

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS 2019

CURRICULUM FOR ZOOLOGY IN UNDER GRADUATE DEGREE PROGRAMME CBCS SYLLABUS SCHEDULE 2019

Year	Semester	Paper		Title of the Paper	No. of Credits	Exam Hrs.	Max. Marks		
							I.A	End Exam	Total
I	I	Paper - I	Core-I Theory	Animal Diversity- Invertebrates	4	2	20	80	100
			Core-I Practical	Animal Diversity- Invertebrates	1	2	-	25	25
	II	Paper - II	Core-II Theory	Animal Diversity- Vertebrates	4	2	20	80	100
			Core-II Practical	Animal Diversity- Vertebrates	1	2	-	25	25
II	III	Paper - III	Core-III Theory	Animal Physiology, Animal Behaviour and Developmental Biology	4	2	20	80	100
			Core-III Practical	Animal Physiology, Animal Behaviour and Developmental Biology	1	2	-	25	25
			SEC-1	Sericulture / Aquaculture	2	2	10	40	50
	IV	Paper - IV	Core-IV Theory	Cell Biology, Genetics, Evolution and Zoogeography.	4	2	20	80	100
			Core-IV Practical	Cell Biology, Genetics, Evolution and Zoogeography	1	2	-	25	25
			SEC-3	Apiculture / Poultry and Animal Husbandry	2	2	10	40	50
	V	Paper - V	DSE-I Theory	Physiological Chemistry / Immunology / Diagnostic Methods of Parasites / Animal Biotechnology	4	2	20	80	100
			DSE -I Practical	Physiological Chemistry / Immunology / Diagnostic Methods of Parasites / Animal Biotechnology	1	2	-	25	25
			GE - I Theory	Preventive Medicine / Integrated Pest Management / Health and Hygiene	4	2	20	80	100
III	V	Paper - VI	DSE-II Theory	Fisheries / Limnology / Vector Biology / Laboratory Animals Maintenance and Applications	4	2	20	80	100
			DSE-II Practical	/ Fisheries / Limnology / Vector Biology / Laboratory Animals Maintenance and Applications	1	2	-	25	25
			Project / Tools and Techniques in Biology		4				

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Practical One Credit equal to 3hrs

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Periods: 60

Max. Marks: 80

UNIT – I :

1.1 Protozoa.

(15 Periods)

- 1.1.1 General characters and classification of Protozoa upto order levels with examples
- 1.1.2 Type study – *Elphidium*
- 1.1.3 Locomotion and Reproduction in Protozoa.
- 1.1.4 Epidemiology of Protozoan diseases - Amoebiasis; Giardiasis; Leishmaniasis and Malaria.

1.2 Porifera

- 1.2.1. General characters and classification of Porifera upto order levels with examples
- 1.2.2 Type study – *Sycon*
- 1.2.3 Canal system in sponges and Spicules.

UNIT – II

(15 Periods)

2.1. Cnidaria

- 2.1.1 General characters and classification of Cnidaria upto order levels with examples
- 2.1.2 Type study - *Obelia*
- 2.1.3 Polymorphism in Siphonophora
- 2.1.4 Corals and coral reef formation

2.2 Platyhelminthes

- 2.2.1 General characters
- 2.2.2 Classification of Platyhelminthes up to classes with examples
- 2.2.3 Type study- *Schistosoma*

2.3 Nematelminthes

- 2.3.1 General characters
- 2.3.2 Classification of Nematelminthes up to classes with examples
- 2.3.3 Type study - *Dracunculus*
- 2.3.4 Parasitic Adaptations in Helminthes

UNIT – III

(15 Periods)

3.1 Annelida

- 3.1.1 General characters
- 3.1.2 Classification of Annelida up to classes with examples
- 3.1.3 Type study - *Hirudinaria granulosa*.
- 3.1.4 Evolutionary significance of Coelome and Coelomoducts and metamerism

3.2 Arthropoda

- 3.2.1 General characters
- 3.2.2 Classification of Arthropoda up to classes with examples
- 3.2.3 Type study - Prawn

Practical One Credit equal to 3hrs

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- 3.2.4 Crustacean larvae
- 3.2.5 Insect metamorphosis
- 3.2.6 *Peripatus* - Structure and affinities

UNIT – IV

(15 Periods)

4.1 Mollusca

- 4.1.1 General characters
- 4.1.2 Classification of Mollusca up to classes with examples
- 4.1.3 Type study - *Pila*
- 4.1.4 Pearl formation
- 4.1.5 Torsion and detorsion in gastropods

4.2 Echinodermata

- 4.2.1 General characters
- 4.2.2 Classification of Echinodermata up to classes with examples
- 4.2.3 Water vascular system in star fish
- 4.2.4 Echinoderm larvae and their significance

Suggested Readings

1. L.H. Hyman 'The Invertebrates' Vol I, II and V. – M.C. Graw Hill Company Ltd.
2. Kotpal, R.L. 1988 - 1992 Protozoa, Porifera, Coelenterata, Helminthes, Arthropoda, Mollusca, Echinodermata. Rastogi Publications, Meerut.
3. E.L. Jordan and P.S. Verma 'Invertebrate Zoology' S. Chand and Company.
4. R.D. Barnes 'Invertebrate Zoology' by: W.B. Saunders CO., 1986.
5. Barrington. E.J.W., 'Invertebrate structure and Function' by ELBS.
- 6 P.S. Dhami and J.K. Dhami. Invertebrate Zoology. S. Chand and Co. New Delhi.
7. Parker, T.J. and Haswell 'A text book of Zoology' by, W.A., Mac Millan Co. London.
8. Barnes, R.D. (1982). Invertebrate Zoology, V Edition"

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Practical One Credit equal to 3hrs

B.Sc. I Year
ZOOLOGY PRACTICAL SYLLABUS FOR I SEMESTER
Discipline Specific Course, Paper – I
ANIMAL DIVERSITY - INVERTEBRATES

Periods: 45

Max. Marks: 25

1. Study of museum slides / specimens / models (Classification of animals up to orders)

- i. **Protozoa:** *Amoeba*, *Paramecium*, *Paramecium* Binary fission and Conjugation, *Vorticella*, *Entamoeba histolytica*, *Plasmodium vivax*
- ii. **Porifera:** *Sycon*, *Spongilla*, *Euspongia*, *Sycon* - T.S & L.S, Spicules, Gemmule
- iii. **Coelenterata:** *Obelia* – Colony & Medusa, *Aurelia*, *Physalia*, *Velella*, *Corallium*, *Gorgonia*, *Pennatula*
- iv. **Platyhelminthes:** *Planaria*, *Fasciola hepatica*, *Fasciola* larval forms – Miracidium, Redia, Cercaria, *Echinococcus granulosus*, *Taenia solium*, *Schistosoma haematobium*
- v. **Nemathelminthes:** *Ascaris* (Male & Female), *Dracunculus*, *Ancylostoma*, *Wuchereria*
- vi. **Annelida:** *Nereis*, *Aphrodite*, *Chaetopterus*, *Hirudinaria*, Trochophore larva
- vii. **Arthropoda:** *Cancer*, *Palaemon*, *Scorpion*, *Scolopendra*, *Sacculina*, *Limulus*, *Peripatus*, Larvae - Nauplius, Mysis, Zoea, Mouth parts of male & female *Anopheles* and *Culex*, Mouthparts of Housefly and Butterfly.
- viii. **Mollusca:** *Chiton*, *Pila*, *Unio*, *Pteredo*, *Murex*, *Sepia*, *Loligo*, *Octopus*, *Nautilus*, Glochidium larva
- ix. **Echinodermata:** *Asterias*, *Ophiothrix*, *Echinus*, *Clypeaster*, *Cucumaria*, *Antedon*, Bipinnaria larva

2. Dissections:

Prawn: Appendages, Digestive system, Nervous system, Mounting of Statocyst
Insect Mouth Parts

3. Laboratory Record work shall be submitted at the time of practical examination

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.

5. Computer aided techniques should be adopted – show virtual dissections

Suggested manuals:

1. Practical Zoology- Invertebrates S.S. Lal
2. Practical Zoology - Invertebrates P.S. Verma
3. Practical Zoology - Invertebrates K.P. Kurl

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J. Gupta

Practical One Credit equal to 3hrs

B.Sc. I Year
ZOOLOGY PRACTICAL SYLLABUS FOR I SEMESTER
Discipline Specific Course, Paper – I
ANIMAL DIVERSITY - INVERTEBRATES

Time: 2 Hrs.

Max.

Marks: 25

1. Identification, labeled diagram and salient features of spots: (7 Museum specimens + 2 slides)	18
2. Dissection (one) (Diagram -02 + Dissection & Display-05)	07
3. Field Visit & Note Book	04
4. Project Work	03
5. Certified practical record	03
6. Animal Album	03
7. Viva voce	02



Manita Das




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f. Ganga 15/6/15

Practical One Credit equal to 3hrs

B.Sc. I Year

II - SEMESTER

Core Paper – II

Animal Diversity- Vertebrates

Periods: 60

Max. Marks: 80

UNIT – I

(15 Periods)

1.1 Hemichordata

1.1.1 General characters

1.1.2 Classification of Hemichordata up to classes with examples

1.1.3 *Balanoglossus* - Structure and affinities

1.2. Urochordata, Cephalochordata, Cyclostomata

1.2.1. Salient features of Urochordata

1.2.2. Retrogressive metamorphosis and its significance in Urochordata

1.2.3. Salient features and affinities of Cephalochordata

1.2.4. General characters of Cyclostomata

1.2.5. Comparison of the *Petromyzon* and *Myxine*

1.2.6. General characters and classification of Chordata upto orders with examples.

UNIT – II

(15 Periods)

2.1. Pisces

2.1.1. General characters of Fishes

2.1.2. Classification of fishes up to order level with examples

2.1.3. *Scoliodon* – Respiratory, Circulatory and Nervous system.

2.1.4. Types of Scales and types of Fins

2.2. Amphibia

2.2.1. General characters of Amphibians

2.2.2. Classification of Amphibians up to orders with examples.

2.2.3. *Rana tigrina* - Respiratory, Circulatory and Nervous system.

2.2.4. Parental care in amphibian; neoteny and paedogenesis.

UNIT – III

(15 Periods)

3.1 Reptilia

3.1.1. General characters of Reptilia

3.1.2. Classification of Reptilia up to orders with examples

3.1.3. *Calotes* – Respiratory system, Circulatory and Nervous system.

3.1.4. Temporal fosse in reptiles and its evolutionary importance

3.1.5. Distinguished characters of Poisonous and Non poisonous snakes.

3.2. Aves

3.1.1. General characters of Aves

3.1.2. Classification of Aves up to orders with examples.

3.1.3. *Columba livia* -, Digestive system, Circulatory systems, Respiratory system and Nervous system.

3.1.4. Migration in Birds

3.1.5. Flight adaptation in Birds

UNIT – IV

(15 Periods)

15/6/19

Practical One Credit equal to 3hrs

4.1. Mammalia

- 4.1.1. General characters of Mammalia
- 4.1.2. Classification of Mammalia up to orders with examples
- 4.1.3. Rabbit –Digestive, Respiratory, Circulatory and Nervous system.
- 4.1.4. Dentition in mammals.
- 4.1.5. Aquatic adaptations in Mammals.

Suggested Readings:

1. E.L.Jordan and P.S. Verma '*Chordate Zoology*' - S. Chand Publications.
2. Mohan P.Arora. '*Chordata – I*', Himalaya Publishing House Pvt.Ltd.
3. Marshal, Parker and Haswell '*Text book of Vertebrates*'. ELBS and McMillan, England.
4. Alfred Sherwood Romer. Thomas S. Pearson '*The Vertebrate Body*, Sixth edition, CBS college Publishing, Saunders College Publishing
5. George C. Kent, Robert K. Carr. '*Comparative Anatomy of the Vertebrates*, 9th ed. McGraw Hill.
6. Kenneth Kardong '*Vertebrates: Comparative Anatomy, Function and Evolution*, 4th ed, 'McGraw Hill.
7. J.W. Young, '*The Life of Vertebrates*, 3rd ed, Oxford University press.
8. Harvey Pough F, Christine M. Janis, B. Heiser, '*Vertebrate Life*, Pearson, 6th ed, Pearson Education Inc.2002.

16/02/19
Manita Das

Practical One Credit equal to 3hrs

J. Garg
15/6/19

B.Sc. I Year
ZOOLOGY PRACTICAL SYLLABUS FOR II SEMESTER
ZOOLOGY - CORE PAPER - II
Animal Diversity- Vertebrates

Periods: 45

Max. Marks: 25

Study of museum slides / specimens / models (Classification of animals up to orders)

1. **Hemichordata:** *Balanoglossus*, *Tornaria* larva
2. **Protochordata:** *Amphioxus*, *Amphioxus* T.S. through pharynx
3. **Cyclostomata:** *Petromyzon*, *Myxine*, *Ammocoetus* larva
4. **Pisces:** *Sphyrna Pristis*, *Torpedo*, *Channa*, *Pleuronectes*, *Hippocampus*, *Exocoetus*, *Echlenels*, *Labeo*, *Catla*, *Clarius*, *Protopterus*, Scales: Placoid, Cycloid, Ctenoid
5. **Amphibia:** *Ichthyophis*, *Amblystoma*, *Siren*, *Hyla*, *Rachophous*, *Bufo*, *Rana*, *Axolotal* larva
6. **Reptilia :** *Draco*, *Chamaeleon*, *Gecko*, *Uromastix*, *Vipera russelli*, *Naja*, *Bungarus*, *Enhydrina*, *Typhlops*, *Testudo*, *Trionyx*, *Crocodilus*, *Ptyas*.
7. **Aves:** *Archaeopteryx*, *Passer*, *Psittacula*, *Bubo*, *Alcedo*, *Columba*, *Corvus*, *Pavo*; Collection and study of different types of feathers: Quill, Contour, Filoplume, Down
8. **Mammalia:** *Ornithorhynchus*, *Tachyglossus*, *Pteropus*, *Funambulus*, *Manis*, *Loris*, *Hedgehog*

Histology: T.S. of Liver, Pancreas, Kidney, Stomach, Intestine, Lungs Artery, Vein, Bone T.S., Spinal cord.

Osteology :

1. Rabbit – Axial skeleton system (bones of Skull and Vertebral Column)
2. Varanus, Pigeon and Rabbit – Appendicular skeleton system (bones of limbs and girdles)

Dissections of *Labeo/Tilapia*:

1. Digestive system.
2. Brain, Weberian ossicles
3. V, VII, IX, X cranial nerves

Laboratory Record work shall be submitted at the time of practical examination

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.

Computer aided virtual dissections.

Suggested manuals

1. S.S.Lal, Practical Zoology – Vertebrata
2. P.S.Verma, A manual of Practical Zoology – Chordata
3. Freeman & Bracegirdle, An atlas of embryology

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Practical One Credit equal to 3hrs
15/6/19
F. D. Garg

Question paper pattern

Faculty of Science
Zoology

Title of the paper:

Duration: 3 hrs]

Paper:

Max. Marks: 80]

Section - A

(Short Answer type questions)

(8 × 4 = 32 marks)

Answer any eight questions.

1. Unit - I
2. Unit - II
3. Unit - I
4. Unit - II
5. Unit - II
6. Unit - II
7. Unit - IV
8. Unit - III
9. Unit - IV
10. Unit - IV
11. Unit - IV
12. Unit - IV

Section - B (Essay Answer type questions)

4 × 12 = 48 marks

13(a) Unit - I

(or)

(b) Unit - I

14(a) Unit - II

or

(b) Unit - II

15(a) Unit - IV

or

(b) Unit - IV

16(a) Unit - IV

or

(b) Unit - IV

Signature: _____

Markings

9. Marks

B.Sc. II Year
ZOOLOGY PRACTICAL SYLLABUS FOR III SEMESTER
ZOOLOGY - CORE PAPER - III
Animal Diversity- Vertebrates and Developmental Biology

Max. Marks: 25

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|--|----|
| 1. Identification, labeled diagram and salient features of spots:
(6 Museum specimens + 2 slides) | 08 |
| 2. Osteology (02 Spots) | 04 |
| 3. Dissection (one) (Diagram + Dissection & Display) | 05 |
| 4. Embryology (02 Spots) | 04 |
| 5. Certified practical record | 03 |
| 6. Animal Album | 02 |
| 7. Viva voce | 02 |

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