

Water Treatment and Distribution System Operations

Section B.88
9/22/2020

Certificate (4135)

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PROGRAM OVERVIEW

This part-time online certificate program provides learners with the knowledge and skills required to work in the water treatment operations industry, an industry which plays a critical role in protecting public health and the natural environment through the responsible treatment of drinking water. To enter the operating profession, individuals must become certified. Graduates of this program will have sufficient knowledge to write various level certification examinations. Courses within this program may also be of interest to water operators who are seeking director-approved continuing education units (CEUS) that are recognized by the Ontario Water Wastewater Certification Office (OWWCO).

Note: learners interested in obtaining Class 1 certification must complete the Entry-Level Course (ELC) for Drinking Water Operators which is a mandatory course, developed by the Ministry of Environment, Conservation and Parks, for all drinking water operators. The ELC course is not included in this certificate program but can be completed via the Walkerton Clean Water Centre (<https://wcwc.ca/>).

Learners must complete six compulsory courses listed below

- OEL868 Applied Mathematics for Water and Wastewater Operations
- OEL859 Drinking Water Operator-in-Training Certification Preparation
- OEL861 Water Treatment Certification Level I and II
- OEL869 Applied Hydraulics for Water and Wastewater Operations
- OEL870 Water Distribution Certification Level I & II
- OEL866 Water Treatment Certification Level III & IV

PROGRAM OUTCOMES

Graduates will be able to:

1. Formulate unit conversions and area and volume calculations of various devices and pipes in water and wastewater systems.
2. Differentiate between SI and USC systems of measurement; mass and weight terms.
3. Calculate concentration, feed solution rate, amount of liquid chemical required to prepare solutions of given strength, molarity, normality and organic loading.
4. Apply the principles of hydraulics to find flow rates, pressures and pumping head and power in water flow systems.
5. Calculate the operating efficiency of pump and determine its performance; determine pump power for given operating conditions.
6. Operate pumps, motors, valves and other commonly used devices in water systems.
7. Identify safety and water legislation.
8. Identify the principles and importance of disinfection of water in relation to parameters of water quality and sampling requirements for compliance and process control.
9. Describe the main processes and operations employed in water treatment and explain the processes and equipment employed in water distribution systems.
10. Describe the principle of coagulation and flocculation and factors affecting these processes.
11. Explain sedimentation and understand the importance of filtration and basic components.

12. Describe various methods of disinfecting water and familiarization with miscellaneous methods including, softening and iron removal.

ADMISSIONS

MINIMUM ACADEMIC REQUIREMENTS

- Ontario Secondary School Diploma with Grade 12 U or C Math (e.g. MCT4C).
- Students must successfully complete all courses within 7 years of acceptance into the program in order to graduate.
- Students must obtain a G.P.A. of 2.0 or 60% or higher to obtain this certificate.

CAREER PATHS

This certificate is intended for those wanting to work in the water industry as well and for current water operators in the water industry who are seeking professional development opportunities. This certificate can open doors that will lead to a variety of careers in the drinking water industry and those completing it will have potential to be a vital member of the water operations team.

Employment areas include: water treatment operator, water distribution operator, field technician, environmental inspector, sampling technician, and municipal inspector.

For more details on related occupations, job market information and career opportunities, see the Government of Canada website: <http://www.jobbank.gc.ca>.

PROGRAM OF STUDY

SEMESTER 1

OEL859-4 Drinking Water Operator-in-Training Certification Prep
OEL861-4 Water Treatment Certification Level I & II
OEL866-4 Water Treatment Certification Level III & IV
OEL868-4 Applied Math for Water and Wastewater Operations
OEL869-4 Applied Hydraulics for Water and Wastewater Operations
OEL870-4 Water Distribution Certification Level I & II

Course Descriptions

Semester 1

Drinking Water Operator-in-Training Certification Prep (OEL859) (4 credits)

This course is intended to provide you with basics as related to the operation of water treatment and distribution systems. The basic concepts in science and math are discussed first. This is covered under topics including: conversions, math, chemistry, hydraulics, electricity. It will be followed by topics on support systems mainly pertaining to pumps and motors and processes in water treatment and water distribution. At the end of the course you will be fully prepared to write the OIT certification examination of the Ontario Ministry of Environment. (Director Approved CEU 6.0, Course Id:11896)

Water Treatment Certification Level I & II (OEL861) (4 credits)

In this course, students review the material related to basic sciences, math and hydraulics and support systems as done in earlier courses. After review, students are presented with knowledge and practices, theories and applications relevant to sources of water supply, treatment processes, quality parameters and plant operations.

Water Treatment Certification Level III & IV (OEL866) (4 credits)

The purpose of this course is to present advanced knowledge and practices, theories, and applications relevant to wastewater flows and characteristics, treatment processes, and plant operations. Topics covered in Wastewater Treatment Certification Level I & II are covered in more detail and depth. This will prepare students to write the higher level certification examinations.

Applied Math for Water and Wastewater Operations (OEL868) (4 credits)

This course is intended to provide the students with math basics as applicable to the operation of water and wastewater systems. The basic concepts in unit conversions, area, volume calculations, and density are discussed first. Based on this, students are introduced to the use of math to understand chemistry math under the topics of concentration, feed solutions, liquid chemicals, molarity, normality and organic loading. The main objective of the course is to lay a sound foundation in math and chemistry concepts as required to understand and apply to the operation of water and wastewater systems. This will allow students to get ready for the math component in various levels of operator certification examinations of the Ministry of the Environment, Conservation and Parks.

Applied Hydraulics for Water and Wastewater Operations (OEL869) (4 credits)

This course is intended to provide students with basics of hydraulics as applicable to the operation of water and wastewater systems. The basic concepts in flow, detention time, pressure, energy, head and power are discussed first. Based on this, students are introduced to the use of continuity and energy concepts. The application of continuity and energy equation is illustrated by numerical problems from the areas of water and wastewater. The main objective of the course is to lay a sound foundation in hydraulics concepts as required to understand and apply to the operation of water and wastewater systems. This will help prepare students for the hydraulic component in various levels of operator certification examinations of the Ministry of the Environment, Conservation and Parks.

Water Distribution Certification Level I & II (OEL870) (4 credits)

This course is intended to provide participants with an understanding of key concepts related to the operation of distribution water systems. Basic technical concepts related to drinking water distribution will be introduced such as unit conversions, graph reading and preparation, water chemistry, hydraulics and electricity. Other topics include sources of water supply, components of water distribution system, water quality monitoring, water wells and requirements for quality monitoring.

Note: This course is not a replacement for the Entry Level Course (ELC) course, offered by the Walkerton Clean Water Centre, which is required to obtain the Class 1 certificate.