# Environmental Technology
## Program Guide

### Wastewater Certificate Requirements

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Credits</th>
<th>Spring Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENV 102 Safety Orientation (OSHA-10)</td>
<td>1</td>
<td>ENV 108 Wastewater Treatment Plant O&amp;M II</td>
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<tr>
<td>ENV 105 Wastewater Treatment Plant O&amp;M I</td>
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<td>ENV 109 Water Quality</td>
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<td>ENV 111 Water &amp; Wastewater Disinfection</td>
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<td>ENV 120 Internship</td>
<td>3</td>
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<tr>
<td>ENV 135 Management of Municipal Utilities</td>
<td>3</td>
<td>ENV 157 Collection Systems O&amp;M II</td>
<td>4</td>
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<tr>
<td>ENV 155 Collection Systems O&amp;M I</td>
<td>4</td>
<td>ENV 163 Water &amp; Wastewater Math</td>
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<td><strong>Semester Total</strong></td>
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### Potable Water Certificate Requirements

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<th>Spring Semester</th>
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<td>ENV 117 Potable Water Systems O&amp;M II</td>
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<td>ENV 102 Safety Orientation (OSHA-10)</td>
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<td>ENV 120 Internship</td>
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<td>ENV 103 Potable Water Sources</td>
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<td>ENV 135 Management of Municipal Utilities</td>
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<td>ENV 115 Potable Water Systems O&amp;M I</td>
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<td>ENV 165 Potable Water Distribution</td>
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<td>ENV 163 Water &amp; Wastewater Math</td>
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<td><strong>Semester Total</strong></td>
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<tr>
<td><strong>Total Technical Education Credits</strong></td>
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### Associate of Applied Science Degree Requirements

**Required Technical Courses**
- Certificate in Wastewater and Certificate in Potable Water (10 credit hours overlap) **49**

**General Education (course numbers 100 or above)**
- Verbal Communications **3**
- Written Communications **3**
- Mathematics, and/or Computer Science **6**
- Ethics in the Workplace **3**

**Technical Certificates** **49**
- **General Education** **15**
- **Total AAS Credits** **64**

### Admission Criteria

- Successfully complete applicable preadmission testing and/or advising

All students completing this program will have in-depth knowledge of all chemical and biological processes commonly used in potable water and wastewater treatment facilities. Students learn how treatment processes and operational changes made to these treatment processes can impact public health and the environment. They will understand why and how certain treatment processes are chosen and implemented to meet the myriad federal regulations that apply to potable water and wastewater treatment facilities. Students learn the legal and ethical responsibilities incumbent upon certified operators of potable water or wastewater treatment facilities.

If a student entering this program has no previous experience working in a potable water or wastewater treatment facility, the program will give the student the knowledge necessary to
perform all the duties of an entry level employee. In addition, the student will have the chemistry and mathematics skills comparable to an employee that has worked for at least two years in a potable water or wastewater treatment facility. If a student has previous experience or is currently working in a potable water or wastewater treatment facility, this program will prepare the student to advance within their profession.

**Career Opportunities:** Water/Wastewater Treatment Technician, Utilities Manager.

**Course Descriptions**

**ENV 101 Water Treatment Chemistry, 3 credits.**
This course provides students with the basic information related to the underlying chemistry commonly encountered in the treatment of water for potable use; includes treatment at the water source, pretreatment, coagulation and flocculation, sedimentation, filtration, disinfection, fluoridation, iron and manganese control, softening and membrane processes. Basic chemistry concepts, common chemical compounds encountered in potable water treatment processes, safe storage and handling of commonly encountered treatment chemicals are explained. Personal protective equipment selection, operation and maintenance related to chemical treatment at a water treatment plant are covered in detail.

**ENV 102 Safety Orientation (OSHA 10), 1 credit.**
This course provides students with an understanding of current safety regulations, established safety practices, hazard recognition, and the impact of behavior and environment on injury prevention.

**ENV 103 Potable Water Sources, 3 credits.**
This course covers basic information related to the various sources of water used by water treatment plants to provide potable water. Included are: groundwater sources, types of wells and their construction, operation, maintenance and abandonment, aquifer performance, surface water sources, source consideration and operational problems, emergency and alternative water sources, water use, water conservation, water rights, water source protection through wellhead protection programs and watershed protection, water quality characteristics, and the public health significance of water quality.

**ENV 105 Wastewater Treatment Plant Operation and Maintenance, 4 credits.**
This course provides students with the basic information related to the operation and maintenance of wastewater treatment facilities including: the characteristics of wastewater and its effect on the environment, state and federal regulations, safety hazard identification and avoidance, operation and maintenance of pumps, motors, and other plant equipment, wastewater sampling and testing, basics of flow measurement, basic information and preliminary and primary treatment processes, and basic and applied math.

**ENV 108 Wastewater Treatment Plant, 4 credits. (Prerequisite: ENV 105)**
This course provides students with the basic information related to the operation and maintenance of wastewater treatment facilities including fixed reactors (trickling filters and rotating biological contactors), the activated sludge process, operation and maintenance of pumps, motors and other plant equipment, and basic and applied math.

**ENV 109 Water Quality, 3 credits.**
This course provides students an understanding of the importance of Public Water Supply Regulations and how those regulations affect both water operators and those who drink the water produced by any public water supplier. The importance of water contaminants, both microbiological and chemical is covered. Students learn how to select a sample site for microbiological sample collection as well as how to properly collect those samples. The course
provides students with a basic understanding of the major types of chemical contaminants and the EPA’s Health Effect Categories applied to Organic Chemicals. Student also acquire tools for communicating directly with customers who have complaints/inquiries about the drinking water quality they receive in their homes.

**ENV 111 Water and Wastewater Disinfection, 3 credits.**
This course provides students with the basic information related to the selection and use of disinfections systems for both potable and wastewater treatment systems, including chlorination, chloramination, ozonation and novel methods being developed.

**ENV 115 Potable Water Systems Operations and Maintenance I, 4 credits.**
This course provides the basic information related to the various potable water treatment plant processes and the underlying chemistry commonly encountered in the treatment of ground water for potable use. This includes: treatment at the water source, pretreatment, filtration, disinfection, fluoridation, iron and manganese control, softening and membrane processes. The math includes figuring dosages for chlorination, treatment chemicals, dilution calculations, scaling and corrosion calculations, recordkeeping and reporting.

**ENV 117 Potable Water Systems Operations and Maintenance II, 4 credits. (Prerequisite: ENV 115)**
This course provides the basic information related to the various potable water treatment plant processes and the underlying chemistry in the treatment of surface water for potable use. Treatment at the water source, pretreatment, coagulation and flocculation, sedimentation, filtration, disinfection, fluoridation, and membrane processes are included. The math includes figuring dosages for chlorination, treatment chemicals, dilution calculations, scaling and corrosion calculations, recordkeeping and reporting.

**ENV 120 Internship, 3 credits. (Prerequisites: ENV 105, ENV 109)**
The internship provides opportunities to learn how real world operations differ from classroom and textbook instruction situations. The student/intern is expected to perform all the duties of an entry level employee. Student/interns receive time credit for only operational or plant maintenance work experience that their work supervisor approves on the daily time log. The intern also completes a paper about their internship experience.

**ENV 135 Management of Municipal Utilities, 3 credits.**
This course provides students with the basic information related to management of municipal utilities including: leadership skills, budget creation and management, time management techniques, departmental organization, selection and orientation and training of employees, direction and introduction of change to the organization, how to communicate to employees and other departments as well as to outside customers.

**ENV 155 Collection Systems Operations and Maintenance, 4 credits.**
This course provides participating students basic information concerning the operation and maintenance of wastewater collection system facilities including: the duties of the wastewater collection system operator, the importance of proper collection system operation and maintenance, the components of a wastewater collection system, the identification and avoidance of safety hazards, how to identify the sources of wastewater and how to calculate the flow rates and quantity of flow, how to inspect new and existing sewers for proper operation and maintenance, the importance of proper record keeping and mapping, the need for regular inspection and testing for system integrity, the importance of controlling infiltration and illegal connections to the sewer system, how to calculate basic measurements such as volumes, velocities, flow rates and chemical feed rates.
ENV 157 Wastewater Collection Systems Operation and Maintenance II, 4 credits.
(Prerequisite: ENV 155)
This course covers basic information concerning the operation and maintenance of wastewater collection system facilities including: cleaning of sewers, identification and clearing of sewer clearing/cleaning equipment, odor and corrosion control, safe methods of excavation and repair of sewer lines, inspection of sewer construction, location selection requirements, typical components that make up a life station, supervisory control systems, maintenance of equipment, troubleshooting lift station, supervisory control systems, maintenance of equipment, troubleshooting lift station systems and work hazards associated with all components of waste water collection systems including lift stations, essential and accurate recordkeeping methods and requirements.

ENV 163 Water and Wastewater Math, 3 credits.
This course covers: specific mathematic calculations necessary for proper monitoring of both water and wastewater treatment plant process effectiveness, the proficiency of these calculations required for producing the accurate information that is entered on all regulatory reporting forms, producing accurate operational data for troubleshooting process deficiencies, the ability to control various inventories and processes.

ENV 165 Potable Water Distribution Systems, 3 credits.
This course covers basic information related to the various components of a potable water distribution system and the transmission of that water through the distribution system, including water storage systems, pumps and pumping stations, piping systems and their materials of manufacture; control valving; system security; water main installation, excavation, pressure testing, flushing and disinfection of water mains; distribution system hydraulics; water services and metering; fire hydrant installation, maintenance and operation; information management related to the distribution system; backflow prevention and cross-connection control and public relations.