

Advanced Welding Technology

Course Number: 13208

Rational Statement:

Students will learn more advanced techniques and skills related to welding applications. Welding skills will be developed in the context of a series of projects. This course will help prepare the student for the entry level welding certification.

Suggested Grade: 10-12

Topics Covered:

- Safety
- Interpret drawings
- Base Metal Prep
- Gas Metal Arc Welding (GMAW)
- Gas Tungsten Arc Welding (GTAW)
- Welding Quality
- Career Exploration

Core Technical Standards & Examples

Indicator #1: Identify and understand basic welding safety	
Bloom's Taxonomy Level	Standard and Examples
Knowledge	<p>AWT1.1 Identify and demonstrate the proper industry safety standards.</p> <p>Examples:</p> <ul style="list-style-type: none">• Complete 10 hour OSHA (Occupational Safety Health Administration) certification• Identify some common hazards in welding• Explain and identify proper personal protection used in welding• Identify and explain uses for material safety data sheets (MSDS)• Describe how to avoid welding fumes• Describe proper material handling methods• Assume responsibilities under HazCom (Hazard Communication)• Maintain a portfolio record of written safety and equipment examinations for which the student has passed

Indicator #2: Interpret, layout, and fabricate in conformance to construction and fabrication drawings	
Bloom's Taxonomy Level	Standard and Examples
Application	<p>AWT2.1 Correctly interprets dimensions and locations of components in construction and fabrication drawings.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Makes a material take-off in conformance to construction and fabrication drawings and specifications • Lays out components, structural and others, and their locations to dimensions and tolerances indicated on construction and fabrication drawings
Application	<p>AWT2.2 Correctly scale dimensions in construction and fabrication drawings.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Uses the scale of a drawing to determine locations not explicitly dimensioned • Uses the scale of drawing to determine dimensions not explicitly shown on drawing
Application	<p>AWT2.3 Correctly interprets orthographic views shown in construction and fabrication drawings.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Interprets three-dimensional features found in construction and fabrication drawings •
Understanding	<p>AWT2.4 Recognize and correctly interpret lines and symbols commonly used in construction and fabrication drawings.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Identify and explain a welding detail drawing • Identify and explain lines, material fills, and sections • Interprets welding symbols to determine type, geometry, process, extent, and required testing of welds

Indicator #3: Exhibit knowledge and perform base metal prep	
Bloom's Taxonomy Level	Standard and Examples
Application	<p>AWT3.1 Prepare base metal for various welding processes.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Safely use a grinder • Clean base metal for welding and cutting • Identify and explain joint design • Explain joint design considerations • Mechanically and thermally bevel the end of a mild steel

Indicator #4: Understand and perform Gas Metal Arc Welding (GMAW) process	
Bloom's Taxonomy Level	Standard and Examples
Understanding	<p>AWT4.1 Identify and understand GMAW equipment and setup.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Explain gas metal arc welding (GMAW) safety • Explain the characteristic of welding current and power sources • Identify and explain the use of GMAW equipment • Set up GMAW equipment and identify tools for weld cleaning
Application	<p>AWT4.2 Demonstrate knowledge of Gas Metal Arc Welding (GMAW) process.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Demonstrate fillet welds in one or more positions • Demonstrate groove welds in one or more positions • Complete a test plate in the flat weld position • Identify the filler rod transfer process

Indicator #5: Understand and perform Gas Tungsten Arc Welding (GTAW) process

Bloom's Taxonomy Level	Standard and Examples
Understanding	<p>AWT5.1 Understand GTAW equipment and filler metals.</p> <p>Examples:</p> <ul style="list-style-type: none">• Explain gas tungsten arc welding (GTAW) safety• Identify and explain the function of GTAW equipment• Identify and explain the function of GTAW filler metals• Identify and explain the function of GTAW shielding gases• Set up GTAW equipment
Application	<p>AWT5.2 Demonstrate knowledge of Gas Tungsten Arc Welding (GTAW) process.</p> <p>Examples:</p> <ul style="list-style-type: none">• Demonstrate fillet welds in one or more positions• Demonstrate groove welds in one or more positions• Complete a test plat in the flat weld position

Indicator #6: Demonstrate knowledge of weld quality	
Bloom's Taxonomy Level	Standard and Examples
Understanding	<p>AWT6.1 Identify and demonstrate knowledge of quality control of the welding process.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Identify and explain codes governing welding • Identify and explain weld imperfections and their causes • Identify and explain nondestructive examination practices • Identify and explain welder qualification tests • Explain the importance of quality workmanship • Identify common destructive testing methods • Perform visual inspection of fillet welds

Indicator #7: Student will participate in career exploration activities	
Bloom's Taxonomy Level	Standard and Examples
Application	<p>AWT7.1 Research career opportunities in the manufacturing fields.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Utilizing the career exploration software research and write a report on career opportunities in the manufacturing fields • Utilizing the career exploration software to research educational requirements for a chosen career path • Utilizing career exploration software, update the student's portfolio