Welding Technology

Course Number: 13207

Rationale Statement:
There is a high demand for motivated and creative individuals in the welding field. The desire for the students to succeed at the basic level and step up to the higher level of competency in this field is the ultimate goal of this course.

Suggested Grade: 9-12

Topics Covered:

- **Welding safety**
- **Technical specifications**
- **Oxyfuel cutting**
- **Preparing base metals**
- **Shielded Metal Arc Welding (SMAW)**
- **Career Exploration**

Core Technical Standards & Examples

Indicator #1: Identify and understand basic welding safety	
Bloom's Taxonomy Level	**Standard and Examples**
Apply	**IWT1.1 Identify and demonstrate the proper industry safety standards.** Examples: • Complete 10 hour OSHA (Occupational Safety Health Administration) certification • Identify some common hazards in welding • Explain and identify proper personal protections used in welding • Describe how to avoid welding fumes and the dangers associated with them • Identify and explain uses for material safety data sheets • Explain safety techniques for storing and handling cylinders • Describe proper material handling methods • Assume responsibilities under HazCom (Hazard Communication) regulations • Maintain a portfolio record of written safety examinations and equipment examinations for which the student has passed

Indicator #2 Read, comprehend, and communicate written and spoken technical specification and instructions related to welding and welded assemblies	
Bloom's Taxonomy Level	**Standard and Examples**
Apply	**IWT2.1 Demonstrate mathematical skills related to work assignments.** Examples: • Add, subtract, multiply, and divide whole numbers, fractions, mixed numbers, and decimals • Comprehend, demonstrate, and record measurements derived from using measuring devices • Analyze the functions of angles and parts of a circle • Construct parts using the principles of geometry
Understand	**IWT2.2 Read and demonstrate understanding of welding terms and definitions from ANSI/AWS A3.0, *Standard Welding Terms and Definition.*** Examples: • Pronounce and use welding terms in conversation and in written work
Apply	**IWT2.3 Complete a job assignment given verbal and written work assignments.** Examples: • Complete work assignments according to verbal and written instructions • Carry out verbal and written instructions over the length of the program

Indicator #3 Interpret drawings and welding symbol information	
Bloom's Taxonomy Level	**Standard and Examples**
Apply	**IWT3.1 Read and sketch drawings.** Examples: • Sketch parts and assigns measurements to the sketch
Remember	**IWT3.2 Identify basic weld symbols.** Examples: • Evaluate welding symbol interpretation • Identify fillet weld and v-groove
Remember	**IWT 3.3 Identify lines and joints.** Examples: • Label objective, hidden, center, and break lines • Label butt, tee, lap, edge, and corner joints

Indicator #4: Understand and Perform Oxyfuel cutting operations	
Bloom's Taxonomy Level	**Standard and Examples**
Remember	**IWT4.1 Identify and explain the use of oxyfuel cutting equipment.** Examples: • Setup oxyfuel equipment • Light and adjust an oxyfuel torch • Shut down oxyfuel cutting equipment • Disassemble oxyfuel equipment • Change cylinders • Use a combination torch with welding, cutting and heating attachments
Apply	**IWT4.2 Prepare layouts for cutting individual parts.** Examples: • Utilizes rulers, straightedges, chalklines, and other layout equipment to make a layout suitable for guiding a cutting operation • Uses principles of algebra and geometry to assist in complex layout operations
Apply	**IWT4.3 Perform cuts using oxyfuel gas-cutting process.** Examples: • Cut straight parts • Cut shaped parts • Cut beveled parts • Pierce
Apply	**IWT4.4 Use weld-washing techniques.** Examples: • Removes tack welds using weld-washing techniques • Washes out the defective weld material

Indicator #5: Exhibit knowledge and perform base metal prep.	
Bloom's Taxonomy Level	**Standard and Examples**
Apply	**IWT5.1 Prepare base metal for various welding processes.** Examples: • Clean base metal for welding or cutting • Identify and explain joint design • Explain joint design considerations • Mechanically bevel the edge of a mild steel plate • Thermally bevel the end of a mild steel plate • Select the proper joint design based on a welding procedure specification (WPS) or instructor direction

Indicator #6: Understand and Perform Shielded Metal Arc Welding (SMAW) process	
Bloom's Taxonomy Level	**Standard and Examples**
Remember	**IWT6.1 Identify and understand SMAW equipment and setup.** Examples: • Identify and explain shielded metal arc welding (SMAW) safety • Explain welding electrical circuit • Identify welding power supplies and their characteristics • Explain how to set up welding power supplies • Set up a machine for welding
Remember	**IWT6.2 Identify and understand Shielded Metal Arc electrodes.** Examples: • Identify electrodes using the AWS specifications • Identify factors that affect electrode selection • Identify different types of filler metals • Explain the storage and control of filler metals • Identify and select the proper electrode for an identified welding task
Apply	**IWT6.3 Demonstrate knowledge of Shielded Metal Arc Welding (SMAW) process.** Examples: • Demonstrate filler welds in one or more positions • Demonstrate grove welds in one or more positions • Complete a test plate in the flat weld position

Indicator #7: Demonstrate knowledge of weld quality	
Bloom's Taxonomy Level	**Standard and Examples**
Apply	**IWT7.1 Identify and demonstrate knowledge of quality control of the welding process.** Examples: • 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 #8: Student will participate in career exploration activities	
Bloom's Taxonomy Level	**Standard and Examples**
Apply	**IWT8.1 Research career opportunities in the manufacturing fields.** Examples: • Utilize the career exploration software research and write a report on career opportunities in the manufacturing field • Utilize the career exploration software to research educational requirements for a chosen career path • Utilize career exploration software, update the students portfolio • Speaker