INDIRA PRIYADARSHINI GOVERNMENT DEGREE COLLEGE FOR WOMEN, NAMPALLY (AUTONOMOUS),

Re-Accredited with NAAC A Grade (3rd Cycle)

(AFFILIATED TO OSMANIA UNIVERSITY)

HYDERABAD, TELANGANA

DEPARTMENT OF MICROBIOLOGY

DSC-1A **Semester – I** **Course Title:- General Microbiology**

Credits: 4+1=5

Overall Course Objective: To give basic concepts of Microbiology

Course Objectives:

- Describe the history of Microbiology and contributions of various scientists in development of Microbiology.
- Discuss the morphological features of bacteria, viruses and isolation and preservation methods.
- To explain microbial nutrition and metabolism
- To discuss sterilization techniques and concept of growth.

Course Title:- General Microbiology (4HPW -Credits-4Theory: 60 Lectures)

UNIT-1: INTRODUCTION TO MICROBIOLOGY No. of hours: 15

Meaning, definition and scope. History of microbiology: Contributions of Louis Pasteur and Robert Koch, **Edward Jenner, Antonie Van Leeuwenhoek, Alexander Flemming. Nobel laureates in Life Sciences of 21st Century (Project based learning: Assignment)**. Importance and applications of Microbiology.

Principles of Microscopy-Bright field, Dark field, Phase-contrast, Fluorescent and Electron microscopy (SEM and TEM). Principles and types of stains- Basic and Acidic stains, Properties and role of Fixatives, Mordants, Decolourisers. simple stain, differential stain, negative stain, structural stain-spore, capsule, flagella, Acid fast staining. Bacterial motility - Hanging drop method.

UNIT-2: STRUCTURE OF BACTERIA, VIRUSES & PURE CULTURE CONCEPT No. of hours: 15

Prokaryotes — Ultra structure of eubacteria.

General characteristics of and Classification of viruses. **Differences between bacteria and viruses.** Morphology and structure of TMV and HIV. Structure and multiplication of

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lambda bacteriophage.

Isolation of pure culture techniques- Enrichment culturing, Dilution plating, streak plate, spread plate, pour plate method, Micromanipulator.

Preservation of Microbial cultures — Sub culturing, overlaying cultures with minerals oils, lyophilization, glycerol stocks, sand cultures, storage at low temperature.

UNIT-3: MICROBIAL NUTRITION AND METABOLISM

No. of hours: 15

Microbial Nutrition — Nutritional requirement – **Macro elements, Micro elements, growth factors.** Uptake of nutrients by cell- Passive diffusion, facilitated diffusion, active transport, group translocation, iron transport–siderophores.. Nutritional groups of microorganisms — Autotrophs, Heterotrophs, Mixotrophs. Components and types of bacterial growth media — simple and complex media: nutrient agar medium, MacConkey agar and blood agar, **Yeast media, Algal media.**

Respiration — Glycolysis, HMP Pathway, ED Pathway , TCA Cycle and Anaplerotic reaction, Electron Transport Chain, Oxidative and Substrate level phosphorylation.

UNIT-4: STERILIZATION TECHNIQUES AND MICROBIAL GROWTH

No. of hours: 15

Sterilization and disinfection techniques - Physical methods - Autoclave, Hot air oven, Laminar air flow, Filter sterilization. Radiation methods - U. V rays, Gammarays, Ultrasonic methods. Chemical methods - Alcohols, Aldehydes, Phenol, Halogens, Hypochlorides, **Ethylene oxide (ETO), Nitrogen dioxide, Peracetic acid, Ozone, Vaporized Hydrogen Peroxide (VHP).**

Microbial growth — Different Phases Of Growth in Batch culture. Factors Influencing microbial growth. Synchronous, Continuous, Biphasic Growth. Methods for measuring microbial growth: Direct Microscopic Count (DMC), Viable Count, Turbidometry, Biomass.

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