



Yukon Water & Wastewater Operator Program

## **Small Wastewater Systems Mechanical & Non Mechanical Course Outline**

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<b>INSTRUCTOR:</b>	Graeme Faris
<b>DATE:</b>	January 23 – 26, 2018 (Tuesday – Friday)
<b>TIME:</b>	8:30 am – 4:00 pm
<b>LOCATION:</b>	Mayo

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### **Course Description**

This 3.5 day (20 hour) course is designed to prepare the participants to write their Environmental Operators Certification Program (EOCP) certification exam for Small Wastewater Systems (SWWS; required by Yukon Government Regulation). EOCP has 2 separate classifications for SWWS, therefore, there are 2 separate exams available depending on your system classification. They are SWWS Mechanical and SWWS Non Mechanical.

The main objective of the course is to provide knowledge to operators regarding the safe and reliable management of wastewater in order to safeguard the public and environment. The course specifically addresses treatment processes used in Yukon communities as well as processes that might be found in use at lodges and industrial camps.

### **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.

### **Continuing Education Units (CEUs)**

This course is accepted with EOCP as core for WWC - WWT - SWWS - for 2.00 CEUs.

### **Course Duration**

- 3.5 days
- 8:30 am to 4:00 pm each day, except last day from 8:30 am to 12:00 pm
- 1 hour lunch break
- morning and afternoon break (15 minutes each)



## **Learning Outcomes**

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

- Understand how the various components of a sewerage system interact to convey wastewater from homes and businesses to a wastewater treatment facility for treatment prior to return of the treated water to the environment.
- Understand how material removed from the wastewater is treated so that it too may be beneficially reused.

## **Course Topics**

### Introduction

- Housekeeping
- Instructor Introduction
- Operator Introductions
- EOCP Certification and Renewal

### Introduction to Wastewater Systems

- Sources of Wastewater
- Impact of Wastewater
- The Spread of Disease
- Other Water Quality Considerations
- The Solution
- Responsibilities

### Characteristics of Wastewater

- What is Wastewater
- Physical Characteristics
- Chemical Characteristics
- Biological Characteristics

### Wastewater Collection Systems

- Functions of a Collection System
- Types of Collection Systems
- Storm Sewers
- Lift Stations
- Operation & Maintenance
- Inspection of Manholes
- Inspection of Lines
- Cleaning Methods
- Lift Station Inspection



## Wastewater Treatment Systems

- Introduction
- Preliminary Treatment
- Primary Treatment
- Secondary Biological Treatment
- Activated Sludge
- Secondary Clarifies
- Ponds or Lagoons
- Flow Measurements

## Sludge Treatment and Disposal

- Introduction
- Sources & Types of Sludge
- Solids Conditioning and Dewatering
- Sludge Disposal

## Disinfection

- Methods of Disinfection
- Chlorine Properties and Chemistry
- Safety Equipment
- Hypochlorite Systems
- Operational Considerations
- Dechlorination
- Lime Application

## Wastewater Laboratory

- Lab Equipment
- Basic Laboratory Techniques
- Laboratory Safety
- Sampling
- Process Control Testing
- QA/QC
- Record Keeping

## Pumping Systems

- Basic Hydraulic Terms and Concepts
- Pumping Hydraulics
- Pumping System Uses
- Hydraulic System
- Centrifugal Pumps Configuration
- End-Suction Centrifugal Pump Components
- Pneumatic Ejector
- Air Lift Pumps



- Positive Displacement Pumps
- Electrical Basics
- Measurements of Electricity
- Types of Circuits
- Horsepower
- Electromagnetism
- Control Circuit
- Maintenance Considerations

### Safety

- Responsibility
- Safety Program
- Major Safety Concerns
- Confined Space
- Electrical Measurements
- Lockout/Tagout
- Hazardous Material Communication
- Traffic Control
- Competent Person/Shoring
- General Safety
- First Aid
- General Hygiene
- Waterborne Pathogens
- Fire Safety

### Management Considerations

- Application of Management to Utilities
- Organizational, Planning, Operations, & Financial Management

### Math

- Abbreviations
- Metric System
- Common Conversions
- Math Equations
- Perimeter & Circumference Calculations
- Area Calculations
- Volume Calculations
- Working with Percent
- Calculating Pressure and Head
- Determining Flow
- Detention Calculations
- Ratio and Proportion Calculations



### **Material/Handouts (supplied)**

- Student Binder: Yukon College, 2018. Small Wastewater Systems Mechanical & Non Mechanical; a core –EOCP Exam Preparation– course. Whitehorse, Yukon.
- Reference Manual: Office of Water Programs, 2012. Small Wastewater System Operation and Maintenance, Volume I; a field study training program. 2<sup>nd</sup> Edition. Sacramento, CA. Office of Water Programs, 2012. Small Wastewater System Operation and Maintenance, Volume II; a field study training program. 2<sup>nd</sup> Edition. Sacramento, CA.
- 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%. If anyone fails this evaluation, arrangements can be made for a re-assessment. Please note that this evaluation is for self-assessment purpose only.

**The final evaluation for this course is NOT an EOCP certification exam. To challenge a certification exam, register separately with EOCP at least 3 weeks in advance: 1-866-552-3627 or [crm.eocp.ca](http://crm.eocp.ca).**



### **Appropriate Language**

In all areas of the college environment, students are responsible for showing respect for others. Swearing, or language that is discriminatory or derogatory in relation to race, sex, ethnic background, religious beliefs, age, and physical condition is not appropriate.

### **Electronic Devices**

In order to be successful in classes and minimize distractions for others, cell phones, iPods, and other electronic devices must be turned off while students are in class. In an emergency situation, the instructor may give a student permission to use a cell phone or pager.

### **Academic and Student Conduct**

Information on academic standing and student rights and responsibilities can be found in the current Academic Regulations that are posted on the Student Services/Admissions & Registrations web page.

### **Plagiarism**

Plagiarism is a serious academic offence. Plagiarism occurs when students present the words of someone else as their own. Plagiarism can be the deliberate use of a whole piece of another person's writing, but more frequently it occurs when students fail to acknowledge and document sources from which they have taken material. Whenever the words, research or ideas of others are directly quoted or paraphrased, they must be documented according to an accepted manuscript style (e.g., APA, CSE, MLA, etc.). Resubmitting a paper which has previously received credit is also considered plagiarism. Students who plagiarize material for assignments will receive a mark of zero (F) on the assignment and may fail the course. Plagiarism may also result in dismissal from a program of study or the College.

### **Academic Accommodation**

Reasonable accommodations are available for students requiring an academic accommodation to fully participate in this class. These accommodations are available for students with a documented disability, chronic condition or any other grounds specified in section 8.0 of the Yukon College Academic Regulations (available on the Yukon College website). It is the student's responsibility to seek these accommodations. If a student requires an academic accommodation, he/she should contact the Learning Assistance Centre (LAC) at (867) 668-8785 or [lassist@yukoncollege.yk.ca](mailto:lassist@yukoncollege.yk.ca).



## **Class Outline**

### **Day 1**

8:30 am to 9:00 am: Introduction  
9:00 am to 10:00 am: Introduction to Wastewater  
10:00am to 10:15 am: *Health break*  
10:15 am to 12:00 pm: Characteristics of Wastewater  
12:00 pm to 1:00 pm: *Lunch*  
1:00 pm to 2:15 pm: Characteristics of Wastewater (cont.....)  
2:15 pm to 2:30 pm: *Health break*  
2:30 pm to 4:00 pm: Wastewater Collection Systems

### **Day 2**

8:30 am to 9:30 am: Wastewater Collection Systems (cont.....)  
9:30am to 10:00 am: Wastewater Treatment Systems  
10:00am to 10:15 am: *Health break*  
10:15 am to 12:00 pm: Wastewater Treatment Systems (cont.....)  
12:00 pm to 1:00 pm: *Lunch*  
1:00 pm to 2:00 pm: Sludge Treatment and Disposal  
2:00 pm to 2:15 pm: Disinfection  
2:15 pm to 2:30 pm: *Health break*  
2:30 pm to 4:00 pm: Disinfection (cont.....)

### **Day 3**

8:30 am to 10:00 am: Wastewater Laboratory  
10:00am to 10:15 am: *Health break*  
10:15 am to 12:00 pm: Pumping Systems  
12:00 pm to 1:00 pm: *Lunch*  
1:00 pm to 2:15 pm: Safety  
2:15 pm to 2:30 pm: *Health break*  
2:30 pm to 3:15 pm: Management Considerations  
3:15 pm to 4:00 pm: Math

### **Day 4 (1/2 day)**

8:30 am to 10:00 am: Math (cont.....)  
10:00am to 10:15 am: *Health break*  
10:15 am to 11:30 am: Math (cont.....)