

# ATMW-2530: ADVANCED WELDING IV

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## Cuyahoga Community College

**Viewing: ATMW-2530 : Advanced Welding IV**

**Board of Trustees:**

2012-06-28

**Academic Term:**

Fall 2025

**Subject Code**

ATMW - Appld Ind Tech - Millwrighting

**Course Number:**

2530

**Title:**

Advanced Welding IV

**Catalog Description:**

Course covers the welding techniques and skills required for welding certification in wire feed and standard shielded metal arc welding (SMAW) or stick welding. Included are techniques required for machine set-up for Tungsten Inert Gas (TIG) welding and its welding processes.

**Credit Hour(s):**

2

**Lecture Hour(s):**

2

## Requisites

**Prerequisite and Corequisite**

Departmental approval: Acceptance to Millwrighting Technology apprenticeship program.

## Outcomes

**Course Outcome(s):**

N/A

**Objective(s):**

1. Identify all safety requirements pertaining to stick, wire feed and TIG welding processes.
2. Explain how each one of the welding processes work including the proper set-up of the machines regarding their polarities and amperage. Also be able to select the best welding process for the type of work that is to be done.
3. Demonstrate the ability to pass a structural plate test in each of the four welding positions flat, horizontal, vertical and overhead.

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**Methods of Evaluation:**

1. Quizzes
2. Tests
3. Class participation

**Course Content Outline:**

1. Review welding safety
  - a. Welding hazards
    - i. Electrocution
    - ii. Fumes
    - iii. Arc-flash

- iv. Burns
- v. Fire
- b. OSHA Regulations
  - i. Sub part J
  - ii. Personal Protection Equipment (PPE)
- 2. Review welding set-up
  - a. Stick welding
    - i. Electrodes
    - ii. Polarities
    - iii. Amperages
    - iv. Advantages and disadvantages
  - b. Wire feed welding
    - i. Flux core or gas
    - ii. Polarities
    - iii. Amperages
    - iv. Wire speed
    - v. Advantages and disadvantages
  - c. Tig welding
    - i. Types of tungsten
    - ii. Filler wires
    - iii. Shielding gasses
    - iv. Polarities
    - v. Amperages
- 3. Structural plate test
  - a. Root passes
    - i. Proper penetration
    - ii. Rod selection
  - b. Cleaning
    - i. Slag removal
    - ii. Tools
  - c. Overlapping
    - i. Tying beads together
    - ii. Technique
  - d. Weld positions
    - i. Flat
    - ii. Horizontal
    - iii. Vertical
    - iv. Overhead
- 4. Tig welding
  - a. Butt welds
  - b. Fillet welds
    - i. Using filler wire
    - ii. Flat and horizontal
- 5. H-beam fabrication
  - a. Coping beam with torch
    - i. Lay-out
    - ii. Cutting the beam
  - b. Weld H-beam 100%

## Resources

Lincoln Electric Company. *Arc Welding Safety*. current. Lincoln Electric Company Euclid Ohio, 2005.

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Ronal G. Garby,. *IPT's Metal Trades Welding Handbook*. current. IPT Publishing and Training Alberta, Canada, 2007.

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Raymond J Sacks, Edward R Bohnart. *Welding Principles and Practices*. current. McGraw-HillNew York, New York, 2005.

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Carpenters International Training Center. *Welding*. current. Carpenters International Training Center, Las Vegas, 2009.

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Lincoln Electric Company. *Arc Welding Safety*. current. Lincoln Electric CompanyEuclid Ohio, 2005.

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*Welding and Cutting*. Las Vegas, NV: Carpenters International Training Fund, 2007.

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Raymond J Sacks, Edward R Bohnart. *Welding Principles and Practices*. current. McGraw-HillNew York, New York, 2005.

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*Pocket Welding Guide: A Guide to Better Welding 32nd Edition*. Troy, OH: Hobart Institute of Welding Technology, 2019.

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*Advanced Welding Techniques*. Las Vegas, NV: Carpenters International Training Fund, 2010.

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#### **Resources Other**

[www.instructables.com/id/How-to-Weld-TIG/](http://www.instructables.com/id/How-to-Weld-TIG/)

[www.usawelders.com/TIG-Welders-c2.html](http://www.usawelders.com/TIG-Welders-c2.html)

[www.learn-how-to-weld.com/tig-welding/](http://www.learn-how-to-weld.com/tig-welding/)

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