

# WELD 012B: INTERMEDIATE GAS METAL ARC WELDING

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**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**

012B

**Full Course Title**

Intermediate Gas Metal Arc Welding

**Short Title**

INTERM GMAW WELDING

**Discipline****Disciplines List**

Welding

**Modality**

Face-to-Face

**Catalog Description**

This course covers intermediate level GMAW welding. This course includes safe work practices, safety in the welding industry, CNC plasma cutting processes, and the four positions of welding: Horizontal, Flat, Vertical, and Overhead. Student will demonstrate the ability to select the proper machine and settings and to perform the five basic welds in the four welding positions.

**Schedule Description**

Intermediate GMAW welding. Emphasis on vertical position. Prerequisite: WELD 012A

**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 012A

**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

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**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 positions.

**Requisite Course Objectives**

WELD 012A-Explain how each of the major welding processes works.

WELD 012A-List the factors that must be considered before a welding process is selected.

WELD 012A-Discuss types of injuries that can occur and how to prevent them.

WELD 012A-Discuss the proper use and maintenance of tools and equipment.

WELD 012A-Describe the backhand and forehand welding techniques.

WELD 012A-List and describe the basic GMAW equipment.

WELD 012A-Discuss how the GMAW molten weld pool can be controlled by varying the shielding gas, power settings, weave pattern, travel speed, electrode extension, and gun angle.

WELD 012A-Define voltage, electrical potential, amperage, and electrical current as it applies to GMAW.

WELD 012A-Describe the five basic weld types.

WELD 012A-Demonstrate how to make each of the five basic welds using the GMAW process in both the flat and horizontal positions.

### Course Content

Classroom introduction of the following:

- FCAW Welding
- Fabrication techniques
- Proper grounding
- Fundamentals of arc welding
- 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 vertical position
- Lap welds in the vertical position
- Outside corner welds in the vertical position
- T welds in the vertical position
- Edge welds in the vertical position

### Course Objectives

Objectives	
Objective 1	Explain the various cutting processes, safety considerations of each of the different cutting processes and compare the advantages of using each of the different cutting processes.
Objective 2	Explain the advantages of FCAW welding and evaluate its limitations.
Objective 3	Compare common shielding gases used in the GMAW process and choose the appropriate shielding gas for a particular weldment.
Objective 4	Evaluate how changing the welding gun angle affects the weld produced.
Objective 5	Explain weld porosity and determine how it can be prevented.
Objective 6	Demonstrate how to grind a tack weld and starts and stops to a featheredge.
Objective 7	Explain the acceptable criteria of a visual inspection of a pipe weld.
Objective 8	Demonstrate the ability to make a root pass, filler pass, and cover pass welds using GMAW, FCAW-G, and FCAW-S processes.
Objective 9	Modify parts to meet tolerance specifications called for in technical drawings, demonstrate how to assemble and fit up parts for welding, and estimate the advantage of custom welding parts.
Objective 10	Demonstrate and compare different methods of controlling heat distortion.

### 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 all four positions with an emphasis on the vertical position.
Outcome 2	Demonstrate fabrication techniques including measuring, bending, cutting, metal preparation, metallurgy and the properties of different metals, and the importance of proper fit-up of weldments based on technical drawings.

**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. 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.

**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 are assessed by the instructor.	Out of Class Only
Laboratory projects	Student work samples are self-assessed and are 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**

- a. Reading assignments: Students are required to read four selected chapters from the textbook and to answer chapter review questions for each chapter.
- b. Students are expected to use the materials from their chapter review work to study and prepare for mid-term and final tests.
- c. Students are encouraged to find opportunities outside of class time to practice welding techniques.

**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**

CCC000609546

**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/>)