S. S. JAIN SUBODH PG COLLEGE, JAIPUR

DEPARTMENT OF ZOOLOGY
(Three/Four Year Undergraduate Programme)

SYLLABUS

B.Sc. - Specialization (Zoology)

(Semester Scheme)

Choice-Based Credit System (CBCS)

[As Per the National Education Policy (NEP) – 2020]

B. Sc. (Zoology) Semester I & II

Subject: Zoology

Session 2025-onwards

Name of the Affiliating University	**University of Rajasthan, Jaipur**
Name of Faculty	**Science**
Name of Discipline	**Zoology**
Type of Discipline	**Specialization (Major)**
A list of programmes offered as a Minor Discipline	**Biotechnology** **Botany** **Chemistry** **Microbiology**
Offered to Non-Collegiate Students	**No**

Examination Scheme (CBCS – NEP 2020)

Type of Examination	Course Code and Nomenclature	Duration of Examination	Maximum Marks
Theory (EoSE)	End of Semester Exam (Each Paper)	3 Hrs	70 Marks
Theory (CIA)	Continuous Internal Assessment (Each Paper)	1 Hr	30 Marks
Theory (Total)	Each Theory Paper	–	100 Marks
Practical	Practical Examination (Internal + External)	Internal – 1 Hr External – 3 Hrs	Internal- 20 Marks External- 30 Marks Total- 50 Marks
Overall Semester	**Theory + Practical**	**–**	**150 Marks**

*** CIA: Continuous Internal Assessment ; EoSE: End of Semester Examination**

Examination Pattern for Regular Students

- **Credits**:
  - 1 Credit = 25 Marks
  - Theory Classes: 3 hrs/week per paper
  - Practical Classes: 4 hrs/week per lab
- **Pattern of Theory Question Papers:**
  - The question paper will consist of two parts A & B.
  - **Part A**: 7 Very Short Questions (out of 10) × 2 marks = 14 Marks
  - **Part B**: 4 Questions (1 from each unit with internal choice) × 14 marks = 56 Marks
  - **Total (EoSE)** = 70 Marks
- **Pattern of Practical Question Paper:**
  - Practical I: Based on Paper I
  - Practical II: Based on Paper II
  - The detailed marking scheme can be found in the practical exam syllabus for the respective paper.

Programme Outcomes (POs) – Zoology

PO No.	Title	Programme Outcome
PO 1	Strong Knowledge Base	Comprehensive understanding of animal diversity, evolution, genetics, physiology, ecology, applied zoology, molecular biology, microbiology, biotechnology, research methodology, developmental biology, and biostatistics.
PO 2	Laboratory Proficiency	Hands-on expertise in microscopy, specimen and slide studies, dissections, histology, instrumentation, molecular biology techniques, microbial culture, biochemical methods, animal behavior studies, vermiculture, sericulture, apiculture, lac culture, and blood analysis.
PO 3	Analytical & Critical Thinking	Ability to apply zoological concepts to address environmental, biomedical, and applied biological challenges.
PO 4	Field Exposure & Practical Learning	Experience in biodiversity surveys, ecological data collection, environmental assessments, and exposure to various animal farms.
PO 5	Research Orientation	Development of research aptitude through project work, data analysis, report writing, and scientific communication.
PO 6	Ethics & Sustainability	Awareness of conservation strategies, ethical research practices, and responsible use of biological resources.
PO 7	Career Readiness	Preparedness for careers in education, research, applied biology, biotechnology, environmental sciences, wildlife management, and medical laboratories.

Scheme of Examination – B.Sc. Zoology

Credit System

- 1 Credit = 25 Marks
- Final grade will be determined through a combination of CIA and EoSE.
- Each course in the Semester Grade Point Average (SGPA) will include:
    - CIA (30% weightage)
    - EoSE (70% weightage)

1. Continuous Internal Assessment (CIA) – 30%

- Sessional work may include:
    - Class tests / Mid-semester examinations
    - Assignments and practical records
    - Seminars and presentations
    - Field-based tasks

2. End of Semester Examination (EoSE) – 70%

- Each paper carries 70% of the total marks of the course.
- Duration: 3 hours.
- All questions carry equal marks.
- Question Paper Pattern:
    - Part A: Multiple short-answer questions (knowledge, understanding, application).
    - Part B: Four descriptive questions (one from each unit with internal choice).
    - 60%: Conceptual understanding
    - 40%: Application & analytical skills

3. Attendance

- Minimum 75% attendance is mandatory for appearing in the EoSE.

4. Eligibility for EoSE

- Students must appear in the mid-semester examination.
- Must secure at least a “C” grade in the subject to be eligible.

5. Credit Assignment

- Credit points will be awarded only if a student secures a “C” grade or higher in both midterm and EoSE examinations.

6. Contact Hours (15 Weeks per Semester)

Mode	Credit Conversion
Lecture (L)	1 Credit = 1 Hour/Week
Tutorial (T)	1 Credit = 1 Hour/Week
Self-Study (S)	1 Credit = 2 Hours/Week
Practical/Practicum (P)	1 Credit = 2 Hours/Week
Field Practice/Projects (F)	1 Credit = 2 Hours/Week
Studio/Specimen Activities (SA)	1 Credit = 2 Hours/Week
Internship (I)	1 Credit = 2 Hours/Week
Community Engagement & Service (C)	1 Credit = 2 Hours/Week

SYLLABUS

Course Structure: UG0812-ZOO-51T-151 Lower Invertebrates

Course Details

Semester	Course Code	Title of the Course/Paper	NHEQF Level	Credits
I	UG0812-ZOO-51T-151	Lower Invertebrates	5	6
	UG0812-ZOO-51P-152	Practical based on Lower Invertebrates		

Course Specifications

Level of Course	Type of Course	Credit Distribution	Offered to NC Students	Course Delivery Method	Minor Discipline Availability	Prerequisites
5	Major	Theory: 4 Practical: 2 **Total: 6**	No	Lectures and Practical	NA	XII Pass

Objective Focus	Course Objective
Phylogenetic Understanding	Provide a comprehensive understanding of the phylogenetic relationships and classification of Protozoa, Porifera, Coelenterata, Platyhelminthes, Aschelminthes, and Annelidans up to the class level.
Morphology & Physiology	Study the detailed characteristics, including locomotion, nutrition, and reproduction, of representative species like *Paramecium, Amoeba, Plasmodium, Sycon, Obelia, Hydra, Taenia, Ascaris, Fasciola,* and *earthworm*.
Functional Biology	Explore the functional biology of simple organisms, with a special focus on their structural adaptations and reproductive strategies.
Ecology & Applied Biology	Discuss the ecological and economic importance of the studied phyla, highlighting their roles in ecosystems, their significance to human activities, and applied aspects such as Vermiculture.

Semester I
Paper I
Detailed Syllabus
ZOO-51T-151-Lower Invertebrates

Unit-I

Principles of T axonomy:

International Code of Zoological Nomenclature;	
Concept of Five Kingdom System	3 Lectures
Basis of Classification: Symmetry, Coelom, Segmentation, Embryogeny	4 Lectures
Levels of Organization, Invertebrate Versus Vertebrate (Comparison).	2 Lectures

Phylum: Protozoa

Salient Features and Classification of Protozoa Up to Classes.	2 Lectures
Nutrition, Locomotion, and Reproduction in Protozoa	6 Lectures

Unit-II

Phylum: Porifera

Salient Features and Classification of Porifera Up to Classes.	2 Lectures
Sycon (Salient Features, Nutrition, Reproduction).	3 Lectures
Evolution of the Canal System of Sponges.	2 Lectures
Types and Development of Spicules in Porifera	2 Lectures

Unit-III

Phylum: Coelenterata

Salient features and classification of Cnidaria and Ctenophora up to Class	3 Lectures
Obelia (Salient Features, Nutrition, Reproduction, Metagenesis)	4 Lectures
Polymorphism in Coelenterata	2 Lectures
Coral, Coral Reefs and Their Economic Importance	3 Lectures

Unit-IV

Phylum: Platyhelminthes and Aschelminths

Salient Features and Classification of Platyhelminthes and Aschelminths (up to Classes)	2 Lectures
Fasciola (External features, Nutrition, Excretion, Nervous, Reproduction and Life Cycle	4 Lectures
Taenia (External features, Excretion, Nervous, Reproduction and Life Cycle)	3 Lectures
Ascaris (External features, Reproduction and Life Cycle)	3 Lectures
Parasitic Adaptations in Helminths	3 Lectures

Suggested Books and References –

1. *Barnes, R. (1981). Invertebrate Zoology. W.B. Saunders Co*
2. *Barrington, E.W.J. (1969). Invertebrate Structure and Function. ELBS*
3. *Barradaile L.A. & Potts F.A. The Invertebrate*
4. *Jordan, E. L. & Verma, P.S. Invertebrate Zoology. S. Chand & Co.*
5. *Kotpal, Agrawal &Khetrapal. Modern Textbook of Zoology – Invertebrates.*
6. *Puranik P.G. & Thakur R.S. Invertebrate Zoology*
7. *Majupuria T.C. Invertebrate Zoology*
8. *Dhami & Dhami. Invertebrate Zoology*
9. *Parker &Hashwell, Textbook of Zoology Vol. I (Invertebrates) A.Z.T.B.S. Publishers*
10. *R.L. Kotpal – Phylum Protozoa to Echinodermata (series), Rastogi and Publication, Meerut*
11. *Vidyarthi – Textbook of Zoology, Agrasia Publishers, Agra*
12. *Marshal & Williams. Textbook of Zoology.*
13. *Boolotin & Stiles. College Zoology. MacMillan*
14. *Arora, M.P. & Malhotra, P. (2008). Invertebrate Zoology for Degree Students. Himalaya Publishing House, Mumbai.*
15. *Tandon, K.K. & Sharma, P.D. (2007). A Textbook of Invertebrate Zoology. Vikas Publishing House, New Delhi.*
16. *Prasad, S.N. & Bharadwaj, G.P. (2021). A Textbook of Invertebrate Zoology. Vikas Publishing House, New Delhi.*
17. *Ekambaranatha Ayyar, C.N. & Ananthakrishnan, T.N. (2002). Manual of Zoology, Vol. I (Invertebrates). S. Viswanathan Pvt. Ltd., Chennai.*
18. *Verma, P.S. & Agarwal, V.K. (2015). Cell Biology, Genetics, Molecular Biology, Evolution and Ecology (Selected invertebrate topics). S. Chand & Co.*

Practical Zoology (Invertebrates)

1. *Verma, P.S. A Manual of Practical Zoology: Invertebrates. S. Chand & Co.*
2. *Lal, S.S. (9th Ed.). Practical Zoology: Invertebrates. Rastogi Publications, Meerut & Distributors, New Delhi.*
3. *Roy Mahoney (1966). Laboratory Techniques in Zoology. Butterworths*

Course Learning Outcomes –

After successful completion of the course:

- Students will be able to classify Protozoa up to the class level and describe their salient features, understanding the diversity within this phylum.
- Students will gain detailed knowledge of *Paramecium*, *Amoeba*, and *Plasmodium*, including their locomotion, nutrition, and reproduction processes.
- Students will be able to classify Porifera up to the class level, describe the salient features, and understand the canal system of sponges.
- Students will be able to classify Cnidaria and Ctenophora up to the class level and understand their unique features, including metagenesis in Obelia.
- Students will develop a solid understanding of Platyhelminthes and Aschelminthes, including their classification, external features, and life cycles, with emphasis on species like *Taenia, Ascaris*, and *Fasciola.*
- Students will be able to connect theoretical knowledge with practical applications, appreciating the relevance of the studied phyla in applied zoology.
- Students will be able to compare the life cycles and adaptations of parasitic and free- living organisms, enhancing their analytical skills in understanding evolutionary strategies.

UG0812- ZOO-51P-152-Practical based on Lower Invertebrates

Duration: 4 Hrs

Max. Marks: 10+40 Marks **Min. Marks: 4+16 Marks**

Microscopic Techniques:

Organization and working of optical microscopes:

Dissecting and Compound Microscope;
General methods of microscopical permanent preparations

Fixatives and Preservatives: Formalin, Bouin's Fluid

Stains: Borax carmine, Acetocarmine, Acetoorcein, Haematoxylin, Eosin Common Reagents: Normal saline, Ringer's solution, Acid water, Acid alcohol, Mayer's egg albumin

Study of museum specimens (Classification of animals up to orders):

Protozoa: Euglena, Elphidium (Polystomella), Foraminiferous shell, Monocystis, Opalina, Paramecium, Paramecium showing Binary fission, Paramecium Conjugation, Balantidium, Nyctotherus, Vorticella

Porifera: Leucosolenia, Sycon, Hyalonema, Euplectella, Spongilla

Coelenterata: Obelia Colony & Medusa, Millepora, Physalia, Vellela, Aurelia, Alcyonium, Gorgonia, Pennatula, Metridium, Stone Corals

Platyhelminthes: Planaria, Fasciola, Taenia

Aschelminthes: Ascaris, Dracunculus, Ancylostoma, Wuchereria

Annelida: Neanthes (Nereis), Heteronereis, Polynoe, Chaetopterus, Arenicola, Pheretima (Earthworm), Aphrodite, Pontobdella, Clespine (Glossiphonia), Hirudinaria (H.granulosa), Polygordius

Study of Permanent Slides:

Porifera: Sponge Gemmules, Sponge Spicules, V.S. Sycon, T.S. Sycon

Coelenterata: *Obelia* Medusa, *Obelia* Colony

Platyhelminthes: Miracidium, Sporocyst, Redia, and Cercaria, Metacercarial larvae of *Fasciola*, Hexacanth and Oncosphere Larvae of *Taenia solium*, Scolex of *Taenia*, Mature and Gravid Proglottids of *Taenia solium*

Annelida: Parapodia of Nereis; Parapodia of Heteronereis

Audio-visual Demonstration of External Features and Anatomy:

Major:

Earthworm: External Features, Digestive, Nervous, and Reproductive Systems

Leech: External Features, Digestive, Nervous, and Reproductive Systems

Minor:

Mounting: Permanent Slide Preparation of Parapodia (Neries), Parapodia (Hetroneris), Spermatheca

Mounting: Paramecium, Euglena, Spicules, Spongin Fibers, and Gemmules of Sponge, Obelia Colony, Medusa

Study of Collections of invertebrates from natural habitat

A Visit to Any Natural Habitat (Aquatic/ Terrestrial) For Collecting and Studying the Natural Behaviour of Invertebrates

Scheme of Practical Examination and Distribution of Marks

S.N.	Exercise/Practical	Regular	Ex. Students
1.	Major Exercise	**6**	**12**
2.	Minor Exercise	**4**	**6**
3.	Minor Exercise	**4**	**6**
4.	Identification and comments on Spots (1 to 8)	**16**	**16**
5.	Viva Voce	**5**	**10**
6.	Class Record	**5**	
	Total	**10*+40=50**	**50**

*Internal marks for regular students only

Note:

1. With reference to microscopic slides, in case of non-availability, the exercise should be substituted with diagrams / photographs.
2. Candidates must keep a record of all work done in the practical class and submit the same for inspection at the time of the practical examination.
3. The candidates may be asked to write detailed methodology wherever necessary and separate marks may be allocated for the same.
4. Mounting material for permanent preparations would be as per the syllabus or as available through collection.
5. It should be ensured that animals used in the practical exercises are not covered under the wild life act 1972 and amendments made subsequently.

UG0812 -ZOO-51T-153- Higher Invertebrates I-Semester - Zoology

Semester	Code of the Course	Title of the Course/Paper				NHEQF Level	Credits
II	UG0812-ZOO-51T-153 UG0812-ZOO-51P-154	Higher Invertebrates Practical based on Higher Invertebrates				5	6
Level of Course	**Type of the Course**	**Credit Distribution**			**Offered to NC Student**	**Course Delivery Method**	
		Theory	**Practical**	**Total**			
5	Major	4	2	6	No	Lectures and Practical	
List of Programme Codes in which Offered as Minor Discipline		NA					
Prerequisites		XII Pass					
Objectives of the Course:		By the end of this course, students will be able to: 1. Understand the general characteristics and classification of Annelida, Arthropoda, Mollusca, and Echinodermata up to the class level with examples. 2. Learn about the evolution of coelom and metamerism in Annelida. 3. Explore the nutrition, excretion, and respiration processes in Annelida. 4. Study the anatomy and developmental stages of Nereis, including its external characters, morphology, and systems. 5. Examine the social behaviours and life cycles in arthropods, particularly in bees and termites.					

Detailed Syllabus
ZOO-51T-153- Higher Invertebrates

Unit-I

Phylum: Annelida

General Characters and Outline Classification Up to Classes with Examples.	**2 Lectures**
Nereis (External Features, Morphology, Digestive, Excretory, Nervous System, Development & Trochophore Larva)	**5 Lectures**
Evolution of Coelom and Metamerism	**2 Lectures**
Nutrition, Excretion, And Respiration in Annelida	**6 Lectures**

Unit-II

Phylum: Arthropoda

General Characters and Outline Classification Up to Classes with Examples.	**2 Lectures**
Prawn (External characters, Morphology, Skeletal, Digestive, Respiratory, Nervous, Circulatory, Excretory & Reproductive Systems)	**6 Lectures**
Metamorphosis in Insects, Types of Metamorphosis	**3 Lectures**
Mouth Parts in Arthropoda; Larval Forms in Crustacea	**3 Lectures**

Unit-III

Phylum: Mollusca

General characters and outline classification up to classes with examples.	**3 Lectures**
Pila (External Characters, Skeletal System, Digestive System, Respiration, Nervous System, Circulatory, and Excretion)	**8 Lectures**
Larval Forms in Mollusca: Velliger, Glochidium	**2 Lectures**

Unit-IV

Phylum: Echinodermata and Hemichordata

General Characters and Outline Classification Up to Classes with Examples.	**3 Lectures**
Asterias (External Characters, Water Vascular System, Digestive System, & Reproductive Systems	**7 Lectures**
Water-Vascular System in Echinodermata	**2 Lectures**
Larval Forms in Echinodermata	**2 Lectures**
Balanoglossus: Salient Features and Affinities	**1 Lectures**

Suggested Books and References –

Systematics (Animal Taxonomy)

1. Dalela, R.C. & Sharma, R.K. (1976). *Animal Taxonomy and Museology*. Jai Prakash Nath.
2. Kapoor, V.C. (1988). *Theory and Practicals of Animal Taxonomy*. Oxford & IBH.
3. Kapoor, V.C. (2011). *Theory and Practice of Animal Taxonomy* (Relevant sections on Invertebrate classification). Oxford & IBH Publishing.
4. Simpson, G.G. (1962). *Principles of Animal Taxonomy*. Oxford.
5. Roy Mahoney (1966). *Laboratory Techniques in Zoology*. Butterworths.
6. Mayer, E. & Ashlock, P.D. (1991). *Principles of Systematic Zoology*. McGraw Hill.

Non-Chordates

1. Ruppert, E.E., Fox, R.S., & Barnes, R.D. (2004/2006). *Invertebrate Zoology: A Functional Evolutionary Approach* (7th/8th Ed.). Brooks/Cole, Cengage Learning / Holt Saunders International.
2. Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W., & Spicer, J.I. (2002). *The Invertebrates* (3rd Ed.). Blackwell Science.
3. Barrington, E.J.W. (1979). *Invertebrate Structure & Function* (2nd Ed.). ELBS & Nelson.
4. Barradaile, L.A. & Potts, F.A. *The Invertebrate*.
5. Parker, T.J. & Haswell, W.A. (2005). *Textbook of Zoology, Vol. I (Invertebrates)*. Macmillan / A.Z.T.B.S. Publishers.
6. Brusca, R.C. & Brusca, G.J. (2003). *Invertebrates* (2nd Ed.). Sinauer Associates.
7. Anderson, D.T. (2001). *Invertebrate Zoology*. Oxford University Press.
8. Majupuria, T.C. *Invertebrate Zoology*.
9. Marshall & Williams. *Textbook of Zoology*.
10. Meglitsch, P.A. & Schram, F.R. (1991). *Invertebrate Zoology* (3rd Ed.). Oxford University Press.
11. Pechenik, J.A. (2022). *Biology of the Invertebrates* (8th Ed.). McGraw-Hill Education.
12. Hickman, C.P., Roberts, L.S., Keen, S.L., Larson, A., Eisenhour, D.J. (2020). *Integrated Principles of Zoology* (18th Ed.). McGraw-Hill.
13. Campbell, N.A. & Reece, J.B. (2005). *Biology* (7th Ed.). Pearson.
14. Miller, S.A. & Harley, J.P. (2006). *Zoology* (7th Ed.). McGraw-Hill Education.
15. Boolotian, R.A. & Stiles, K.A. (1981). *College Zoology* (10th Ed.). Macmillan.

16. Jordan, E.L. & Verma, P.S. *Invertebrate Zoology*. S. Chand & Co.
17. Kotpal, R.L. (Phylum Series: Protozoa to Echinodermata). Rastogi Publications, Meerut.
18. Kotpal, Agarwal & Khetrapal. *Modern Textbook of Zoology – Invertebrates*.
19. Puranik, P.G. & Thakur, R.S. *Invertebrate Zoology*.
20. Dhami, P.S. & Dhami, J.K. *Invertebrate Zoology*.
21. Vidyarthi. *Textbook of Zoology*. Agrasia Publishers, Agra.
22. Nigam, H.C. (1997). *Biology of Non-Chordates*. S. Chand.

Practical Zoology (Invertebrates)

4. Verma, P.S. *A Manual of Practical Zoology: Invertebrates*. S. Chand & Co.
5. Lal, S.S. (9th Ed.). *Practical Zoology: Invertebrates*. Rastogi Publications, Meerut & Distributors, New Delhi.
6. Roy Mahoney (1966). *Laboratory Techniques in Zoology*. Butterworths.

Online Tools and Web Resources

1. SWAYAM (MHRD Portal) – Government of India's online education platform. SWAYAM Portal
2. Animal Diversity (SWAYAM Course) – Online course on animal diversity. Animal Diversity Course
3. Advances in Animal Diversity, Systematics and Evolution (SWAYAM Course) Advances in Animal Diversity, Systematics and Evolution
4. e-PG Pathshala

Course learning outcomes –

- Students will be able to classify Annelida, Arthropoda, Mollusca, and Echinodermata up to the class level.
- Students will understand the evolution and significance of coelom and metamerism in Annelida.
- Students will describe the anatomy, nutrition, excretion, and respiration mechanisms in Annelida, with a focus on Nereis.
- Students will explain the external and internal structures of Arthropoda, particularly in prawns, and understand the types of metamorphosis in insects.
- Students will understand the anatomical features and physiological systems of Mollusca, with a focus on Pila, and explain the process of pearl formation in bivalves.
- Students will be able to analyze the structure and function of the water-vascular system in Echinodermata.

UG0812-ZOO-51P-154-Practical based on Higher Invertebrates

Duration: 4 Hrs

Max. Marks: 10+40 Marks **Min. Marks: 4+16 Marks**

Study of Museum Specimens (Classification of Animals Up To Orders)

Arthropoda:

Peripatus, Lepus, Balanus, Sacculina, Squilla, Palemon, Eupagurus (hermit Crab), *Carcinus* (Crab), *Scolopendra, Julus*, Scorpion, Spider, *Limulus, Schistocerca*/*Locusta*, Dragonfly, Praying mantis, Queen Termite, *Cimex*, Moth/ Butterfly

Mollusca:

Chiton, Dentalium, Cypraea, Pila, Aplysia, Mytilus, Pinctada, Loligo, Sepia, Octopus, Nautilus

Echinodermata:

Antedon, Asterias, Ophiothrix, Echinus, Cucumaria, Holothuria

Hemichordata: *Balanoglossus*

Study of Permanent Slides:

Arthropoda: Crustacean Larvae - Nauplius, Zoea, Metazoea, Megalopa, Mysis

Mollusca: Veliger and Glochidium larvae, T.S. of *Unio* Shell

Echinodermata: T.S. of arm of starfish

Hemichordata: *Balanoglossus* through collar and proboscis

Audio-visual Demonstration of External Features and Anatomy:

Major:

Prawn: External Features, Appendages, Digestive, Nervous, and Reproductive System

Pila: External Features, Nervous System

Minor:

Mounting: *Daphnia*; Prawn (Hastate Plate, Statocyst) Pila (Gill lamella, Osphradium, Radula)

Field Work:

- Observation And Collection of Aquatic Invertebrates from a Pond
- Insect Diversity Study in a Local Area (Garden/ Field)
- Study Of Soil-Dwelling Non-Chordates with Special Focus on Earthworms:
- Collection and in-Lab Work, External Features, Vermicomposting Demonstration, Experimental Identification of Soil Texture

Scheme of Practical Examination and Distribution of Marks

S.No.	Exercise/Practical	Regular	Ex. Students
1.	Major Exercise	**6**	**12**
2.	Minor Exercise	**4**	**6**
3.	Minor Exercise	**4**	**6**
4.	Identification and comments on Spots (1 to 8)	**16**	**16**
5.	Viva Voce	**5**	**10**
6.	Class Record	**5**	
	Total	**10*+40=50**	**50**

*Internal marks for regular students only

Note:

1. With reference to microscopic slides, in case of non-availability, the exercise should be substituted with diagrams/photographs.
2. Candidates must keep a record of all work done in the practical class and submit the same for inspection at the time of the practical examination.
3. The candidates may be asked to write detailed methodology wherever necessary and separate marks may be allocated for the same.
4. Mounting material for permanent preparations would be as per the syllabus or as available through the collection.
5. It should be ensured that animals used in the practical exercises are not covered under the wild life act 1972 and amendments made subsequently.