Yukon Water & Wastewater Operator Program

Math Review for Small Water Systems and Bulk Water Delivery

Course Outline

INSTRUCTOR: Lisa Kanary
DATE: May 1 – 2, 2019 (Wednesday – Thursday)
TIME: 8:30 am – 4:00 pm

Course Description

This 2 day (12 hour) course is designed to increase the participant's proficiency with the math components involved in small water systems operation and bulk water delivery.

This course will review the following: metric system; math basics (using a calculator, estimating, solving equations, scientific notation, order of operations); length; area; volume; flow rates; pressure; force; head; chlorine dosages; pumping rates; and detention time.

This course is targeted to Operators soon attending 'Basic Small Water Systems' or 'Bulk Water Delivery' (and possibly writing the related EOCP certification exam). This course is also relevant to anyone involved in the water & wastewater sector who wants to brush up on their math skills.

Course Pre-requisites

There are no specific pre-requisites for this course. However, Grade 12 (or equivalent) math skills are an asset. Math upgrades are available –contact us.

CEU Credit

This course is recognized by EOCP for 1.2 CEUs (core for SWS, WT, WD, WWT, WWC and SWWS certifications).

Course Duration

- 2 days
- 8:30 am to 4:00 pm each day
- 1 hour lunch break
- morning and afternoon break (15 minutes each)

Course Topics and Learning Outcomes

Upon successful completion of the course, the students will be able to:

Math Basics

- Use a DAL calculator to perform basic math operations
- Convert values between scientific notation and standard form
- Use the proper order of operations to solve a math problem
- Use a conversion factor to convert between units of measurement
- Solve equations with one unknown; including using a given formula to input variables and solve for an unknown (rearranging the equation if necessary)

The Metric System

- Recognize common metric units
- Convert among units of the metric system

Length

- Convert values to a common unit before solving a problem
- Using a given formula for length, solve an equation to find the unknown

Area

- Calculate the area of a rectangle or circle

Volume

- Calculate the volume of a rectangular tank and cylinder

Flow Rate

- Using a given formula for flow rate, solve to find the unknown

Pumping Rate

- Using a given formula for pumping rate, solve to find the unknown

Pressure, Force and Head

- Recognize the relationship between head and pressure, calculate the pressure based on the head.

Detention Time

- Using a given formula for detention time, solve to find the unknown

Pressure, Force and Head

- Recognize the relationship between head and pressure
- Using a given formula for head, solve to find the unknown

Chlorine Dosage/Feed Rate

- Using a given formula for chlorine dosage, solve to find the unknown
- Recognize the relationship between chlorine dosage, chlorine residual and demand and apply this to find an unknown value when the other two values are known
- Determine how much chlorine to use from a given source, based on the percentage of available chlorine in that substance

Delivery Method/Format

Instructional Method	Percentage of Class Time
Lecture	25%
Demonstration	25%
Hands-on /Q & A	50%

Material/Handouts (supplied)

- Student Binder: Yukon College, 2019. Math Review for Small Water Systems and Bulk Water Delivery; an elective – Workplace Essential Skills– course. Whitehorse, Yukon. *in collaboration with* GNWT Municipal and Community Affairs, School of Community Government (MACA).
- EOCP Course Completion and Evaluation Form.
  - every student needs to complete and return this form for any CEU allocation
- Calculators are provided but students are welcome to use their own.
  - please return

Course Requirements

Attendance and participation in class are required. It is the student's responsibility to attend all classes.

CEUs will be allocated based on attendance and course completion; Yukon College records will show a pass or fail result. If the participant doesn't attend the class, Yukon College records will show a "no show" result and no CEUs will be allocated.

Evaluation

There will be a quantifiable evaluation at the end of this course with a passing mark of 70%. Please note that this evaluation is for self-assessment purpose only.

Class Outline

Topic	Time Allocation
Morning 1	
The Metric System	1 hour
Math Basics • Order of Operations • Rounding and Estimating • Scientific Notation	1 hour
Break	15 min
Conversion Factors	1 hour
Afternoon 1	
Warm-up Review 1	.5 hour
Solving Equations	.75 hour
Length	.5 hour
Break	15 min
Area • Rectangles • Circles	.75 hour
Volume • Rectangular tanks • Cylinders	.50 hour
Morning 2	
Warm-up Review 2	.5 hour
Volume	.25 hour
Flow Rate	.75 hour
Break	15 min
Pumping Rate	.75 hour
Detention Time	.75 hour
Afternoon 2	
Warm-up Review 3	.5 hour
Pressure, Force and Head	.75 hour
Break	15 min
Chlorine Dosage/Feed Rate	1.25 hour
Review 4	.5 hour