Course Information Form (CIF)

Course Code: WLD 212

Course Title: Advanced Gas Metal Arc Welding

Department: Applied Sciences and Technologies
PCS Code: 1.2 - Occupational/Technical Instruction
CIP Code: 48.0508
Repeatability: 0

Effective Date: Summer 2026

Credit Hours

Catalog Notation: 1-2-2
Credit Hour Distribution:

Lecture: 1	Lab: 2	Clinical: 0	**Total: 2**

General Course Information

Catalog Description

Advanced gas metal arc welding (GMAW). Gas metal arc equipment adjustments, metal transfer, and shielding gases. Skill development in all positions of welding on mild steel ranging from 1/8" to 3/8" steel and aluminum. Welding symbols and print reading.

General Course Objectives

Students will learn how to competently adjust equipment to parameters dictated by specific types and thicknesses of metal, and be able to adapt to specific techniques to comply with guidelines and welding codes controlling weld quality.

Minimum Placement Levels

English	Reading	Math
Placement into ENG 098	Placement into CCS 098	Placement into MAT 059

Prerequisites

Concurrent enrollment in WLD 112
Credit or concurrent enrollment in WLD 110 or WLD 111

Methods of Evaluation

Students will be graded on weekly 2-4 lab assignments to evaluate skill proficiency (80% of grade), and on 3 written exams and 1 quiz to evaluate knowledge acquired in the classroom setting (20% of grade).

Instructional Materials and Additional Supplies

None.

Course Content

General Learning Outcomes (GLOs)

- Reasoning and Inquiry: Students will demonstrate the ability to solve problems using deductive reasoning and logic, quantitative reasoning, or the scientific method.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Course Overview and GMAW Skills	1. List the objectives of the course. 2. Describe the methods of evaluation. 3. List the grade scale to be used for the course. 4. Perform the welding skills to complete padding on 3/16.	1	3	0
GMAW Safety and Skills	1. Observe proper safety procedures at all times. 2. Score 100% on safety exams. 3. List the hazards created by inert gas welding. 4. Demonstrate the safety practices of inert gas welding. 5. List the personal welding equipment required to protect the welder. 6. Perform the welding skills to fillet and groove welds in the 1G and 2F positions on 3/16.	2	3	0
GMAW Theory, Practice, Equipment Setup, and Skills	1. Summarize and explain the theory of GMAW welding. 2. List the advantages of GMAW welding over conventional stick-arc welding. 3. Set up GMAW welding equipment in preparation for welding. 4. Name and explain the main components of a GMAW welding outfit. 5. List the factors which affect the setup of GMAW welding equipment. 6. Explain the function of the shielding gas in the GMAW welding process. 7. List the types of shielding gases used, the characteristics of each gas, and the type of metal and welding conditions each shielding gas is used with. 8. List the parts and functions that comprise the GMAW work station. 9. Describe the process of the gas delivery system. 10. Determine correct gas flow rates upon particular welding applications.	2	4	0
Types of Shielded Gases Relevant to Type of Metal Being Welded and GMAW Skills	1. Explain the function of the shielding gas in the GMAW welding process. 2. List the types of shielding gases used, the characteristics of each type of gas, and the type of metal and welding conditions each shielding gas is used with. 3. List the parts and functions that comprise the GMAW work station. 4. Describe the process of the gas delivery system. 5. Determine correct gas flow rates upon particular welding applications. 6. Perform the welding skills to complete the T-joint on 16 gauge and 1/8 steel.	2	4	0
GMAW Types of Welding	1. List the three methods of metal transfer in the GMAW welding process. 2. Describe each method relevant to the welding current, quantity of molten metal transfer, quality of penetration, spatter, arc stability, and applications of each type of transfer to metal size and type. 3. List the conditions and factors on which each type of metal transfer depends. 4. Simulate each type of metal transfer setup on the GMAW welding equipment. 5. Perform the welding skills to fillet welds in the 2F and 4F positions on 3/16. 6. Perform the welding skills to multiple pass fillet welds in the 2F and 4F positions on 3/16.	2	4	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Types of Filler Wire Available and GMAW Skills	1. Explain the American Welding Society (AWS) classification code for GMAW welding wire. 2. List the basic wire diameters that are available for GMAW welding. 3. List the factors to consider when selecting the electrode wire. 4. Explain the process and applications of flux core welding. 5. Read and interpret welding symbols. 6. Perform the welding skills to groove welds on beveled 3/8.	2	4	0
Out-of-Position Welding and GMAW Skills	1. Describe the types of arc transfer to be used in out-of-position welding. 2. List the major problems encountered in out-of-position welding. 3. Explain the techniques used in GMAW in each of the positions. 4. Define a weld in each of the four off positions. 5. Perform the welding skills to prepare welded material to bend test. 6. Perform the bend test. 7. Evaluate to AWS D1.1 structural code, steel.	2	4	0
Troubleshooting GMAW Problems, Spool Gun, and Push/Pull GMAW Machine Setup, Operation	1. List the probable areas of GMAW welding problems. 2. List common GMAW welding problems, their causes, and possible ways to correct them. 3. Discuss and apply efficient cleaning methods for the GMAW welding gun and accessories. 4. List negative results of spatter buildup. 5. Perform the welding skills to fillet welds on 1/8. 6. Perform the welding skills to fillet welds on 1/4.	2	4	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
15	30	0