

## EICC COURSE DEVELOPMENT MODEL (CDM)

**CATALOG COURSE NUMBER:** WEL-416

**COURSE TITLE:** Advanced Gas Metal Arc Welding (GMAW)

Originating College: ☐CCC ☐MCC ☒SCC

Effective Term/Year: Fall 2015

Initiating Faculty Member: Bruce Baldwin

Initiating Department Coordinator: Ben Kettering

### Reason for submission: Check all that apply

☒New Course If yes, type of course:

☐A&S

To be considered for General Education? ☐ Yes ☐ No Category:

To be part of an A & S Concentration? ☐ Yes ☐ No Concentration:

☒CTE Program Title: Gas Metal Arc Welding-Adv ☐Required ☒Elective

☐General Education or Program Review ☐Reactivation of an inactive course ☐Making course inactive

☐Changing course; please explain:

☐Other; please explain:

### Contact Hours/Distribution of Contact Hours

#### Lecture Hours

#### Lab Hours

#### Clinical Hours

#### Coop Hours

Hours per Week: 1.00 Hours per Week: 2.00 Hours per Week: Hours per Week:

Number of Weeks: 16.50 Number of Weeks: 16.50 Number of Weeks: 16.50 Number of Weeks: 16.50

**\*\*Note: If offering a course for the full fall or spring semester, the number of weeks is 16.5**

Total Lecture Hrs: 19.80 Total Lab Hrs: 39.60 Total Clinical Hrs: Total Coop Hrs:

**Semester Hours Credit:** 2.00 if variable credit, give range:

Allow repeat\* for credit: ☐Yes ☒No

If yes, total course repeats allowed: If yes, total credits:

\*Note that repeat for credit means a student can pass the course and then repeat it for additional credit. An internship course is an example of a course that could be set up as repeatable for additional credit

**Course or courses this CDM replaces, if any:** WEL-217 Gas Metal Arc Welding Advanced I

**CATALOG COURSE DESCRIPTION:** This course will build advanced skills in Gas Metal Arc Welding. Topics such as spray arc, short-circuit, and pulse welding, process variation, out of position welding, principle of operation, shielding gases, filler metals, and base metals will be covered. Safety and practical application of these welding processes will be stressed.

### RECOMMENDED ENTRY LEVEL SKILLS/KNOWLEDGE:

### PRE-REQUISITE COURSES

CCN#	COURSE TITLE
WEL 256	Gas Metal Arc Welding Basic

### CO-REQUISITE COURSES

CCN#	COURSE TITLE

**PUBLISHED MATERIAL(S) USED FOR CDM DEVELOPMENT:** Hobart Institute of Welding Technology. Gas Metal Arc Welding Advanced EW369 GMAWA. Troy, OH: Hobart Institute of Welding Technology, 2010. Print.

In general it is expected that source material will be dated within 5 years of this CDM date. If all materials/ textbooks cited above are older than this, please explain:

## GENERAL COURSE GOALS

Upon successful completion of this course the student should be able to:

Demonstrate knowledge of advanced GMAW processes, principles, and safe working habits.

## TOPICAL OUTLINE

1. GMAW Advanced Course Overview
2. Introduction To GMAW
3. Safety and Health of Welders
4. Equipment Set-up, Operation and Shutdown
5. Single V-Groove Weld, Butt Joint
6. Pulsed Spray Transfer
7. Single V-Groove Weld, Butt Joint, Pulsed Spray Transfer
8. Single V-Groove Weld, Butt Joint Destructive Test
9. Weldability of Aluminum
10. Fillet Weld, Lap and T-Joint, Horizontal
11. Fillet Weld, Lap and T-Joint, Vertical
12. Single V-Groove Weld, Butt Joint, Vertical
13. Single V-Groove Weld, Macro Etch Test
14. Single V-Groove Weld, Butt Joint, Overhead
15. Fillet Weld, Lap and T-Joint, Horizontal

## COURSE OBJECTIVES

Upon successful completion of the course, a student should be able to:

1. Gas Metal Arc Welding Advanced Course Overview
  - a. Describe the GMAW process.
  - b. Create quality welds.
  - c. Develop safe work practices.
2. Introduction to Gas Metal Arc Welding
  - a. Explain wire feed speed.
  - b. Describe the types of metal transfer.
  - c. Compare the advantages and dis-advantages of GMAW welding.
3. Safety and Health of Welders
  - a. Select proper personal protective equipment.
  - b. Explain what a material safety data sheet is.
  - c. Identify metals that can produce gasses.
4. Equipment Set-up, Operation and Shutdown
  - a. Perform visual inspections on machine and cables.
  - b. Install correct wire and wire tension.
  - c. Identify gun cable assembly components.
  - d. Discuss proper machine settings.
  - e. State machine and gas shut down procedures.
5. Single V-Groove Weld, Butt Joint
  - a. Assemble a single v-groove butt joint.
  - b. Produce a quality v-groove weld using the flat welding position.
6. Pulsed Spray Transfer
  - a. Define correct wire stick out.
  - b. Explain background current.
  - c. Explain pulse width.
7. Single V-Groove Weld, Butt Joint, Pulsed Spray Transfer
  - a. Assemble a single v-groove butt joint.
  - b. Produce a quality single v-groove weld using the pulsed spray transfer mode employing the horizontal welding position.
8. Single V-Groove Weld, Butt Joint Destructive Test
  - a. Produce a quality single v-groove weld.
  - b. Perform a visual inspection.
  - c. Perform a guided bend test.
9. Weldability of Aluminum
  - a. Explain thermal conductivity.

- b. Explain thermal expansion.
- c. Define the aluminum classification system.
- 10. Fillet Weld, Lap and T-Joint, Horizontal
  - a. Assemble a lap and t-joint.
  - b. Produce quality lap and t-joint welds on aluminum using the horizontal welding position.
- 11. Fillet Weld, Lap and T-Joint, Vertical
  - a. Assemble a lap and t-joint using aluminum.
  - b. Produce quality welds in the lap and t-joint configuration using the vertical up welding position.
- 12. Single V-Groove Weld, Vertical
  - a. Construct a butt joint with backing using aluminum.
  - b. Produce a quality single v-groove weld using the vertical up welding position.
- 13. Single V-groove Weld, Macro Etch Test
  - a. Produce a quality multi-pass single v-groove weld.
  - b. Perform a visual inspection.
  - c. Perform a macro etch test.
- 14. Single V-Groove Weld, Butt Joint, Overhead
  - a. Assemble a single v-groove butt joint with backing.
  - b. Produce a quality weld using the overhead welding position.
- 15. Fillet Weld, Lap and T-Joint, Horizontal
  - a. Assemble lap and t-joints using aluminum.
  - b. Produce a quality weld using the horizontal welding position.

**RECOMMENDED METHODS OF INSTRUCTION:** Check all appropriate methods of instruction to facilitate student learning of course objectives.

- |  |   |
|--|---|
| <input type="checkbox"/> Case Studies                                  | <input checked="" type="checkbox"/> Class Discussions       |
| <input type="checkbox"/> Computer lab work                             | <input checked="" type="checkbox"/> Computer-assisted tools |
| <input type="checkbox"/> Computer-assisted writing                     | <input type="checkbox"/> Conducting experiments             |
| <input type="checkbox"/> Demonstration or modeling                     | <input type="checkbox"/> Electronic interaction             |
| <input type="checkbox"/> Field observation                             | <input type="checkbox"/> Field trips                        |
| <input type="checkbox"/> Guest speaker                                 | <input checked="" type="checkbox"/> Guided practice         |
| <input type="checkbox"/> In-class writing or editing workshops         | <input type="checkbox"/> Journals                           |
| <input type="checkbox"/> Lecture                                       | <input type="checkbox"/> Library instruction and resources  |
| <input type="checkbox"/> Model building                                | <input type="checkbox"/> Peer review                        |
| <input type="checkbox"/> Readings                                      | <input type="checkbox"/> Role play                          |
| <input type="checkbox"/> Service learning                              | <input checked="" type="checkbox"/> Simulation              |
| <input type="checkbox"/> Student and instructor conferences            | <input type="checkbox"/> Student collaborative learning     |
| <input type="checkbox"/> Student presentation                          | <input checked="" type="checkbox"/> Student projects        |
| <input checked="" type="checkbox"/> Tests or quizzes                   | <input type="checkbox"/> Worksheets/surveys                 |
| <input type="checkbox"/> Writing assignments/exercises (graded or not) |   |
| <input type="checkbox"/> Other (please list specifics):                |   |

**RECOMMENDED EVALUATION METHODS:** Check all appropriate methods of evaluation to assess student achievement of course objectives.

- |   |   |
|---|---|
| <input type="checkbox"/> Class workshops        | <input checked="" type="checkbox"/> Classroom discussions/participation |
| <input type="checkbox"/> Collaborative work     | <input checked="" type="checkbox"/> Demonstration of skill(s)           |
| <input type="checkbox"/> Individual conferences | <input type="checkbox"/> Journals                                       |
| <input type="checkbox"/> Laboratory reports     | <input type="checkbox"/> Oral presentations                             |
| <input type="checkbox"/> Portfolios             | <input type="checkbox"/> Pretest/Posttest                               |
| <input checked="" type="checkbox"/> Quizzes     | <input type="checkbox"/> Reading responses                              |
| <input type="checkbox"/> Student presentations  | <input checked="" type="checkbox"/> Student projects                    |
| <input checked="" type="checkbox"/> Tests       | <input type="checkbox"/> Writing Assignments                            |

☐ Other (please list specifics):

**ATTENDANCE:** Policies on attendance will be formulated by the instructor and communicated to the students on the course syllabus.

**ACADEMIC DISHONESTY:** Policies on academic dishonesty can be found in the EICC student code of conduct published in the student handbook.

### CDM CREATION/REVIEW/REVISION INFORMATION

Originally Written by:

Date:

Department Chair, Comments, & Date:

Does similar curriculum exist at other EICC Colleges? ☐ CCC ☐ MCC ☐ SCC ☐ No

If yes, Counterparts Consulted, College, Comments & Date:

### CDM Review or Revision Date:

Faculty member(s) & College:

Does similar curriculum exist at other EICC Colleges? ☐ CCC ☐ MCC ☐ SCC ☐ No

Changes made to course which will require further review steps:

☐ Making course inactive ☐ Credit hours ☐ Contact hours ☐ Course Description

☐ 25% or more of course objectives ☐ Other minor revisions or no revisions

Dean Review, Comments & Date:

### If changes made require further review and approval:

College Curriculum Committee Sign-off & Date:

IC Review Subcommittee Sign-off & Date:

Instructional Council Approval: