

KUVEMPU UNIVERSITY
B.Sc. DEGREE – ZOOLOGY (SEP)
IV Semester : Skill Enhancement Course (SEC)
Title: Tools and techniques in Biological Science

Program Name	B Sc	Semester	IV
Compulsory Course	Tools and techniques in Biological Science		
Course Code	--	No. of Credits	2
Contact hours	2 hrs/ week	Duration of SEA/Exam	2hrs
Formative assessment marks	10	Summative assessment marks	40

Learning Objectives

- To give students a hands on experience of instrumentation used in the laboratory facility.
- To expose students to concepts and working principles of techniques and instruments.

Expected Outcomes

After successfully completing this course, the student will able to:

- Understand the purpose of the techniques, its proper use and possible modifications/improvement.
- Learn the theoretical basis of techniques, its principle of working and its appropriate application.
- Learn the maintenance of laboratory equipments/tools, safety hazards and precautions.
- Understand the process of preparation of buffer, maintenance of museum and learn the techniques of preservation of biological specimens.

Tools and techniques in Biological Science

Unit-I Principle and Types of Microscope: Working principles, basic operation and application of microscope types- Dissection microscope, Light microscope, Dark field microscope, Fluorescent microscope, Phase contrast microscope, and Electron microscope.

Unit-I Centrifugation and Chromatography: Working principles, basic operation and application of types of Centrifuges: high speed and ultracentrifuge. Types of rotors: Vertical, swing-out, fixed-angle. Working principles, basic operation and application of Paper and Thin Layer Chromatography.

Unit-III Spectrophotometry and Biochemical techniques: Principle and application of Analytical instrument- pH meter, colorimeter and spectrometer. Biochemical preparation of buffers and solutions.

Unit-IV Molecular techniques: Working principles, basic operation and application of PCR DNA sequencing. Molecular cloning and genomic libraries.

Unit-V Museum preparation- Concepts and Principles of Microtome its types Embedding, sectioning and staining techniques of light microscopy; Preservation of biological specimens: Taxidermy, Fossils, Dead animals (formalin). Laboratory safety: Laboratory lay out, wet lab, storage of chemicals and glassware. Maintenance of Laboratory equipment (microscopes, centrifuge, incubators, analytical and electronic balances, electrophoretic units, pH meter, turbidity meter etc.); precautions while working in laboratory.

Recommended Books:

1. Charles R Cantor, Paul R. Schimmel (2008). Biophysical Chemistry (Techniques for the Study of Biological Structure and Function), Part II, W.H. Freeman and Company, ISBN-13: 978-0716711902
2. Plummer David T. (2004). Introduction to Practical Biochemistry, 3rd edition, Tata McGraw Hill, ISBN.
3. Agarwal, S. C. 1990. Fishery Management, South Asia Books publication.
4. Berry, A.K. 2013. Text Book of Animal Histology, Emkay Publications.
5. Freeman, W.H. & Brain, B. 1968. An Atlas of Histology, 2nd Edition, Heinemann Edwal Book Ltd., London.
6. Arumugam N . 2015. Bio technique, Saras Publication Ngercoil-629002, Tamilnadu.
7. Daniel, M. Basic Biophysics for biologists Agrobios.

**THEORY EXAMINATION QUESTION PAPER PATTERN FOR SKILL
ENHANCEMENT COURSE**

(Semesters IV)

B.Sc. Semester-IV Degree Examination; 2025-26

(Semester Scheme; New Syllabus: 2024-25)

SUBJECT: ZOOLOGY

Paper – Tools and techniques in Biological Science

Paper Code: _____

Time: 2 Hours

Max. Marks: 40

Instructions to candidates:

- 1) All sections are compulsory
- 2) Draw neat and labelled diagrams wherever necessary.

SECTION-A

Answer **all** the following questions: (2×5=10)

- 1.
- 2.
- 3.
- 4.
- 5.

SECTION-B

Answer any **FOUR** of the following: (4×5=20)

- 6.
- 7.
- 8.
- 9.
- 10.

SECTION-C

Answer any **ONE** of the following: (10×1=10)

- 11.
- 12.

Formative assessment		10 marks
SL NO	Internal assessment	Maximum marks
1.	Internal test	04
2.	Assessment of skill development activities/ seminars /assignment with proper record	03
3.	Attendance with a proper record*	03

***Attendance marks – breakup**

Total: 10 Marks

$<75\%$	-	00 Marks
75-80%	-	01 Mark
85-90%	-	02 Marks
90-100%	-	03 Marks
90-100%	-	03 Marks