

## COURSE SYLLABUS

### COURSE IDENTIFICATION

Course Prefix/Number: MFGT 116  
Course Title: Gas Tungsten Arc Welding  
Division: Outreach and Workforce Development  
Program: Welding  
Credit Hours: 3  
Initiation/Revision Date: Fall 2011  
Assessment Goal Percentage per Outcome: (75%)

### CLASSIFICATION OF INSTRUCTION

Vocational

### COURSE DESCRIPTION

In this course students will explore the tools, safety and operating procedures essential when working with Gas Tungsten Arc Welding equipment. In a supervised setting, students will set up equipment, build weld pads with selected electrodes and filler materials in both the flat and horizontal positions. Students will also weld selected joints and inspect GTAW welds for uniformity and tolerance.

### PREREQUISITES AND/OR COREQUISITES

None

### TEXTS

\*The official list of textbooks and materials for this course are found on Inside NC.

Althouse, Andrew D., Turnquist, Carl H., Bowditch, William A., Bowditch, Kevin E., Bowditch, Mark, A. Modern Welding. Goodheart Willcox Company, Inc., 2004.

### Reference Materials

American Welding Society. Welding Inspection Technology. 2000. 4<sup>th</sup> ed.

### COURSE OUTCOMES/ COMPETENCIES (as required)

1. Explain the gas tungsten arc welding process (GTAW)
  - a. You will demonstrate your competence:
    - i. through an instructor-provided written or oral evaluation tool
  - b. Your performance will be successful when:
    - i. you differentiate between types and uses of current

- ii. you identify the advantages and disadvantages of GTAW
  - iii. you identify types of welding power sources
  - iv. you identify different components of a GTAW workstation
  - v. you describe basic electrical safety
- 2. Demonstrate the safe and correct set up of the GTAW workstation
  - a. You will demonstrate your competence:
    - i. in a lab or shop setting
    - ii. using a GTAW workstation
  - b. Your performance will be successful when:
    - i. you demonstrate proper inspection of equipment
    - ii. you demonstrate proper use of PPE
    - iii. you demonstrate proper placement of workpiece connection
    - iv. you check for proper setup of equipment
    - v. you inspect area for potential hazards/safety issues
    - vi. you troubleshoot GTAW equipment and perform minor maintenance
- 3. Relate GTAW electrode and filler metal classifications with base metals and joint criteria
  - a. You will demonstrate your competence:
    - i. through a written or oral examination
  - b. Your performance will be successful when:
    - i. you identify electrode classifications
    - ii. you explain the AWS electrode and filler metal nomenclature
    - iii. you determine proper electrode and filler metal for given joint based on material and position of weld
    - iv. 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
  - a. You will demonstrate your competence:
    - i. in a lab or shop setting
    - ii. using GTAW equipment
    - iii. using appropriate tools
  - b. Your performance will be successful when:
    - i. you use safety hazard precautions and PPE
    - ii. you properly prepare the tungsten electrode profile relative to base material
    - iii. you perform weld using GTAW process appropriate to electrode size and filler metal size
    - iv. you select the proper electrode and filler metal type and size relative to metal size, type and thickness
    - v. you select the proper electrode and filler metal type and size based on material specifications

- vi. you use tools appropriate for the task
5. Build pads of weld beads with selected electrodes and filler material in the flat position
    - a. You will demonstrate your competence:
      - i. in the lab or shop setting
      - ii. using GTAW equipment
    - b. Your performance will be successful when:
      - i. you use safety hazard precautions and PPE
      - ii. you demonstrate proper equipment setup and troubleshooting
      - iii. you create a pad of beads using GTAW process
      - iv. your weld exhibits proper uniformity and profile
  6. Build pads of weld beads with selected electrodes and filler material in the horizontal position
    - a. You will demonstrate your competence:
      - i. in the lab or shop setting
      - ii. using GTAW equipment
    - b. Your performance will be successful when:
      - i. you use safety hazard precautions and PPE
      - ii. you demonstrate proper equipment setup and troubleshooting
      - iii. you create a pad of beads using GTAW process
      - iv. your weld exhibits proper uniformity and profile
  7. Perform basic GTAW welds on selected weld joints
    - a. You will demonstrate your competence:
      - i. in the lab or shop setting
      - ii. using GTAW equipment
      - iii. using appropriate tools
    - b. Your performance will be successful when:
      - i. you conduct proper base metal preparation
      - ii. you use safety hazard precautions and PPE
      - iii. you demonstrate proper equipment setup and troubleshooting
      - iv. you perform fillet weld in flat position
      - v. you perform a fillet weld in horizontal position
      - vi. you perform a groove weld in a flat position
      - vii. you perform a groove weld in a horizontal position
      - viii. you use tools appropriate for the task
  8. Perform visual inspection of GTAW welds
    - a. You will demonstrate your competence:
      - i. in the lab or shop setting
      - ii. using proper inspection tools
    - b. Your performance will be successful when:
      - i. you identify common visual discontinuities and defects on welds
      - ii. you determine causes of discontinuities and defects of welds

- iii. you inspect welds for pass/fail ratings according to industry standards
- iv. you use tools appropriate for the inspection

### COURSE OUTLINE

1. Explain gas metal arc welding process (GTAW).
2. Demonstrate the safe and correct set up of the GTAW workstation.
3. Correlate GTAW electrode classifications with base metals and joint criteria
4. Demonstrate proper electrode selection and use based on metal types and thicknesses
5. Build pads of weld beads with selected electrodes in the flat position
6. Build pads of weld beads with selected electrodes in the horizontal position
7. Produce basic GTAW welds on selected weld joints.
8. Conduct visual inspection of GTAW welds

### INSTRUCTIONAL METHODS

1. Lecture
2. Audio-Visual aids
3. Example and demonstration
4. Lab practice
5. Class discussions
6. Field trips and guest speakers
7. Tests (written)
8. Skills tests (performance-based)

### STUDENT REQUIREMENTS AND METHOD OF EVALUATION

Evaluation of student performance is determined primarily from results of written and performance tests to validate mastery of course competencies. Due to the nature of the class, student participation, teamwork, courtesy, honesty, and adherence to safety policies are required. Students are required to take the 3<sup>rd</sup> party testing examination.

Safety and Health examination must be passed at 90%

### GRADING SCALE

On objective materials, the following scale is used:

90-100 %	A
80-89 %	B
70-79 %	C
60-69 %	D
0-59 %	F

Student competence is achieved by obtaining a minimum of 75% on written tests and by passing visual inspections.

American Welding Society standards will be applied when accessing lab work. Students must meet AWS levels of competence to pass the course.

### ASSESSMENT OF STUDENT GAIN

Students will be assessed through written testing. Practical application will be assessed on the first attempt at the skill and again at the conclusion of the course. Comparison will determine the extent of student gain.

### ATTENDANCE POLICY

Absences that occur due to students participating in official college activities are excused except in those cases where outside bodies, such as the State Board of Nursing, have requirements for minimum class minutes for each student. Students who are excused will be given reasonable opportunity to make up any missed work or receive substitute assignments from the instructor and should not be penalized for the absence. Proper procedure should be followed in notifying faculty in advance of the student's planned participation in the event. Ultimately it is the student's responsibility to notify the instructor in advance of the planned absence.

Unless students are participating in a school activity or are excused by the instructor, they are expected to attend class. If a student's absences exceed one-hundred (100) minutes per credit hour for the course or, in the case of on-line or other non-traditional courses, the student is inactive for one-eighth of the total course duration, the instructor has the right, but is not required, to withdraw a student from the course. Once the student has been dropped for excessive absences, the registrar's office will send a letter to the student, stating that he or she has been dropped. A student may petition the chief academic officer for reinstatement by submitting a letter stating valid reasons for the absences within one week of the registrar's notification. If the student is reinstated into the class, the instructor and the registrar will be notified.

### ACADEMIC INTEGRITY

NCCC expects every student to demonstrate ethical behavior with regard to academic pursuits. Academic integrity in coursework is a specific requirement. Definitions, examples, and possible consequences for violations of Academic Integrity, as well as the appeals process, can be found in the College Catalog, Student Handbook, and/or Code of Student Conduct and Discipline.

### CELL PHONE POLICY

Student cell phones and pagers must be turned off during class times. Faculty may approve an exception for special circumstances.

NOTE:

Information and statements in this document are subject to change at the discretion of NCCC. Changes will be published and made available to the students.

**NOTE:** If you are a student with a disability who may need accommodation(s) under the Americans with Disabilities Act (ADA), please notify the *Dean of Student Development*, Chanute Campus, Student Union, 620-431-2820, Ext. 213., or the *Dean, Ottawa Campus, 785-242-2607 ext 312*, as soon as possible. You will need to bring your documentation for review in order to determine reasonable accommodations, and then we can assist you in arranging any necessary accommodations.