

# AQUA NEXUS



Waterworks CPE  
Course Outline

---

---

# Course Overview

---

---

Aqua Nexus was founded with the intention of helping in all aspects of Water Facilities Operations. My first goal is to assist in the education and continuing education for all operators in a simple and convenient manner.

This course is designed to fulfill the 20 Continuing Professional Education credits required for license renewal. It includes 5 contact hours of Utility Management instruction required for the Virginia Class 1 and 2 licenses.

## Instructor Information

J. Evan Woods

[evan@aquanexus.org](mailto:evan@aquanexus.org)

(276) 451 – 9467

Questions or concerns should be directed to my email address provided above. For more urgent matters, please leave a detailed voice message or text.

## Course Outline

### Day 1

#### Course Introduction

#### Why Treat Water?

- Water Science
- Water Quality
- Source Waters
- Public Water Systems
- Regulatory Agencies

#### Pre-Treatment and Intake

- Types of Intakes
- Multi-barrier Approach
- Pre-treatment Methods
- Monitoring, Operation, Maintenance

#### Coagulation and Flocculation

Colloids  
Coagulant Chemistry  
What is Alkalinity?  
Mixers  
Flocculators  
Detention Time  
Chemical Controls  
Jar Testing  
Monitoring, Operation, Maintenance  
Enhanced Coagulation  
Ballasted Flocculation  
MATH: Detention Time

## Day 2

### Clarification

Types of Sedimentation Basins  
Zones of a Basin  
Baffle Walls  
Settling Path and Currents  
Tube and Plate Settlers  
Dissolved-Air Flotation  
Upflow Clarifiers  
Pulsators and Superpulsators  
Monitoring, Operation, Maintenance  
MATH: Weir Loading Rates  
Sludge Handling  
Inline and Direct Filtration  
MATH: Surface Loading Rates

### Filtration

Mechanisms of Filtration  
Methods of Filtration  
Filter Media  
Filter Anatomy and Underdrains  
MATH: UFRV Calculations  
Filter Backwashing  
Filter Troubleshooting  
Monitoring, Operation, Maintenance

Zeta Potential  
MATH: Filter Rise and Drop  
MATH: Filter Expansion

Day 3

#### Disinfection:

Water Safety  
Coliform Sampling  
Sanitation vs Disinfection vs Sterilization  
Methods of Sterilization  
Chlorine Disinfection  
MATH: Chlorine Dosage  
MATH: Chlorine Residuals  
MATH: Contact Time  
Chlorine Safety  
Chlorine Containers  
Liquid Chlorine  
Chlorination Points  
Breakpoint Chlorination  
Chloramination  
MATH: Feed Rates  
Other Disinfection Methods

#### Distribution

Mains and Pipes  
Tanks and Towers  
Meters  
Hydrants  
Valves  
Backflow Prevention  
Quality Testing  
Equipment  
Monitoring, Operation, Maintenance  
Public Relations  
Emergency Response  
MATH: Hydraulics

Day 4

## Laboratory Procedures

- Lab Manuals
- MATH: Unit Conversions
- Glassware and Equipment
- Titrations
- Concentrations
- MATH: Molar Mass
- GHS Pictogram Safety
- NFPA Safety Ratings
- Chemical Labeling
- Lab Testing Methods
- MATH: Alkalinity
- Biological Tests
- Sampling
- Lab Safety
- Chemical Storage

## Special Topics

- Fluoridation
- Iron and Manganese
- Water Stabilization
- Lime Softening
- Ion Exchange
- MATH: Percent Bypass
- Membrane Filtration
- Reverse Osmosis
- Electrodialysis
- Arsenic
- Heavy Equipment Operations
- Electrical Work
- Plumbing

Day 5

## Administration and Management

- SCADA
- Budgeting
- Staffing

- Certifications
- Chemical Shipments
- National Response Center
- Record Keeping
- Water Quality Reports
- Safety
- Security
- Emergency Response
- Cyber Security
- Media and Press
- Tours
- Future Planning

#### Excel: A Management Tool

- Excel Basics
- Navigating Excel
- Data Management
- How Excel is Useful
- Useful Shortcuts
- Basic Functions
- Practical Examples
- Pivot Tables

## Schedule

This course will be taught online via Microsoft Teams over the course of five (5) calendar days. Each day will consist of four hours of formal instruction with one 10-minute break in the middle, and one 30-minute break at the end. This is in accordance with Virginia regulations allowing 10 minutes of break for every 50 minutes of instruction.

The time which each day will start will be provided in promotional material prior to class start. Aqua Nexus offers classes in both the morning and the afternoon.

## Attendance Policy

All operators are required to attend 90% of the course to receive credit for the class and a CPE certificate.

Attendance will be recorded through Microsoft Teams. To ensure students do not leave the class unattended, focus questions will be given periodically throughout each day. A printout will be provided to each attendee prior to the start of the course with a number corresponding to each attendance question. As questions appear, you can note the correct answer on this printout or a blank sheet of paper which can be emailed to me at the end of each day OR the end of the course.

Sharing a device is acceptable (e.g. – two operators attending the class on the same computer at their facility), but I require an attendance printout or email for each individual be submitted to record individual attendance.

To maintain an appropriate learning environment, *attendees will be muted* throughout the course. Questions or comments can be made through the chat feature or during appropriate breaks. Video is optional.

Absences can be made up by completing course handouts for the days missed. Each handout covers two hours of class. *No more than two days can be recovered through course handouts.*

Unforeseeable emergencies lasting more than two days will be handled on a case-by-case basis. Please contact the instructor.

## CPE Certificate

Continuing Professional Education Certificates will be printed, signed, and mailed out no later than the Wednesday following the last day of the course OR no later than 3 business days following the receipt of proof of attendance or make-up worksheets.

Only attendees that have attended 90% (minimum of 18 contact hours) of the course will receive a CPE Certificate. If you missed more than 2 hours, please see the attendance policy on compensatory work.

## Refund Policy

Refunds must be requested five (5) calendar days prior to the first day of the course. Most courses will start on Monday, meaning refunds must be made on or before the Wednesday before the course.

Any questions, please contact the course instructor.