Learning Wastewater Treatment

The Northeast Ohio Regional Sewer District encourages all employees to learn about its core service, the collection, treatment and disposal of wastewater. Employees can increase their knowledge of treatment plant operations or collection system operations with courses offered by two education providers:

- Operator Training Committee of Ohio, Inc. (OTCO) [http://www.ohiowater.org/OTCO/]
- Office of Water Programs at the California State University, Sacramento (CSUS) [http://www.owp.csus.edu].

Both entities offer self-study courses. OTCO also offers classroom courses throughout Ohio, annually. The courses are designed for beginning, intermediate and advanced study of both collection system and treatment plant operation. The following table provides a quick overview of the provider/format, course level, and course title:

<table>
<thead>
<tr>
<th>Provider/Format</th>
<th>Wastewater Plant Operation</th>
<th>Wastewater Collection System Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTCO (self-study; classroom)</td>
<td>Beginning Basic WW I</td>
<td>Beginning WW Collection Systems</td>
</tr>
<tr>
<td>CSUS (self-study)</td>
<td>Advanced WW III Operation of WW Treatment Plants, Vol. II</td>
<td>Advanced WW Treatment</td>
</tr>
<tr>
<td>OTCO (self-study; classroom)</td>
<td>Wastewater Plant Operation</td>
<td>Wastewater Collection System Operation</td>
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If you are interested in taking any of the courses, follow the procedures below:

**OTCO- Self-Study and Classroom**
- Basic WW I
- Intermediate WW II
- Advanced WW III
- WW Collections Systems

**Procedure**
OTCO courses are eligible for tuition reimbursement under the Tuition Reimbursement Program. You must submit a Request for Authorization/Reimbursement form to your supervisor. You enroll in the course through OTCO and upon successful completion your cost will be refunded. When there is enough interest, arrangements can be made to hold the classroom course on-site.

**CSUS- Self-Study**
- Operation of WW Treatment Plants Vol. I, II, Advanced
- O & M of WW Collection Systems Vol. I, II

**Procedure**
CSUS courses are administered through Employee Resources. Your supervisor can obtain the materials for you.

To assist with your learning, you can request help from a tutor. Tutoring is scheduled partially during paid work-time and personal time, weekly at Southerly WWTP.

These courses are also an important first step for those seeking Ohio EPA Wastewater certification. Following is a detailed description of each course:
Objective
This course is designed to train operators in the safe and effective operation and maintenance of wastewater treatment plants.

Scope
This course is designed to train operators in the practical aspects of operating and maintaining wastewater treatment plants, with emphasis on the use of safe practices and procedures. Information presented includes the role and responsibilities of a treatment plant operator, an explanation of why wastes must be treated, and detailed descriptions of the equipment and processes used in a wastewater treatment plant. Operators will learn how to operate and maintain racks, screens, comminutors, sedimentation tanks, trickling filters, rotating biological contactors, package activated sludge plants, oxidation ditches, ponds, and chlorination facilities. Operators will also learn how to analyze and solve operational problems and how to perform the mathematical calculations relating to wastewater treatment process control.

Contents
1. The Treatment Plant Operator
2. Why Treat Wastes?
3. Wastewater Treatment Facilities
4. Racks, Screens, Comminutors and Grit Removal
5. Sedimentation and Flotation
6. Trickling Filters
7. Rotating Biological Contactors
8. Activated Sludge (Package Plants and Oxidation Ditches)
9. Waste Treatment Ponds
10. Disinfection and Chlorination

Appendix
Final Examination and Suggested Answers
How to Solve Wastewater Treatment Plant Arithmetic Problems
Wastewater Words
Subject Index
Objective
This course is designed to train operators in the safe and effective operation and maintenance of wastewater treatment plants (continuation of Volume I).

Scope
This course is designed to train operators in the practical aspects of operating and maintaining wastewater treatment plants, with emphasis on the use of safe practices and procedures. Topics covered include conventional activated sludge processes, sludge digestion and solids handling, effluent disposal, plant safety and good housekeeping, plant and equipment maintenance, laboratory procedures and chemistry, use of computers for plant operation and maintenance, analysis and presentation of data, and records and report writing. Operators will also learn how to analyze and solve operational problems and how to perform the mathematical calculations relating to wastewater treatment process control.

Contents
11. Activated Sludge (Operation of Conventional Activated Sludge Plants)
12. Sludge Digestion and Solids Handling
13. Effluent Disposal
14. Plant Safety and Good Housekeeping Maintenance
15. Laboratory Procedures and Chemistry
16. Applications of Computers for Plant O & M
17. Analysis and Presentation of Data
18. Records and Report Writing

Appendix
Final Examination and Suggested Answers
How to Solve Wastewater Treatment Plant Arithmetic Problems
Wastewater Treatment Words
Subject Index
Advanced Wastewater Treatment

Objective
This course is designed to train operators in the safe and effective operation of advanced wastewater treatment plants.

Scope
This course is designed to train operators in the practical aspects of operating and maintaining wastewater treatment plants, with emphasis on the use of safe practices and procedures. Information presented includes detailed descriptions of the equipment and advanced treatment processes used for odor control, pure oxygen activated sludge treatment, solids removal from secondary effluents, residual solids management, enhanced biological control including nitrogen and phosphorus removal, and wastewater reclamation. Operators also learn how to operate and maintain treatment plant instrumentation equipment and systems. The residual solids management chapter contains information on sludge types, characteristics and quantities; sludge thickening using gravity thickeners, dissolved air flotation units, centrifuges and thermal conditioning as well as wet oxidation and elutriation; dewatering with pressure filtration (plate and frame, belt, vacuum), centrifuges and drying beds; volume reduction using composting, mechanical drying, incineration, and lagoons; and disposal methods for dewatered or liquid stabilized sludge. This course focuses on actual operating procedures and teaches operators how to analyze and solve operational problems.

Contents
1. Odor Control
2. Activated Sludge (Pure Oxygen Plants and Operational Control Options)
3. Residual Solids Management
4. Solids Removal From Secondary Effluents
5. Phosphorus Removal
6. Nitrogen Removal
7. Enhanced Biological (Nutrient) Control
8. Wastewater Reclamation
9. Instrumentation

Appendix
Final Examination and Suggested Answers
Waste Treatment Words
Subject Index
## Objective
This course is designed to train personnel in the safe and effective operation and maintenance of wastewater collection systems.

## Scope
This course is designed to train operators in the practical aspects of operating and maintaining wastewater collection systems, with emphasis on the use of safe practices and procedures. Information is presented about the importance and responsibilities of a collection system operator, the need for collection system O & M, and the components and typical layouts of collection systems. Operators will learn safety procedures for construction, inspection and testing of sewers, inspection of manholes, and underground construction and repair. Detailed instructions are included for using closed-circuit television, clearing stoppages, cleaning sewers, and controlling roots, grease, odors, and corrosion in collection systems. This course focuses on the knowledge and skills operators will need to identify actual collection system problems and select appropriate methods to solve them. Operators will also learn how to solve arithmetic problems relating to the operation and maintenance of wastewater collection systems.

## Contents
1. The Wastewater Collection System Operator
2. Why Collection System Operation and Maintenance?
3. Wastewater Collection Systems
4. Safe Procedures
5. Inspecting and Testing Collection Systems
6. Pipeline Cleaning and Maintenance Methods
7. Underground Repair

## Appendix
- Final Examination and Suggested Answers
- Collection System Words
- Applications of Arithmetic to Collection Systems
- Subject Index
Objective
This course is designed to train personnel in the safe and effective operation and maintenance of wastewater collection systems.

Scope
This course focuses on three areas: (1) lift stations, (2) sewer rehabilitation, and (3) administration of a collection system agency. Detailed information is provided about the components and practical operation of lift stations. Operators will learn how to operate and maintain a variety of types of motors, supervisory controls, pumps, valves, and other equipment. They will also learn how to examine the condition of a sewer system, set up a sewer rehabilitation program, and safely use various methods to replace or repair damaged sewers. This course also teaches operators about critical aspects of effectively administering a wastewater collection agency or department. Administrative topics covered include overall organization of the agency as well as employment, training and compensation of personnel, selection and acquisition of equipment and facilities, system mapping, management information systems, report writing, and public relations. Operators will learn how to organize and administer all facets of a collection system agency.

Contents
8. Lift Stations
9. Equipment Maintenance
10. Sewer Rehabilitation
11. Safety/Survival Programs for Collection System Operators
12. Administration
13. Organization for System Operation and Maintenance

Appendix
Final Examination and Suggested Answers
Collection System Words
Subject Index
BASIC WASTEWATER I COURSE

OBJECTIVE

The Basic Wastewater Course is for operators or individuals interested in plant operations that lack experience or background in wastewater treatment. It is also valuable for the more experienced operator who wants to review, prepare for examinations, or prepare for advanced training. It will help to acquaint students with terms, equipment, and procedures used in the treatment and processing of wastewater. A review of mathematics with examples relating to treatment plant problems is included.

Wastewater personnel may elect to take Basic Wastewater training at one of the classes offered at various locations throughout the state or they may avoid travel by choosing to enroll in the Basic Wastewater Correspondence Course.

A Certificate of Completion, 6.0 Continuing Education Units (CEU’s) or 60 Contact Hours will be awarded by OTCO to each participant who successfully completes the course.

CORRESPONDENCE COURSE

The correspondence or home study course covers all the pertinent material used in the classroom. All homework or lesson quizzes are mailed to an assigned correspondence counselor. The counselor grades the quizzes and returns them to the student. Three exams, first, second, and final, are provided to the students by the counselor through the mail. The counselor is available to the student by either mail or telephone.

Students may start this course at any time. There is a one-year time limit to complete the course. COURSE FEE: $395 Includes shipping & handling fee

TEXTBOOKS

The Classroom and Correspondence Course includes the following textbooks:

- Basic Wastewater I Workbook
- Manual of Practice 11 (WEF)
- Recommended Standards for Wastewater Works (also known as 10 States Standards)
- Applied Math for Wastewater Plant Operators
### INTERMEDIATE WASTEWATER II COURSE

**WHO SHOULD ATTEND THIS COURSE?**

- Operators who have successfully completed the Basic Wastewater Course.
- Operators who have received sufficient training and experience to comprehend the basic theory and mathematics within the Basic Wastewater I Course.
- Operators who have successfully passed the Ohio EPA Class I Basic Wastewater examination.
- Operators who have one year or more of college credit in environmental course work.

This course emphasizes the purpose, theory, use of treatment plant units, how to evaluate the performance of each unit, and the calculations involved. The following subjects are covered in this course:

- Mathematics & Conversion Factors
- Chemistry & Biology
- Hydraulics, Instrumentation & Pumping
- Industrial Waste Monitoring & Treatment
- Pretreatment & Odor Control
- Sedimentation & Phosphorus Removal
- Attached Growth
- Activated Sludge
- Waste Treatment Ponds
- Advance Waste Treatment
- Disinfection, Dechlorination & Post Aeration
- Wastewater Reclamation
- Sludge Digestion, Handling & Utilization
- Maintenance
- Records, Reports & Safety

A Certificate of Completion, 6.0 Continuing Education Units (CEU’s) or 60 Contact Hours will be awarded by OTCO to each participant who successfully completes the course.

### TEXTBOOKS:

- Manual of Practice II (WEF) may substitute to Activate Sludge MOP-OM9 (WEF)
- Intermediate Wastewater Workbook (OTCO)
- Recommended Standards for Wastewater Works (also known as 10 States Standards)
- OEPA Land Application Biosolids Manual
## ADVANCED WASTEWATER III COURSE

### CLASSROOM COURSE
- Hours per Class: 3
- Number of Classes: 20
- Time: 6 pm - 9 pm
- Frequency: once a week
- Total Hours: 60
- COURSE FEE: $450
  - Fee includes classroom instruction, textbooks, and other materials used in the course. A Certificate of Completion, 6.0 CEU's or 60 Contact Hours will be awarded to each participant who successfully completes the course.

### CORRESPONDENCE COURSE
- Not Available

### Who should attend this course?
- Operators who have successfully completed the Basic Wastewater Course.
- Operators who have received sufficient training and experience to comprehend the basic theory and mathematics within the Basic Wastewater Course.
- Operators who have successfully passed the Ohio EPA Class I or II Wastewater examination.
- Operators who have three years or more of college credit in environmental course work in wastewater treatment.

### This course will present additional material on the following
- Wastewater Characteristics
- Toxics and Bioassay
- Pretreatment and Sewer Systems
- Design Consideration & Construction Materials
- Hydraulics, Pumping, and Instrumentation
- Preliminary Treatment, and Sedimentation
- Biological Treatment, Activated Sludge, Microbiology, Microscopics Examination, Aqua Culture, Land Application, Lagoons, Trickling Filters, Fixed and Rotating Media Biological Treatment
- Advance Waste Treatment
- Chemical Treatment
- Disinfection, Dechlorination, and Post Chlorination
- Sludge Treatment & Sludge Handling and Utilization
- Safety
- Maintenance
- Management, Supervision, Personnel, Staffing, Budgeting, and Public Relations
- Permit Compliance Monitoring
- Laboratory Quality Assurance and Quality Control

### TEXTBOOKS
- Manual of Practice 11 (WEF) may substitute to Activated Sludge MOP-OM9 (WEF)
- Advanced Wastewater III Workbook (OTCO)
- Recommended Standards for Wastewater Works (also known as 10 States Standards)
- Ohio Administrative Code (abridged version for wastewater)
- OEPA Land Application of Wastewater Sludge
Objective
The objective of this course is to provide comprehensive training to personnel engaged in wastewater collection systems operation and maintenance, thus enabling better service to both employers and the public.

The following topics are covered in the course:

- The Wastewater Collection Systems Operator.
- The Need for Collection Systems Operation & Maintenance.
- Lift Stations & Equipment Maintenance
- Safety Programs for Collection Systems Operation, Administration, and Organization for Systems Operation & Maintenance

Students may elect to take Wastewater Collection Systems training at one of the classes offered at various locations throughout the state or they may avoid travel by choosing to enroll in the Wastewater Collection Systems Correspondence Course.

A Certificate of Completion, 4.2 Continuing Education Units (CEU’s), and **42 Contact Hours** will be awarded by OTCO to each participant who successfully completes the course.

CORRESPONDENCE COURSE
The correspondence or home study course covers all the pertinent material used in the classroom. All homework or lesson quizzes are mailed to an assigned correspondence counselor. The counselor grades the quizzes and returns them to the student. Three exams, first, second, and final, are provided to the students by the counselor through the mail. The counselor is available to the student by either mail or telephone.

Students may start this course at any time. There is a one-year time limit to complete the course. COURSE FEE: $395

Includes shipping & handling fee

TEXTBOOKS
The Classroom and Correspondence Course includes the following textbooks:

- Operation and Maintenance of Wastewater Collection Systems (California State University Sacramento)
- Recommended Standards for Wastewater Works (also known as 10 States Standards)