PELLISSIPPI STATE COMMUNITY COLLEGE  
MASTER SYLLABUS  

PIPE WELDING  
WELD 2120  

Class Hours: 3.0  Credit Hours: 3.0  
Laboratory Hours: 3.0  Revised: Fall 2015

Catalog Course Description: 
Pipe Welding prepares the student for pipe joint welding within the ASME, API, TRA and AWS specifications. Students use the E6010 and E7018 electrodes and pass the visual and guided bend test in the 2G, 5G and 6G positions. Evidence of advanced skill development in SMAW, GTAW, pipe-welding is expected. Oxy-fuel cutting of ferrous metals is required.

Entry Level Standards: 
Students entering this course must have completed basic skills in mathematics.

Prerequisites: WELD 2010 and WELD 2020 and WELD 2320

Corequisites: WELD 2330

Textbook(s) and Other Course Materials: 

TOOL LIST:
Other  
Safety glasses with shields  
Arc Welding helmet with #10/12 lens  
Oxy-fuel welding goggles  
Welding gloves  
Chipping hammer  
Hand wire brush  
Spark torch lighter  
6-10 foot tape measure  
Torch tip cleaner set  
Slip Joint pliers or vise grip  
Layout maker or soapstone  
Long sleeve shirt (blue jean) not flannel  
Leather boots  
Beanie cap  
Welding leathers

I. Week/Unit/Topic Basis:

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<tr>
<th>Week</th>
<th>Chapter</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
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<td>Introduction</td>
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<tr>
<td>1</td>
<td>General Welding Safety</td>
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<td>2</td>
<td>Filling Up-Pipe</td>
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<td>3</td>
<td>Qualification of the Welding</td>
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<td>4</td>
<td>Procedure and the Welder</td>
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<td>5</td>
<td>Essentials of Shielded Metal-Arc Welding Technology</td>
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<td>6</td>
<td>Preparation of the Pipe Joint</td>
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<td>7</td>
<td>Heat Input and Distribution</td>
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<td>8</td>
<td>Welding the Root Bead by the Gas Tungsten Arc Welding Process</td>
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<td>9</td>
<td>Uphill Welding the Root Bead on Heavy-Wall Pipe 5G Position</td>
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<td>10</td>
<td>The Intermediate and Cover Passes</td>
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<td>11</td>
<td>The Intermediate and Cover Passes</td>
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<td>12</td>
<td>Introduction to Welding Metallurgy</td>
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<td>13</td>
<td>Distortion in Pipe Welding</td>
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<td>14</td>
<td>Pipe Welding Defects</td>
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<td></td>
<td>Welding Thin-Wall Pipe (6G)</td>
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<tr>
<td>15</td>
<td>Review / Final Exam</td>
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**II. Welding Technology General Outcomes (Educational objectives)**

1. Reach their full potential in the welding field.
2. Use the correct procedure in setting up equipment, and the skills used in welding.
3. Use Shielded Metal Arc Welding, Gas Metal Arc Welding, and Gas Tungsten Arc Welding machines in both pipe and plate welding.
4. Explain the physical characteristics of different metals
5. Develop the cognitive and physical skills necessary to pass certification tests.
6. Apply welding knowledge to effectively utilize problem solving skills as it relates to the operation of equipment in the industry.
7. Demonstrate the ability to identify, analyze, and synthesize relevant data from multiple information sources in order to develop acceptable conclusions.

**III. Welding Technology Concentration Competencies***

Students will:

A. Demonstrate knowledge to pass a practical examination such as AWS code. I, II, III,
V, VI, VII.

B. Demonstrate basic welding techniques for a variety of welding positions and various joint designs related to principals, policies and procedures in the welding industry. I, II, III, V, VI, VII.

C. Perform metal layout processes and prepare metals. I, II, III, V, VI, VII.

D. Examine work pieces for defects and measure work pieces with straightedges or templates to ensure conformance with specifications. I, III, V, VI, VII.

E. Apply the principles of metallurgy toward the metalworking trades. I, III, IV, V, VI, VII.

F. Read and interpret blueprints and welding symbols to fabricate components. I, III, V, VI, VII.

G. Apply math and measurement skills to perform specific tasks. I, II, III, V, VI, VII.

H. Follow industry safety practices. I, II, III, V, VI, VII.

I. Apply written, oral and graphical communication skill in both technical and non-technical environments; identify and use appropriate tech literature. I, II, IV, V, VI, VII.

J. Demonstrate a commitment to quality, timeliness, and continuous improvement. I, II, III, V, VI, VII.

K. Engage and interact as a team in a learning environment. I, V, VI, VII.

* Roman numerals after program competencies reference the Welding Technology General Outcomes (Educational objectives) listed above.

IV. Course Goals*:

The course will

1. Introduce SMAW, GTAW arc welding on pipe. (A, B, C, E, F, G, H, J, K)

2. Expand student’s understanding of pipe welding defects and distortion. (A, D, E, J)


*Capital letters after course goals reference the competencies of the Engineering Technology concentrations listed above.

V. Expected Student Learning Outcomes*:

Students will:
a. Prepare and operate SMAW arc welding equipment on pipe. 1, 3
b. Identify and explain pipe weld techniques with SMAW equipment. 1
c. Perform pipe welds in the 2G, 5G and 6G positions using SMAW equipment. 1, 3
d. Prepare and operate GTAW arc welding equipment on pipe. 1, 2, 3
e. Identify and explain pipe weld techniques with GTAW equipment. 1
f. Perform pipe welds in the 2G, 5G, and 6G positions using GTAW equipment. 1, 3
g. Identify pipe welding distortion, defects and the cause. 2
h. Explain the essentials of welding metallurgy. 2
i. Pass visual and guided bend test. 3

*Numbers after Expected Student Learning Outcomes reference the course goals listed above.

VI. Evaluation:

A. Testing Procedures:

   **Unit tests**
   **Final comprehensive exam**

B. Laboratory Expectations:

   Homework
   Lab work

C. Field Work:

   n/a

D. Other Evaluation Methods:

   n/a

E. Grading Scale:

   90-100 A
   86-89 B+
   80-85 B
   76-79 C+
   70-75 C
   60-69 D
   0-59 F

VII. Policies:

A. Attendance Policy:

   Pellissippi State expects students to attend all scheduled instructional activities. As a minimum, students in all courses (excluding distance learning courses) must be present for
at least 95 percent of their scheduled class and laboratory meetings in order to receive credit for the course. Individual departments/programs/disciplines, with the approval of the vice president of Academic Affairs, may have requirements that are more stringent. In very specific circumstances, an appeal of the policy may be addressed to the head of the department in which the course was taken. If further action is warranted, the appeal may be addressed to the vice president of Academic Affairs.

B. Academic Dishonesty:

Academic misconduct committed either directly or indirectly by an individual or group is subject to disciplinary action. Prohibited activities include but are not limited to the following practices:

- Cheating, including but not limited to unauthorized assistance from material, people, or devices when taking a test, quiz, or examination; writing papers or reports; solving problems; or completing academic assignments.
- Plagiarism, including but not limited to paraphrasing, summarizing, or directly quoting published or unpublished work of another person, including online or computerized services, without proper documentation of the original source.
- Purchasing or otherwise obtaining prewritten essays, research papers, or materials prepared by another person or agency that sells term papers or other academic materials to be presented as one’s own work.
- Taking an exam for another student.
- Providing others with information and/or answers regarding exams, quizzes, homework or other classroom assignments unless explicitly authorized by the instructor.
- Any of the above occurring within the Web or distance learning environment.

Please see the Pellissippi State Policies and Procedures Manual, Policy 04:02:00 Academic/Classroom Conduct and Disciplinary Sanctions for the complete policy.

C. Accommodations for disabilities:

Students that need accommodations because of a disability, have emergency medical information to share, or need special arrangements in case the building must be evacuated should inform the instructor immediately, privately after class or in her or his office. Students must present a current accommodation plan from a staff member in Disability Services (DS) in order to receive accommodations in this course. Disability Services may be contacted by sending email to disabilityservices@pstcc.edu, or by visiting Alexander 130. More information is available at http://www.pstcc.edu/sswd/.