

# AMEV19 WASTE WATER ENGINEERING

## UNIT-1 WASTE WATER CHARACTERISTICS

- 1.1 Physical, chemical & biological.
- 1.2 Waste water characterization studies- sampling
- 1.3 Location & interval of sampling- sampling equipment- preservation of sample.

## UNIT-2 WASTE WATER COMPOSITION

- 2.1 Loading factors- analysis of waste water loading data.
- 2.2 Chemistry and analysis of various characteristics of waste water viz. Total Solids,
- 2.3 Total Dissolved Solids, Volatile Matter, Fixed Solids, BOD5, COD, ThOD, TOD, Ammon.
- 2.4 Nitrogen, Protein content, TOC, Chlorides, Alkalinity, pH, Sulphides,
- 2.5 Dissolved Oxygen, Total Coliform Count, and Metal content.

## UNIT-3 PHYSICAL UNIT OPERATIONS

- 3.1 Screening- Flow Equalization- Flocculation- Settling/ Sedimentation- Filtration.

## UNIT-4 CHEMICAL PRECIPITATION

- 4.1 Different precipitating agents- Theoretical aspects of precipitation.
- 4.2 Hydraulic characteristics of different Reactors, Reaction kinetics & Reactor selection.

## UNIT-5 IMPORTANT MICRO-ORGANISMS & WASTE WATER TREATMENT

- 5.1 Kinetics of biological growth- application of kinetics to biological treatment processes- Aerobic Suspended growth process- its microbiology- Process analysis for different reactors-
- 5.2 Aerobic Attached growth process- different types- microbiology of the process- process analysis- mathematical designing of Activated Sludge process- its considerations.
- 5.3 Sludge disposal- Solid waste management- Solid waste characteristics- Generation rate component- moisture content- VOC content.
- 5.4 Density- solid waste collection and transportation- solid waste transfer and transportation.
- 5.5 Solid waste processing and recovery recycling- processing for recovery of material- manufacture of solid waste product- electrical energy recovery- disposal of solid waste.

## UNIT-6 BIOREMEDIATION

- 6.1 Sources of contaminants, current bioremediation practices,
- 6.2 Ground water bioremediation, soil bioremediation (like in-situ treatment, land farming, composting, bioreactor), factors influencing bioremediation,
- 6.3 Environmental factors, physical factors and chemical factors.

### Reference Books:

1. S.K.Banerjee, Environmental Chemistry, 2nd edition. Prentice Hall of India (1999), New Delhi.
2. A.Mackenzie, A.S. Ball & S.R. Virde- Instant notes in Ecology, Viva Books Pvt. Ltd. (1999) New Delhi.