

# Wastewater Treatment Processes

## Course 382: Wastewater Treatment Processes

Covers the various stages of wastewater treatment. Goes into detail on the removal of solids, then explains the use of chemical and biological processes for water purification. Covers the treatment and disposal of the extracted solids.

TPC Training is accredited by IACET to offer **0.5 CEU** for this program.



### Lesson 1: Overview of Wastewater Treatment

#### Topics

Purpose of Treatment; Sources of Wastewater; Wastewater Collection Systems; Typical Treatment Facilities; Influent; Preliminary Treatment; Primary Treatment; Secondary Treatment; Tertiary Treatment; Disinfection and Effluent Discharge; Solids Handling

#### Objectives

- List the purposes of wastewater treatment.
- Describe the way organic wastes pollute water.
- Identify elements of wastewater collection systems.
- Stages of wastewater treatment at typical treatment facility.
- Explain what happens to wastewater during preliminary, primary, secondary, and tertiary treatment.
- Describe methods of solids handling.

### Lesson 2: Physical Separation of Solids

#### Topics

Screening; Grinding; Grit Removal; Primary Sedimentation; What Happens During Sedimentation?; Factors Affecting Settling Rates; Types of Clarifiers; Air Flotation; Filtration; Effluent Disposal

#### Objectives

- Identify and describe the different types of bar and woven screens used for screening.
- Identify and describe common types of grit-removal equipment.
- List factors affecting settling rates.
- Figure the length of detention time needed to settle out settleable particles.
- Describe the three principal methods of land disposal.

### Lesson 3: Chemical Treatment Processes

#### Topics

Solids in Wastewater; Chemical Coagulants; Phosphate Removal; Chemical Clarification Equipment; Disinfection; Factors Affecting Disinfection; Disinfection with Chlorine; Equipment Used in Chlorine Feeding

#### Objectives

- Describe what colloidal particles are and outline the problems associated with removing them from wastewater.
- List chemicals used as coagulants.
- Explain how the flocculation process works.
- Explain the function of a precipitant.
- List chemical agents commonly used as disinfectants.
- Identify factors affecting disinfection.
- Describe methods for applying chlorine to wastewater.

### Lesson 4: Biological Processes

#### Topics

Lagoons; Activated Sludge; Aeration with Pure Oxygen; Trickling Filters; Distribution Systems; Trickling Filter Operations; Synthetic Media; Activated Biofilter Process (ABF); Rotating Biological Contactors (RBC); Secondary Clarifiers

#### Objectives

- Differentiate between the way unaerated and aerated lagoons function.
- Distinguish between suspended growth and fixed-growth systems.
- List and describe different methods of utilizing activated sludge to stabilize wastewater.
- Tell how trickling filters, ABFs, and RBCs operate.
- Explain how secondary clarifiers are used in conjunction with fixed- and suspended-growth systems.

### Lesson 5: Solids Treatment and Disposal

#### Topics

Three Processes; Sludge Conditioning; Thickening; Dewatering; Drying Beds; Lagoons; Vacuum Filtration; Filter Presses; Further Reduction of Water Content; Composting; Ultimate Disposal

#### Objectives

- Distinguish between conditioning, thickening, and dewatering.
- List the factors that affect which conditioning, thickening, and dewatering methods are used.
- Describe four methods of sludge conditioning.
- Describe three methods of thickening.
- List factors that affect drying-bed operation.
- Describe methods for disposing of digested or dewatered sludge.