

# Online Learning Academy

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## 8 hr Overview

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### Course Overview

From the brand-new service technician, to the seasoned local inspector, there is something for everyone in the NOWRA A to Z Overview course. Participants will gain an understanding of the varying contaminants in wastewater and how to determine wastewater loading for treatment. They will also learn the differences between a variety of onsite technologies; recognize important site considerations and distribution methods; and understand effective management techniques for decentralized systems.

This national training course contains various formats including audio guided PowerPoint presentations, videos, technical documents and internet links to associated materials. The students set their own pace for training and can either take the 8-hour overview class in its entirety, or break it into smaller sections based on how many hours they need or their interest. The hours assigned for each section are based on the time it took others who piloted the material to take the course, and the theoretical time it should take to go through the materials. Even though everyone learns at a different pace, it should always take participants the amount of credit hours offered, and may take longer\*.

Students can choose an A to Z course from these four different options:

1. Overview course – 8 hours (contains sections 2, 3, and 4 below)
2. Introduction to Onsite and Wastewater course - 3 hours
  - a. Treatment Overview - 1.5 hours
  - b. Wastewater Characteristics - 1.5 hours
3. Soil Evaluation, Treatment & Dispersal course - 4 hours
  - a. Soil and Site Evaluation – 1.5 hours
  - b. Soil Based Gravity and Pressure Distribution – 1.5 hours
  - c. Pumps and Controls – 1 hour
4. Operation and Maintenance course - 1 hour

## Course Agenda

The details of each module are outlined below.

### Module 1: Treatment Overview (1.5 hours)

Upon completion of this section, students will be able to identify why wastewater treatment is needed, basic wastewater treatment components and how wastewater is treated.

1. Presentation: *Course Introduction, Treatment and Decentralized Overview* (28 minutes), Dr. Sara Heger. Provides learners a course overview, an overview of treatment with septic systems, the advantages of decentralized systems and the numbers of decentralized systems on a national level.
2. Reading: *Septic System Glossary* (94 pages), The Consortium of Institutes for Decentralized Wastewater Treatment. Provided for learners to assist with acronyms or terminology during the course.
3. Video: *Overview of Septic Systems* (26 min), Texas A&M. Provides an overview of how septic systems work and the technologies available for managing residential wastewater.
4. Presentation: *Septic System Options* (18 minutes), Dr. Sara Heger. Presentation provides the basics of onsite wastewater treatment: source, collection, pretreatment and soil treatment.
5. Website Review: *Septic System Overview*, EPA. Learners review the EPA website for national information on septic systems including case studies and guidance, policy and regulations.
6. Assessment: Nine questions with 75% passing rate required.

### Module 2: Wastewater Characteristics (1.5 hours)

Upon completion of this section, students will be able to identify why wastewater treatment is needed, basic wastewater treatment components, and how wastewater is treated.

1. Presentation: *Hydraulic Determinations* (20 minutes), Dr. Sara Heger. Provides learners with information on determining the flow from domestic and commercial facilities.
2. Reading: *EPA Design Manual* (367 pages), EPA. Provided for learners as a reference for national information about wastewater characteristics.
3. Reading: *Pipeline Basic Wastewater Characteristics* (7 pages), Small Flows Clearinghouse. Provides information on wastewater characteristics.
4. Assessment #1 - Wastewater Characteristics: Five questions with 75% passing rate required.
5. Presentation: *Contaminant Treatment* (20 minutes), Dr. Sara Heger. Presentation discusses the various contaminants in black and graywater and how septic systems treat them.
6. Reading: *The Attenuation of Selected Contaminants of Emerging Concern in Shallow-Placed Soil Absorption Systems* (17 pages), George Heufelder. Provides information on the removal of contaminants of emerging concern including hormones, pharmaceuticals, and personal care products in septic systems.
7. Assessment #2 - Contaminant Treatment: Four questions with 75% passing rate required.

### Module 3: Soil and Site Evaluation (1.5 hours)

Upon completion of this section, students will be able to understand how soils treat wastewater, identify key soil properties and components included in a site evaluation, and describe soil and linear loading rates.

1. Presentation: *Soil's Role in Wastewater Treatment* (11 minutes), Dr. Sara Heger. Provides learners with information on determining the flow from domestic and commercial facilities.
2. Video: *Water Movement in Soils* (3 minutes), NRCS. Explains how and why soils transmit water at different rates.
3. Video: *Soil and Soil Dynamics* (10 minutes), Bozeman Science. Explains how soils are formed and classified.
4. Assessment #1 - Soil Intro: Four questions with 75% passing rate required.
5. Presentation: *Soil Properties* (25 minutes), Dr. Sara Heger. Presentation discusses key aspects of a site evaluation including slope and drainage, soil horizons, texture, structure, color and limiting condition identification.
6. Website Review: *Soil Survey*, USDA. Learners review USDA and look up information on soil surveys and soils in your area.
7. Presentation: *Soil Treatment Design* (20 minutes), Dr. Sara Heger. Presentation discusses how the soil and site investigation is used to size the soil treatment area.
8. Reading: Factsheet: *Septic Tank-Soil Absorption Systems* (8 pages), EPA. *Onsite Wastewater Treatment Systems Manual*. Describes to learners the distribution of effluent wastewater into a subsurface soil absorption area or drainfield.
9. Assessment #2 - Soil Properties and Treatment: Five questions with 75% passing rate required.

### Module 4: Soil Based Gravity and Pressure Distribution (1.5 hours)

Upon completion of this section, students will be able to describe the differences between gravity and pressurized systems, discuss the role of the biomat and identify the components utilized in gravity and pressurized systems.

1. Presentation: *Distribution Overview* (8 minutes), Dr. Sara Heger. Provides learners with information on the types and goals of distribution and compares gravity versus pressure.
2. Presentation: *Gravity Distribution* (13 minutes), Dr. Sara Heger. Provides learners with information how gravity flow works and the different types and management.
3. Video: *Distribution Box in Operation* (1 minute), Bayer Risse. Shows how a distribution box delivers effluent to the soil.
4. Assessment #1 - General Distribution and Gravity: Five questions with 75% passing rate required.
5. Presentation: *Pressure Distribution* (16 minutes), Dr. Sara Heger. Presentation discusses pressure distribution applications, benefits, design, and management.
6. Reading: Factsheet: *Low Pressure Pipe System* (2 pages), Small Flows Clearinghouse. Information provided on low-pressure pipe (LPP) systems.
7. Presentation: *Drip Distribution* (6 minutes), Dr. Sara Heger. Presentation provides basics on drip application and design.
8. Video: *Drip Distribution* (5 minute), Texas A&M. Video provides an overview of drip distribution
9. Assessment #2- Pressure and Drip Distribution: Five questions with 75% passing rate required.

### Module 5: Pumps and Controls (1 hour)

Upon completion of this section, students will be able to identify the types of pumps utilized in wastewater treatment and what is needed to size a pump and discuss basic hydraulic properties of pumps.

1. Presentation: *Overview of Pumps* (9 minutes), Dr. Sara Heger. Provides learners with information on the basics of pump selection including the purpose, application, and location.
2. Reading: *Effluent Pumps for Onsite Wastewater Treatment* (28 minutes), Sump and Sewage Pump Manufacturers Association. Provides learners with information on applications and sizing of effluent pumps.
3. Video: *Turbine Pump vs Centrifugal Pump*, 2 minutes, Roth Pump Company. Shows the differences between the two common types of pumps in distribution of effluent in septic systems.
4. Assessment #1 - Pumps Overview: Five questions with 75% passing rate required.
5. Presentation: *Pump Controls* (13 minutes), Dr. Sara Heger. Presentation discusses the different types of controls for pumps and overall system management including a discussion on demand versus time dosing.
6. Video: *Demand Dosed Systems* (10 minute), SJE-Rhombus. Video provides an overview of demand dosing for onsite systems.
7. Video: *Time Dosed Systems* (4 minute), SJE-Rhombus. Video provides an overview of time dose control panels for onsite systems.
8. Presentation: *Control Panels* (13 minutes), Dr. Sara Heger. Presentation discusses the range in types of panels, their capabilities, and related installation issues.
9. Assessment #2: Panel and Controls: Four questions with 75% passing rate required.

### Module 6: Operation and Maintenance (1 hours)

Upon completion of this section, students will be able to understand why operation and maintenance (O&M) is needed, identify the responsibilities of a service provider and basic O&M requirements for septic systems.

1. Presentation: *O&M Purpose and Frequency* (5 minutes), Dr. Sara Heger. Provides learners with information on the types and goals of distribution and compares gravity versus pressure and discusses why and how often systems should be maintained.
2. Reading: *Management Guidelines* (57 pages), EPA. Provides learners with information on the EPA Guidelines for Management of Onsite/Decentralized Wastewater Systems to raise the level of performance of onsite/ decentralized wastewater systems through improved management programs.
3. Video: *Homeowner Videos*, University of Minnesota. Videos provide short and long videos describing septic system functions, use, and maintenance geared towards property owners for future reference of learners.
4. Video: *O&M Technology Videos*, Iowa Onsite Wastewater Association. Videos provides required O&M for various components and technologies for future reference of learners.
5. Presentation: *Conventional System O&M* (36 minutes), Dr. Sara Heger. Presentation discusses the basic operation and maintenance including flow determination, septic tank and effluent screening cleaning, pumps and soil treatment systems.
6. Assessment: Five questions with 75% passing rate required.

## **Assessments**

Within each module there is a quiz the participant must pass with a score of >75% to obtain credit. If the student passes, they may move on. If they do not pass, they have the opportunity to review materials and take the quiz as many times as they need to pass. The presentations must be watched start to finish (no fast forwarding) and the student must complete the sections in sequential order.

## **Course Completion**

Upon completion, the student is provided a certificate of completion (example attached).

## **Course Instructor**

Dr. Sara Heger is an engineer, researcher and instructor in the Onsite Sewage Treatment Program in the Water Resources Center and is an Adjunct Assistant Professor in the Bioproducts and Biosystems Engineering Department at the University of Minnesota (UMN). Since 1998, she has been providing education and technical assistance to homeowners, small communities, onsite professionals and local units of government regarding onsite wastewater treatment. She leads the research program at the UMN, currently serving as the principle investigator on grants for evaluating rest stops, wastewater reuse, and the impact of water softeners. She presents at many local and national training events regarding the design, installation and management of septic systems and related research. Sara is a board member and Education Chair of the National Onsite Wastewater Recycling Association and has served on the board of the Minnesota Onsite Wastewater Association. Sara serves on the NSF International Committee on Wastewater Treatment Systems. She is also the chair of the Minnesota State Advisory Committee on Decentralized Systems. She has BS in Biosystems & Agricultural Engineering and a MS and a PhD in Water Resource Science.

# CERTIFICATE OF COMPLETION



## Sample Course

*Presented to:*

Johnny Certificate

  
Eric Casey, Executive Director, NOWRA

**Date:**

December 5, 2016

**Hours/CEUs:**

10 Units, 25 Credits

**NOWRA**  
National Onsite Wastewater  
Recycling Association