Course Name	**Maintaining Wastewater Equipment**
Credit Hours	2 Hours
Instructor(s)	Ralph Stevens
Fee	$29.00

Course Description

This course provides details on a variety of wastewater equipment, including pumping stations, screening equipment, grinding equipment, grit removal systems, sludge and scum collection apparatus', and flow measurement devices. For each piece of equipment, we will cover major parts, start-up, operation, shutdown, maintenance, and safety.

Learning Objectives

After completing this course, the licensee should be able to:

- Describe a typical collection system layout.
- Name the three types of pumping stations currently in use and explain how they differ.
- Use the following terms in an explanation of pump operation: impeller, shroud, volute case, stuffing box, shaft sleeve, wearing ring.
- Name the importance of a pump station ventilation system.
- Demonstrate the necessary procedures to follow before pump start-up.
- Name the two basic parts of a hand-cleaned bar screen and explain their functions.
- Describe the operation of a mechanically cleaned bar screen.
- Explain why grinders are used and how they are maintained.
- Compare and contrast a rotating drum comminutor and a stationary screen comminutor with an oscillating cutter.
- Explain how a barminutor combines the functions of a bar screen and a comminutor.
- Give examples of important safety rules to follow when working with screening and grinding equipment.
- Tell why grit removal is important.
- Name the three phases of the grit removal process.
- Explain the functions of slide gates and dewatering drains in handcleaned grit chambers.
- Describe the action of a reciprocating rake and explain its purpose.
- List several maintenance checks to make on chain and flight grit collectors.
- Explain how an aerated grit chamber works and how to tell if it is not working correctly.
- Describe the operation of a cyclone grit separator.
- List the five major components common to all clarifiers.
- Describe the operation of slotted-pipe and helicaltype skimmers.
- Name the two flow patterns possible in circular clarifiers.

- Discuss the daily maintenance requirements of clarifers.
- Explain the importance of laboratory testing on the contents of a clarifer.
- Identify possible safety hazards associated with clarifer operation.
- Define flow and differentiate between flow rate and total flow.
- List the three basic types of flow systems.
- Distinguish between direct and indirect flow measurements, and between primary and secondary devices.
- Five a brief description of a current meter, a pitot tube, a weir, and a flume, and tell how each functions in open channels.
- Describe several methods of measuring flow from freely discharging pipes.
- Name at least five level detection devices and explain their operation.
- Describe the following flow measurement devices as they are used in completely filled pipes: orifice, venturi, flow nozzle, rotameter, magnetic flowmeter, and ultrasonic flowmeter.

Equipment Requirements

You must have an active, working internet connection to access this course online, as well as a platform to access the internet, such as a computer, tablet, or phone. All popular web browsers are supported, including Google Chrome, Mozilla Firefox, Safari, and Opera. No specialized software, speaker, microphone, or web camera is required.

Schedule and Location

This course is available online at any time at www.AYPOTech.com. Upon enrolling in the course, students will have access for 365 days or until the agency-issued course expiration date, whichever comes first. After the access expiration date, the student may re-activate their course if the course approval has not expired. If they do not re-activate, the course will be removed from the student's account and any progress in the course will be lost. Before the access expiration date, the student may sign in and out of the course as many times as needed to complete the course.

Student Support

Both general and technical support is available to the student before, during, and after taking the course online. Students have access to general customer support via phone, chat, and email. Students have access to the course instructor via email. All questions, concerns, and comments received will be responded to within one business day.

Participation/Interactivity Verification

Timed Logs - Per our company's record retention policy, each student's every log-in, log-out, and lesson/assessment completion time is tracked and retained as part of the student record.

Review Questions - After each section of text, students must answer a review question. Students cannot progress in the course until the question between sections has been answered correctly.

Global Timer - Students will not get credit until they spend a minimum of 120 active minutes total in the course.

Identity Verification

Unique Username/Password - Each student that wants to complete a training course with us must create an account by registering a unique personal email address and password. The student must enter this unique identifier every time they take a break from the course.

Assessment Details

Review Questions - The student must successfully answer all review questions between sections to get credit for the course. If their first response is incorrect, students will have to try again until they choose the correct answer.

Maintaining Wastewater Equipment Timed Syllabus

Section	Topic	Questions	Minutes*
	Pumping Stations		
1	Collection Systems	**1**	**1.7**
2	Pumping Stations	**2**	**4.2**
3	Pump Operation	**3**	**5.5**
4	Pump Types	**1**	**2.6**
5	Pump Maintenance	**2**	**3.5**
6	Pump Drive Units	**1**	**2.1**
7	Piping, Ventilation, and Control Systems	**2**	**5.5**
8	Level Detection	**1**	**3.4**
9	Station Operation and Maintenance	**1**	**4.2**
10	Safety Considerations	**1**	**2.0**
	Screening and Grinding Equipment		
11	Hand-Cleaned Bar Screens	**2**	**4.4**
12	Mechanically Cleaned Bar Screens	**3**	**9.2**
13	Grinders	**1**	**2.2**
14	Rotating Drum Comminutors	**1**	**3.5**
15	Stationary Screen Communutors	**1**	**3.4**
16	Barminutors	**2**	**4.7**
	Grit Removal Systems		
17	The Nature of Grit	**1**	**2.9**
18	Hand-Cleaned Grit Chambers	**2**	**4.3**
19	Maintaining Hand-Cleaned Grit Chambers	**1**	**2.0**
20	Detritus Tanks	**3**	**5.2**
21	Maintaining Detritus Tanks	**1**	**2.7**
22	Chain and Flight Grit Collectors	**2**	**3.0**
23	Maintaining Chain and Flight Grit Collectors	**1**	**2.5**
24	Aerated Grit Chambers and Cyclone Separators	**2**	**3.8**
25	Maintaining Aerated Grit Chambers	**1**	**6.2**
	Sludge and Scum Collection Apparatus		
26	Sedimentation	**2**	**3.6**
27	Rectangular Clarifiers	**2**	**4.3**
28	Scum Removal	**1**	**1.7**
29	Circular Clarifiers	**2**	**5.9**
30	Sludge Removal	**1**	**2.8**
31	Laboratory Testing	**1**	**1.6**
32	Troubleshooting	**2**	**3.6**
33	Safety Considerations	**1**	**2.1**
	Flow Measurement Devices		
34	Properties of Flowing Liquids	**2**	**3.4**

35	Flow Measurement Methods, Including Batch Processes	**1**	**2.5**
36	Flow Measurement in Open Channels	**2**	**4.7**
37	Measuring Flow from Freely Discharging Pipes	**1**	**1.7**
38	Methods of Depth Measurement	**2**	**6.5**
39	Flow Measurement in Completely Filled Pipes	**1**	**6.0**
40	Methods of Pressure Measurement	**1**	**2.4**
41	Maintenance of Flow Measurement Devices	**1**	**2.0**
	Totals:	**62**	**149.7**
	Student Minimum Time Required:		**120**