25th National Level Microbiolympiad (Silver Jubilee Event)

SYLLABUS FOR TY and Final Year (Advanced level)

1. **Microbial Genetics:** Central Dogma of molecular biology - Replication, transcription, and translation, (Prokaryotic and Eukaryotic cell), Genetic recombination (Transformation, Conjugation in Bacteria, Transduction), Plasmids and Transposons, Gene regulation Lac operon and genetic attenuation
   Viral genetics – features of viral genome, lytic cycle and lysogeny, reverse transcription, Recombinant DNA Technology - Host cells, vectors in rDNA, An Overview of recombinant DNA procedure, Applications of DNA Technology

2. **Microbial Biotechnology:**
   Strain improvement; Development of inoculums; types of fermentations; design and types of Fermentor; scale-up; quality control process; production of citric acid; primary screening and secondary screening; bioinsecticides. Extremophile (thermophile, Alkalophile, acidophile, psychrophile, Pizophile and halophile)

3. **Microbial metabolism:** Basics of metabolism; Bioenergetics, degradation of macromolecules (carbohydrates, proteins, lipids); synthetic pathways (carbohydrates, lipids, proteins, and nucleic acids); vitamins and coenzymes; photosynthesis.

4. **Medical microbiology:** Introduction to medical Microbiology; Diphtheria, Covid-19, AIDS; TB; Cholera; Poliomyelitis. Antibiotic resistance

5. **Immunology: Cell mediated immunity and Humoral immunity,** Cells and organs involved in immune system, Antigen; antibody and its types; immunological techniques; blood grouping; monoclonal antibodies; interferon; hypersensitivity; autoimmunity and its causes; complement system; primary and secondary immune response.
6. **Applied Microbiology:** Basic concepts in milk microbiology; plant pathology; Food Microbiology; Xenobiotics; pesticide degradation; biogeochemical cycles (P, S, C and N cycles), Agricultural microbiology, Geomicrobiology

7. **Advanced techniques in Microbiology: Bioinformatics (significance** in life sciences; identification by bioinformatics tools, concept of biological databases)
   Practical Techniques: Polymerase Chain Reaction, RT-PCR, ELISA, antibiotic, and vitamin bioassay; electrophoresis (SDS-PAGE and Agarose); chromatography (Paper and TLC); BOD; COD; alcohol production, fluctuation test; MIC, HPLC, Thermal cycler, Vertical and Horizontal electrophoresis apparatus.

8. **Advanced microbiology** (introductory level)**:** Human microbiome, forensic microbiology, public health microbiology, CRISPER gene editing, antibiotic resistance, pandemic, biological warfare, newly emerging diseases, Diagnostic Microbiology, RT-PCR, Bio-nanotechnology, quorum sensing. Traditional and Indian Knowledge about microbes.

Celebrating 25 Years of Excellence in Microbiology

Think Micro Dream Big!

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