



## Course Calendar and Class Descriptions

### May – July 2022

Class registration is available at [www.utiliency.com](http://www.utiliency.com)

| Date          | Time             | Course  | TCHs | Fee  |
|---------------|------------------|---|------|------|
| May 10, 2022  | 9:00 - 11:00 am  | Collection System Concepts and Terminology (US-2021-16; 2-hrs)                | 2    | \$50 |
| May 12, 2022  | 6:00 - 8:00 pm   | Fundamentals of Collection System Rehabilitation (US-2021-18; 2-hrs)          | 2    | \$50 |
| May 17, 2022  | 9:00 - noon      | Fundamentals of High Strength Brewery Wastewater (US-2021-03; 3-hrs)          | 3    | \$75 |
| May 19, 2022  | 6:00 - 9:00 pm   | Disinfection Fundamentals (US-2022-03; 3-hrs)                                 | 3    | \$75 |
| May 24, 2022  | 9:00 - noon      | Pumps 101 for Exam Prep (US-2022; 11; 3-hrs)                                  | 3    | \$75 |
| May 26, 2022  | 6:00 - 9:00 pm   | Essential Math Skills Review* (US-2022-05; 3-hrs)                             | 3    | \$75 |
| May 31, 2022  | 9:00 - noon      | Introduction to NPDES & the National Pretreatment Program (US-2021-10; 2-hrs) | 2    | \$75 |
| June 1, 2022  | 6:30 - 8:00 pm   | Experiences of a New Wastewater Operator (US-2022-02; 1.5-hrs)                | 1.5  | FREE |
| June 2, 2022  | 6:00 - 9:00 pm   | Collection System Math Skills Review* (US-2022-06; 3-hrs)                     | 3    | \$75 |
| June 7, 2022  | 9:00 - noon      | Clarifiers and Sedimentation, with Math (US-2021-11; 3-hrs)                   | 3    | \$75 |
| June 9, 2022  | 6:00 - 9:00 pm   | Wastewater Operator Math Skills Basic Review* (US-2022-07; 3-hrs)             | 3    | \$75 |
| June 14, 2022 | 9:00 - noon      | Disinfection Fundamentals (US-2022-03; 3-hrs)                                 | 3    | \$75 |
| June 16, 2022 | 6:00 - 9:00 pm   | Activated Sludge Math Skills Review* (US-2022-08; 3-hrs)                      | 3    | \$75 |
| June 20, 2022 | 10:00 - 11:30 am | Experiences of a New Wastewater Operator (US-2022-02; 1.5-hrs)                | 1.5  | FREE |
| June 21, 2022 | 9:00 - noon      | Stormwater Management (US-2022-19; 3-hrs)                                     | 3    | \$75 |
| June 23, 2022 | 6:00 - 9:00 pm   | Solids Processing Math Skills Review* (US-2022-12; 3-hrs)                     | 3    | \$75 |
| June 28, 2022 | 9:00 - noon      | pH and Suspended Solids Benchtop Tests (US-2022-04; 3-hrs)                    | 3    | \$75 |
| June 30, 2022 | 6:00 - 9:00 pm   | Developing Problem-Solving and Decision-Making Skills (US-2022-01; 3-hrs)     | 3    | \$75 |
| July 12, 2022 | 9:00 - noon      | Collection System Math Skills Review (US-2022-06; 3-hrs)                      | 3    | \$75 |



| Date          | Time             | Course  | TCHs | Fee  |
|---------------|------------------|---|------|------|
| July 14, 2022 | 6:00 - 9:00 pm   | Grease Issues and Source Control (US-2022-10; 3-hrs)                          | 3    | \$75 |
| July 18, 2022 | 10:00 - 11:30 am | Experiences of a New Wastewater Operator (US-2022-02; 1.5-hrs)                | 1.5  | FREE |
| July 19, 2022 | 9:00 - 11:00 am  | Introduction to NPDES & the National Pretreatment Program (US-2021-10; 2-hrs) | 2    | \$50 |
| July 20, 2022 | 6:30 - 8:00 pm   | Experiences of a New Wastewater Operator (US-2022-02; 1.5-hrs)                | 1.5  | FREE |
| July 21, 2022 | 6:00 - 9:00 pm   | Fundamentals of High Strength Brewery Wastewater (US-2021-03; 3-hrs)          | 3    | \$75 |
| July 26, 2022 | 9:00 - noon      | Activated Sludge Math Skills Review (US-2022-08; 3-hrs)                       | 3    | \$75 |
| July 28, 2022 | 6:00 - 9:00 pm   | Asset Management and Preventive Maintenance (US-2022-09; 3-hrs)               | 3    | \$75 |

**\* Wastewater Operator Math Academy**

Utiliency Services offers five 3-hour math classes intended to assist prospective and current operators in preparing for certification exams. Attendees can receive a 20% discount on all five classes by signing up for all classes.

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### **Collection System Concepts and Terminology**

Target Audience: Those relatively new to the field of wastewater treatment, those seeking career advancement, or those considering collection system certification.

General concepts covered - utilizing lecture, videos, and class exercises:

- Characteristics of combined, separate, and storm sewer systems.
- Components of gravity sewers and pressure sewers.
- Collection system materials, construction, and repairs
- General discussion of inspection and cleaning techniques.
- Safety considerations

### **Fundamentals of Collection System Rehabilitation Techniques**

Target Audience: Those relatively new to the field of wastewater treatment, those seeking to expand their knowledge of collection system rehabilitation, and those considering collection system certification.

General concepts covered - utilizing lecture, videos, and class exercises:

- Characteristics of wastewater collection systems
- Mainline renewal technologies for repair, rehabilitation, and replacement.
- Sewer lateral renewal technologies
- Manhole renewal technologies

### **Fundamentals of High-Strength Brewery Wastewater**

Concepts covered:

- Commercial brewing process equipment and terminology
- Typical brewery wastewater characteristics
- EPA National Pretreatment Program's general and specific discharge prohibitions
- Opportunities for side-streaming and waste strength reduction
- Guidance materials for conducting brewery inspections
- Guidance materials for brewery wastewater management BMPs



## **Disinfection Fundamentals**

This three-hour training class will highlight the purpose of disinfection for the reduction of waterborne diseases and explore the three most-prevalent wastewater disinfection processes – chlorination, ultraviolet radiation, and ozonation. The need and mechanisms for de-chlorination will also be reviewed. Solving several typical math word problems associated with disinfection will also be demonstrated.

Topics covered include:

- Description of pathogens and waterborne diseases necessitating the need for disinfection.
- Review the disinfection processes for utilizing chlorine, hypochlorite, ultraviolet radiation, and ozone.
- Description of the breakpoint chlorination process.
- Review the methods of disinfectant application to wastewater flows.
- Safety hazards associated with handling, usage, and storage of disinfectants.

## **Pumps 101 for Exam Prep**

This three-hour training class will help attendees refresh or develop skills related to pump components, their functions, and utilizations for moving liquids and solids in a wastewater system. Associated pump-related math skills will also be reviewed.

Topics covered include:

- Theory of Pumping Fluids
- Centrifugal vs. Positive Displacement Pumps
- Wet well and dry well configurations
- Basic Pump Hydraulics, Pump Curves, and Horsepower Concepts
- Typical centrifugal pump components (sleeves, seals, impellers, etc.)
- Pumping Rate Calculations (centrifugal and positive displacement)



### **Essential Math Skills Review**

This three-hour training class will help attendees refresh or develop their basic math skills utilizing problem-solving demonstrations and group participation practice questions followed by guided solution development.

Topics covered include:

- Fractions and percentages
- Unit Conversions
- Circumference and perimeters
- Areas
- Volumes
- Introduction to ABC formula sheet
- How to rearrange formulas

### **Introduction to NPDES and the National Pretreatment Program**

Concepts covered:

- Clean Water Act and its regulatory components
- NPDES permits, stormwater, industrial discharges, biosolids
- Elements of the National Pretreatment Program
- Categorical and Significant Industrial Users
- General and specific prohibitions
- Effluent limitation guidelines
- Local limits and sewer use ordinances



### **Experiences of a New Wastewater Operator**

This 90-minute training class will highlight my recent personal experiences as a new member of the wastewater operator community. During the class, my experiences with exam strategy and the certification process for several states will be reviewed, the facility I presently work at will be discussed via a virtual-tour, and my impression of entering the field later-in-life and becoming a licensed wastewater operator will be made available for group discussion. Common daily, weekly, and monthly operational tasks will also be reviewed and shared.

Topics covered include:

- Certification exam experiences (paper-based and computer-based) for NH, MA, and FL
- Assisting in the operation of a Modified Ludzack Ettinger (MLE) facility, permitted for 12 MGD with a daily flow of 6.5 MGD, and authorized for reuse of plant effluent.
- Conducting bench-top laboratory tests for daily process control strategy.
- Routine tasks of a typical workday – plant tours, sampling and data gathering, process monitoring, and general house-keeping.
- Determination of daily sludge wasting, based on solids inventory, mixed liquor concentrations, and desired mean cell residence time.
- Initial impressions and eye-opening experiences of a new operator.

### **Collection System Math Skills Review**

This three-hour training class will help attendees refresh or develop collection system related math skills utilizing problem-solving demonstrations and group participation practice questions followed by guided solution development.

Topics covered include:

- Slopes
- Loading/Population Equivalents
- Detention Times
- Flow Rates
- Velocity
- Pump station calibration



## **Clarifiers and Sedimentation, with math**

Concepts covered:

- Characteristics of solids in wastewater and the science of settling solids
- Clarifier configurations and common components
- Process variables and their control
- Safety awareness and general clarifier maintenance tips
- Math topics presented: volumes, detention times, surface overflow rates, process control parameters

## **Wastewater Operator Math Skills Basic Review**

This three-hour training class will help attendees refresh or develop wastewater treatment related basic math skills utilizing problem-solving demonstrations and group participation practice questions followed by guided solution development.

Topics covered include:

- Review basic math concepts
- Detention Times
- Percent Removal
- Pounds/Loading
- Pumping Rates
- Weir Overflow Rates
- Surface Settling Rates



### **Activated Sludge Math Skills Review**

This three-hour training class will help attendees refresh or develop activated sludge related math skills utilizing problem-solving demonstrations and group participation practice questions followed by guided solution development.

Topics covered include:

- Review basic math concepts
- Aeration basin organic loading
- F/M Ratios
- Solids Retention Times
- Wasting Rates
- Trickling Filter Organic/Hydraulic Loading
- RBC Organic/Hydraulic Loading

### **Stormwater Management; Training topics beyond the treatment plant**

Target Audience: New and experienced wastewater operators looking to expand their awareness of current issues that impact water quality and potentially affect treatment plant discharge permit limits.

General concepts covered - utilizing lecture, videos, and class exercises:

- Nationwide water quality management objectives and tools under the Clean Water Act.
- Water pollution threats from uncontrolled urban stormwater.
- The array of stormwater permits (municipal, industrial, construction).
- Innovative steps to address stormwater pollution.





### **Solids Processing Math Skills Review**

This three-hour training class will help attendees refresh or develop solids processing related math skills utilizing problem-solving demonstrations and group participation practice questions followed by guided solution development.

Topics covered include:

- Review basic math concepts
- Suspended and Percent Solids Determination and Loading
- Dewatering Calculations
- Gravity Thickener and Centrifuge Solids Loading
- Digester Gas Production Problems
- Volatile Acids-to-Alkalinity Ratios
- Lime Neutralization Problems
- Composting Percent Moisture Calculations

### **pH and Suspended Solids Benchtop Tests**

This three-hour training class will highlight the utilization of pH and suspended solids information for making operational decisions at a wastewater treatment plant; while emphasizing critical steps an operator takes to ensure proper sample collection, analyses, and documentation of results. One-hour will be devoted to the topic of pH and one hour will be for the topic of suspended solids analysis; total suspended solids (TSS) and volatile suspended solids (VSS). The remaining time will consist of demonstrating process control math word problems. Example calculations– based on actual analytical results - will be solved.

Topics covered include:

- Introduction to pH, what pH measurements mean and the difference between acidic and basic conditions.
- Discussion of sample representativeness and the difference between composite and grab sampling, utilization of proper sample containers and hold times, and meter calibration techniques.
- The role and usefulness of pH monitoring for making operational changes.
- Discussion of total and volatile suspended solids and how their determination can be utilized for process control decisions.
- How to prepare for TSS and VSS analyses, and utilization of drying oven, furnace, and analytical balance.
- Determination of actual TSS and VSS concentration and removal efficiency – based on real-world analytical data.



### **Developing Problem-Solving and Decision-Making Skills**

Utilizing information from Sacramento's Manage for Success, this three-hour training class will help attendees recognize problems and their need/opportunity for change; and take measures to solve the problem before it becomes larger and more difficult to control. It will highlight techniques for communication, information gathering, and analysis to support making choices when there are a range of potential alternatives, many appearing similar and each having consequences.

Topics covered include:

- Eight steps in the problem-solving process
- Analysis of the problem using a variety of techniques to gather as much information as possible about the problem and its causes.
- Using measurable criteria to evaluate the effectiveness of the solution to ensure that the problem is resolved. Identifying four decision levels (strategic, management, operational, and transactional), with examples of how each could be applied in a water/wastewater utility.
- Building support for a decision and overcoming possible resistance.
- Benefits and drawbacks of using groups and committees to make decisions

### **Grease Issues and Source Control**

This three-hour training class will help attendees refresh or develop knowledge and skills associated with the negative aspects of excess fats, oil, and grease in collection systems and wastewater treatment plants. The course will also offer preliminary steps that wastewater staff have typically employed when working with food-service and food-preparation establishments to decrease grease discharges.

Topics covered include:

- Relationship between grease discharges and sanitary sewer blockages and overflows
- Relative anticipated grease contributions from various types of food service establishments
- Typical internal and external grease separators
- Sewer Use Ordinance enhancements for grease controls
- Food Service Establishment BMPs
- Outreach Materials



### **Asset Management and Preventive Maintenance**

This three-hour training class will help attendees refresh or develop awareness and skills associated with the concepts of asset management and preventive maintenance. Key terminology and practices will be presented, and various guidance documents will be reviewed and shared.

Topics covered include:

- Preventive vs. Emergency Maintenance
- The purpose and use of asset management
- Maintaining Asset Inventories
- Level of Service Determination
- Establishing Consequences and Likelihood of Failure
- Managing and Maintaining Assets
- Asset Management Plans
- Resource Materials

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