**COLLEGE OF DUPAGE**

**Welding 1112-HYB04, 1122- HYB04, 1132- HYB04, 1142- HYB04, 1151- HYB04, 1160- HYB04**

**Instructor: Roger Nelson TEC 1029**

**Nelsonr@cod.edu Saturday 8:00AM- 11:50 AM**

**630-942-8382 Welding Coordinator: Jim Filipek**

**filipek@cod.edu**

**630-942-2038**

**Course Name:** Welding 1112 *Oxy Fuel*, 1122 *Shielded Metal Arc*, 1132 *Gas Metal Arc,* 1142 *Gas Tungsten Arc*, 1151 *Pipe Welding*, 1160 *Skill Assessment.*

**Credit and Contact Hours:** 3 credit hours (1 lecture hour, 3 lab hours)

**Prerequisites:** Welding 1100

(WELD 1160 requires successful completion of all previous welding

courses.)

**Textbook & Lab Manual: *Welding, Principles and Applications, 6th or 7th edition, Larry Jeffrus***

***Welding, Principles and Applications, Study Guide/Lab Manual, Larry Jeffrus***

**Course Description: 1112:** Operation of oxyacetylene welding and cutting equipment and plasma cutting. Students learn to produce quality welds and braze joints in the flat, horizontal, overhead and vertical positions. Also introduces cutting methods of profile, pipe, square and bevel.

**1122:** Theory and practice in the preparation and welding of steel joints in various positions. Safety, electrode selection, inspection and testing. Skill is developed in producing different position butt and fillet welds. American Welding Society testing is stressed.

**1132:** Solid steel and cored wire welding on common industrial joints. Travel direction, weave motion, bead sequence, and gun angles for out-of-position welding on steel are emphasized. Setup and operation of MIG

welder for flux-core, stainless steel and aluminum welding under varying conditions.

**1142:** Theory and practice of welding in all positions and on various joint configurations using the Gas Tungsten Arc Welding (GTAW or TIG) welding process on carbon steel, stainless steel, and aluminum.

**1151:** Covers safety inspections, minor repairs, operating parameters, and operation of shielded metal arc welding(SMAW), gas metal arc welding (GMAW), and flux core arc welding (FCAW) equipment in a variety of positions on various materials used in pipe joints. Evaluating and solving complex welding and fabrication problems.

**1160:** Theory and practice of test qualification procedures for certification in accordance with AWS, API, or other welding codes. Simple non-qualifying bend tests and/or non-destructive tests are performed at no extra cost. Additional testing may be performed by a private laboratory at the student's expense.

**Course Objectives:**

**All courses will:**

1. Identify safe welding practices and procedures conforming to American Welding Society (AWS) Z 49 standards.
2. Demonstrate practical knowledge of making welds with all types of mild steel   electrodes, arc air gouging and the welding of mild steel in all positions in a safe manner.
3. Exhibit a basic understanding of metallurgy required of a competent welder.
4. Interpret both basic and advanced welding fabrications  blueprints including: welding symbols, weld testing symbols, structural steel shapes, and welding specifications.
5. Document advanced knowledge and techniques for the safe and successful      operation of gas tungsten welding, shielded metal arc welding, gas metal arc welding, and oxy fuel gas welding.
6. Demonstrate knowledge of code practices and procedures in American Welding Society (AWS) D1.1.
7. Perform an American Welding Society (AWS)1G with a backing strip test or 3G with an open root.

**1112:**

1. Set up and operate oxy-acetylene welding equipment and weld joints in the various positions

2. Set up and operate oxy-acetylene cutting equipment and perform cuts in the various positions

3. Set up and operate plasma cutting equipment and perform cuts in the various positions

4. Set up and operate oxy-acetylene welding equipment and braze joints in the various positions

**1122:**

1. Demonstrate the proper use of the shielded metal arc welding (SMAW) process

2. Identify SMAW variables

3. Select the electrodes required for SMAW

4. Demonstrate the ability to successfully weld selected lab projects

5. Demonstrate the ability to successfully set up, weld, and test v-groove welds

6. Identify the difference between welder qualification and welder certification

**1132:**

1. Demonstrate shop safety practices

2. Perform safety inspections on GMAW equipment

3. Prepare carbon steel and aluminum plate

4. Determine proper filler wire and diameter

5. Set up arc welding equipment

6. Select proper current, polarity, and amperage

7. Perform various weld beads in the flat, horizontal, vertical, and overhead positions on carbon steel and other materials

**1142:**

1. Utilize shop safety practices

2. Utilize guidelines prescribed in course progress chart

3. Prepare carbon steel, stainless steel, and aluminum plate

4. Identify proper filler rod and diameter

5. Set up arc welding equipment

6. Select proper current, polarity, and amperage

7. Perform weld beads in the flat, horizontal, vertical, and overhead positions on various materials

8. Identify surface discontinuities and suggest corrective measures

**1151:**

1. Utilize shop safety practices

2. Utilize assigned instructions to complete work assignments

3. Operate welding equipment

4. Perform pipe layout and cutting operations

5. Utilize corrective actions to repair surface flaws on welds and base metals

6. Prepare and weld common pipe joints using oxy-acetylene, stick arc, MIG, and TIG processes

**1160:**

1. Explain the American Welding Society Test Codes and other applicable codes and standards

2. Demonstrate proper welding procedures and techniques using the American Welding Society codes

3. Produce quality welds on plates and pipes in accordance with qualifications tests using procedures for certification

**Topical Outline:**

**WELD 1112**

* + Shop safety and the safety rules
  + Proper use of the oxy-acetylene cutting (OAC) or oxy-fuel cutting (OFC) process
  + Proper use of the plasma cutting (OFC) process
  + Demonstration of the ability to successfully weld selected lab projects
  + Demonstration of the ability to successfully set up, weld, and test v-groove welds
  + Difference between welder qualification and welder certification

**WELD 1122**

* + Shop safety and safety rules
    - Identify safety rules
    - Identify and select proper personal protective clothing
  + Shielded metal arc welding (SMAW) Process
    - Set up and shut down the SMAW equipment
    - Operation of SMAW equipment by welding selected weld joints in selected positions
    - Definition of terms: Padding block, fire triangle, duty cycle, and SMAW variables
    - Correct current when welding on mild steel
  + Industry standards for correct welding technique
    - Factors that change the current value for electrodes
    - Factors that determine the successful welding
  + Demonstrate the successful welding of selected projects with SMAW

**WELD 1132**

* + Safety manuals / safety regulations / safety requirements
  + Running beads flat
  + Running beads horizontal
  + Running beads vertical up
  + Running beads vertical
  + Running beads overhead
  + Multiple pass tee-joints all positions
  + Multiple pass lap-joints all positions
  + Single vee-grooves all positions
  + Flux-cored arc welding
  + Spray-arc aluminum welding
  + Stainless steel welding

**WELD 1142**

* + Safety manuals / safety regulations / safety requirements
  + Running melt strips in all positions
  + Running beads with filler rod in all positions( steel)
  + Welding tee joints, lap joints, butt joints and corner joints in all positions (steel)
  + Running beads with filler rod in all positions(stainless steel)
  + Welding tee joints, lap joints, butt joints and corner joints in all positions (stainless steel)
  + Running beads with filler rod in all positions(aluminum)
  + Welding tee joints, lap joints, butt joints and corner joints in all positions (aluminum)

**WELD 1151**

* + Safety and record keeping
    - Follow shop safety practices
    - Maintain a clean, safe work area
    - Prepare assigned records
    - Inspect equipment
  + Equipment setup and operation
    - Set up for welding
    - Pipe layout and cutting operations
  + Welding problem solving
    - Welding and fabrication problems
    - Solutions to assigned welding and fabrication problems

**WELD 1160**

* + American Welding Society test codes
  + Preparation of test plates
    - Cutting and beveling the test plates
    - Cleaning and assembling the test plates
    - Tack welding the test plates
  + Weld test coupon evaluation
    - Visual evaluation
    - Guided bend evaluation
  + Evaluation of proper welding procedures
    - American Welding Society
    - Welding flaw allowances
    - Weld bead types

**Course Requirements:** Class attendance and participation are essential if students are to receive maximum benefit from this class. The grading rubric will be: laboratory work 50%, attendance 25% and exams 25%. All work must be completed by the last day of class.

**Make-up Policy:** If you cannot attend class, is the responsibility of the student to work with the instructor to insure all work is completed.

**General Note:** In order to achieve the course objectives, it is essential that you enjoy the class in addition to complying with the above requirements and the rules and policies of College of DuPage contained in the catalog and other College materials. If you are having course/College related problems, please feel free to contact me so that we can resolve them to your satisfaction and benefit.

**Student Evaluation:** All welding exercises (Practices from your Study Guide/Lab Manual) will be evaluated by the instructor based on the standard practices for weld evaluation outlined in your text. The specific welding exercises required for each course are found on your course assignment sheet. **You must check with your instructor for your grading.**

From the grant agreement’s Part IV  Special Conditions, Item 15, Intellectual Property Rights, the following needs to be on all products developed in whole or in part with grant funds:

“This workforce solution was funded by a grant awarded by the U.S. Department of Labor’s Employment and Training Administration. The solution was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timelines, usefulness, adequacy, continued availability, or ownership. This solution is copyrighted by the institution that created it. Internal use, by an organization and/or personal use by an individual for  non-commercial purposes, is permissible. All other uses require the prior authorization of the copyright holder.”

**Minimum Grade Average**

|  |  |  |  |
| --- | --- | --- | --- |
| **Exercise Score** | **C=8.5** | **B=8.7** | **A=9.3** |

**Other Requirements**

1. Carefully check your Assignment Sheets for specific exercises for your course. Consult with the instructor before beginning each exercise.
2. Complete the text book reading and workbook written exercise and have them checked with the instructor.
3. All courses have unit pre and post tests and Mid-term exam. All unit tests must be completed before lab work begins. Only post test scores will be used for grading.
4. Your final grade is calculated as the total points of the following:
   1. Score on all Unit Post Tests
   2. Completed Activities Exercises from your workbook
   3. Mid-Term test score
   4. Final Test Score
   5. Workbook exercises
5. Incomplete grades **will not** be given for poor attendance!

SAFETY

Safety glasses must be supplied by the student and worn at all times in the shop. They must be Z-87 rated. Your instructor will also list what other equipment is needed for laboratory participation. Failure to observe these rules will result in a verbal warning followed by a reduction in the student’s grade! Students will be instructed in other laboratory safety rules and these must be followed or you may be removed from the class.

TOOLS AND CLEANUP

Each student is responsible for cleaning his or her station at the completion of the period. This applies even if the station was found in a dirty condition. All tools should be returned to the tool cabinet and the student should secure all projects and materials.

INSTRUCTOR OFFICE HOURS

The instructor is available on campus in the TEC building, room 1024 by appointment only.

**INCOMPLETE GRADES**

The instructor may give an incomplete of “I” grade when a student has been unable to complete the course within the prescribed time due to unforeseen circumstances. The student is responsible for contacting the instructor or when the instructor is no longer employed at the college, the appropriate dean regarding course completion. Coursework must be completed within the time limits prescribed by the instructor but not to exceed twelve (12) months from the end of the term in which the “I” grade was assigned. The “I” grade may be changed within the time limit prescribed by the instructor of record. If the “I” has not been changed by the instructor of record at the end of them twelve (12) month period, the “I” will automatically change to an “F”. During the time the “I” is on the student’s record, it will not be calculated into the cumulative grade point average. [*http://www.cod.edu/catalog/AcademicPolPro\_11-13.pdf*](http://www.cod.edu/catalog/AcademicPolPro_11-13.pdf)

**WITHDRAWAL POLICY**

The final day for a student to withdraw from any course will be equal to 75% of the time for the respective academic session ([see the Registration Calendar](http://cod.edu/registration/pdf/reg_calendar.pdf)) through [myACCESS](https://myaccess.cod.edu/) or in person at the Registration office, Student Services Center (SSC), Room 2221.

After the deadline, students will be required to appeal for late withdrawal and provide appropriate documentation to the Student Registration Services Office for all requests. Students who are granted approval to withdraw by petition will not be eligible for refunds of tuition or fees and will receive a ‘W’ grade on their transcript. Appeals must be submitted prior to the designated final exam period for 16-week classes and before the last class meeting for all other session classes.

**The last day to withdraw from 16 week Spring classes is 4/17/14**

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| **CODE OF CONDUCT/PLAGIARISM/ACADEMIC DISHONESTY:** |
| See COD catalog (2011-2013), p. 98, regarding Student Code of Conduct (Board Policy 20-35) [http://www.cod.edu/catalog/studentservices\_11-13.pdf](http://www.cod.edu/catalog/StudentServices_11-13.pdf%20) This policy is incorporated by reference into this document. An atmosphere of respect, civility and honor is expected to exist in the classroom, and each student should do his or her best to make sure such an atmosphere flourishes. |
| Academic dishonesty is prohibited. Disciplinary action will be pursued in all instances in which it is determined that academic dishonesty has occurred. Disciplinary action may include, but is not limited to |
| 1. Assignment of a failing grade for a test, examination or assignment.  2. Assignment of a failing grade for a course.  3. Referral to a dean for disciplinary sanction or to the Judicial Review Board (Administrative Procedure 20-40), college catalogue p. 99. |

A.W.S. is now being offered Spring 2014

**MANUF 1820 003 – AWS SENSE I**

**03/17/2014**-05/05/2014 Lecture/Lab Discussion Monday 06:00PM - 09:50PM, Technical Education Ctr, **talk to your instructor or Welding Coordinator Jim Filipek if interested**

Covers Occupational Orientation, Safety and Health of Welders, Drawing and Welding Symbol Interpretation, Thermal Cutting Processes and Welding Inspection and Training utilizing AWS Sense 1 standards.

**COURSE SCHEDULE**

**Saturday 8 – 11:50AM**

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| --- | --- |
| **Class #** | **Day** |
| 1 | | 1/18/2014 |
| 2 | | 1/25/2014 |
| 3 | | 2/1/2014 |
| 4 | | 2/8/2014 |
| 5 | | 2/15/2014 |
| 6 | | 2/22/2014 |
| 7 | | 3/1/2014 |
| 8 | | 3/8/2014 |
| 9 | | 3/15/2014 |
| 10 | | 3/22/2014 |
| 111 | | 3/29/2014 |
| ***NO Class Spring Break*** | | 4/5/2014 |
| 12 | | 4/12/2014 |
| 13 | | 4/19/2014 |
| 14 | | 4/26/2014 |
| 15 | | 5/3/2014 |
| 16 | | 5/10/2014 |
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