



बिरसा मुंडा ट्रायबल युनिवर्सिटी Birsā Mūṇḁā ḁrāyabala Yuniṁarsiṁṁī

राजपिपला, जि. नर्मदा Rajpipla, Dist. Narmada

Established by Tribal Development Department, Govt. of Gujarat

School of Science B.Sc. (Zoology) Programme

Subject Code & Name: BS06MIZOO2 Bio-Techniques

Teaching and Evaluation Scheme:

Teaching Scheme				Examination Scheme			
Credits				Component Weightage			
				CCE		SEE	
L	T	P	Total	TH	PWE	TH	PWE
2	-	2	4	25 %	25 %	25 %	25 %

Programme Name	B. Sc. Zoology
Semester	VI
Course Code	BS06MIZOO2
Course Title	Bio-Techniques
Course Content Type (Th./Pr.)	Theory + Practical
Course Credit	4
Sessions + Lab. Per Week	2+ 4
Total Teaching/Lab. Hours	60 Hours
* 2 Laboratory = 1 Session	

Learning Objectives

- To familiarize students with the operation and applications of bioinstrumentation tools in biological research.
- To understand the theoretical principles behind bioinstrumentation techniques used in zoological studies and to explore the various types of bioanalytical instruments and their applications in animal physiology, biochemistry and ecology.

Prerequisites (if any)

Students should have a basic understanding of cell biology, biomolecules, and fundamental concepts of physics and chemistry. Familiarity with laboratory safety, scientific measurements, and basic biological techniques will help in understanding bio-instrumentation and analytical methods.

Learning Outcomes

On the Completion of this course, students will be able to:

- Understand and explain principles of different microscopes.
- Understand and learn preparation of microtome slides.
- Describe different separation techniques.
- Extract and separate protein and DNA by electrophoresis.





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PRACTICALS: To study following instruments Principle, Structure and applications with the help of charts, Models, Photographs, Multimedia or instruments: 1. Light Microscope 2. Binocular Microscope 3. Phase Contrast Microscope 4. Fluorescent Microscope 5. Electron Microscope – SEM & TEM 6. Microtomy 7. To Study working principle of paper chromatography 8. Separation of pigments by paper /Thin Layer Chromatography 9. Identification of types of amino acids by chromatography technique 10. To study working principle of centrifuge 11. Protein separation by SDS-PAGE 12. DNA separation by agarose gel electrophoresis	30
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Text Book(s)

1. Microscopy and Micro Techniques by R. Marimuthu. MJP Publishers, Chennai
2. Biological Instrumentation and Methodology by P. K. Bajpai
3. Biotechniques by N. Arumugam, V. Kumaresan SARAS Publications
4. Microscopy: A very short introduction by Terence David Allm-2015
5. Microtomy: Microtome and Its Applications by Chandak Tilak, Chaudhary Minal, Vinita Chandak, Lap Lambert Academic Publishing GmbH KG, 2012

Reference Books

1. Springer handbook of microscopy by Peter Haukes, John Spance, 2019
2. Fundamentals of light Microscopy and electronic imaging by Douglas Murphy, Michale Davidson 2013
3. Practical Zoology Invertebrates by S. S. Lal Rastogi Publications Meerut, New Delhi.
4. Bioinstrumentation by N. Arumugam SARAS Publications
5. Techniques and Methods in Biology by K. L. Ghatak, PHI Learning Private Limited
6. Electrophoresis in Practice by Reiner Westermeier, Wiley-VCH

Web Resources

1. SWAYAM – <https://swayam.gov.in/>
2. Molecular Expressions Microscopy Primer – <https://micro.magnet.fsu.edu/primer/>
3. NPTEL – <https://nptel.ac.in>
4. JoVE Science Education Library – <https://www.jove.com/science-education-library>
5. LabXchange (Harvard University) – <https://www.labxchange.org>



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L:: Lecture, **T::** Tutorial , **P::** Practical

CCE:: Continuous and Comprehensive Evaluation

(CCE Theory includes Mid Semester Examination, Assignment, MCQ quizzes, Seminar, Reflective notes, class participation, case analysis and presentation, slip tests (announced/ surprised), attendance etc. or any combination of these)

PWE:: Practical Work Examination

(PWE includes Laboratory practical work, project work, viva simulation exercise work etc.)

SEE:: Semester End Evaluation

