

GUJARAT UNIVERSITY

B .SC. SEMESTER I

BOTANY

As per NEP 2020 Guidelines

In effect from June 2023

SEC – BLT 116 (B.Sc. Basic/Hons- Botany)

Course Type	Course	Credit	Work Hours/ week	Exam hours	Marks		Total Mark
					Internal	External	
Skill Enhancement Courses	SEC – BLT 116 (B.Sc. Basic/ Hons- Botany)	2	2	2	25	25	50

SEC – BLT 116- Botany

Two alternatives are given. Student may choose one of them

1. Biolab techniques and safety measures (BLT)

Course Code: SEC – BLT 116 (B.Sc. Basic/Hons- Botany)

Credits: 2

Total Contact Hours: 30

Learning Objectives:

1. To learn about a biological laboratory with focus on plants studies and environment
2. To understand, in theory, about a Biolab and various important equipment, their working, calibration, and maintenance
3. Understanding working of student microscopes in detail
4. To know about plant identification, plant anatomy and plant propagation

5. Understanding laboratory safety measures in all aspects.

Learning outcomes:

By the end of the course, the students will be able to:

1. Understand about a biological lab and various important equipment, their working, uses and maintenance
2. Understand working and care of dissecting and compound microscopes
4. Learn morphology of plants for plant identification, plant anatomy and plant propagation methods
5. Know the importance of laboratory safety measures in all aspects like waste management, fire safety, etc.

Unit 1: Bio-lab techniques (15 hours)

1. Introduction to Biolab Techniques
 - Overview of a biological laboratory, its layout, important biological equipment and their uses
 - Basic laboratory safety guidelines
2. Microscopy Techniques
 - Principles of light microscopy and compound microscopes
 - Sample preparation and staining techniques
3. Plant Anatomy Techniques
 - Study of different plant tissues and cell types
 - Staining techniques for enhanced visualization of plant structures
4. Plant Identification Techniques
 - Morphological aspects for use in plant identification
 - Collection and preservation of plant specimens for herbarium records
 - Techniques for accurate botanical drawing and documentation
5. Molecular Biology Techniques
 - DNA extraction methods from different sample types
 - Polymerase Chain Reaction (PCR) and its applications
 - Gel Electrophoresis for DNA and protein analysis
6. Plant Propagation Techniques
 - Asexual propagation methods, including cutting, layering, and grafting
 - Seed germination and seedling care techniques
 - Nursery management and maintenance of propagated plants

Unit 2: Safety Measures in the Biolab (15 hours)

1. Risk Assessment and Hazard Identification
 - Understanding laboratory hazards and risks
 - Conducting risk assessments for different experiments
2. Personal Protective Equipment (PPE)
 - Types of PPE used in the lab and their proper use

- Importance of wearing PPE to ensure personal safety
3. Chemical Safety
 - Handling and storage of chemicals in the laboratory
 - Safety data sheets (SDS) and chemical labeling
 4. Biological Safety
 - Biosafety levels and containment measures for working with microorganisms
 - Safe disposal of biological waste
 5. Fire Safety and Emergency Protocols
 - Fire prevention and extinguishing techniques
 - Evacuation procedures in case of emergencies
 6. Equipment Safety and Maintenance
 - Safe operation of laboratory equipment
 - Regular maintenance and calibration of instruments
 7. Laboratory Waste Management
 - Proper disposal of chemical and biological waste
 - Recycling and environmentally friendly practices

Assessment Methods: These may be-

- Written assessments and quizzes to evaluate theoretical knowledge.
- Demo of Safety audits to ensure adherence to safety measures in the lab.
- Assignments and projects on specific laboratory techniques and safety protocols.

REFERENCE BOOKS

1. "Plant Microtechnique and Microscopy" by A.L. Kothari, R. K. Sharma, and A. K. Sharma
2. "Plant Anatomy" by Katherine Esau
3. "Introduction to Botany" by Murray Nabors
4. "Practical Plant Anatomy" by Dr. S. M. Reddy and S. C. Panda
5. "Biological Science" by Scott Freeman, Kim Quillin, Lizabeth Allison, and Michael Black
6. "Plant Biotechnology: The Genetic Manipulation of Plants" by Adrian Slater, Nigel W. Scott, and Mark R. Fowler
7. "Biotechnology and Plant Breeding: Applications and Approaches for Developing Improved Cultivars" by Henry T. Nguyen and Abraham Blum
8. "Essentials of laboratory safety" By Fredrick M. Latterell
9. "Biosafety in the laboratory: Prudent practices for the handling and disposal of infectious materials" By National Research Council
10. "Laboratory safety for biotechnology and laboratory classes" By William M. Sanders.