Cerro Coso College

Course Outline of Record Report

10/07/2021

WELDC200 : Gas Metal Arc Welding (GMAW)

General Information

Author:	• David Villicana • O'Connor, James • Foster, Herman
Course Code (CB01) :	WELDC200
Course Title (CB02) :	Gas Metal Arc Welding (GMAW)
Department:	Industrial Arts
Proposal Start:	Fall 2013
TOP Code (CB03) :	(0956.50) Welding Technology
SAM Code (CB09) :	Clearly Occupational
Distance Education Approved:	No
Course Control Number (CB00) :	CCC000504287
Curriculum Committee Approval Date:	01/25/2013
Board of Trustees Approval Date:	03/14/2013
External Review Approval Date:	06/04/2013
Course Description:	In this course, students gain practical experience in Gas Metal Arc Welding (GMAW), Metal Inert Gas (MIG) as well as learn safety, welding and identification of ferrous and non-ferrous metals, shielding gasses, bare and flux cored electrodes, and proper selection of welding materials for different applications.
Submission Type:	Mandatory Revision Cyclical review, only change is updating of textbook.
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 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
- Pass/No Pass

Allow Students to Gain Credit by

Allowed Number of Retakes

Course Prior To College Level (CB21)

Allow Students to Gain Credit by Exam/Challenge

0

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)

No value

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)

No value

Transferability

Transferable to CSU only

Transferability Status

Approved

Units and Hours

Summary

Minimum Credit Units (CB07)	2
Maximum Credit Units (CB06)	2
Total Course In-Class (Contact) Hours	72
Total Course Out-of-Class Hours	36
Total Student Learning Hours	108
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	1	2
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	18
Laboratory	54
Activity	0
Total	72
Course Out-of-Class Hours	
Lecture	36
Laboratory	0
Activity	0
Total	36

Time Commitment Notes for Students

Students will be expected to study for exams and handouts given.

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

WELDC101 - Oxyacetylene Welding

Content Review
WELD C101
The students entering this class need the skills learned in WELD C101 including safety, care and operation of high

pressure cylinders and regulators, identification of metals, terminology, joint configuration, welding positions, symbols and weld pool manipulation.

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	Other
Rationale	Other Methods: Textbook tutorials Other Methods: Practical exercises
Methods of Instruction	Audiovisual
Rationale	No value
Methods of Instruction	Demonstration
Rationale	No value
Methods of Instruction	Discussion
Rationale	No value
Methods of Instruction	Laboratory
Rationale	No value

Methods of Instruction	Lecture
Rationale	No value

Methods of Instruction	Peer analysis, critique & feedback
Rationale	No value

Methods of Instruction	Project-based learning
Rationale	No value

Assignments

Text readings. Example: Weld Metal Transfer. The mode of metal transfer is the mechanism by which molten metal is transferred across the arc to the base metal. The modes of metal transfer are short-circuiting transfer(GMAW-S), axial-spray transfer, globular transfer, and pulsed-arc transfer (GMAW-P). Selecting the mode of transfer depends on the welding power source, the wire electrode size, type and thickness of material, type of shielding gas used, and the best welding position used for the task.
Research report. Example: Gather information on the more popular uses for GMAW. Explain how the process has change from the 1960's both in technology and the types of jobs capable of being performed from then until now.

Methods of Evaluation	Rationale
Homework	Instructor assigned homework and readings that supplement and augment class lectures and demonstrations.
Tests	Exams on class lectures and handouts. Example: Effects of shielding gas on welding.
Other	Practical assignments making specific types of welds. Example: Horizontal welds performed in the 2F position utilizing both the forhand and backhand techniques.
Final Exam	Final written and practical exam Example: Theory Final Exam. True or false. Oxygen, carbon dioxide, helium, and nitrogen can be blended with argon to change argon's welding characteristics. Example: Practical Final Exam. Students will make a series of welds on a pre-assembled, mild steel fixture in all positions using short circuit transfer method.

Equipment

Welding helmet, safety gloves, safety glasses, closed toe boots, welding jacket.

Textbooks

Author	Title	Publisher	Date	ISBN
Larry Jeffus	Welding principles and Applications	Cengage Learning	2017	978-1-305-46469-5

Other Instructional Materials

No Value

Materials Fee

Yes Fee: 40.00 Justification: The student welding fee is for a portion of the cost of consumables used for student exercises and projects. Materials include shielding gasses, welding wire, metal, etc.

Learning Outcomes and Objectives

Course Objectives

No value

CSLOs

Practice clean and safe working habits to Occupational Safety and Health Administration OSHA standards that are consistent with trade practices.
Expected SLO Performance: 100.0

Demonstrate how to set up a Gas Metal Arc Welding GMAW installation. Expected SLO Performance: 95.0

Control the quality of the weld by changing the electrode extension, gun angle, proper shielding gas flow, and deposition rate.
Expected SLO Performance: 95.0

Produce proper forehand and backhand welds in fillet and groove joints in all positions that can pass the specified standard.
Expected SLO Performance: 95.0

Outline

Course Outline

A. Safety
1. Burn classification
2. Face; eye; and ear protection
3. Respiratory protection
4. Ventilation
5. Special protective clothing
6. Fire protection
7. Electrical protection

B. GMAW Equipment Setup and Operation
1. Introduction
2. Metal Transfer
3. Filler Metal Specifications
4. Wire Melting and Deposition Rates
5. Welding Power Supplies
6. Molten Weld Pool Control
7. Equipment

C. Gas Metal Arc Welding
1. Setup
2. Gas Density and Flow Rates
3. Arc-voltage and Amperage Characteristics
4. Electrode Extension
5. Welding Gun Angle
6. Effects of Shielding Gas on Welding

Lab Outline

Students complete guided tutorials and perform practical exercises during lab.
A. Practices
1. Metal Preparation
2. Flat Position; 1G and 1F Positions; forehand and backhand
3. Vertical Up 3G and 3F Positions
4. Vertical Down 3G and 3F Positions
5. Horizontal 2G and 2F Positions; forehand and backhand
6. Overhead 4G and 4F Positions; forehand and backhand
7. Globular Metal Transfer 1G Position
8. Axial Spray

Delivery Methods and Distance Education

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 2 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?

No Value

Effective Student-Instructor Contact: 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 -Moodle Message -Other Contact -Chat/Instant Messaging -E-mail -Face-to-face meeting(s) -Newsgroup/Discussion Board -Proctored Exam -Telephone -iTV -Interactive Video -Other (specify)

No Value

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.

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