Lexington High School-Skills Armory

Welding 1
Periods 3-4, 5-6,
2023-2024
Skills Armory-Welding Classroom and Shop

Instructor: Mr. Keith Nielson keith.nielson@lexschools.org
Plan Period 2: 8:45-9:39am M-F
Lab Makeup times: 3:45-5:30pm T & Th
Phone: 308-324-4691 Ext 2908

1. Rationale

This is an introductory welding class that is the first in a three-course offering at LHS. Students who successfully complete Welding I, Welding II, & Welding Manufacturing III will have skills to qualify as an American Welding Society (AWS) Entry-Level Welder. Successful completion of NCCER test and performance objectives will be eligible for registration in the National NCCER registry database that can be used by employers to verify your skills. Successful completion of this course is required for advancement to Welding 2.

2. Course Aims and Outcomes

This class is intended teach a student who has little to no experience with the welding and/or cutting of metal how to safely perform oxy-fuel cutting (OFC), plasma arc cutting (PAC), shielded metal arc welding (SMAW) and carbon arc cutting (CAC). A student who successfully completes this class will be able to read and interpret basic welding symbols on a blueprint. This course will introduce students to metal identification, surface preparation, joint fit-up, and weld inspection. The course is intended to be 30% in the classroom and 70% in the lab. After successfully completing all performance objectives and unit tests you will be able to be placed in the NCCER registry with your qualifications.

Specific Learning Outcomes:
By the end of this course, students will be able to:

- Identify common hazards in welding and explain some of the causes of accidents.
- Explain and identify proper personal protection used in welding.
- Develop communications skills using verbal, non-verbal and written communication.
- Identify some of the many dangers that are inherent when working around fumes and gases, and how to safely use respirators to mitigate some of the dangers.
- Explain the need for extra precautions when oxyfuel gas welding & cutting, storing & handling cylinders, & working around electrical hazards.
- Identify and explain uses for material safety data sheets (MSDSs).
- Explain the principles of safe oxy-fuel cutting (OFC).
- Safely perform setup, adjustment, and shutdown procedures of oxy-fuel equipment.
- Follow procedures and methods for performing various types of oxy-fuel cuts.

- Explain the principles of plasma arc cutting (PAC) processes.
- Identify, prepare, and set-up plasma arc cutting equipment.
- Follow procedures and methods for performing various types of plasma arc cuts.
- Identify and interpret welding basic welding symbols.
- Identify and interpret welding drawings.
- Prepare metals for welding and cutting.
- Identify and explain joint design.
- Read and interpret code specification and how to use gauges and measuring devices to perform and inspect joint-fit-up.
- Find, identify, and avoid weld imperfections.
- Prepare for welder performance qualification tests.
- Explain the principles of shielded metal arc welding (SMAW).
- Identify, prepare, and set up shielded metal arc welding (SMAW) equipment.
- Classify, select, store, and control electrodes that are used for shielded metal arc welding
- (SMAW).
- Strike an arc and how to make stringer, weave, and overlapping beads with E6010 and E7018 electrodes.
- Make fillet welds in the 1F, 2F, 3F, and 4Fpositions with E6010 & E7018 electrodes.
- Make groove welds with backing strip in the 1G, 2G, 3G, and 4G positions using E6010 and E7018 electrodes
- Make open-root groove welds in the 1G,2G,3G, 4G positions using E6010 & E7018 electrodes.
- Properly clean welds.
- Identify and explain the types & components of a groove weld.
- Follow procedures and methods for making open-root V-groove welds.

3. Assumptions

- Students are expected to read outside of the classroom to be familiar with lessons that will be taught and discussed in the classroom.
- A student who is enrolled in a welding class is, at the very minimum, willing to put forth an effort to learn and/or improve his/her welding & cutting skills and knowledge.
- Safety will be addressed, discussed and/or evaluated before, during, and after any lab activity. There must be 100% compliance with rules and procedures that are intended to ensure the health and safety of participants and observers.
    - Students who do not bring in the appropriate welding clothes will be given 1 day to have the appropriate clothing for class. Second day without appropriate clothing the Lab grade will be a 0.
- Students understand and appreciate the investments in tools, welding machines, consumables and misc. equipment that were made in order for them to have an opportunity to learn some employable skills.

- Tools, machinery, personal protective equipment, consumables, tables, stands, fixtures, etc. will be used for the purpose for which they were intended.
- Students prefer to learn in a high-quality training environment. Unsolicited welding on any welding booth partition walls, welding tables, stands, fixtures and/or tools that intentionally falls in the “Damaging or Stealing Property” category of the student handbook.
- Students have specific skills that they would like to possess. Students are encouraged to establish personal learning goals for the class and they should be willing to communicate those goals with the instructor.
- Zero tolerance for use of cell phone or using electronic devices in the classroom and lab. These can only be used under the approval of the instructor in the classroom.

4. <u>Course Requirements:</u>

A. Class attendance: see 2021-2022 LHS Student Handbook, pg 8-10

B. Course training materials:
   1. Course text: Althouse, Andrew D., et al. Modern Welding. 11th ed. Goodheart-Willcox Company, Inc. 2013. Print.
   2. Student Workbooks: Hobart Institute of Welding Technology
   3. NCCER Construction Core, Pearson Publishing
   4. NCCER Welding Level 1, Pearson Publishing

C. Grading
   1. Each quarter grade is 45% of semester grade.
   2. Semester test is 10% of the semester grade.
   3. Semester grade is 45% Quarter 1 + 45% Quarter 2 + 10% Semester test =Final grade:
   4. Final grade is 50% Semester 1 + 50% Semester 2 = Final grade.

D. Grading Categories:
   1. Early work 5%
   2. Performance test 40%
   3. Unit Test 30%
   4. Class and Lab Exercises/Clean up 25%
      Students are to have the appropriate clothing for the class. They will be given one excused day then on the second day if they do not have the appropriate clothing, they will receive a 0 for the lab grade.

E. Required clothing: students
   1. must be dressed in the specific attire in order for them to participate in lab activities that involve welding, cutting, and/or grinding, along with certain material handling activities.
   2. Jeans that are free of holes, tears, rips and/or frays are required.
   3. High-top leather work boots with 8” uppers. (steel or safety toes recommended but not required).
   4. Athletic shoes with synthetic materials are not permitted.

5. Points may be deducted from the student's lab grade if s/he is unable to perform due to the lack of proper attire.
6. Personal Protective Equipment (PPE):
    a) Students will need specialized protective clothing and equipment to safely perform the tasks that they will be assigned to them in this class.
    b) Students will be provided with the necessary personal protective equipment (PPE).
    c) Z49.1 Safety in Welding, Cutting and Allied Processes is the governing document for determining required PPE.
    d) P.P.E. that is assigned to the student for the period of the course must be signed for upon time of issue.
    e) The student takes responsibility for any PPE upon signing for and/or taking possession of the equipment.
    f) No P.P.E. that is owned by the school may leave the school grounds unless the instructor grants permission.
    g) Students may bring in their personal welding helmet. <u>However, the school is not responsible for damage or replacement if it is damaged or stolen</u>. Helmets must meet the Z47.1 Safety in Welding, Cutting and Allied Process standards.
    h) The student will not receive any credit for the course until all PPE that she/he was issued is returned to the school. If the student does not return PPE or the student pays the replacement cost for damaged P.P.E.

F. <u>Grading Procedures;</u>

1. Early work is completed during the first 5 minutes of the class and is turned in.
2. Performance tasks that meet all of the criteria will be awarded full credit. Points may be deducted for not meeting all of the criteria.
3. Unit exams: Must attain at least a 70% for certification. You are allowed to retake the unit test no earlier than 48 hours after the original test was completed to improve your score.
4. Lab Grading Criteria:
    a) a. Punctual for all commitments OR notifies instructor before start of day if absent or tardy.
    b) Follow instructions and be able to take direction from the instructor.
    c) Motivated to accomplish the task at hand.
    d) Uses language & manners suitable for the workplace
    e) Observes established rules, policies & procedures.
    f) Maintains equipment and supplies in good working condition.
    g) Organizes and implements a productive plan of work. Displays self-initiative

h) Demonstrates honesty, integrity & reliability.
i) Responds positively to ongoing performance feedback. Displays a willingness to cooperate.
j) Maintains positive working relationships and respects cultural and ethnic differences.
k) Wears clothing suitable to the job, task, and environments while adhering to the dress code.
    (1) Students are to have the appropriate clothing for the class. They will be given one excused day, then on the second day if they do not have the appropriate clothing they will receive a 0 for the lab grade
l) Communicates effectively with instructor(s) and classmates.
m) Identifies problems and takes appropriate action.
n) Identifies appropriate resources.
o) Deals with stress in appropriate ways.