Course Code: 240 MBIO

Course Name: Laboratory Skills

Course Learning Outcomes (CLOs)

At the end of the course, the students will be able:

- To define the basic principles of procedures performed in a microbiology laboratory and biosafety.
- To recall the methods that used to isolation, purification and identification of microbes.
- To distinguish between chemicals, solutions and culture media that used in microbiology laboratory.
- To interpret the results of different experiments in microbiological scope.
- To work in group in different microbiological activities.
- To, Ability to understand and engage in research work

Topics:

Experiment 1	1.Introduction to microbiology laboratory skills: laboratory safety, basic equipment, and laboratory techniques.
Experiment 2	2-Basic chemical preparations: preparation of simple buffers, quantity calculation and PH calibration. (PPM/Molarity) A.Preparation and dilution of PPM solutions
Experiment 3	B. Preparation and dilution of Molar solutions
Experiment 4	4. A-Basic aseptic techniques: use of aseptic technique to prevent contamination and maintain sterile conditions in the laboratory. (Sterilization) B-Microbial growth: culture media (NA/PDA), culture methods (plates/tubes) + different types of media
Experiment 5	5. Pouring media- Microbial isolation from different sources (Bacteria & Fungi)
Experiment 6	6. -Purification methods (Bacteria & Fungi)- identification (culture characteristic)
Experiment 7	7. Basic microscopy: principles of light microscopy, types of microscopes, and specimen preparation. +Gram stain +Fungus stain (LC)
Experiment 8	8.Factors affecting microbial growth (Temperature , pH, Osmotic pressure)
Experiment 9	Kirby- Bauer Method (Disc Diffusion Method) +Basic bacterial physiology: microbial metabolism, energy production, and microbial metabolic diversity. Microbial enzymatic activity - Amylase production test - Catalase Activity
Experiment 10	10.Microbial enumeration: methods for counting viable cell, including plate counts, membrane filtration, and most probable number (MPN) assays +Basic microbiology laboratory calculations: dilutions, serial dilutions, and colony-forming units (CFUs)
Experiment 11	11.Basic molecular techniques: DNA extraction, DNA amplification, agarose gel preparation and gel electrophoresis.