Welding Core: Gas Tungsten Arc Welding
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

Instruction Type                      Credits
1. Explain the gas tungsten arc welding process (GTAW)                      3

Competencies

1. Explain the gas tungsten arc welding process (GTAW)
   Properties
   Domain: Cognitive   Level: Synthesis
   You will demonstrate your competence:
   o through an instructor-provided written or oral evaluation tool
   Your performance will be successful when:
   o you differentiate between types and uses of current
   o you identify the advantages and disadvantages of GTAW
   o you identify types of welding power sources
   o you identify different components of a GTAW workstation
   o 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:
   o in a lab or shop setting
   o using a GTAW workstation
   Your performance will be successful when:
   o you demonstrate proper inspection of equipment
   o you demonstrate proper use of PPE
   o you demonstrate proper placement of workpiece connection
   o you check for proper setup of equipment
   o you inspect area for potential hazards/safety issues
   o 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