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**REEDLEY COLLEGE – MAG 41 – INTRODUCTION TO AGRICULTURAL WELDING**

**Spring 2017 MAG 41 – #56862 T & Th 3:30pm – 5:45pm**

**3 Units, 18 weeks (1/9 - 5/18)**

**Instructor:** Darrell Hirschler

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**Office:** IND 22

**Classroom:** IND 17

**Lab:** IND 11

**Office hours:** Mon - Thur 12:00pm – 1:00pm & Fri 7:00am – 7:30am

**Text Book:** Deere Welding Book FMO John

**Description:** This course provides an introduction into the welding industry as it relates to agricultural mechanics. Instruction in the areas of safety, welding processes (oxy-fuel, SMAW & GMAW), cutting processes (oxy-fuel & plasma arc), equipment and the properties of metals will be covered.

**Student Learning Outcomes:**

**Upon completion of this course students will be able to:**

* Demonstrate the welding processes as they relate to the agricultural field.
* Demonstrate the ability to properly and safely use an oxy-fuel apparatus to cut, weld and braze.
* Demonstrate the ability to properly and safely use a SMAW machine to weld.
* Demonstrate the ability to properly and safely use a GMAW machine to weld.
* Demonstrate the ability to properly and safely use a Plasma Arc Cutting Machine

**Course Objectives**

1. Be able to identify hazardous issues that pertain to the agricultural welding shop.
2. Be able to properly set, adjust and operate a SMAW welding machine.
3. Be able to properly set, adjust and operate a GMAW welding machine.
4. Be able to perform welds in the flat position using E6013, E7018 & E6011 rods.
5. Be able to properly set up and shut down the oxy-fuel setup.
6. Be able to properly demonstrate braze welding using the oxy-fuel apparatus.
7. Be able to properly demonstrate fusion welding using the oxy-fuel apparatus.
8. Be able to properly demonstrate oxy-fuel cutting.
9. Be able to properly demonstrate plasma arc cutting.
10. Be able to demonstrate the ability to clean and fit their welds.
11. Be able to demonstrate the ability to maintain welding machines and equipment in the welding shop.

**Basic Skills Advisories:**

Eligibility for English 126 and Math 101

**Prerequisites: None**

**Required Materials: \*Optional but recommended**

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| --- | --- |
| **Clear Safety Glasses (Z87.1+)** | **\*Chipping Hammer** |
| **Oxy-Fuel Goggles or Glasses (shade #5)** | **\*Oxy-Fuel Tip Cleaners** |
| **Welding Jacket / Leathers – or-****Coveralls / Shop Coat – or –** **Long Sleeve Work Shirt & Jeans**  | **\*Friction Lighter** |
| **Approved footwear (leather work boots)** | **\*Slip Joint Pliers or Locking Pliers** |
| **Welding Helmet (shade #10)** | **\*Soap Stone**  |
| **Leather Welding Gloves** | **Scan-Tron for final exam** |

**How class will be conducted:**

* Lecture
* Instructor Demonstrations
* Lab Tasks / Assignments 50%
* Quizzes 20%
* Attendance / Clean-up 10%
* Final Exam: 20% May 18, 2017 3:30pm – 5:30pm

\*Final Exam is mandatory – Failure to participate will result in a non-passing grade.

**Point Distribution:** 100% - 90% = A

 89% - 80% = B

 79% - 70% = C

 69% - 60% = D

 59% and less = F

**Course Outline:**

The instructor will determine the order in which the following will be presented and developed. It is also probable that several skills may be served by the same assignment.

**Introduction to safety**

 Protective equipment

 Ventilation

 Fire Protection

 Arc Welding

 Oxyacetylene welding

**Joint Design and Terms**

 Design Factors

 Controlling Distortion

 Weld Defects

**Oxyacetylene Welding and Cutting**

 Equipment

 Set-up and operations

 Cutting Plate Steel

 Piercing Holes

 Power Cutting

**Shielded Metal Arc Welding (SMAW)**

 Machines and Accessories

 Selecting the Electrode

 Striking the Arc

 Running Continuous Beads

 Surfacing

 Welding positions

**Gas Metal Arc Welding (GMAW)**

 Machines and Accessories

 Set-up and operation

 Running Beads

**Properties of Metal**

 Ferrous and Non Ferrous Metals

 Iron and Steel

 Alloy Metals

 Identification of Metals

**Project Design and Construction**

 Measurement

 Basics of Sketching and Drawing

 Basic Construction

**LABS:**

**Oxy-Fuel Welding/ Cutting Labs**

LAB #1 Oxy-Fuel - Safety / Start up and shut down procedures

LAB #2 Oxy-Fuel Welding Project #1 (push-a-puddle, bead with rod & fusion corner)

LAB #3 Oxy-Fuel Welding Project #2 (butt, lap, tee)

LAB #4 Oxy-Fuel Welding Project #2 (butt, lap, tee)

LAB #5 Oxy-Fuel Brazing – Tee & Lap Joint

LAB #6 Oxy-Fuel Project – COW BELL

LAB #7 Oxy-Fuel Project – COW BELL

LAB #8 Oxy-Fuel Cutting – Straight Line Cutting & Pierce-a-Hole

**SMAW Welding**

LAB #9 SMAW - E6013 Bead Pad Project (weld)

LAB #10 SMAW - E6013 Bead Pad Project (weld, grid & finish)

LAB #11 SMAW - E7018 Welding Project (pad, butt, lap, tee & outside corner)

LAB #12 SMAW - E7018 Welding Project (butt, lap, tee & outside corner)

LAB #13 SMAW - E6011 Welding Project (pad, butt, lap, tee & outside corner)

LAB #14 SMAW - E6011 Welding Project (butt, lap, tee & outside corner)

**GMAW Welding**

LAB #15 GMAW – Pad

LAB #16 GMAW Welding Project (butt, lap, tee & outside corner)

LAB #17 GMAW Welding Project (butt, lap, tee & outside corner)

LAB #18 Plasma Arc Cutting

**\*NOTE: Content and order may be changed as deemed necessary by the instructor.**

**Essential Information:**

* Any assignment turned in over week late will receive 50% credit.
* Home work will not be accepted more than one week late.
* Attendance and participation is very important. You must attend class in order to participate and complete the required work.
* You are required to find out from the instructor any material missed during absence.
* Tests may be made up at the instructor’s discretion.
* Campus policy requires all students who miss 2 consecutive weeks must be dropped.
* In the event of class being cancelled you will be notified by a sign on the door.
* “Because cheating, plagiarism, and collusion is dishonest activities that erode the integrity of the college, each student is expected to exert an entirely honest effort in all academic endeavors. Academic dishonesty in any form is a very serious offense and will incur serious consequences.” – SO DO NOT CHEAT!!
* If you carry a cellphone, please be respectful and set to vibrate before class starts.
* Foul Language will not be tolerated and student will be asked to leave class if not contained.
* Do not leave the classroom or shop area without instructor’s permission.

**IMPORTANT DATES:**

* **January 16 (M) Martin Luther King Day No Classes**
* **February 17 (F) Lincoln Day No Classes**
* **February 20 (M) Washington Day No Classes**
* **March 10 End of 1st - 9 week courses**
* **March 12 (S) Daylight Savings Move clocks forward 1 hr.**
* **March 10 – 14 Spring Break No Classes**
* **May 19 End of 2017 Spring Semester**

**Work Ethic:** Most students are enrolled in college classes to obtain a quality job or to enhance their skills for enhancement with their current employment situation. Employers look for a punctual, responsible individual who is prepared to go to work. Our goal is to replicate the workplace environment where a student can develop and demonstrate these desirable traits.

* **Punctual**: It is customary to arrive at least 5 minutes before work begins. Individuals will be terminated if they are not punctual.
* **Responsible**: It is expected that an employee works every scheduled work day. Individuals will be terminated if they are not responsible.
* **Prepared**: It is expected that an employee be prepared when he/she arrives for work. Students must have the appropriate clothing, tools and safety gear to participate in the laboratory. If a student is not prepared, he/she cannot participate and will receive a zero (see “responsible”).