# CNST-1640: UTILITY LOCATING AND TRAFFIC FLAGGING

## Cuyahoga Community College

### Viewing: CNST-1640 : Utility Locating and Traffic Flagging

**Board of Trustees:**
October 2024

**Academic Term:**
Fall 2025

**Subject Code**
CNST - Construction Engineering Tech

**Course Number:**
1640

**Title:**
Utility Locating and Traffic Flagging

**Catalog Description:**
Proper methods to locate and communicate to stakeholders existing communication, electrical, gas, oil, wastewater, water, and other utility facilities in the ground. Familiarization with the basic operation of underground utility locating equipment. OUPS (Ohio Utility Protection Services)/811 procedures, work zone traffic control, safety, and flagger requirements are introduced.

**Credit Hour(s):**
2

**Lecture Hour(s):**
1

**Lab Hour(s):**
3

### Requisites

**Prerequisite and Corequisite**
CNST-1290 Construction Print Reading, or concurrent enrollment; or departmental approval

### Outcomes

**Course Outcome(s):**
Communicate utility locations to construction crews, design professionals, and technicians on the ground based on standard color codes in the field.

**Essential Learning Outcome Mapping:**
Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

**Objective(s):**
1. Demonstrate usage of a magnetic locator.
2. Demonstrate usage of two additional utility locating methods.
3. Identify water, communication, and electric lines in a demonstration area.
4. Identify different utilities on construction drawings and wheel off locations.
5. Explain  common utility components at ground level that are visually available.
6. Mark utility locations on the ground.

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**Course Outcome(s):**
Communicate in layperson terms legal elements involved in utility locating.

**Essential Learning Outcome Mapping:**

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

**Objective(s):**

1. Explain what is a right-of-way and utility easement.
2. Explain the role of the utility locator when protecting subsurface utilities.
3. Explain legal requirements of utilities companies to mark utilities.

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**Course Outcome(s):**

Explain the different work zone tapers, compute the length of each, identify the various roadway signs and channeling devices, and the required spacing of each.

**Essential Learning Outcome Mapping:**

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

**Objective(s):**

1. Explain the purpose of a Maintenance of Traffic Plan and interpret traffic maintenance drawings.
2. Calculate merging tapers lengths for different traffic speeds based on selected Maintenance of Traffic standards.
3. Identify common equipment used in traffic management in a work zone.
4. Demonstrate successful and safe operations of a simple flagging operation.

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**Methods of Evaluation:**

1. Quizzes
2. Written laboratory assignments
3. Exams
4. Class discussion and participation
5. Laboratory projects

**Course Content Outline:**

1. Introduction to Utility Locating
   a. The One Call System
   b. 811 and OUPS
   c. Utility Color Codes for Markings
2. Subsurface Utilities
   a. Utility Prints and Facility Records
   b. Introduction to Utility Configurations
   c. Safe Work Practices
   d. Visual Observation Skills and Visually Inspection of Utilities
   e. Manholes - Confined Space Entry
   f. Locating Pipelines
3. Electro-Magnetic Locator
   a. Completing a Circuit
   b. Signal– Electric and Magnetic Fields (EMF)
   c. Frequencies
   d. Transmitter and Receiver
   e. Signal Strengths
   f. Induction Locating
   g. Passive Locating
   h. Depth Readings
4. Other Locating Methods
   a. Potholing
   b. Probing Rod

   c. Ground Penetrating Radar
   d. Exposure Methods
5. The Utility Industry
   a. Brief introduction to Water/Wastewater
   b. Brief Introduction to Communications Systems
   c. Brief Introduction to Electric Systems
   d. Brief Introduction to Gas Systems
   e. Brief Introduction to Other Utility Systems
6. Property Rights and Legal Requirements
   a. Introduction to Right-of-Way
   b. Introduction to Easements
   c. Property Deed Reading
   d. Legal Requirements of Utility Markings
   e. Utility Ownership
7. Work Zone Terminology
   a. Blind Spot
   b. Operator
   c. Speed Limit
   d. Barricade
   e. Safety Vest
   f. Job Hazard Analysis (JHA)
   g. Retroreflective
   h. Warning Lights
   i. Back up Alarm
   j. Pinch Point
   k. Site Distance
   l. Work Zone
8. Traffic Control and Flagging
   a. Fundamental Principles
      i. Traffic Control Devices
      ii. Safety Hardware
   b. Elements of a Traffic Control Plan
   c. Work Zone Traffic Control Layouts
   d. Flagging, Moving and Mobile Operations
   e. Street Closures
   f. Practice Demonstrating Flagging Operations

The Course Schedule is subject to change due to pedagogical needs, instructor discretion, parts of term, and unexpected events.

## Resources for the Instructor

Mitchell, J. A. (2009) *Introduction to locating buried utilities*, APWA Press.

Mitchell, J. A., & D. Woolley. (2023) *Subsurface utility locating: One-call locating and subsurface utility designating*, APWA Press.

Al-Bayati, A., & L. Panzer. (2021) *Underground utilities for construction practitioners and homeowners*, ASCE Press.

**Additional Resources for the Instructor**

Ohio Department of Transportation. (2024). Standard construction drawings - Traffic. https://www.dot.state.oh.us/SCDs/Pages/traffic.aspx?&FilterField1=Series&FilterValue1=Maintaining%20Traffic%20%28MT%29

AASHTO. (2024). Flagger. https://store.transportation.org/Item/TrainingDetail/2565?NoCategory

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