CLUSTER UNIVERSITY SRINAGAR

SYLLABUS (FYUP UNDER NEP 2020)

Offered By Department Of BIOTECHNOLOGY

Semester 1st Skill Enhancement Course (SEC)

Course Title: Lab Techniques -I

Course Code: UGBTC22S101 **Max. Marks 100**
Credits: 4 (Theory: 1, Practical: 3) **Theory External: 15; Min Marks: 06**
Contact Hrs: 105 (Theory: 15, Practical: 90) **Theory Internal (Continuous Assessment): 10 Marks, Min Marks: 04**
Practical Experimental Basis= 45 Marks, Min. Marks: 18
Practical Internal (Continuous Assessment): 30 Marks, Min. Marks: 12

Objective:

- Acquaint students with basic laboratory skills
- Proper use and handling of laboratory equipment's commonly used in Biotechnology
- Laboratories, as well as to lab safety rules.
- Preparation of Solutions and buffers.
- Detection of Biomolecules

Course Outcome:

After completion of course, students will able to:

- Follow the basic safety requirements and rules in a Science Laboratory.
- Handle and use Laboratory Equipment's correctly,
- Carry out basic Biochemical Calculations,
- Work as a part of a team.
- Understand the importance of careful Experimental Planning and Organization

THEORY

UNIT I

Introduction to Basic Laboratory Equipment's

General Laboratory Safety Rules.
Sterilization and different Sterilization Techniques.
Principle and working of Autoclave, Laminar Air Flow, Hot Air Oven, Centrifuge, Colorimeter, Spectrophotometer and Microscope.
Brief Idea about Carbohydrates and Proteins

PRACTICALS

UNIT II

Working with Solutions

Use and Handling of Micropipettes.
Concepts of Solutions: (Solute, Solvents, Saturated solution, unsaturated Solution Concentrations, Stock solution, Working Solution)
Different methods of measuring concentrations: Normality, Molality, Molarity, Percent Solution, Mole fraction) with practice problems
Preparation of solutions of different concentrations.
Concept of Dilutions: Preparation of Stock Solutions and Working Solutions/Methods of Dilution (Simple and Serial Dilution) with practice Problems

Unit III:
pH & Buffers
Concept of Ionization of water, Weak acids and Weak Bases
Ionic Product (kw)and concept of pH
Dissociation constant (Ka) & pKa
The Henderson-Hasselbalch Equation
Calibration and use of pH meter

Practice Problems on pH/pKa
The Buffer concept & Buffer capacity
Biological buffers
Preparation of some commonly used buffers
Practice Problems on Buffer.

UNIT IV:
Qualitative Tests
Idea about Qualitative and Quantitative tests
Qualitative analysis of carbohydrates by:
a) Molisch's test
b) Benedicts' test
c) Fehlings' test
d) Iodine test
Qualitative analysis of proteins by:
a) Ninhydrin test
b) Xanthoproteic test
c) Biuret test
d) Nitroprusside test

Recommended literature

- Rodney F. Boyer, Biochemistry Laboratory: Modern Theory and Techniques, Pearson.
- Wilson And Walker's Principles And Techniques Of Biochemistry And Molecular Biology •
- Introductory Practical Biochemistry by S.K. Sawhney
- https://www.mgel.msstate.edu/pdf/solutions.pdf