Welding Core: Gas Tungsten Arc Welding (GTAW)
Course Outcome Summary

Course Information

Description
Through classroom and/or lab/shop learning and assessment activities, students in this course will:
- explain the gas tungsten arc welding process (GTAW);
- demonstrate the safe and correct set up of the GTAW workstation;
- relate GTAW electrode and filler metal classifications with base metals and joint criteria;
- build proper electrode and filler metal selection and use based on metal types and thicknesses;
- build pads of weld beads with selected electrodes and filler material in the flat position;
- build pads of weld beads with selected electrodes and filler material in the horizontal position;
- perform basic GTAW welds on selected weld joints; and
- perform visual inspection of GTAW welds.

Types of Instruction

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Competencies

1. **Explain the gas tungsten arc welding process (GTAW)**
   - **Properties**
   - Domain: Cognitive  Level: Synthesis
   - **You will demonstrate your competence:**
   - through an instructor-provided written or oral evaluation tool
   - **Your performance will be successful when:**
   - you differentiate between types and uses of current
   - you identify the advantages and disadvantages of GTAW
   - you identify types of welding power sources
   - you identify different components of a GTAW workstation
   - you describe basic electrical safety

2. **Demonstrate the safe and correct set up of the GTAW workstation**
   - **Properties**
   - Domain: Cognitive  Level: Application
   - **You will demonstrate your competence:**
   - in a lab or shop setting
   - using a GTAW workstation
   - **Your performance will be successful when:**
   - you demonstrate proper inspection of equipment
   - you demonstrate proper use of PPE
   - you demonstrate proper placement of workpiece connection
   - you check for proper setup of equipment
   - you inspect area for potential hazards/safety issues
   - you troubleshoot GTAW equipment and perform minor maintenance
3. Relate GTAW electrode and filler metal classifications with base metals and joint criteria
   
   **Properties**
   Domain: Cognitive   Level: Analysis

   **You will demonstrate your competence:**
   - through a written or oral examination

   **Your performance will be successful when:**
   - you identify electrode classifications
   - you explain the AWS electrode and filler metal nomenclature
   - you determine proper electrode and filler metal for given joint based on material and position of weld
   - you determine proper type of electrodes to be used in a variety of industry applications

4. Build proper electrode and filler metal selection and use based on metal types and thicknesses
   
   **Properties**
   Domain: Psychomotor   Level:

   **You will demonstrate your competence:**
   - in a lab or shop setting
   - using GTAW equipment
   - using appropriate tools

   **Your performance will be successful when:**
   - you use safety hazard precautions and PPE
   - you properly prepare the tungsten electrode profile relative to base material
   - you perform weld using GTAW process appropriate to electrode size and filler metal size
   - you select the proper electrode and filler metal type and size relative to metal size, type and thickness
   - you select the proper electrode and filler metal type and size based on material specifications
   - you use tools appropriate for the task

5. Build pads of weld beads with selected electrodes and filler material in the flat position
   
   **Properties**
   Domain: Psychomotor

   **You will demonstrate your competence:**
   - in the lab or shop setting
   - using GTAW equipment

   **Your performance will be successful when:**
   - you use safety hazard precautions and PPE
   - you demonstrate proper equipment setup and troubleshooting
   - you create a pad of beads using GTAW process
   - your weld exhibits proper uniformity and profile

6. Build pads of weld beads with selected electrodes and filler material in the horizontal position
   
   **Properties**
   Domain: Psychomotor

   **You will demonstrate your competence:**
   - in the lab or shop setting
7. **Perform basic GTAW welds on selected weld joints**

Properties
Domain: Psychomotor

**You will demonstrate your competence:**
- in the lab or shop setting
- using GTAW equipment
- using appropriate tools

**Your performance will be successful when:**
- you conduct proper base metal preparation
- you use safety hazard precautions and PPE
- you demonstrate proper equipment setup and troubleshooting
- you perform fillet weld in flat position
- you perform a fillet weld in horizontal position
- you perform a groove weld in a flat position
- you perform a groove weld in a horizontal position
- you use tools appropriate for the task

8. **Perform visual inspection of GTAW welds**

Properties
Domain: Psychomotor

**You will demonstrate your competence:**
- in the lab or shop setting
- using proper inspection tools

**Your performance will be successful when:**
- you identify common visual discontinuities and defects on welds
- you determine causes of discontinuities and defects of welds
- you inspect welds for pass/fail ratings according to industry standards
- you use tools appropriate for the inspection