COASTAL BEND COLLEGE
WELDING
SYLLABUS
(Revised 11/13)

WLDG 1421: Introduction to Welding Fundamentals
Semester Hours: 4
Textbook: Modern Welding

Course Description: A fundamental course in layout and fabrication related to the welding industry. Major emphasis on structural shapes and use in construction.

Course Learning Outcomes: The student will demonstrate safety procedures associated with oxyacetylene and arc process; perform basic welds using oxyacetylene and arc welding equipment; and identify ferrous and nonferrous metals.

Supplementary Materials: Videos, DVD, Handout material

Performance Objectives:

1. Given instruction and practice the student will be able to perform the following tasks in the classroom and welding shop. This knowledge will be evidenced by laboratory demonstrations, completion of assignment sheets, and by scoring the college minimum satisfactory grade.

   A. List the six main parts of an oxyacetylene rig without looking at a reference list.

   B. Demonstrate how to assemble an oxyacetylene rig and to test for leaks by using soap and water. The student must strive to assemble the rig without leaks.

   C. List the four safety considerations for storing and handling gas cylinders using information from the library and textbooks.

   D. Demonstrate personal protection requirements by wearing at least six pieces of personal welding safety equipment.

   E. Name orally safety requirements pertaining to oxyacetylene equipment other than those used for gas cylinders.
F. Demonstrate the proper method to light an oxyacetylene torch by using a striker and explain the major reasons why a striker must always be used.

G. Be able to prepare metal for welding on a tee cross.

2. Given instructions and practice and using an oxyacetylene station in the lab the student will be able to setup and operate the cutting torch freehand and with a guided apparatus to perform the following tasks. This knowledge will be evidenced by laboratory demonstration, completion of assignment sheets, and by scoring the college minimum satisfactory grade.

A. Setup oxyacetylene station in a safe manner and check for leaks making sure there are no leaks before operating the cutting torch.

B. Cut mild steel plates 1/4" to 1/2" thick in a straight line not to vary more than 1/8" from the intended path.

3. Given instructions and practice the student will be able to braze and weld on mild steel with the oxyacetylene torch. This knowledge will be evidenced by laboratory demonstrations, completion of assignment sheets, and by scoring the college minimum satisfactory grade.

A. Braze mild steel parts in at least three different types of joints.

B. Oxyacetylene weld with and without filler metal mild steel plates and pipes in three different positions.

4. Given instructions and practice the student will be able to name the main parts of an electric arc welding station, adjust the welding machine to different electrodes, and be able to weld on basic mild steel joints.

A. Identify and interrelate AC-DC electric arc welding equipment and supplies.

B. Name AC-DC electric arc principles and practices required in the welding lab.

C. Start and adjust the welding machine to the necessary current to weld with various electrodes and metal thickness.

D. Run beads on lap joints in the 1F, 2F, 3F, and 4F positions.

E. Run multiple tee joint fillet welds in the 1F, 2F, 3F, and 4F positions.

**Teaching Methods:**
1. Lecture on textbook
2. Lecture on "Coastal Bend College” Safety handbook
3. Power point presentations and videos
4. Handout material
5. Transparencies in conjunction with lecture
6. Individual and group instructions in the lab
7. Groups of two or three students will work together on lab projects.

**Evaluation Methods:**

1. Attendance
2. Lab tests and lab performance
3. Safety
4. Written exams

**Grading Policy:**

<table>
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<tr>
<th>Evaluation</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Lecture Evaluation</td>
<td>20%</td>
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<tr>
<td>Practical Application (Lab)</td>
<td>80%</td>
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**Attendance Policy:**

Students must attempt to attend all classes. Excessive absenteeism will have a detrimental effect on the student grade. Students can be dropped from classes for excessive absenteeism. The instructor will call roll at the beginning and end of each class or any time he or she feels it necessary. Three (3) times tardy will count as one (1) absence. The attendance record starts the first day of class beginning of each semester. **No Cell phones or MP3 players or any other type of recording devices may be used during class.**

**Special Note:**

If you have a documented disability that will impact your work in this class, please contact me to discuss your needs or contact the Counseling Center.
Course Outline:

I. Introduction to Safety in the Welding Trade

II. Tour of Welding Shop

III. Electric Arc Welding Safety
   A. Electrical shock
   B. Fire hazards

IV. Job Opportunities
   A. Compare safety, wages, and fringe benefits.
   B. Who employs welders?
   C. Requirements in the welding trade.

V. Oxyacetylene Cutting and Welding Theory and Practice
   A. Different types of cutting and welding
   B. The oxyacetylene equipment
   C. Assembling oxyacetylene equipment
   D. Lighting equal pressure type torch
   E. Torch adjustments
   F. Puddling and welds with and without filler rod
   G. Backhand and multilayer welding
   H. The oxyacetylene cutting process
   I. Cutting attachments and cutting tips
   J. Cutting different kinds and thickness of metals

VI. Oxyacetylene Cutting and Welding Equipment and Supplies
   A. Complete oxyacetylene cutting and welding outfit
   B. Oxygen and acetylene cylinders and supply
   C. Oxygen and acetylene manifolds
   D. Oxygen and acetylene equal pressure regulations
   E. Regulator safety
   F. Protective clothing and equipment
   G. Review of safety in oxyacetylene cutting and welding
   H. Torch Guides, Mechanical, Electrical, and Electronic

VII. Lighting the torch
   A. Explain how to light a torch
   B. Adjust the torch to a neutral, carburizing and oxidized flame

VIII. Oxyacetylene Cutting
   A. Cut 90 degrees kerf on light plate
   B. Cut 30 degrees bevel on 1/4 inch plate
C. Cut 45 degrees bevel on 1/2 inch plate

IX. AC and DC Arc Welding Equipment and Supplies
   A. The arc welding station
   B. Fundamentals of DC and AC arc welding
   C. Fundamentals of straight and reverse polarity direct current
   D. Adjusting and starting the arc welding machine
   E. Selecting the electrode
   F. Running metal arc beads and selecting the metal and proper current
   G. Arc Blow what causes it and how to correct it

X. Electric Arc Welding Machine
   A. Hook up ground cable and electrode holder cable to welder
   B. Plug in welder and turn it on
   C. Adjust welder to various currents
   D. Set the welder on AC, DC reverse, and DC straight polarity
   E. Weld lap joints in the 1F, 2F, 3F, and 4F positions
   F. Weld multiple fillet welds on a tee joint in the 1F, 2F, 3F, and 4F positions

WELDING TECHNOLOGY
COMPETENCY PROFILE

STUDENT ________________________ COURSE WLDG 1421

INSTRUCTOR ________________________ SEM./YEAR

RATING SCALE:

4 Skilled: Can work independently with no supervision.
3 Moderately Skilled: Can perform job completely with limited supervision.
2 Limited Skill: Requires instruction and close supervision.
1 No Exposure: No experience or knowledge in this area.

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<tbody>
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<tr>
<td>COMPETENCY</td>
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<tr>
<td>List safety consideration for storing and handling gas cylinders.</td>
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<td>Demonstrate personal protection requirements.</td>
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<td>List safety requirements pertaining to oxy-acetylene cutting equipment other than gas cylinders.</td>
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<td>Identify types of fuels and applications.</td>
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<td>Handles, makes preliminary safety inspection, and stores cylinders properly</td>
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<td>Identifies, selects, and installs oxy-fuel welding and cutting equipment.</td>
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<td>Lights and adjusts flame for welding and cutting, and properly secures oxy-fuel equipment.</td>
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<tr>
<td>Cut mild steel plate of various thicknesses in a straight line (freehand)</td>
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<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
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<tbody>
<tr>
<td>Bevel cut</td>
<td>on mild steel plate of various thicknesses.</td>
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<tr>
<td>Make circular cut</td>
<td>on mild steel plate of various thicknesses. (freehand)</td>
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<tr>
<td>Pierces holes and cuts slots</td>
<td>on mild steel plate of various thicknesses. (freehand)</td>
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<td>Gouge flat plate and welded plate</td>
<td>CAC-A</td>
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<tr>
<td>Makes ninety-degree and beveled cuts</td>
<td>on plate with beveling machine.</td>
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<td>Cuts round bars and other structural shapes used in fabrication.</td>
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<tr>
<td>Makes corner welds</td>
<td>in flat, horizontal, vertical and overhead positions with and without filler rod.</td>
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<td>Identifies welding and cutting problems.</td>
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<td>Identifies safety procedures for arc welding.</td>
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<td>Demonstrates knowledge in theory of shielded metal arc welding.</td>
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<td>Identifies and selects power source and sets current for weld procedure.</td>
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<tr>
<td>Identifies and makes proper electrode selection.</td>
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<td>Identifies, selects joint design, and prepares material for weld procedure.</td>
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<tr>
<td>Makes lap, tee, butt joint weld</td>
<td>in the flat, horizontal, vertical and overhead position.</td>
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<td>Identifies welding problems, their causes, and takes corrective action.</td>
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<td>Prepares weld for test</td>
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<td>Passes visual test</td>
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<td>Passes destructive test</td>
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**SCANS FOUNDATIONS**

**BASIC SKILLS:**
- Reading.
- Arithmetic/mathematics
- Listening.

**THINKING SKILLS:**
- Thinks creatively.
- Making decisions.
- Solving problems
- Seeing with the mind's eye.
- Knowing how to learn and reason.
<table>
<thead>
<tr>
<th>PERSONAL QUALITIES:</th>
<th>Individual responsibility.</th>
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<tbody>
<tr>
<td></td>
<td>Integrity</td>
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