



GOVERNMENT OF KARANATAKA

Department of Collegiate Education
GOVERNMENT COLLEGE (AUTONOMOUS), KALABURAGI
DEPARTMENT OF STUDIES AND RESEARCH IN MICROBIOLOGY
(UG)

I & II SEMESTER SYLLABUS FOR MICROBIOLOGY UNDER SEP

EFFECT FROM THE ACADEMIC YEAR 2024-25

SUBMITTED TO
GOVERNMENT COLLEGE (AUTONOMOUS) KALABURAGI

APPROVED BY THE BOS COMMITTEE - 2024-25

SEMESTER- I

DSE T-1

TITLE: GENERAL MICROBIOLOGY

UNIT-1:

14hrs

Introduction - different branches and Scope of microbiology, history & Development of Microbiology, Spontaneous generation theory, germ theory of diseases. Contribution of Scientist- Antony Van Leeuwenhoek, Louis Pasteur, Robert Koch, Joseph Lister, Alexander Fleming, Edward Jenner.

Unit-2

12hrs

Ultra structure of prokaryotic (Bacteria) and Eukaryotic cell (Fungi). Difference between prokaryotic and Eukaryotic microorganisms. General Characteristics, classification and economic importance of different types Bacteria, Protozoa, Algae, Fungi and Viruses.

Unit-3:

12hrs

Systematic classification microbes- Binomial nomenclature, Haeckel's three kingdom classification, Whittaker's five kingdom classification. Principles/methods of classification of microbes. Distribution of microorganism in soil, air and water and their significance. Microscopy- working principle, construction and operation of compound microscope. Micrometry and photomicrography.

Unit-4

12hrs

Sterilization - types physical and chemical methods and their mode of action, Staining techniques- Nature and types of stains, methods of staining- Simple staining, gram's staining method. Microbiological Media- definition, components and types, Basal media - Nutrient Broth. Potato Dextrose Agar and Starch Casein Agar.,

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Dr. Ramakrishna

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SEMESTER- I

DSE- PRACTICAL -1

TITLE: GENERAL MICROBIOLOGY: PRACTICAL

- 1. Microbiological standards and safety measures in Microbiology laboratory.
- 2. Operation and working principles of light / compound microscope.
- 3. Applications of basic microbiological tools- (Pipette, Micropipette, Burner, Inoculation loop and Spreader)
- 4. Demonstration and observation of microorganisms from natural sources (Wet mount preparation).
- 5. Demonstration of Bacterial motility by hanging drop method.
- 6. Simple staining technique.
- 7. Differential staining technique- Gram's staining technique.
- 8. Staining of Fungi lacto phenol cotton blue.
- 9. Preparation of Microbiological media- Nutrient Agar, Nutrient Broth, Potato Dextrose Agar Media & SCA (Starch Casein Agar Media).

10. Isolation and enumeration of microbes from soil by serially dilution method.

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200 min

II SEMESTER

TECHNIQUES IN MICROBIOLOGY

DSC-2

Total hours - 50

Uni-1:

14 hrs

Microscopy: working principle, operation and construction different types of Microscopes- Phase Contrast Microscope, Darkfield Microscope, Fluoresence Microscope and Electron Microscope- TEM (Transmission Electron Microscope) and SEM (Scanning Electron Microscope), Micrometry, Photomicrography, chromatography techniques- Paper chromatography, TLC and HPLC

Unit-2

Microbiological Media: types, chemical composition, and preparation - Complex media and special media, differential media, indicator media, enriched, enrichment media and transport media. Pure culture Techniques, Maintenance and preservation of microbial cultures- Slant culture, stab culture, soil method, mineral oil overlaying, glycerol preservation, liquid nitrogen, lyophilization method. Types of culture collection centers - NCIM, ATCC, MTCC NCCS.

Unit-3

Staining Techniques- Negative staining method, Acid Fast Bacilli staining, Spore staining, Capsule staining, flagella staining, staining of Nucleus and Cytoplasm, Staining of reserve food materials, Fungal staining, Algal wet mount method.

Unit-4

Safety measures of microbiological laboratory, levels of laboratory and good laboratory practices. Working principles and operation of instruments used in microbiology- Autoclave, Incubator, Hot air oven, and Laminar air flow. Working principle, operation of equipment and techniques- pH meter, Spectrophotometer, centrifuge and. X-Ray diffraction, NMR.

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SEMESTER- II

DSC-PRACTICAL -2

TITLE: TECHNIQUES IN MICROBIOLOGY: PRACTICAL

- Demonstration and working principles of Autoclave, Incubator, Hot air oven, Laminar air flow, pH Meter, Centrifuge.
- 2. Study of Construction and working principle of SEM & TEM
- 3. Preparation of Microbiological media- Mac conkey's agar media, EMB agar media, Blood agar media Mannitol salt agar media.
- Demonstration of Pure Culture techniques Pour plate method, Spread plate method, Streak plate Method.
- 5. Isolation and enumeration of microbes from air & water by serial dilution method.
- 6. Study of Colony characters of bacteria and fungi.
- 7. Negative staining technique.
- 8 Demonstration of AFB staining technique.
- 9. Spores and Capsule staining technique

10. Demonstration/Study of Chromatography Techniques -TLC, Paper chromatography and HPLC

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