

WELD 012C: ADVANCED GAS METAL ARC WELDING

Originator

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Justification / Rationale

To align with AWS SENSE and create a sequence of courses that lead to an entry-level welder certificate demonstrating proficiency in welding and providing career options for students.

Effective Term

Fall 2020

Credit Status

Credit - Degree Applicable

Subject

WELD - Welding

Course Number

012C

Full Course Title

Advanced Gas Metal Arc Welding

Short Title

ADV GMAW WELDING

Discipline**Disciplines List**

Welding

Modality

Face-to-Face

Catalog Description

This capstone course covers the necessary information, preparation, and application to prepare for the AWS Welding Certification in GMAW welding. The completion of the course will include the opportunity to prepare sample welds and written tests for certification in all positions as defined in the SENSE certification.

Schedule Description

This course covers all the necessary information, preparation, and application to prepare for welding certification. Prerequisite: WELD 012B

Lecture Units

1

Lecture Semester Hours

18

Lab Units

1

Lab Semester Hours

54

In-class Hours

72

Out-of-class Hours

36

Total Course Units

2

Total Semester Hours

108

Prerequisite Course(s)

WELD 012B

Required Text and Other Instructional Materials**Resource Type**

Book

Author

Jeffus, Larry

Title

Welding: Principles and Applications

Edition

8th

Publisher

Cengage Learning

Year

2016

College Level

Yes

Flesch-Kincaid Level

12

ISBN #

978-1305494695

Class Size Maximum

25

Entrance Skills

Student will accurately measure, cut, and fit metal to prepare it for welding. Student will demonstrate proper welding techniques using GMAW equipment in the flat and horizontal, and overhead positions. Student will prepare all sample welds for GMAW certification.

Requisite Course Objectives

WELD 012B-Discuss the various cutting processes.

WELD 012B-List the advantages of using the different cutting processes.

WELD 012B-Explain the safety considerations of each of the different cutting processes.

WELD 012B-List the advantages of FCA welding and explain its limitations.

WELD 012B-List the common shielding gases used and explain their benefits.

WELD 012B-Explain how changing the welding gun angle affects the weld produced.

WELD 012B-Tell what can cause weld porosity and how it can be prevented.

WELD 012B-Demonstrate how to grind a tack weld and starts and stops to a featheredge.

WELD 012B-Explain the acceptable criteria of a visual inspection of a pipe weld.

WELD 012B-Demonstrate the ability to make a root pass welds using GMAW FCAW-G, FCAW-S processes.

WELD 012B-Demonstrate the ability to make a filler pass welds using GMAW, FCAW-G, FCAW-S processes.

WELD 012B-Demonstrate the ability to make a cover pass welds using GMAW, FCAW-G, FCAW-S processes.

WELD 012B-List the advantages of using custom fabrication parts

WELD 012B-Explain how to adjust parts to meet the tolerance.

WELD 012B-Describe how to control weld distortion.

WELD 012B-Describe how to assemble and fit up parts for welding.

Course Content

Classroom introduction of the following:

- FCAW Welding
- Welding codes and standards
- Fabrication techniques
- Proper grounding
- Advanced arc welding techniques
- Stringer beads
- Weave beads
- Multi-pass welds
- Joint preparation
- Setup of GMAW welding machine
- Safe working practices using cutting and welding tools
- Safe use cut-off saw
- Safe use of grinder for grinding and cutting
- Plasma cutting
- Oxy/acetylene cutting

Lab Content

Lab demonstration and practice of the following:

- Butt welds in the overhead position
- Lap welds in the overhead position
- Outside corner welds in the overhead position
- T welds in the overhead position
- Edge welds in the overhead position

Course Objectives

Objectives	
Objective 1	Explain how an oxy/fuel torch works including fuel gasses, metals, regulators, torches, and cutting tips, and properly set up and use an oxy/fuel torch using proper personal protective equipment appropriate for oxy/fuel torch use.
Objective 2	Explain the purpose of setting up the FCAW weld station properly.
Objective 3	Demonstrate how to make a root, filler, and cover passes in FCAW welding and prepare welds in the butt, tee, lap, corner, and edge in all positions that can pass a specific standard.
Objective 4	Demonstrate the ability to pass a bend test on a V-grooved weld.
Objective 5	Compare qualification and certification in the welding industry.
Objective 6	Assess the major considerations when selecting a code or standard.
Objective 7	Compile the steps required to certify and/or qualify a weld and a welder.

Student Learning Outcomes

Upon satisfactory completion of this course, students will be able to:	
Outcome 1	Demonstrate proper welding techniques using GMAW welding equipment in the overhead position.
Outcome 2	Prepare all sample welds for SMAW certification as defined in the SENSE certification.

Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Skilled Practice at a Workstation	Students are given assigned projects with accompanying technical drawings, specifically coupons used to assess weld quality. The instructor assists students with symbols and other questions on the technical drawings. Students are expected to cut and prepare metal and to provide a good fit-up prior to final welding.
Lecture	The instructor uses Google Slides to provide direct instruction at the beginning of the scheduled class.
Self-exploration	Students are expected to read assigned chapters, answer chapter review questions, and be prepared for mid-term and final exams
Discussion	During direct discussion, students are asked questions and discussion is encouraged.

Methods of Evaluation

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
Written homework	Chapter reviews will be assessed by the instructor.	Out of Class Only
Laboratory projects	Student work samples are self-assessed and then assessed by the instructor.	In Class Only
Presentations/student demonstration observations	Skill demonstration – lab work. Students will be assigned a series of shop projects to be completed in the shop.	In Class Only
Mid-term and final evaluations	Both mid-term and final are in multiple choice format	In Class Only
Student participation/contribution	Welding reflection packet and instructor evaluation. Students are expected to display good work habits, punctuality, and clean-up procedures.	In Class Only
Other	Participation	In Class Only

Assignments
Other In-class Assignments

1. Class discussion
2. Group interaction and presentation
3. Display proper work habits in shop
4. Display soft skills

Other Out-of-class Assignments

1. Reading assignments.
2. Chapter review questions.
3. Students are encouraged to find opportunities outside of class time to practice welding and prepare for certification.

Grade Methods

Letter Grade Only

MIS Course Data
CIP Code

48.0508 - Welding Technology/Welder.

TOP Code

095650 - Welding Technology

SAM Code

C - Clearly Occupational

Basic Skills Status

Not Basic Skills

Prior College Level

Not applicable

Cooperative Work Experience

Not a Coop Course

Course Classification Status

Credit Course

Approved Special Class

Not special class

Noncredit Category

Not Applicable, Credit Course

Funding Agency Category

Not Applicable

Program Status

Program Applicable

Transfer Status

Not transferable

Allow Audit

No

Repeatability

No

Materials Fee

No

Additional Fees?

No

Files Uploaded**Attach relevant documents (example: Advisory Committee or Department Minutes)**

Welding_Occupations_in_the_Inland_Empire Aug2018.pdf

Approvals**Curriculum Committee Approval Date**

9/03/2019

Academic Senate Approval Date

9/12/2019

Board of Trustees Approval Date

10/31/2019

Chancellor's Office Approval Date

12/02/2019

Course Control Number

CCC000609547

Programs referencing this course

Gas Metal Arc Welding Certificate (<http://catalog.collegeofthedesert.eduundefined?key=233/>)

Welding Technology SENSE Entry-Level Welder Certificate of Achievement (<http://catalog.collegeofthedesert.eduundefined?key=235/>)