

GUJARAT UNIVERSITY

Ahmedabad



ZOOLOGY MAJOR SYLLABUS [THEORY AND PRACTICAL]

BASED ON NEP 2020 Guidelines

Effective from June - 2024

B. Sc. - ZOOLOGY

Semester –IV

Zoology Major	Zoology Theory	Zoology Theory	Zoology Practical
Paper No.	DSC-C-241T	DSC-C-242T	DSC-C-243 P (Part A + Part B)
Credit	04 credits	04 credits	4 credits
Teaching hours / week	04 hours	04 hours	08 hours (Part A -04 hours + Part B -04 hours)
Examination marks (External + Internal)	100 marks	100 marks	100 marks (Part A-50 marks + Part B-50 marks)
Semester end External Examination Marks	50 marks	50 marks	50 marks (Part A - 25 marks + Part B - 25 marks)
Internal Exam. Marks.	50 marks [30 (Written Test) 15 (Assignment, Seminar / Quiz , 5 Attendance)]	50 marks [30(Written Test) 15 (Assignment, Seminar/Quiz, 5 Attendance)]	50 marks (Part A -25 marks + Part B -25 marks)
Semester end External Examination Duration	2 hours	2 hours	10 hours Part A- 5 hours + Part B -5 hours

Core course	Paper DSC-C-241 Theory	Paper DSC-C-242 Theory	DSC-C-243 P
UNIT-1	Animal Parasitology	Systematics: Reptiles, Aves, Mammals.	Part- A Practicals Based on Theory Paper DSC-C-241 T
UNIT-2	Type study- Cockroach	Comparative Anatomy	
UNIT-3	General Topics	Type Study- Calotes	
UNIT-4	Insect vectors and vector- borne diseases	Cytology	Part - B Practicals Based on Theory Paper DSC-C-242 T

- Detailed curriculum has been designed as per semester system.
- There shall be two theory papers having four units each and one practical paper in semester.

Learning Objectives:

- To understand the fundamental concepts of Zoology.
- To study harmful parasites of Human- their life cycles, effects, diseases and controlling measures.

- To learn anatomy and economic importance of invertebrates.
- To learn entomological aspects of insect vectors and vector-borne diseases affecting the Human population.
- To learn Chordate systematics and comparative anatomy.
- To study fundamental Cell Biology.
- To apply the theoretical knowledge in practical.
- To make the student aware of the wide scope of Zoology as a Core subject as well as a multi-disciplinary subject.

Learning Outcomes

By the end of the course, the students will be able to:

- Acquire knowledge about different branches of Zoology that will guide them to succeed in the same.
- Comprehend the spread of various vectors, diseases, their prevention and cure.
- Create awareness about public health.
- Students will gain knowledge about advance research techniques and applied branches of Zoology.

Credits: 04

Teaching Hours: 04 hours / Week

Total Marks: 100 (External 50 + Internal 50) Marks

- Students must record the laboratory work done in a journal. The journal is to be certified by the Teacher in-charge and Head of the department.
- Duly certified journals have to be produced while appearing at the time of university exam.

Zoology Paper – DSC-C-241 T
Semester – 4
Animal diversity (Non-chordates) & Parasitology

Unit- 1: Animal Parasitology

Harmful parasites of human- their parasitic adaptations, life cycles, effects, diseases and controlling measures of following parasites:

1. Flatworms

- *Fasciola hepatica*- Life history & Development, Diseases- Liver Rot or Fascioliasis (Pathogenesis, Therapy, Prophylaxis).
- *Taenia solium*- Life history & Development, Diseases Cestodiasis- 1. Taeniasis & 2. Cysticercosis (Pathogenesis, Therapy, Prophylaxis and Diagnostic tests)

2. Helminthes

- *Ascaris lumbricoides*- Life history & Development. Diseases- Ascariasis (Pathogenesis, Therapy, Prophylaxis).
- *Wuchereria bancrofti* - Life history & Development. Diseases- Filariasis/Elephantiasis (Diagnosis, Pathogenesis, Therapy, Control).

Unit- 2: Type study- Cockroach (*Periplaneta americana*)

Systematic position, Habits and Habitat, External Morphology, Appendages, Digestive system, Circulatory system, Excretory system, Nervous system, Reproductive system and Sense organ (only compound eyes), Mouth parts

Unit- 3: General topics

1. Zooplanktons – Introduction, types and Importance.
2. Economic importance of following invertebrates - Annelids, Arthropods & Molluscs.
3. Mouthparts of Insects:
 - Cockroach
 - Butterfly
 - House fly
 - Honey bee
 - Mosquito (*Anopheles* & *Culex* - male and female)

Unit- 4: Arthropod vectors and vector- borne diseases

1. Introduction of vectors (Mechanical and biological)
2. Vector Insects: Mosquitoes, House Flies, Fleas, Ticks, Bed Bug, Human Louse, Mites, Black Flies and Cockroach.
3. Insect borne diseases- Malaria, Dengue, Chikungunia, Filariasis, Visceral Leishmaniasis, Plague, Tick-borne encephalitis, Crimean-congo haemorrhagic fever, Trypanosomiasis, River blindness.

Zoology Paper – DSC-C-242 T
Semester – 4
Animal Diversity (Chordates), Comparative Anatomy & Cytology

Unit- 1: Systematics (Chordates)

General characters, salient features and classification of Vertebrates, starting from Kingdom up to order giving reasons with examples (as per practical syllabus)

1. Reptiles
2. Aves
3. Mammals

Unit- 2: Type study- *Calotes versicolor* (Garden lizard)

Systematic position, Habits and Habitat, External characters, Digestive system, Respiratory system, Blood-vascular system (Heart, Arterial system, Venous system), Urinogenital system, Brain, Hyoid apparatus and Columella auris.

Unit- 3: Comparative Anatomy

Comparative anatomy of Vertebrates:

1. Heart
2. Kidney
3. Brain

Unit- 4: Cytology

Structure and function of following cell organelles:

1. Lysosome
2. Endoplasmic Reticulum
3. Golgi Complex
4. Mitochondria
5. Ribosomes

Reference books for DSC-C 241 T, DSC-C 242 T and DSC-C-243 P.

1. Textbook of Invertebrates, R. L. Kotpal, Rastogi Publishers, Meerut.
2. Manual of Zoology, E. K. Ayer, Vol. I & II.
3. Invertebrate Zoology, Jordan and Verma, S. Chand & Company, Delhi.
4. Textbook of Vertebrates, R. L. Kotpal, Rastogi Publication, Meerut.
5. Chordate Zoology, P. S. Dhami, and J. K. Dhami, S. Chand & Co. Delhi.

6. Introduction to Chordates, T. C. Majupuria, Pradeep Publication, Jalandhar.
7. Chordate Zoology, E.L. Jordan, P.S. Verma, S. Chand & Company, Delhi.
8. Text book of practical zoology - Invertebrates, S. S. Lal Rastogi Publication, Meerut.
9. Text book of practical zoology - Vertebrates, S. S. Lal Rastogi Publication, Meerut.
10. Entomology and Pest Management. Pedigo L. P. (2002), Prentice Hall Publication.
11. Integrated Vector Management: Controlling Vectors of Malaria and other Insect Vector borne Diseases. Methews, G. (2011) Wiley-Blackwell
12. Cytology, P. S. Verma & V. K. Agarwal, S. Chand & Company, Delhi.
13. Cell Biology, C. B. Power, Himalaya Publishing House.
14. Introduction to cytology, Veerbala Rastogi, Kedarnath Ramnath, Meerut.

Zoology Paper – DSC-C-243 P- Practical
(Based on theory papers DSC-C-241 T & DSC-C-242 T)
Semester – 4
Part A
(Based on theory papers DSC-C-241 T)

Unit: 1 Parasitology: Study through Slides/Charts/Multimedia.

A. Flat Worms

1. *Faciola hepatica* - W.M., Eggs, Larval stages (Miracidium, Sporocyst, Redia, Cercaria, Metacercaria).
2. *Taenia Solium* – W.M., Scolex, Neck, Strobila, Mature proglottid, Gravid proglottid, Larval Stages (Hexacanth and Bladder worm)

B. Helminths

1. *Ascaris lumbricoides* – W.M. (male and female), Study of life cycle through chart.
2. *Wuchereria bancrofti* – W.M., Study of life cycle through chart.

Unit: 2 Type study- Cockroach (*Periplaneta americana*)

1. Study of Cockroach by Slides/Charts/Multimedia.

- External Morphology, Appendages, Digestive system, Circulatory system, Nervous system and Reproductive system.
2. Mouth parts, T.S. of Gizzard, W.M. of Salivary apparatus, Male Gonapophyses (External genitalia), and V.S. of compound eye.

Unit: 3 General topics

1. Identification of Protozoan planktons from pond water.
2. Identification of Crustacean planktons from pond water.
3. Study of Mouthparts by Slides/Charts/Multimedia – Cockroach, Butterfly, House fly, Honey bee, Mosquito (*Anopheles* & *Culex* – male and female)

Unit: 4 Arthropod vectors and Vector-borne diseases:

Study of Arthropod Vectors and Vector-borne diseases through slides/charts/multimedia:

Mosquitoes, House Flies, Fleas, Ticks, Bed Bug, Human Louse, Mites, Black Flies and Cockroach.

Part B
(Based on theory papers DSC-C-242 T)

Unit: 1 Systematics (Chordates)

Identification and classification of following animals with scientific names up to order giving reasons:

1. Reptiles – Giant Turtle, Tuatara, Common house lizard, Horned toad, Chameleon, Varanus, Rat snake, Sea snake.
2. Aves – Painted Storke, Pelican, Hoopoe, Kite, Peacock, Crane, Baya/ Weaver Bird, Kingfisher, Wood packer, Tailor Bird, Owl, Flamingo, Lapwing and Swift.
3. Mammals – Duck Billed Platypus, Kangaroo, Hedgehog, Porcupine, Flying fox, Dolphin, Dugong, Gorilla, Asiatic Lion, Domestic horse, Blue bull, Black buck.

Unit: 2 Type study- *Calotes versicolor* (Garden lizard)

1. Study of Calotes by Slides/Charts/Multimedia:
External characters. Digestive system, Arterial system, Venous system, Urinogenital systems, Brain.
2. Study of Hyoid apparatus and Columella auris.

Unit: 3 Comparative Anatomy

Comparative anatomy of following organs:

1. Heart
2. Kidney
3. Brain

Unit: 4 Cytology

- Identification of following cell organelles:
 1. Lysosome
 2. Endoplasmic Reticulum
 3. Golgi Complex
 4. Mitochondria
 5. Ribosomes

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EFFECTIVE FROM JUNE-2024
DISCIPLINE SPECIFIC COURSE (CORE) PRACTICAL
B.SC. SEMESTER-IV ZOOLOGY
DSC-C-243 P (MAJOR PRACTICAL) (4- CREDITS)
PRACTICAL PART-A
(Based on theory paper DSC-C-241T)

SKELETON QUESTION PAPER FOR PRACTICAL EXAMINATION

Time: 5 Hours.

Marks: 25

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- Q. 1 Sketch, label and describe..... system of Cockroach.
(External Morphology, Appendages, Digestive system, Circulatory system, Nervous system, Reproductive system.) 6
- Q. 2 Sketch, label and describe.....temporary mounting of Cockroach.
(Mouth parts, T.S. of Gizzard, W.M. of Salivary apparatus, Male Gonapophyses (External genitalia) and V.S. of compound eye.) 3
- Q. 3 Identify Freshwater Protozoans/Crustaceans from pond water sample **OR** Draw labelled diagram of mouthparts of _____ animal **OR** Preparation of temporary mounting of mouthparts _____ animal and show it to examiners. 5
- Q. 4 Identify specimens 1 to 3 as per instructions: (Each Specimen is of 2 Marks). 6
Sp. 1 Identify and describe. (Flat worms & Helminths)
Sp. 2 Identify and describe. (Mouthparts of insects)
Sp. 3 Identify and describe. (Arthropod Vectors)
- Q. 4 Viva 3
- Q. 5 Journal 2
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B.SC. SEMESTER-IV ZOOLOGY
DSC-C-243 P (MAJOR PRACTICAL) (4- CREDITS)
PRACTICAL PART-B
(Based on theory paper DSC-C-242T)

SKELETON QUESTION PAPER FOR PRACTICAL EXAMINATION

Time: 5 Hours.

Marks: 25

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- Q. 1 Sketch, label and describe..... system of Calotes.
(External characters, Digestive system, Arterial system, Venous system, Urinogenital system, Brain.) 5
- Q. 2 Sketch, label and describe..... temporary mounting of Calotes.
(Study of Hyoid apparatus and Columella auris.) 3
- Q. 3 Give Comparative account ofwith labelled diagram.
(Heart, Kidney, Brain.) 4
- Q. 4 Identify specimens 1 to 4 as per instructions: (Each Specimen is of 2 Marks). 8
 Sp. 1 Identify and classify up to order, giving reasons. (Reptiles)
 Sp. 2 Identify and classify up to order, giving reasons. (Aves)
 Sp. 3 Identify and classify up to order, giving reasons. (Mammals)
 Sp. 4 Identify and describe. (Cell Organelles)
- Q. 5 Viva 3
- Q. 6 Journal 2
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B.SC. SEMESTER-IV ZOOLOGY
DSC-C-243 P (MAJOR PRACTICAL) (4- CREDITS)

PRACTICAL PART-A

(Based on theory paper DSC-C-241T)

SKELETON QUESTION PAPER FOR PRACTICAL EXAMINATION

Time: 5 Hours.

Marks: 25

Q. 1 Sketch, label and describe..... system of Cockroach.	6
Q. 2 Sketch, label and describe.....temporary mounting of Cockroach.	3
Q. 3 Identify Freshwater Protozoans/Crustaceans from pond water sample OR Draw labelled diagram of mouthparts of _____ animal OR Preparation of temporary mounting of mouthparts _____ animal and show it to examiners.	5
Q. 4 Identify specimens 1 to 3 as per instructions: (Each Specimen is of 2 Marks). Sp. 1 Identify and describe. Sp. 2 Identify and describe. Sp. 3 Identify and describe.	6
Q. 4 Viva	3
Q. 5 Journal	2

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B.SC. SEMESTER-IV ZOOLOGY
DSC-C-243 P (MAJOR PRACTICAL) (4- CREDITS)

PRACTICAL PART-B

(Based on theory paper DSC-C-242T)

SKELETON QUESTION PAPER FOR PRACTICAL EXAMINATION

Time: 5 Hours.

Marks: 25

Q. 1 Sketch, label and describe..... system of Calotes.	5
Q. 2 Sketch, label and describe..... temporary mounting of Calotes.	3
Q. 3 Give Comparative account ofwith labelled diagram.	4
Q. 4 Identify specimens 1 to 4 as per instructions: (Each Specimen is of 2 Marks). Sp. 1 Identify and classify up to order, giving reasons. Sp. 2 Identify and classify up to order, giving reasons. Sp. 3 Identify and classify up to order, giving reasons. Sp. 4 Identify and describe.	8
Q. 5 Viva	3
Q. 6 Journal	2
