PEN4I102 ENVIRONMENTAL MICROBIOLOGY AND TOXICOLOGY

Module I

General properties of microorganism: Environmental importance of microorganism, classification, distribution, enumeration of microbes, prokaryotic & Eukaryotic cells.

Bacteria: Cell structure, Spore, Morphology and reproductions, Bacterianutration, Culture media and culture characteristics, growth of bacteria, batchculture, specific growth rate and doubling time, continuous culture, synchronous growth, effects of environmental factors on growth.

Module II

Control of microbes: physical and chemical methods, destruction and suppression. Microbialmetabolisms: Anabolism and catabolism, Glycolysis, TCA cycle and ETC, Fermentation and anaerobic respiration, Energy balance (ΔG) -Growth, Substrate Partitioning and theoretical yield, Electronacceptors, Enzyme, Monod and Halden kinetics.

Module III

Drinking water microbiology: Streampollution, Water borne diseases and pathogens,MPN test, Faecal coliform and faecalstreptoccoci, MFtechniques,IMVICtest.Air microbiology: air borne diseases and pathogens.Soilmicrobiology:Bio-fertilizer,VAMfungi,N-fixations,Bio-pesticides,degradation of natural substances. Composting,Bio-energy from waste.

Module IV

Toxicology:- Toxic substances and toxicity, environmental toxicants and its classification, Exposure to toxicants. Dose response relationship. Biotransformation of toxicants. Factors affecting toxicity.

Toxicity of metals like mercury, cadmium, arsenic lead, fluorides, toxicity of pesticides, Bio magnification, Antidotes and neutralization of toxicity.

TEXT BOOKS

1. Microbiology – P.D.Sharma – Rastogi publication
2. Concept of Toxicology – Omkar – Shoban Lal Nagin Chand & Co.

Reference Books

1. Microbiology— Chan etel-McGraw Hill-New Delhi Lehninger Principles of Bio-Chemistry-Nelson & cox

ENVIRONMENTAL MICRBIOLOGY AND TOXICOLOGY (PRACTICAL)

Apparatus used for a Microbiology labrotory. Methods of Sterilisation and Disinfections.

Culture media: Media preparation-Semi-synthetic media. Liquid,Solid and semisolid media,Nutrientagar,PDA media.

Gram staining techniques for detection of gram positive and gram negative bacteria.

Bacteriology of drinking water and domestics sewage-MPN techniques for total coliform, FaecalCOLIform and faecal streptococci(FS),membrane filtration techniques for faecal coliform and total coliform. IMVIC test.

Microbiology of Air:Enumeration of microbes by exposure plate method.

Microbiology of soil:Isolation of microbes by serial dilution methods and colony count by colony counter. study of fungi(medium-Rose Bengal agar).Study of fresh water and polluted water algae-(Blue green algae,Green algae and Diatoms).