

## **Advanced Shielded Metal Arc Welding (WLDG 2443)**



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

**Prerequisite/Co-requisite:** WLDG 1428

### **Course Description**

Advanced topics based on accepted welding codes. Training provided with various electrodes in shielded metal arc welding processes with open V-groove joints in all positions.

### **Required Textbook and Materials**

1. *Modern Welding* by Althouse, Turnquist, Bowditch 2013
  - a. ISBN number is 978-1-60525-795-2
2. Personal 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

**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. Describe the effect of preheat and post-weld heating. Explain precautions used when welding various metals and alloys.
2. Distinguish between qualification and certification procedures. Identify and discuss problems of welding discontinuities.
3. Perform open groove welds with mild steel and low alloys electrodes in all positions.

## Course Outline

### 1. Oxy-fuel Cutting

- Demonstrate proper oxy-fuel cutting safety procedure
- Follow proper hand cutting procedures
- Make accurate measured cuts

### 2. Oxy-fuel Automatic cutting machine

- Oxy-fuel automatic machine
- Beveled cuts on various thicknesses of metal
- Speed and angle of the cut properly

### 3. SMAW Groove welds on plate in all positions

- Weld a single V groove plate weld in the 1G position. E6010 root pass, E7018 hot pass, fill and cap. Weave and bead method.
- Weld a single V groove plate weld in the 2G position. E6010 root pass, E7018 hot pass, fill and cap. Three bead cap
- Weld a single V groove plate weld in the 3G position. E6010 root pass, E7018 hot pass, fill and cap. Weave and bead method.
- Weld a single V groove plate weld in the 4G position. E6010 root pass, E7018 hot pass, fill and cap. two bead cap.
- Discussion and detection of discontinuities

### 4. Destructive testing

- Destructive testing procedures and equipment
- Cut 1" strips out of welded plate and prepare for root and face bend test
- Bend two face and two root specimens (must pass AWS code standard)

### 5. Plasma arc cutting

- Plasma Arc Cutting
- Advantages and disadvantages of plasma arc cutting
- Plasma arc cutting using the proper procedures

### 6. Heat Treatment

- Preheat procedures
- Post-heat procedures
- Heat treatment on various metals and alloy

### 7. Qualification and certification

- Welding procedure specifications
- Welding procedure variables
- AWS certifications

## 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:

assignments	30%
TEST	70%

Late Penalties will be assessed on all work turned in late.

### **Course Requirements**

1. Select electrodes and amperage setting for various thicknesses of metal and welding positions.
2. Perform SMAW Open V Groove welds in 1G position.
3. Perform SMAW Open V Groove welds in 2G position.
4. Perform SMAW Open V Groove welds in 3G position.
5. Perform SMAW Open V Groove welds in 4G position
6. Perform proper set-up and shut-down of oxyacetylene torch.
7. Perform proper oxyacetylene cuts.
8. Follow general shop safety
9. Use proper personal protective equipment

### **Attendance Policy**

- I. Students are allowed to miss two days without penalty, each additional day will result in the students grade being dropped by a letter grade.  
  
Example:     1 days absent = If student has an A average no penalty  
                  2 days absent = A drops to a B  
                  3 days absent = B drops to a C  
                  4 days absent = C drops to a D (student must retake class)  
                  5 days absent = D drops to a F (student must retake class)
- II. Absences are counted for unexcused, excused and coming to class late.
- III. 2 tardys = 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.

WLDG 2443  
Course Syllabus

- 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.

### **Classroom 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.
6. Be considerate of others in the classroom. Remember they paid for the class just like you.

### **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.

### **Student Code of Conduct Statement**

It is the responsibility of all registered Lamar Institute of Technology students to access, read, understand and abide by all published policies, regulations, and procedures listed in the LIT Catalog and Student Handbook. The LIT Catalog and Student Handbook may be accessed at [www.lit.edu](http://www.lit.edu) or obtained in print upon request at the Student Services Office.

WLDG 2443  
Course Syllabus

**Course Schedule**

<b>Week</b>	<b>Topic</b>	<b>Reference</b>
1&2	Course introduction and policies Shop orientation and safety procedures Cutting torch safety and procedures Measuring and Lay-out tools Use the Oxyfuel torch beveling machine Preparing the bevel plate to weld Welding E6010 root pass, E7018 hot pass, fill and cap in the 1G position (weave and bead method) and test • LECTURE/LAB	Syllabi  Instructor Demonstration/ Supervision
3&4	Use the Oxyfuel torch beveling machine Preparing the bevel plate to weld Welding E6010 root pass, E7018 hot pass, fill and cap in the 2G position and test • LECTURE/LAB	Instructor Demonstration/ Supervision
5	Use the Oxyfuel torch beveling machine Preparing the bevel plate to weld Welding E6010 root pass, E7018 hot pass, fill and cap in the 3G (weave and bead method) position and test • LECTURE/LAB	Instructor Demonstration/ Supervision
6	Use the Oxyfuel torch beveling machine Preparing the bevel plate to weld Welding E6010 root pass, E7018 hot pass, fill and cap in the 4G position and test • LECTURE/LAB	Instructor Demonstration/ Supervision