WLDG 1428: Introduction to Shielded Metal Arc Welding (SMAW)

Semester Hours: 4

Textbook: Modern Welding by Goodheart-Wilcox Co., Inc. (Library of Congress, Catalog Card No. 6502044)

Course Description: A fundamental course in layout and fabrication related to the welding industry. Major emphasis on structural shapes and use in construction.

Course Learning Outcomes: The student will select electrodes and amperage settings for various thicknesses of materials and welding positions; define principles of arc welding; and interpret electrode classifications. The student will perform SMAW operations in various positions using selected electrodes and different joint designs.

Supplementary Materials: Videos, DVD, Handout Material

Performance Objectives:

1. Given instructions and practice the student will be able to perform the following tasks in the classroom and welding shop. This knowledge will be evidenced by laboratory demonstrations completion of assignment sheets, destructive methods of evaluating the welds to conform with American Welding Society standards, and by scoring the college minimum satisfactory grade.

   A. Prepare metal for welding with a flame torch and grinder.
   B. Tack weld two plates with the correct gap with and without a back-up strap.
   C. Run a stringer bead and finish welding the plates in the flat position.
   D. Run a stringer bead and finish welding a set of plates in the downhill motion.
   E. Run a stringer bead and finish welding a set of plates in the 1G and 2G position.

Teaching Methods:

1. Transparencies in conjunction with lectures
2. Individual and group instructions in the lab
3. Groups of four or five students will work together on lab projects

**Evaluation Methods:**

1. Written examinations
2. Attendance
3. Discussion participation
4. Lab test and lab performance
5. Destructive method using a guided bend tester

**Grading Policy:**

Lecture Evaluation 20%
Practical Application (Lab) 80%

**Attendance Policy:**

Students must attempt to attend all classes. Excessive absenteeism will have a detrimental effect on the student grade. Students can be dropped from classes for excessive absenteeism. The instructor will call roll at the beginning and end of each class or any time he or she feels necessary. Three (3) times tardy will count as one (1) absence. The attendance record starts the first day of class beginning of each semester.

**Course Outline:**

I. Preparing the Metal For Welding
   A. Bevel Plate
   B. Grind a landing on the level
   C. Set the correct gap for root pass
   D. Cut and tack back-up strap
   E. Be able to set plate in the correct position

II. Stringer Bead or Root Pass
   A. Be able to run a root pass in the 1G and 2G position by stepping the electrode with 6010 and 6011 electrode 1/8 inch in diameter.
   B. Be able to run a root pass using a backup strap and using E6010 electrode 1/8 inch in diameter.
   C. Be able to run a root pass in the 3G downhill position using E6010 electrodes 1/8 inch in diameter.
III. Filler Bead

A. Fill up a 1G and 2G groove plate using E7018 electrode 1/8 inch in diameter.

B. Fill up a 3G groove downhill motion using E6010, E6011 or E7010 electrodes 5/32 inch in diameter.

IV. Finish Bead

A. Finish the weld in the 1G position using the multiple-passes with three beads exposed, with E7018 electrodes.

B. Fill up and finish a weld in the 2G position with multi-layer with three beads exposed using E7018 electrodes.

C. Finish the weld in the 3G vertical down position using E6010, E6011 or E7010 electrodes 5/32 or 3/16 inch in diameter.

COMPETENCY PROFILE

STUDENT ___________________________ COURSE WLDG 1428

INSTRUCTOR _________________ SEM./YEAR

RATING SCALE:

4 Skilled: Can work independently with no supervision.
3 Moderately Skilled: Can perform job completely with limited supervision
2 Limited Skill: Requires instruction and close supervision.
1 No Exposure: No experience or knowledge in this area.

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COMPETENCY

Identifies and selects power source.

Identifies and makes proper electrode selection.

Identifies, selects joint design, and prepares material for weld procedure.

Sets welding current for correct weld procedure.

Identifies welding problems, their causes, and takes corrective action.

Makes V-groove, butt joint weld in the flat test position. (1G)

Makes V-groove, butt joint weld in the horizontal position. (2G)

Makes V-groove, butt joint weld in the horizontal position with back up strap. (2G)
| Makes V-groove, butt joint weld in the vertical position. (3G) |
| Makes V-groove, butt joint weld in the vertical position with back up strap (3G) |
| Prepares weld for test. |
| Passes visual test. |
| Passes destructive test |

**SCANS FOUNDATIONS**

**PERSONAL QUALITIES:**

| Responsibility: | Exert a high level of effort and persevere toward goal attainment. |
| Self-Esteem: | Believe in one's self-worth and maintain a positive view of oneself. |
| Sociability: | Demonstrate understanding, friendliness, adaptability, empathy, and politeness in group settings. |
| Self Management: | Assess oneself accurately, set personal goals, monitor progress, and exhibit self control. |
| Integrity and Honesty: | Choose ethical courses of action |