

NEP NEW SYLLABUS

MODERN ZOOLOGICAL TECHNIQUES AND INSTRUMENTS-II (T)

for

**S.Y.B.Sc. Zoology : Semester - IV
[ZOO - 291 - MN] [2 Credits]
(Course Type : Minor Paper - I)**

**As Per National Education Policy-2020 (NEP-2020)
Syllabus w.e.f. Academic Year 2025-26**

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S.Y.B.Sc. MODERN ZOOLOGICAL TECHNIQUES AND INSTRUMENTS-II (T)
First Edition : January 2026 **ISBN 978-93-6993-798-1**

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Published By :
NIRALI PRAKASHAN
Abhyudaya Pragati, 1312, Shivaji Nagar,
Off J.M. Road, Pune – 411005
Tel - (020) 25512336/37/39
Email : niralipune@pragationline.com

Polyplate **Printed By :**
YOGIRAJ PRINTERS AND BINDERS
Survey No. 10/1A, Ghule Industrial Estate
Nanded Gaon Road
Nanded, Pune - 411041

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Preface ...

The authors are indeed very happy to present this book "**Modern Zoological Techniques and Instruments-II (T)**" for the students of Second Year B.Sc. Semester IV of Savitribai Phule Pune University.

This book has been written as per the New Syllabus of National Education Policy 2020 prescribed.

This book has been carefully designed to comprehensively cover all the essential topics outlined in the prescribed syllabus. It provides a clear introduction to the basics of molecular tools in zoology, including the role of DNA and RNA, DNA extraction, PCR, and DNA barcoding techniques. The book also explains blood analyzers and animal physiology tools, offering practical insights into hematology, diagnostic instruments, and physiological monitoring methods. Diagnostic kits and rapid testing techniques used in animal health, such as ELISA, pregnancy tests, and lateral flow assays, are discussed in a systematic manner. Environmental monitoring tools required for zoological fieldwork, including water quality assessment and habitat analysis, are explained with practical relevance. Additionally, wildlife tracking and field techniques such as camera trapping, GPS usage, and citizen science applications are thoroughly covered. The content is presented in a simple, student-friendly language to enhance understanding.

We are thankful to our publishers Shri. Dineshbhai Furia, Shri. Jignesh Furia and staff of Nirali Prakashan, specially Mr. Rahul Thorat, Mr. Ajit Patil and Ms. Chaitali Takle for taking keen interest in publishing this book and bringing out in time.

Constructive suggestions for the improvement of the book are most welcome.

January, 2026

Dr. Kishore R. Pawar

Dr. Ashok E. Desai

Syllabus ...

1. Basics of Molecular Tools in Zoology [06 L]

- 1.1 DNA / RNA role in animal traits and identification.
- 1.2 Basics of DNA extraction and PCR.
- 1.3 Use of DNA barcoding in animal taxonomy.

2. Blood Analyzer and Animal Physiology Tools [07 L]

- 2.1 Hematology analyzers, Hemoglobin meter, Glucometer, Blood gas analyzer (portable), Hematocrit centrifuge, Manual blood cell counter.
- 2.2 Animal physiology tools: Electrocardiography (ECG), Electromyography (EMG), Blood pressure monitors, Respiratory gas Analyzers.

3. Diagnostic Kits and Rapid Testing in Animals [06 L]

- 3.1 ELISA principle - as used in poultry, vet diagnostics.
- 3.2 Pregnancy tests in animals and glucose strip tests.
- 3.3 Application of lateral flow assays in animal health.
- 3.4 Bleeding and clotting time, and their importance.

4. Environmental Monitoring for Zoology Field Work [06 L]

- 4.1 Use of DO and pH meters in fishery / ponds.
- 4.2 Simple noise / temperature data collection.
- 4.3 Importance in habitat study and animal welfare.

5. Wildlife Tracking and Field Techniques [05 L]

- 5.1 Camera traps, scat analysis, call recording.
- 5.2 Use of GPS and mobile apps for biodiversity mapping.
- 5.3 Application of citizen science and eBird / iNaturalist.



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