*WELD 135*

*Welding for the Maintenance Technician I*

*Section 1002*

*Syllabus*

*Fall 2016*

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**Course Information**

Course Title: Welding for the Maintenance Technician 1

Course Number: WELD 135

Course Discipline: Welding

Course Description: In this course the Maintenance Technician will learn safety in welding and Oxy-Fuel Cutting operations. Also covered in this course, the Maintenance Technician will gain an understanding of electrodes and electrode selection as well as develop an understanding on Shielded Metal Arc Welding equipment that is used in the shop and field environments. The Maintenance Technician will perform the operation of using high alloy electrodes to extract broken bolts. The Maintenance Technician will become knowledgeable in the MSHA and OSHA fabrication regulations regarding hand railing.

Course Prerequisites: None

Course Times: 7:00pm – 10:00pm, Wednesdays, 8/26/2015 – 12/02/2015

Course Location: Weld Shop

**Textbooks**

Required Textbooks: Welding Technology Fundamentals, fourth edition by William A. Bowditch/Kevin E. Bowditch (ISBN 978-1-60525-256-8)

Reading Assignments: Chapters 1, 5, 6, 7, 8, 20, 21, 22

**Learner Expected Outcomes**

Upon completion of this course, the students will:

* Demonstrate the use of high alloy extractor electrodes. (1), (2), (3).
* Determine the type of polarity used with high alloy extractor electrodes. (1), (2), (3).
* Determine what diameter electrode needs to be used / per diameter of bolt to be extracted. (1), (2), (3)
* Interpret (OSHA), (MSHA) requirements regarding Hand Railing. (1), (2), (3).
* Proper layout and fit-up hand rail. (1), (2), (3).
* Distinguish between Direct Current (DC) and Alternating Current (AC). (1), (2), (3)
* Interpret American Welding Society (AWS) abbreviations regarding welding current & polarity. (1), (2), (3)
* Identify the equipment and accessories used in Shielded Metal Arc Welding (SMAW). (1), (2), (3)
* Identify factors to consider when selecting an arc welding outfit. (1), (2), (3)
* Demonstrate the assembly of a welding machine, leads, and electrode holder. (1), (2), (3)
* List the steps in connecting the electrode holder to the lead. (1), (2), (3)
* Describe the procedure for inspecting a shielded metal arc welding outfit. (1), (2), (3)
* Set the proper amperage and polarity on a welding machine. (1), (2), (3)
* Identify carbon and low alloy SMAW electrodes. (1), (2), (3)
* Identify six purposes of an electrode covering. (1), (2), (3)
* Interpret the (AWS) electrode classification system for SMAW. (1), (2), (3)
* Demonstrate the trial amperage of a welding machine using the rule of thumb method. (1), (2), (3)
* Select an electrode to meet the requirement of a weld. (1), (2), (3)
* Identify proper methods of storing electrodes. (1), (2), (3)
* Identify the safety rules required for arc welding. (1), (2), (3)
* Demonstrate how an arc is started. (1), (2), (3)
* Identify and demonstrate five essentials for a quality weld. (1), (2), (3)
* Identify the parts of an oxy-fuel cutting outfit. (1), (2), (3)
* Describe the function of each of the parts. (1), (2), (3)
* List the steps required to assemble an oxy-fuel outfit. (1), (2), (3)
* List the steps required to shut down an oxy-fuel station. (1), (2), (3)
* Identify the safety features of an oxy-fuel cutting outfit. (1), (2), (3)
* Describe the procedure used to check for leaks in an oxy-fuel outfit. (1), (2), (3)
* Demonstrate steps to light and adjust the flame of an oxy-fuel torch. (1), (2), (3)
* Identify three types of flames and the parts of each. (1), (2), (3)
* List fuel gases used for oxy-fuel cutting. (1), (2), (3)
* Identify the protective clothing used in welding and cutting operations. (1), (2), (3)
* List safety precautions that must be taken when performing oxy-fuel and SMAW operations. (1), (2), (3)

 (\*) Numbers represent the learner outcome measurement method.

**Measurement of Learner Outcomes**

 (1) Written Examination

 (2) Practical Evaluation – Students will be asked to show competence by kinesthetic demonstration.

 (3) Verbal – Students will demonstrate competence by presenting oral demonstrations in groups and individually.

 Students will be tested for knowledge and skill attainment through written tests comprised of questions taken from handouts, reading assignments, homework and lectures. Quizzes may be unannounced, but tests will be announced at least one class period before they are given. For the laboratory assessments, the students will demonstrate his or her ability to produce satisfactory welds, set forth by the instructor. These welds will be judged for soundness and quality as set forth by the American Welding Society’s D1.1 Structural Welding Code, which is the standard in this country and throughout the world.

**Method of Instruction**

A combination of lecture, discussion, demonstrations, and film/video presentations will be used in the classroom training. Hands-on training will be in the welding lab. The student will make quality welds in the Flat and Horizontal positions on both fillet and groove welds.

**Course Requirements**

* Students will be required to pass the welding safety test with 100% accuracy before they will be allowed to work in the shop.
* Safety principles in the weld shop will be followed at all times.
* Students will complete training on all needed welding and cutting equipment.
* Students will be required to hand in homework assignments by the due date.
* Students will be required to hand in shop assignments.
* Students will be required to hand in class assignments.

Lab Assignments: The students will perform welding exercises in the following areas:

* Flat position pad using E-7018 Electrodes.
* Flat position pad using E-6010 Electrodes.
* Flat position Inside Outside corner joints using E-6010 and E-7018 electrodes.
* Flat position V-Groove with backing using E-7018 electrodes.
* Weld a 90 degree elbow in the 2G position using E-7018 electrodes.
* Make a Fillet weld from pipe to plate in the 2G position using E-7018 electrodes.
* Extract a broken bolt using high alloy extractor electrode.
* Setup and shutdown of oxy-fuel cutting equipment.
* Make straight, bevel, and circle cuts using oxy-fuel equipment.

**Attendance Policy:**

You are expected to attend all class meetings. Exceptions may be discussed with the instructor with suitable make-up activities agreed upon (before the absence). All course work is due on the assigned dates whether or not you are present. **You will lose one letter grade for every day (not class period) that it is late.** The instructor assumes no responsibility for making sure you receive any course material for which you were absent. **This is your responsibility. After being tardy three times this will count as one absence. If you are tardy more than one hour this will count as a half day absence, and if two and a half hours late or more this counts as an absence. AFTER TWO ABSENCES YOU WILL BE DROPPED FROM THE CLASS.**

*NO CELL PHONES, MP3 PLAYERS, CD PLAYERS, ETC. WILL BE ALLOWED IN THE CLASSROOM OR THE LAB EXCEPT AS PERMITTED BY THE INSTRUCTOR. Violation of this policy will result in the student being dismissed from class that day and it will count as an absence.*

**Students with Disabilities:**

GBC supports providing equal access for students with disabilities. An advisor is available to discuss appropriate accommodations with students. Please contact the Director for Services to Students with Disabilities (Julie Byrnes) in Elko at 775.753.2271 at your earliest convenience to request timely and appropriate accommodations.

**Grading Policy and Grading Scale**

 Grades will be weighted according to the following scale:

 **Class Participation, Assignments, Tests and Quizzes 50%**

 **Lab Assignments 50%**

 **Up to 20% could be deducted from your grade for blatant safety violations.**

**Grade Scale:**

A 94% - 100% A- 90%-93%

 B + 87% - 89% B 84%-86% B- 80%-83%

 C+ 77% - 79% C 74%-76% C- 70%-73%

 D + 67% - 69% D 64%-66% D- 60%-63%

 F Below 60%

**Drop Deadlines**

 If you do not formally withdraw by drop deadline, your instructor will automatically assign you a grade of “F.” The last day to drop the courses is **TBA.**

**Plagiarism**

 Plagiarism is presenting someone else’s words, ideas, or data as one’s own. When a student submits work that includes the words, ideas, or data of others, the source of that information must be acknowledged through complete, accurate, and specific references, and if verbatim statements are included, through quotation marks as well. In academically honest writing or speaking, the student will acknowledge the source whenever another person’s actual words are quoted, whenever another person’s idea, opinion, or theory is used, even if it is completely paraphrased in the student’s own words, or whenever facts, statistics, or other illustrative materials are borrowed, unless the information is common knowledge.

**Tool List – Personal Protective Equipment (PPE)**

 **(The STUDENT is responsible for these items)**

* Suitable, fire resistant work clothing.
* Leather jacket or sleeves and apron.
* Leather gloves.
* High top leather shoes or boots (steel toe is recommended).
* Welder’s hat or skullcap (optional).
* Safety glasses with side shields (clear lens).
* Clear face shield.
* Cutting face shield, #5 or burning goggles with the following cover and filter plates.

 2 each - #5 shaded filter plate/lens

 4 each – Clear cover plate/lens

* Ear plugs.
* Welding helmet and lenses (to match helmet design).

 2 each - #10 shaded filter plate/lens *OR*

 2 each - #11 shaded filter plate/lens

 4 each – Clear cover plate/lens

**Personal tools**

* Carbon steel wire brush.
* Soap stone and holder.
* Chipping hammer.
* Pliers, wrenches and clamps

10” or 12” adjustable wrench

Vice Grip clamp (11R)

* Oxy-fuel friction lighter (striker), flint and tip cleaners
* Flashlight
* Welding Magnets (Qty. 2)
* Lock