Cerro Coso College

Course Outline of Record Report

10/07/2021

WELDC102 : Shielded Metal Arc Welding (SMAW)

General Information

Author:	• David Villicana • O'Connor, James • Foster, Herman
Course Code (CB01) :	WELDC102
Course Title (CB02) :	Shielded Metal Arc Welding (SMAW)
Department:	Industrial Arts
Proposal Start:	Fall 2018
TOP Code (CB03) :	(0956.50) Welding Technology
SAM Code (CB09) :	Clearly Occupational
Distance Education Approved:	No
Course Control Number (CB00) :	CCC000219011
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, hands-on experience in Shielded Metal Arc Welding (SMAW) as well as learn safety, the different types of SMAW machines, identification of metals, electrode selection and electrical theory.
Submission Type:	Mandatory Revision Cyclic review, only change is updating of the 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 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)

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 read handouts outside of class.

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

WELD C101
Content Review
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 practical exercises
Methods of Instruction	Audiovisual
Rationale	No value
Methods of Instruction	Demonstration
Rationale	No value
Methods of Instruction	Instruction through examination or quizzing
Rationale	No value
Methods of Instruction	Laboratory
Rationale	No value
Methods of Instruction	Lecture

Rationale	No value
Methods of Instruction	Outside reading
Rationale	No value
Methods of Instruction	Peer analysis, critique & feedback
Rationale	No value
Methods of Instruction	Performance
Rationale	No value
Methods of Instruction	Project-based learning
Rationale	No value
Methods of Instruction	Skills Development and Performance
Rationale	No value

Assignments

- **A. Text Readings.**

Example: Chapter Readings on Welding Current.

B. Homework Research Report minimum 500 words.

Example: Evaluate what type of welding helmet would suit your needs/preferences best. State advantages and disadvantages of passive vs. automatic helmets, cost, weight, durability etc. If choosing an automatic helmet what features would be most desirable? Would you choose analog or digital?

A. Text Readings.

Example: Chapter Readings on Welding Current.

B. Homework Research Report minimum 500 words.

Example: Evaluate what type of welding helmet would suit your needs/preferences best. State advantages and disadvantages of passive vs. automatic helmets, cost, weight, durability etc. If choosing an automatic helmet what features would be most desirable? Would you choose analog or digital?

Methods of Evaluation	Rationale
Final Exam	Example: Written exam question; What do the following abbreviations mean? AC, DCEN, DCEP, DCSP, and DCRP? Example: Final practical exam consists of a pre-assembled fixture that students perform groove and fillet welds in all positions.
Homework	

	A. Instructor assigned homework and readings that supplement and augment class lectures and demonstrations. Example: Effects of too high or too low current settings.
Other	B. Practical assignments making specific types of welds. Example: Perform a vertical fillet weld (tee 3F position) using a low hydrogen E7018 rod. Example: Perform a weld on a horizontal lap joint in the 2F position using E6010 using a whip technique.
Tests	Exams on readings and handouts. Example: The higher the open circuit voltage, the greater the chance of electric shock. What is the maximum safe open circuit voltage?

Equipment

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

Textbooks

Author	Title	Publisher	Date	ISBN
Larry Jeffus	Welding Principles and Applications	Cengage Learning	2017	978-1-305-49469-5

Other Instructional Materials

No Value

Materials Fee

Yes Fee: 40.00 Justification: The materials fee is to help cover the cost of consumables, welding gasses, welding rods, and electrodes, metals etc. used for exercises and projects. The students may keep their projects.

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 the safe setup and use of Shielded Metal Arc Welding SMAW equipment.
Expected SLO Performance: 100.0

Identify types of metal and the compatible electrodes, as well as select the correct type of machine and current for a specific welding task.
Expected SLO Performance: 75.0

Produce acceptable welds in a variety of configurations and positions.
Expected SLO Performance: 75.0

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 Safety

B. SMAW Equipment Setup and Operation

1. Welding Current
2. Types of Welding Power
3. Open Circuit Voltage
4. Operating Voltage
5. Arc Blow
6. Types of Power Sources
7. Generators and Alternators
8. Rectifiers
9. Duty Cycle
10. Welding Cables
11. Electrode Holders
12. Work Clamps
13. Setup

C. SMAW Welding of Plate

1. Effects of Too High or Too Low Current Settings
2. Electrode Size and Heat
3. Arc Length
4. Electrode Angle
5. Electrode Manipulation
6. Positioning of the Welder and Plate

Lab Outline

Students complete guided tutorials and perform practical exercises during lab.
A. Practice Welds (D)
    1. Stringer Beads
    a. Stringer Beads in the Flat Position
    b. Stringer Beads in the Vertical Up Position
    c. Horizontal Stringer Beads

2. Square Butt Joint
    a. Welded Square Butt Joint in the Flat Position
    b. Vertical Up Welded Square Butt Weld
    c. Welded Horizontal Square Butt Weld

3. Edge Weld
    a. Edge Weld; Flat Position
    b. Edge Joint; Vertical Down Position
    c. Edge Joint; Vertical Up Position
    d. Edge Joint; Horizontal Position
    e. Edge Joint; Overhead Position

4. Outside Corner Joint

a. Outside Corner Joint; Flat Position
b. Outside Corner Joint; Vertical Down Position
c. Outside Corner Joint; Vertical up Position
d. Outside Corner Joint; Horizontal Position
e. Outside Corner Joint; Overhead Position

5. Lap Joint
a. Lap Joint; Flat Position
b. Lap Joint; Horizontal Position
c. Lap Joint; Vertical Position
d. Lap Joint; Overhead Position

6. Tee Joint
a. Tee Joint; Flat Position
b. Tee Joint; Horizontal Position
c. Tee Joint; Vertical Position
d. Tee Joint; Overhead Position

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.

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