

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*, *Lepas*, *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.

Distribution of Marks -	Total Marks 30
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. Dhami&Dhami–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 9thedition,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 9th 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

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