- 1.4 Malaria - Cansative organism & its Life cycle

### Unit II (12 Periods )

- 2.1 Porifera - General Characters
- 2.2 Canal system sponges - Brief Account
- 2.3 Colenterata - General characters,
- 2.4 Polymorphism in Coelenterata
- 2.5 Corals & Coral reef formation, Economic importance of corals

### Unit III (12 Periods )

- 3.1 Helminthes - General characters, Platyhelminthes & Aschelminthes
- 3.2 Ascaris - Morphology, Life Cycle
- 3.3 Taenia - Morphology, Life cycle
- 3.4 Annelida - General characters & Metamerism
- 3.5 Leech - Morphology, Genital system, Trochophore larva - Phylogenetic Significance

### Unit IV (12 Periods )

- 4.1 Arthropoda - General characters and vision in Arthropoda
- 4.2 Crustacean Larvae - Nauplius, Zoea, Megalopa
- 4.3 Mollusca - General characters & Torsion in Gastropoda
- 4.4 Pearl formation in Mollusc, Molluscan Larvae

### Unit V (12 Periods )

- 5.1 Echinodermata - General characters,  
Echinoderm Larvae - Introduction
- 5.2 Asterias - External features  
Water vascular system & Locomotion
- 5.3 Hemichordata - General characters, Phylogeny
- 5.4 Balanoglossus - External features, Affinities of Balanoglossus

### Unit VI (12 Periods )

- 6.1 Parasitism - Concept, parasite protozoa – Entamoeba, Leshmania
- 6.2 Parasitic Helminthes - Adaptation, Ascariasis, Taeasis
- 6.3 Vector - Biological & Mechanical, Insect vector, Housefly

## PRACTICAL – I Based on Life and Diversity of Animals – Nonchordates

### 1. Study of museum specimens (Classification of animals up to orders)

- I. Protozoa (Slides) : *Paramecium*, *Euglena*, *Amoeba*, *Plasmodium vivax*
- II. Porifera: *Sycon*, *Leucosolenia*, *Hyalonema*, *Euplectella*, *Spongilla*
- III. Coelenterata : *Obelia*, *Aurelia*, *Tubipora*, *Fungia*, *Adamsia*
- IV. Platyhelminthes : *Planaria*, *Fasciola*, *Taenia*
- V. Aschelminthes : *Ascaris*, *Dracunculus*, *Ancylostoma*, *Wuchereria*
- VI. Annelida : *Aphrodite*, *Nereis*, *Chaetopterus*, *Tubifex*, *Hirudinaria*
  
- I. Arthropoda : *Peripatus*, *Cyclops*, *Daphnia*, *Lepa*, *Sacculina*, *Limulus*, *Crab*, *Scolopendra*, *Julus*, *Dragonfly*, *Grasshopper*, *Moth*
- II. Mollusca : *Chiton*, *Dentalium*, *Aplysia*, *Pila*, *Mytilus*, *Loligo*, *Sepia*, *Octopus*
- III. Echinodermata : *Asterias*, *Ophiothrix*, *Holothuria*, *Antedon*, *Echinus*
- IV. Hemichordata : *Balanoglossus*, *Saccoglossus*

### 2. Study of permanent slides

*Entamoeba*, *Giardia*, Sponge gemmules, Sponge spicules, V.S. *Sycon*, T.S. *Sycon*, *Obelia* medusa, Miracidium, Redia and Cercaria larvae of *Fasciola*, T.S. male and female *Ascaris*, Scolex of *Taenia*, Mature and gravid proglottids of *Taenia solium*, T.S. of Leech through crop pockets, Trochophore larva,

Nauplius, Zoea and Megalopa larva of Arthropoda, Veliger and Glochidium larva of Mollusca, T.S. of arm of star fish, Bipinnaria and Auricularia larva, T.S. *Balanoglossus* through collar and proboscis, Tornaria larva

### 3. Anatomical observation / demonstration & detail explanation of Digestive, nervous and reproductive system of Earthworm & Digestive and reproductive system of Cockroach through ICT tools / Models / Charts / Photography

### 4. Whole mount preparation or Study of permanent preparation of Spicules and gemmules of Sponge, *Obelia* colony, *Nereis* parapodia, Jaws of Leech, Nephridia of Leech with the help of already available permanent slides / ICT tools / Charts / Photographs

### 5. Local Biodiversity in J. B. Campus – Field visit & Diary

OR

Visit to National Park & Sanctuary & Submission of tour report.

<b>Distribution of Marks -</b>	<b>Total Marks 30</b>
I. Identification and Comment on Spots (4 Museum specimens +4 slides)	08
II. Anatomical observation through ICT tools (Dissection through ICT tools)	04
III. Permanent stained preparation	06
IV. Submission of certified practical record	03
V. Submission of Slides & tour diary	06
VI. Viva voce	03

### **B.Sc. Semester I ( List of Recommended Books )**

#### **Life and Diversity of Animals – Non Chordates**

1. Barnes –Invertebrate Zoology (Holt-Saunders international) Philadelphia, USA
2. Barradaile L.A. & Potts F.A. – The Invertebrate
3. Nigam –Biology of Nonchordates
4. Kotpal, Agrawal&Khetrapal–Modern Text Book of Zoology - Invertebrates,Rastogi Publication, Meerut
5. Puranik P.G. & Thakur R.S. –Invertebrate Zoology
6. Majupuria T.C. –Invertebrate Zoology
7. Dhama&Dhama–Invertebrate Zoology
8. Parker &Hashwell, Textbook of Zoology Vol. I (Invertebrates) A.Z.T.B.S. Publishers & Distributors, New Delhi
9. Dr. S.S. LalPractical Zoology Invertebrates 9<sup>th</sup>edition,Rastogi Publication Meerut
10. EJW Barrington– Invertebrate Structure and Function ELBS III Edition
11. R.L. Kotpal–Phylum Protozoa to Echinodermata (series),Rastogi and Publication, Meerut
12. Parker J. and Haswell W. – Text Book of Zoology, ELBS Edition
13. Vidyarthi – Text Book of Zoology, Agrasia Publishers, Agra
14. Jordan E.L. and Verma P.S. – Chordate Zoology, S. Chand and Co., New Delhi
15. Ayer E. – Manual of Zoology

16. M.D. Bhatia – The Indian Zoological Memories–Leech
17. Beni Prasad – The Indian Zoological Memories–Pila
18. P. K. Gupta – Vermicomposting for Sustainable Agriculture, Agrobios India Ltd
19. A manual of Practical Zoology Invertebrates – P. S. Verma
20. Barnes –Invertebrate Zoology (Halt-Saunders international) Philadelphia, USA
21. Barradaile L.A. & Potts F.A. – The Invertebrate
22. Nigam –Biology of Nonchordates
23. Kotpal, Agrawal&Khetrapal–Modern Text Book of Zoology - Invertebrates,Rastogi Publication, Meerut
24. Puranik P.G. & Thakur R.S. –Invertebrate Zoology
25. Majupuria T.C. –Invertebrate Zoology
26. Dhama&Dhama–Invertebrate Zoology
27. Parker &Hashwell, Textbook of Zoology Vol. I (Invertebrates) A.Z.T.B.S. Publishers & Distributors, New Delhi
28. Dr. S.S. Lal Practical Zoology Invertebrates 9<sup>th</sup> edition, Rastogi Publication Meerut
29. E.J.W. Barrington– Invertebrate Structure and Function ELBS III Edition
30. R.L. Kotpal–Phylum Protozoa to Echinodermata (series), Rastogi and Publication, Meerut
31. Parker J. and Haswell W. – Text Book of Zoology, ELBS Edition
32. Vidyarthi – Text Book of Zoology, Agrasia Publishers, Agra
33. Jordan E.L. and Verma P.S. – Chordate Zoology, S. Chand and Co., New Delhi
34. Ayer E. – Manual of Zoology
35. M.D. Bhatia – The Indian Zoological Memories–Leech
36. Beni Prasad – The Indian Zoological Memories–Pila
37. P. K. Gupta – Vermicomposting for Sustainable Agriculture, Agrobios India Ltd
38. A manual of Practical Zoology Invertebrates – P. S. Verma

# B.Sc. Semester II

## Paper II: Life and Diversity of Animals – Higher Invertebrates and Chordates

### A Higher Invertebrates

#### Unit I (12 Periods)

- 1.1 Phylum Arthropoda :General characters; Vision in Arthropoda; Metamorphosis in Insects
- 1.2 Phylum Mollusca General characters; Torsion in gastropods; Pearl formation in mollusca ,Molluscan larvae
- 1.3 Phylum Echinodermata : General characters; Water-vascular system and locomotion in Asterias
- 1.4 Hemichordata - General features and Phylogeny, Affinities of *Balanoglossus*

### B Chordates

#### Unit II (12 Periods)

- 2.1 Chordata – Origin, Concept,Phylogenetic Tree of Evolution - Animals
- 2.2 Protochordata: General Characters and Classification, Types *Herdmania* and *Branchiostoma*
- 2.3 *Herdmania*: Structure, Ascidian tadpole and retrogressive metamorphosis  
*Branchiostoma*: External Characters and Sense organs
- 2.4 Agnatha:Agnatha concept and Affinities ; General Characters of Cyclostomata :*Petromyzon* and *Myxine*

#### Unit-III (12 Periods)

- 3.1 Class Pisces: Origin, General features of *Chondrichthyes* and *Osteichthyes*,
- 3.2 Origin of paired fins in fishes
- 3.3 Migration in fishes-Types, causes, and significance. Accessory respiratory organs in fishes
- 3.4 Osmoregulation in Fishes, Lateral line receptors.

#### Unit-IV (12 Periods)

- 4.1 Class Amphibia : Origin, General features and Classification up to orders ;
- 4.2 Parental care and Neotony in Amphibia.
- 4.3 Class Reptilia- Origin, General features ; Classification based on temporal vacuities
- 4.4 Snakes : General Characters, Poisonous and non-poisonous snakes, Biting mechanism in snakes, Poison apparatus, snake venom properties

#### Unit V (12 Periods)

- 5.1 Class Aves– Origin, General features and Classification
- 5.2 Comparison of Ratitae and Caranitae
- 5.3 Flight adaptations ; Migration in birds
- 5.4 Flightless Birds : Origin and general characters example

## Unit VI

(12 Periods)

- 6.1 Class Mammals– Origin, Concept, General Features
- 6.2 General characters of Prototheria, Metatheria and Eutheria with types
- 6.3 Adaptive radiations in mammals ; Urinogenital systems in Mammals
- 6.4 Comparative account of Heart in Reptiles, Birds and Mammals

### PRACTICAL - II Based on Life and Diversity of Animals –Chordates

#### Identification, classification, distinguishing characters and adaptive features of

Urochordata	:- Herdmania, Salpa, Doliolum
Cephalochordata	:- Amphioxus
Cyclostomata	:- Petromyzon, Myxine
Pisces	:- Pristis, Torpedo, Notopterus, Exocoetus, Clarius, Catla,
Amphibia	:- Ichthyophis ,Bufo, Salamander
Reptilia	:- Chameleon, Varanus, Pharynosoma, Draco, Tortoise, Cobra, Krait, Russel's viper, Sea snake
Birds	:- Owl, Woodpecker, Kingfisher, Kite, Duck, Parrot
Mammals	:- Squirrel, Mongoose, Bat, Loris, Rabbit

#### 2. Study of skeleton of Rabbit

#### 3. Dissection of the locally available culturable fish -

- i. Digestive system
- ii. Reproductive system
- iii. Brain

#### 4. Study of permanent slides

Amphioxus through Pharynx, Intestine, Gonad and Caudal region; V.S. skin, T.S. Testis, T.S. Ovary of Frog; T.S. Stomach, T.S. Intestine, T.S. Liver of fish

#### 5. Permanent stained preparation:

Fish scales – Placoid, cycloid, ctenoid ;  
Hyaline cartilage and striated muscle

	Distribution of Marks	-	Total Marks	30
I.	Dissection ( Visual through ICT tools )		08	
II.	Identification and comment on spots (Museum specimens/ slides),		08	
III.	Permanent stained Preparation		04	
IV.	Submission of certified practical record		04	
V.	Submission of slides		03	
VI.	Viva voce		03	

## **List of Recommended Books:**

### **Life and Diversity of Animals -Chordates**

1. T. B. of Zoology vol II – Parker & Haswell
2. T. B. of Vertebrate Zoology - S. N. Prasad
3. Chordate Zoology – E. L. Jordan and P. S. Verma
4. Vertebrate Zoology – Vishwanath
5. Zoology of Chordates – Nigam H. C.
6. Phylum: Chordata – Newman H.H.
7. Biology of Vertebrates – Walter & Sayles
8. The Vertebrate Body – Romer A. S.
9. Comparative Anatomy of the Vertebrates - Kingslay J. D.
10. The Biology of Amphibia – Noble G. K.
11. Snakes of India – Gharpura K. G.
12. Life of Mammals – Young J.Z.
13. Vertebrates – Kotpal R. L.
14. Introduction to Chordates - Majupuria T.C.
15. Vertebrate Zoology – Dhami & Dhami
16. T. B. Vertebrate Zoology – Agrawal
17. Protochordates – Chatterjee & Pandey
18. Protochordates – Bhatia
19. T. B. of Chordates – Bhamrah and Juneja
20. Chordate Anatomy - Arora M.P.
21. The Chordates – Alexander.
39. Practical Zoology Vertebrates – Dr. S. S. Lal, Rastogi Publication, Meerut
40. A manual of Practical Zoology Vertebrates – P. S. Verma