



बिरसा मुंडा ट्रायबल युनिवर्सिटी Birsā Mūṇḁā Ḍāyabala Yūnīvārsīṭī

राजपिपला, जि. नर्मदा Rajpipla, Dist. Narmada

Established by Tribal Development Department, Govt. of Gujarat

School of Science B.Sc. (Zoology) Programme

Subject Code & Name: BS05SEZOO3 Medical Laboratory Technology

Teaching and Evaluation Scheme:

Teaching Scheme				Examination Scheme			
Credits				Component Weightage			
				CCE		SEE	
L	T	P	Total	TH	PWE	TH	PWE
-	-	2	2	-	50 %	-	50 %

Programme Name	B.Sc. Zoology
Semester	V
Course Code	BS05SEZOO3
Course Title	Medical Laboratory Technology
Course Content Type (Th./Pr.)	Practical
Course Credit	2
Sessions	2
Total Teaching/Lab. Hours	30 Hours

Learning Objectives

- Explain hematopoiesis and functions of blood cells, identify hematological disorders and use lab diagnostics.
- Understand blood group systems and blood banking, demonstration of immunopharmacological techniques and understand advanced diagnostic techniques and applications.

Prerequisites (if any)

- Completion of lower-level courses in Human Physiology and Cell Biology.
- Basic understanding of General Immunology (Antigen-Antibody interactions).
- Knowledge of laboratory safety protocols and sterilization techniques.

Learning Outcomes

After successful completion of the practical course, students will be able to:

- Perform routine hematological investigations using standard laboratory procedures.
- Demonstrate blood grouping and compatibility testing.
- Perform common clinical biochemistry assays using semi-auto analyzer/manual methods.
- Identify medically important microorganisms using staining and biochemical tests.
- Demonstrate immunological techniques such as ELISA.
- Follow laboratory biosafety, quality assurance and biomedical waste management practices.





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Detailed Contents	TEACHING HOURS
List of Practical (Practical exercises shall be conducted using available laboratory facilities. Where equipment, reagents, or clinical specimens are not available, the practicals may be taught through charts, preserved specimens, permanent slides, laboratory models, simulation exercises, multimedia presentations, virtual laboratory resources, animation-videos, case studies, and demonstration by the teacher). 1. Preparation and staining of peripheral blood smear (Leishman/Wright stain) and differential leukocyte count. 2. Demonstration of bleeding time, clotting time and interpretation of coagulation profile. 3. Identification of various types of anemia from peripheral blood smear (microcytic hypochromic, macrocytic, hemolytic, sickle cell anemia) using prepared slides/images. 4. Determination of ABO blood group and Rh antigen by slide/tube method. 5. Blood donor selection criteria, blood collection procedure, anticoagulants (CPDA-1, SAGM), blood component preparation and storage (demonstration/visit). 6. Estimation of Blood Glucose using Glucose Oxidase-Peroxidase (GOD-POD) method. 7. Estimation of Serum Bilirubin. 8. Estimation of Serum Urea and Creatinine. 9. Demonstration/estimation of Liver Function Tests (SGOT/AST, SGPT/ALT, ALP) using semi-auto analyzer. 10. Estimation of Lipid Profile (Total Cholesterol, Triglycerides, HDL; calculation of LDL and VLDL). 11. Gram staining and microscopic identification of Gram-positive and Gram-negative bacteria. 12. Acid-fast staining (Ziehl-Neelsen method) for demonstration of Mycobacterium tuberculosis. 13. Culture media identification, colony morphology and biochemical identification of Staphylococcus, Streptococcus and Escherichia coli (demonstration). 14. Demonstration of rapid diagnostic tests for HIV, HBsAg and Dengue (simulation/demo). 15. Demonstration of Direct, Indirect and Sandwich ELISA.	30





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Text Book(s)

1. Textbook of Medical Laboratory Technology (Set of 2 Volumes) by Praful B. Godkar and Darshan P. Godkar
2. Concise Haematology by Sunita Sharma
3. Textbook of Blood Banking and Transfusion Medicine by Sally V. Rudmann
4. Kuby Immunology by Jenni Punt et al.
5. Medical Laboratory Technology: Methods and Interpretations — Ramnik Sood. Jaypee Brothers Medical Publishers.
6. Practical Hematology — S. M. Lewis, B. J. Bain & I. Bates. Elsevier.
7. Medical Laboratory Manual for Tropical Countries, Volume 2 — Cambridge University Press.
8. Textbook of Medical Laboratory Technology — Bhalani Publishing House.
9. Medical Laboratory Technology — Tata McGraw-Hill.

Reference Books

1. Wintrobe's Clinical Hematology by John P. Greer et al., Lippincott Williams & Wilkins
2. Technical Manual of the American Association of Blood Banks (AABB).
3. Textbook of Microbiology by Ananthanarayan and Paniker
4. Textbook of Medical Biochemistry by MN Chatterjea & Rana Shinde, Jaypee Brothers
5. Medical Parasitology by KD Chatterjee, CBS Publishers
6. Lippincott's Illustrated Reviews: Biochemistry by Denise Ferrier
7. DeGruchy's Clinical Haematology in Medical Practice by Frank Firkin et al

Web Resources

1. NPTEL / SWAYAM (Medical Laboratory Techniques): URL: <https://swayam.gov.in/>
2. CDC DPDx, URL: <https://www.cdc.gov/dpdx/>
3. LabTests Online (AACC): URL: <https://labtestsonline.org/>
4. American Society for Clinical Pathology (ASCP): URL: <https://www.ascp.org/>
5. Simulation Canada (Virtu-WIL): URL: <https://simulationcanada.ca/>
6. Thermo Fisher Scientific (ELISA Technical Guide): URL: <https://www.thermofisher.com/>
7. CDC (Division of Parasitic Diseases): URL: <https://www.cdc.gov/dpdx/>
8. The Royal College of Pathologists (CPD Resources): URL: <https://www.rcpath.org/>

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

