

# UT-2100: AERIAL CONSTRUCTION

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## Cuyahoga Community College

**Viewing: UT-2100 : Aerial Construction**

**Board of Trustees:**

October 2024

**Academic Term:**

Fall 2025

**Subject Code**

UT - Utilities Technology

**Course Number:**

2100

**Title:**

Aerial Construction

**Catalog Description:**

Introduction to common construction methods used in aerial construction with a focus on communication lines. Students learn to work with materials for overhead communication and electrical systems. Students will demonstrate working knowledge of pole climbing and aerial lifts involving installation, repair, removal of guy assemblies, and additional pole hardware. Lab activities to reinforce/demonstrate concepts. Students need to be 18 years of age or older due to equipment used during lab activities per Occupational Safety and Health Administration (OSHA) regulations.

**Credit Hour(s):**

3

**Lecture Hour(s):**

1

**Lab Hour(s):**

6

## Requisites

**Prerequisite and Corequisite**

CNST-1290 Construction Print Reading; and CNST-2050 Advanced Construction Safety, or concurrent enrollment; or department approval.

## Outcomes

**Course Outcome(s):**

Indicate and state specific parts of overhead communication and electrical lines.

**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. Identify cables used for communication systems.
2. Identify electrical cables and their voltage requirements.
3. Identify a transformer and explain its purpose.
4. Identify an electrical service head and explain its purpose.
5. Identify coaxial cable and twisted pair transmission lines.
6. Show on drawings where pole owner approved attaching new components.

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**Course Outcome(s):**

Classify types and determine uses of aerial lifts are used in different scenarios.

**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. Identify scenarios ideal for a scissor lift.
2. Identify scenarios ideal for a boom lift.
3. Identify scenarios ideal for a bucket truck lift.

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**Course Outcome(s):**

Demonstrate operation of aerial lift machine for installation of communications lines.

**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. Identify site specific hazards and ways to mitigate, including stopping work until hazards corrected.
2. Establish worksite zone safety measures.
3. Perform safety inspection of aerial lift machine.
4. Demonstrate proper rigging procedures.
5. Use meter to verify if communication guy electrically charged or not.
6. Splice communication strands.
7. Install, lash, and perform line tensioning of communication cables.

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**Course Outcome(s):**

Demonstrate proper climbing techniques for utility poles.

**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. Use proper climbing gear for utility poles.
2. Work with hand tools while secured to utility pole.
3. Conduct cable inspection while attached to utility pole.
4. Splice communication strands.
5. Demonstrate methods for storing and inspecting climbing equipment.

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**Methods of Evaluation:**

1. Quizzes
2. Written Assignments
3. Exams
4. Lab Activities
5. Participation
6. Projects

**Course Content Outline:**

1. Construction drawings of electrical distribution and communications systems.
  - a. Utility site plans
  - b. Examples of civil plan/profile drawings
2. Safety hazards with electrical transmission systems and communications.

- a. Current arc hazards
- b. Metal equipment & machine hazards
- c. Cable cutting hazards
- d. Traffic hazards
- 3. Components of electrical transmission line system
  - a. Stepdown transformers
  - b. Electrical service heads
  - c. Cable connections
  - d. Cable mounting systems
- 4. Utility poles
  - a. Pole types
  - b. Purpose of guy wires
  - c. Permission for utility pole use
- 5. Utility Pole climbing
  - a. Climbing gear
  - b. Secure tie-off
  - c. Use of extension ladder
  - d. Methods for carrying tools
  - e. Ascend and descend procedures
  - f. Work zone safety
  - g. OSHA guidelines
- 6. Aerial lift machines
  - a. Types of aerial lifts
  - b. Aerial lift safety
- 7. Vehicle mounted elevating and rotating aerial device
  - a. Bucket truck operation
    - i. Bucket controls
    - ii. Bucket load capacity
    - iii. Bucket reach capacity
    - iv. Safety rigging of bucket truck
    - v. Bucket position lock
    - vi. Bucket inspection
    - vii. Bucket maintenance
  - b. Bucket truck work activity
    - i. Line splicing
    - ii. Cable connection
    - iii. Visual inspections
    - iv. OSHA guidelines
- 8. Communications System Operations
  - 1. Identify components of a communications system
    - a. Identify parts of a fiber optic system
    - b. Identify parts of a cable TV system
  - 2. Installing system components
    - a. Guying
  - b. Tensioning
    - c. Splicing
    - d. Attaching communications components

## Resources

Hayes, J. (2010) *The FOA reference guide to outside plant fiber optics*, The Fiber Optics Association, Inc.

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Agrawal, G. P. (2021) *Fiber-optic communication systems*, Wiley.

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Affordable Safety Training. (n.d.) *Aerial lift operator training video compliance kit*, XO Safety.

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National Safety Compliance. (2024) *OSHA construction industry regulaitons (7th ed.)*, National Safety Compliance, Inc.

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**Resources Other**

1. XO Video Safety Series (2024) site: <https://www.youtube.com/@xosafety662>

Top of page

Key: 5252