

## Table of Contents :

### Part I – Characteristics of Natural Waters

#### 1. Sources of Water Supply

- Surface water (rivers, lakes, reservoirs)
- Groundwater (aquifers, wells)
- Seasonal and climatic influences

#### 2. Physical and Chemical Properties of Water

- Turbidity and suspended solids
- Color, taste, and odor
- Hardness and alkalinity
- Dissolved gases and salts

#### 3. Biological Characteristics

- Microorganisms
- Pathogens
- Algae and biological contamination

### Part II – Treatment Processes for Public Water Supply

#### 4. Coagulation and Flocculation

- Coagulants and chemical dosing
- Mixing and floc formation
- Process optimization

## 5. Sedimentation and Clarification

- Settling theory
- Clarifier design
- Sludge removal

## 6. Filtration

- \* Rapid sand filters
- \* Slow sand filters
- \* Filter media and performance

## 7. Disinfection

- Chlorination
- Alternative disinfectants
- Contact time and safety standards

## Part III – Industrial Water Treatment

### 8. Water Softening

- Ion exchange softening

## 9. Demineralization and Desalination

- Ion exchange resins
- Reverse osmosis principles
- Electrodialysis

## 10. Boiler and Cooling Water Treatment

- Scale prevention
- Corrosion control
- Chemical conditioning

## Part IV – Plant Design and Operation

### 11. Water Treatment Plant Design

- Process selection
- Equipment layout
- Hydraulic considerations

### 12. Operation and Process Control

- Monitoring water quality
- Laboratory testing
- Maintenance and troubleshooting

### 13. Standards and Regulatory Requirements

- Drinking water standards

- Industrial water specifications