

## Advanced Gas Tungsten Arc Welding (WLDG 2451)



**Credit:** 4 semester credit hours (2 hours lecture, 8 hours lab)

**Prerequisite/Co-requisite:** WLDG 2406

### Course Description

Advanced topics in GTAW welding, including welding in various positions and directions.

### Required Textbook and Materials

1. *Modern Welding*. Althouse, Turnquist, Bowditch. 2013
  - a. ISBN number is 978-1-60525-795-2
2. Tool List (approximately \$150-\$250).
  1. Hood
  2. Welders cap
  3. Shade 10 or 11 lens
  4. Clear lens (10)
  5. Long sleeve 100% cotton shirt or leather sleeves or leather jacket
  6. Long 100% cotton work pants (jeans)
  7. High top leather boots (steel toe)
  8. Leather gloves
  9. Chipping hammer
  10. Wire brush
  11. Safety glasses
  12. Cutting goggles or glasses (shade 5)
  13. Measuring tape
  14. Tip cleaner
  15. 12" combination square
  16. Pliers
  17. Flashlight

**Students will not be allowed in class without the proper equipment and clothing**

### Course Objectives

Upon completion of this course, the student will be able to:

1. Demonstrate proficiency in welding various welding positions.
2. Describe safety rules and equipment used and describe the effect of welding parameters in GTAW.
3. Weld various joint designs, diagnose welding problems and perform visual inspection.

### Course Outline

#### 1. Oxy-fuel cutting

Approved 12/2013

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- Perform proper safety procedures
- Manually cut pipe to desire length using oxy-fuel torch
- Manually bevel pipe to desired length using oxy-fuel and plasma torch
- Perform oxy-fuel square cuts and beveled cuts on pipe using an automatic watts cutting machine
- Perform square and beveled plasma arc cuts using the watts automatic cutting machine

**2. GTAW filler metal**

- Safety hazards of electrodes
- Types and sizes of electrodes
- Electrodes for various size pipe and positions

**3. Equipment**

- Welding machine and equipment and perform daily checks
- Setup and adjustment of the GTAW welding station
- Polarity of the GTAW machine welding procedure
- Power source

**4. SMAW and GTAW pipe welding**

- perform single Vee groove pipe weld in the 1G position
- perform single Vee groove pipe weld in the 2G position
- perform single Vee groove pipe weld in the 5G position
- perform single Vee groove pipe weld in the 6G position

**5. Inspection and testing**

- Nondestructive test to detect flaws and defect
- Destructive test to AWS/ASME standards

**Grade Scale**

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

**Course Evaluation**

Final grades will be calculated according to the following criteria:

|          |     |
|----------|-----|
| Tests    | 70% |
| 6-G pipe | 30% |

Late Penalties will be assessed on all work turned in late. 5 points per day.

**Course Requirement**

1. Bevel pipe to length using beveling machine.

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2. Perform 1G, 2G, 5G and 6G welds using various electrodes.
3. Perform 5G and 6G on various sizes pipe.

**Attendance Policy**

- I. Students are allowed to miss two days without penalty; each additional day will result in the student's grade being dropped by a letter grade.  
Example:     2 days absent = If student has an A average no penalty  
                  3 days absent = A drops to a B  
                  4 days absent = B drops to a C  
                  5 days absent = C drops to a D (student must retake class)  
                  6 days absent = D drops to a F (student must retake class)
- II. Absences are counted for unexcused, excused and coming to class late.
- III. 3 tardies = 1 absence
  - A. Tardy- arriving within 15 minutes after class begins or leaving before the end of class.
  - B. More than 15 minutes late you will be counted absent.
  - C. If you go to sleep in class you will be counted absent.
- IV. **Excused absences.** Only given to allow students to make up missed work.
  - A. Will be given for documented Injury or Illness. Doctor's excuse required showing proof. Will count toward total days missed.
  - B. Will be given for documented Death in immediate family. Will count toward total days missed.
  - C. Approved LIT school functions; E.g. SkillsUSA, SGA etc. Will not count toward total days missed
  - D. It is the student's responsibility to obtain from the instructor any handouts or assignments for classes missed. Lectures will not be repeated.
- V. If you wish to drop, you are responsible for the drop process. I will not initiate the drop, no matter how many absences or zeroes you have; that is, if you stop coming to class and do not drop, you will earn an "F" in the course. Students are only allowed to drop 6 times in their college career.

**Course Policies**

1. No electronic devices of any kind (cell phones, I-pod, headphone, ect.) will be tolerated in the classrooms or labs. If you are seen using any electronic device you will be asked to leave the class for the day.
2. No food or drink will be allowed in the classroom.
3. No derogatory or foul language will be tolerated.
4. We have a zero tolerance policy for sexual harassment.
5. We have a zero tolerance policy of racial or ethnic discrimination.

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6. Be considerate of others in the classroom.

**Disabilities Statement**

The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. Among other things, these statutes require that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409) 880-1737 or visit the office in Student Services, Cecil Beeson Building.

**Course Schedule**

| <b>Week</b> | <b>Topic</b>  | <b>Reference</b>  |
|-------------|---|---|
| 1/2         | Course introduction and policies<br>Shop orientation and safety procedures<br>Measuring and Lay-out tools<br>Use the Oxyfuel and plasma torch to cut pipe to length<br>Use of pipe beveling machine<br>1G (roll out) pipe welds<br>Visual test<br>• LECTURE/LAB | Syllabi<br><br>Instructor Demonstration/<br>Supervision |
| 3-6         | Use of pipe beveling machine<br>2G pipe welds<br>Visual test<br>• LECTURE/LAB   | Instructor Demonstration/<br>Supervision                |
| 7-12        | Use of pipe beveling machine<br>5G pipe welds<br>Visual Test<br>• LECTURE/LAB   | Instructor Demonstration/<br>Supervision                |
| 13-16       | Use of pipe beveling machine<br>6G pipe welds<br>Test to ASME pipe certification test<br>• LECTURE/LAB  | Instructor Demonstration/<br>Supervision                |