REEDLEY COLLEGE
MAG 7
DESIGN AND CONSTRUCTION
COURSE OUTLINE

Course Description:

This semester long, two unit course is designed to teach practical skills used in the design and fabrication of equipment used in the landscape, agriculture, and natural resources industries. Students will gain proficiency in basic oxyacetylene cutting and welding, brazing, and soldering. Basic arc welding using the SMAW process primarily in the flat position will be emphasize& Students will learn metallurgy, electrode nomenclature, beginning MIG welding, and practice good safety habits. Students will also construct a simple welded project using the skills acquired in the course.

UNIT 1:
ORIENTATION AND SAFETY

GOAL:
To introduce the student to the required processes and steps involved in becoming a welder, and to develop and reinforce sound safety habits.

OBJECTIVES: After completing this unit the student will:

1. Become aware of the course requirements, expectations, and shop rules.

2. Become familiar with the occupational requirements in welding and be aware of the occupational outlook in the welding industry.

3. Learn general shop safety rules and pass safety test with 100% accuracy.

4. identify and demonstrate the correct use of tools and their proper storage in the welding shop.

5. Demonstrate good shop clean-up habits.

6. Know and demonstrate the safe use of arc welding equipment and oxyacetylene welding equipment

UNIT II. DESIGN OF WELDED UNITS

GOAL: To learn the basics of joint design and the effects of weld on a structure.

OBJECTIVES: After completing of this unit the student will:

1. Understand the basics of joint design
2. Identify the major parts of a welding symbol.
3. List the 5 major types of joints.
4. List 7 types of groove welds.
5. Identify the parts of a groove and fillet welds&
6. Identify weld defects and their causes.
7. Recognize the importance of controlling distortion in the welded joint.

UNIT III: OXYACETYLENE WELDING AND CUTTING

GOALS: To develop welding and cutting skills using the oxyacetylene cutting apparatus.

OBJECTIVES: After completing this unit the student will:

1. Identify the parts of the oxyacetylene welding and cutting outfit

2. Know how to set up, operate, and break down an oxyacetylene outfit.

3. Demonstrate the safe and proper use of the oxyacetylene cutting torch to cut plate, pierce holes, and cut sheet metal.

4. Demonstrate gas welding techniques in the flat position Basic welds will include: & butt welds
   b. lap welds
   c. fillet welds
   d. corner welds

5. Demonstrate brazing techniques using sheet metal, steel, and cast iron.

6. Be able to properly and safely change and handle high pressure gas cylinders, and make minor repairs to oxyacetylene equipment.

UNIT IV: SHIELDED METAL ARC WELDING

GOALS: To develop welding skills primarily in the flat position with the various electrodes used in the trade.

OBJECTIVES: Upon completing this unit the student will:

I. Identify~ and operate the following power sources:
   & transformer welders b. rectifier welders C. generator welders

2. Understand basic welding terminology including:
   & alternating current
   b. direct current
   c. polarity
   d. ampere
   e. voltage
   C resistance

3. Know and use the proper personal equipment used in arc welding.

4. Be able to weld proficiently in the flat position using E6010, E6013, and E7018 electrodes.

5. Be able to identify the different electrodes and understand the electrode classification system.

6. Be able to prepare and weld the S basic welding joints in the flat position

7. Be able to cut, prepare, and weld pipe using E7018.

8. Demonstrate knowledge of welding out of position. (Advanced students)

UNIT V: GAS METAL ARC WELDING

GOAL: To develop skills for the MIG welding process, and to acquire knowledge of the gases and power sources.

OBJECTIVES: After completing this unit the student will:

1. Identify the power sources and gases involved in the GMAW process.
2. Be able to weld mild steel in the flat position.
3. Identify the parts of the MIG sled and gun.
4. Demonstrate the proper care of the MIG welder.
5. Be able to change wire spools on the MIG welding wire feeders.

UNIT VI: PROPERTIES OF METALS

GOALS: To acquire a basic knowledge of metals as it relates to welding

OBJECTIVES: After completing this unit the student will:

1. Know and identify the difference between ferrous and non-ferrous metals.
2. Learn to identify metals by their physical appearance.
3. Know the major tests used to identify metals.
4. Learn the importance of controlling distortion of metals.
5. Learn the common alloy metals and their uses.

6. Learn the basic terminology used with metals.

UNIT VII: PROJECT DESIGN AND CONSTRUCTION

GOAL: To use the skills acquired to design and build a welded project.

OBJECTIVES: After completing this unit the student will:

1. Demonstrate the ability to accurately read and use a tape measure
2. Be able to use and interpret basic welding symbols.
3. Be able to make simple sketches and drawing showing scale and dimensions.
4. Understand metal costs and develop a bill of materials.
5. Design and construct a project according to ability.

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COURSE COMPETENCIES

1. Demonstrate good safety habits and good judgment.
2. Can accurately read and use a tape measure.
3. Can make simple sketches and read basic blue prints.
4. Can use measuring tools and understands squareness.
5. Can layout, plan, and cut materials efficiently.
6. Can arc weld using E6011, E6010, E7018, and E7024 in the flat position.
7. Can use the above electrodes to make butt, lap, tee, corner, and pipe welds.
8. Can use oxy-fuel equipment to weld in the flat position.
9. Can braze weld in the flat position.
10. Can use cutting torch to make accurate cuts.
11. Can use the GMAW process for welding mild steel in the flat position.
12. Can operate an iron worker.
13. Can use a horizontal band saw.
14. Can operate a cold cut and abrasive saw.
15. Can operate a drill press
16. Can use power and hand tools safely and effectively.

18. Can control distortion in welding.
19. Can change lens and head gear in welding hood and welding goggles.
20. Can change blade on cutoff and band saws
22. Can mount regulators on oxy-fuel apparatus.
23. Can plan, execute and supervise an work on a welding project.

GENERAL METHODS OF INSTRUCTION:

I. LECTURE/DISCUSSION.
2. INSTRUCTOR DEMONSTRATIONS
3. HANDOUTS AND TEXT ASSIGNMENTS.
4. STUDENT PRACTICE WITH INSTRUCTOR ASSISTANCE
5. PROBLEM SOLVING EXERCISES
6. DUE TO THE SCOPE OF THE COURSE STUDENTS WILL NEED TO STUDY TEXT OUT OF CLASS TIME.

METHODS OF EVALUATION:

1. WRITTEN TESTS:
   A. SAFETY TEST 100pts
   B. MID TERM 100pts
   C. FINAL EXAM 100pts

2. SKILLS TESTS

A. MIDTERM
1. THREE WELDS 300 PTS
   A. OXY-FUEL CORNER
   B. BUTT BRAZE
   C. E7018 COVER THREE BEADS

B. FINAL
1. THREE WELDS AND EVALUATION OF PROJECT 500 PTS
   A. TEE USING E7024 THREE PASSES (6 BEADS)
   B. SVOG E6010
   C. TEE USING GMAW

C. LAB ASSIGNMENTS
A. 15 WELDS @ 10 pts EACH 150 PTS

D. GRADING PROCEDURE

1. ATTENDANCE : PUNCTUALITY IS A MUST TEN POINTS FOR BEING ON TIME AND TEN POINTS FOR ATTENDING CLASS. 320 PTS

2. CALL IF YOU ARE GOING TO BE OUT OF CLASS

3. FINAL GRADES WILL BE GIVEN ON THE BASES OF YOUR AVERAGE TOTAL

POINTS. NO CURVE

a. TOTAL POINTS POSSIBLE 1570

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

ALL CLASS WORK MUST BE COMPLETED FOR A PASSING GRADE

MATERIALS : SAFETY GLASSES, BOOTS, COVERALLS, SOAP STONE HOLDER, TAPE MEASURE

TEXT: FOS WELDING JOHN DEERE COMPANY

INSTRUCTOR INFORMATION:

ERIC WADE
DAY PHONE 559-855-8311 EXT 227
OFFICE HOURS: 5:30--6:00 PM MONDAYS