Cerro Coso College

Course Outline of Record Report

10/07/2021

WELDC204 : Pipe and Tube Welding

General Information

Author:	• David Villicana • Lee, Travis • Dorrell, Mike
Course Code (CB01) :	WELDC204
Course Title (CB02) :	Pipe and Tube Welding
Department:	Industrial Arts
Proposal Start:	Fall 2021
TOP Code (CB03) :	(0956.50) Welding Technology
SAM Code (CB09) :	Clearly Occupational
Distance Education Approved:	No
Course Control Number (CB00) :	CCC000569041
Curriculum Committee Approval Date:	10/02/2015
Board of Trustees Approval Date:	11/03/2015
External Review Approval Date:	12/17/2015
Course Description:	This course is designed to help the student develop skills required to be proficient at the welding of pipe and tubing using the Shielded Metal Arc Welding (SMAW) and Gas Tungsten Arc Welding (GTAW) processes. Welding position, preparation, and fit-up are covered as well as techniques and special conditions associated with the welding of pipe and tubing.
Submission Type:	Mandatory Revision This course is being revised for cyclic review. This course was last assessed in Fall 2020. All SLOs were successfully met.
Author:	No value

Faculty Minimum Qualifications

Master Discipline Preferred:	No value
Alternate Master Discipline Preferred:	No value
Bachelors or Associates Discipline Preferred:	• Welding
Additional Bachelors or Associates Discipline Preferred:	• Welding

Course Formerly Known As

Course Formerly Known As

No Value

Course Development Options

Basic Skills Status (CB08)

Course is not a basic skills course.

Course Special Class Status (CB13)

Course is not a special class.

Grade Options

- Letter Grade Methods
- Satisfactory Progress

☐ Allow Students to Gain Credit by Exam/Challenge

Allowed Number of Retakes

0

Course Prior To College Level (CB21)

Not applicable.

Rationale For Credit By Exam/Challenge

No value

Retake Policy Description

Type:|Non-Repeatable Credit

☑ Allow Students To Audit Course

Course Support Course Status (CB26)

Course is not a support course

Associated Programs

☑ Course is part of a program (CB24)

Associated Program	Award Type	Active
CC Welding Technology	A.S. Degree Major	Summer 2018

Transferability & Gen. Ed. Options

Course General Education Status (CB25)

Y

Transferability

Transferable to CSU only

Transferability Status

Approved

Units and Hours

Summary

Minimum Credit Units (CB07)	3
Maximum Credit Units (CB06)	3
Total Course In-Class (Contact) Hours	90
Total Course Out-of-Class Hours	72
Total Student Learning Hours	162

Faculty Load 0

Credit / Non-Credit Options

Course Credit Status (CB04)

Credit - Degree Applicable

Course Non Credit Category (CB22)

Credit Course.

Non-Credit Characteristic

No Value

Course Classification Status (CB11)

Credit Course.

Funding Agency Category (CB23)

Not Applicable.

☐ Cooperative Work Experience Education Status (CB10)

☐ Variable Credit Course

Weekly Student Hours

	In Class	Out of Classs
Lecture Hours	2	4
Laboratory Hours	3	0
Activity Hours	0	0

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	54
Course In-Class (Contact) Hours	
Lecture	36
Laboratory	54
Activity	0
Total	90
Course Out-of-Class Hours	
Lecture	72
Laboratory	0
Activity	0
Total	72

Time Commitment Notes for Students

No value

Faculty Load

Extra Duties: 0

Faculty Load: 0

Units and Hours - Weekly Specialty Hours

Activity Name	Type	In Class	Out of Class
No Value	No Value	No Value	No Value

Pre-requisites, Co-requisites, Anti-requisites and Advisories

Prerequisite

WELDC102 - Shielded Metal Arc Welding (SMAW)

The student must utilize the knowledge of electrical safety and hazards of ultraviolet light learned in the C102 course while performing various exercises assigned in the C204 course. Skill building exercises acquired in the C102 course are necessary in order to succeed in the advanced projects assigned in the C204 course.

Entrance Skills

Entrance Skills	Description
No value	No value

Limitations on Enrollment

Limitations on Enrollment	Description
No value	No value

Specifications

Methods of Instruction

Methods of Instruction	Demonstration
Rationale	Students will be given live demonstrations of each assigned exercise.
Methods of Instruction	Discussion
Rationale	Students will be expected to participate in class discussions.
Methods of Instruction	Lecture
Rationale	Lectures will be given on safety and other appropriate course materials.
Methods of Instruction	Laboratory
Rationale	Students will be expected to complete laboratory assignments.

Assignments

Textbook readings, studying handouts, and preparing for quizzes. Example: There will be handouts given on the theory of proper procedures on how to prepare the pipe to be welded. Students will need to study these handouts in depth in order to perform proper fit up and welding of pipe. Example: Students will be given handouts on the correct angle in which to hold the electrode holder as they progress their way around the pipe. This is critical information to study as it will assist the student in making a suitable weld.

Methods of Evaluation	Rationale
Homework	Instructor assigned homework and readings to supplement and augment class lectures and demonstrations. Example: Research different methods and equipment used for purging pipe before welding.
Project	Practical assignments. Example: Prepare and weld a section of stainless steel pipe, using a backing gas in the 1G rolled position.
Final Exam	Final written and practical exam. Example: Final exam on all subjects learned throughout the semester. Stick welding 4" carbon steel pipe in the 6G position.
Tests	Chapter tests will be given throughout the course. Example: Test on chapter 5, Shielded Metal Arc Welding of Pipe.

Equipment

No Value

Textbooks

Author	Title	Publisher	Date	ISBN
Larry Jeffus	Welding Principles and Applications	Cengage	2021	03573777656

Other Instructional Materials

No Value

Materials Fee

Yes Fee: 50.00 Justification: The materials fee is to cover the cost of metal and consumables used for the projects that students can take home and is consistent with other welding courses in the program. Reference: Education Code section 76365 and title 5 regulations on instructional materials. Materials fee justification: -5' section of 4" schedule 40 carbon steel pipe @$6.65/ft. = $33.25 -2lb E7018 1/8" low hydrogen welding electrodes @ $3.27/lb = $5.64 -3.5lb E6010 1/8" 5p+ welding electrodes @ $3.57/lb = $12.50 -1.5lb ER70S-6 3/32" cut length welding rod @ $3.45 = $5.18

Learning Outcomes and Objectives

Course Objectives

No value

CSLOs

Demonstrate safe working habits in a manner consistent with OSHA regulations. Expected SLO Performance: 70.0

Identify and explain the differences between pipe and tubing and explain the advantages of welded pipe and tubing. Expected SLO Performance: 70.0

ISLOs Core ISLOs	Students who are completing a program will be able to communicate ideas, perspectives, and values clearly and persuasively while listening to others openly

Demonstrate preparation procedures for welding pipe. Expected SLO Performance: 70.0

Perform welds on pipe joints in all positions (1G, 2G, 5G, 6G). Expected SLO Performance: 70.0

Outline

Course Outline

A. Pipe and Tubing
    1. Specifications and sizes
    2. Pressure ranges
    3. Uses
B. Advantages of welded pipe
    1. Strength
    2. Maintenance
    3. Longevity
    4. Flow
    5. Weight
C. Preparation and fit-up (SMAW)
    1. Root face
    2. Root gap
    3. Beveling
    4. Root suck back
    5. Concave root surface
D. Practice Welds
    1. Transition of positions
    2. Types of filler metal
    3. Weld standards
    4. Root weld
    5. Hot pass
    6. Filler pass
    7. Cover pass
    8. 1G horizontal rolled position
    9. 2G vertical fixed position
    10. 5G horizontal fixed position
    11. 6G 45°: inclined position
E. Joint preparation (GTAW)
    1. Groove angle
    2. Bevel angle

3. Root
4. Root penetration
5. Root reinforcement
6. Incomplete fusion
7. Concave root surface
8. Excessive root reinforcement
9. Root contamination

F. Backing Gas
1. Atmospheric contamination
2. Types of gas
3. Methods of containment
4. Purging
5. Flow rate calculations

G. Filler Metals
1. Types
2. Consumable metal inserts

H. Practices
1. Tack welding
2. Root pass horizontal rolled position 1G
3. Repairing a root pass with a hot pass
4. Stringer bead; horizontal rolled position 1G
5. Weave and lace beads 1G
6. Filler pass 1G
7. Cover pass 1G
8. Single V-groove 1G
9. Stringer bead horizontal fixed position 5G
10. Single-V butt joint 5G
11. Stringer bead; vertical fixed position 2G
12. Single-V butt joint 2G
13. Stringer bead on fixed pipe 45°: inclined angle 6G

Lab Outline

H. Lab Exercises
1. Tack welding
2. Root pass horizontal rolled position 1G
3. Repairing a root pass with a hot pass
4. Stringer bead; horizontal rolled position 1G
5. Weave and lace beads 1G
6. Filler pass 1G
7. Cover pass 1G
8. Single V-groove 1G
9. Stringer bead horizontal fixed position 5G
10. Single-V butt joint 5G
11. Stringer bead; vertical fixed position 2G
12. Single-V butt joint 2G
13. Stringer bead on fixed pipe 45°: inclined angle 6G

Delivery Methods

Delivery Method: Please list all that apply -Face to face -Online (purely online no face-to-face contact) -Online with some required face-to-face meetings (“Hybrid”) -Online course with on ground testing -iTV – Interactive video = Face to face course with significant required activities in a distance modality -Other

- Face to face

Rigor Statement: Assignments and evaluations should be of the same rigor as those used in the on-ground course. If they are not the same as those noted in the COR on the Methods of Evaluation and out-of-class assignments pages, indicate what the differences are and why they are being used. For instance, if labs, field trips, or site visits are required in the face to face section of this course, how

will these requirements be met with the same rigor in the Distance Education section? Describe the ways in which instructor-student contact and student-student contact will be facilitated in the distance ed environments.

No Value

Good practice requires both asynchronous and synchronous contact for effective contact. List the methods expected of all instructors teaching the course. -Learning Management System -Discussion Forums -Message -Other Contact -Chat/Instant Messaging -E-mail -Face-to-face meeting(s) -Newsgroup/Discussion Board -Proctored Exam -Telephone -iTV - Interactive Video -Other

- Face-to-face meeting(s)

Software and Equipment: What additional software or hardware, if any, is required for this course purely because of its delivery mode? How is technical support to be provided?

No Value

Accessibility: Section 508 of the Rehabilitation Act requires access to the Federal government's electronic and information technology. The law covers all types of electronic and information technology in the Federal sector and is not limited to assistive technologies used by people with disabilities. It applies to all Federal agencies when they develop, procure, maintain, or use such technology. Federal agencies must ensure that this technology is accessible to employees and the public to the extent it does not pose an "undue burden". I am using -iTV—Interactive Video only -Learning management system -Publisher course with learning management system interface.

No Value

Class Size: Good practice is that section size should be no greater in distance ed modes than in regular face-to-face versions of the course. Will the recommended section size be lower than in on-ground sections? If so, explain why.

No Value

Emergency Distance Education Options The course will operate in remote delivery mode when all or part of the college service area is under an officially declared city, county, state, or federal state of emergency, including (check all that apply) - Online including all labs/activity hours - Hybrid with online lecture and onsite lab/activity hours - Correspondence education in high school and prison facilities - None. This course will be cancelled or paused if it cannot be held fully onsite.

- Hybrid with online lecture and onsite lab/activity hours