

Technical Competencies:

1. Identify, inspect, and maintain Gas Tungsten Arc Welding (GTAW) machines; identify, select, and store GTAW electrodes and filler rods.
2. Explain the principles of GTAW and the effects of variables on the GTAW process.
3. Explain the theory and application of Plasma Arc Cutting.
4. Demonstrate the necessary manipulative skills needed to apply the Gas Tungsten Arc on various joint designs, on plate with both ferrous and non-ferrous metals.
5. Identify, inspect, and maintain Gas Metal Arc Welding (GMAW) machines; identify, select, and store GMAW electrodes.
6. Explain principles of GMAW and the effects of variables on the GMAW process.
7. Explain the theory and applications of GMAW and related processes such as Flux Core Arc Welding (FCAW) and Submerged Arc Welding (SAW) and metallurgy.
8. Demonstrate the manipulative skills of Gas Metal Arc Welding on ferrous and non-ferrous metal and on joint designs on plate in all positions, including the welding of groove welds.
9. Explain and read occupationally-specific prints for welders and fabricate from a blueprint.
10. Explain the certification process in welding.
11. Test to certification standards on all types of welding.
12. Demonstrate a working knowledge of materials used in welding.
13. Demonstrate a working knowledge of oxy-fuel identification, set-up, inspection, and maintenance; including identification, selection and care, principles of operation, and effects of variables for manual and mechanized oxy-fuel cutting, welding, and brazing.
14. Identify, inspect, and maintain Shielded Metal Arc Welding (SMAW) electrodes.
15. Explain the principles of SMAW and the effects of variable on the SMAW process to weld plate and pipe.
16. Demonstrate the manipulative skills to perform fillet welds in all positions.
17. Demonstrate the manipulative skills to perform groove welds in all positions.
18. Practice safety procedures for all types of welding.

Diploma - Combination Welder

Upon completion of this program, the graduate can:

Competencies will be met at the level appropriate to the credential.

General Education Competencies:

- I. Communicate Effectively
 1. Read and listen with comprehension.
 2. Speak and write clearly using standard English.
 3. Interact cooperatively with others using both verbal and non-verbal means.
 4. Demonstrate information processing through basic computer skills.
- II. Think Critically
 1. Make connections in learning across the disciplines and draw logical conclusions.
 2. Demonstrate problem solving through interpreting, analyzing, summarizing, and/or integrating a variety of materials.
 3. Use mathematics to organize, analyze, and synthesize data to solve a problem.
- III. Learn Independently
 1. Use appropriate search strategies and resources to find, evaluate, and use information.
 2. Make choices based upon awareness of ethics and differing perspectives/ideas.
 3. Apply learning in academic, personal, and public situations.
 4. Think creatively to develop new ideas, processes, or products.
- IV. Examine Relationships in Diverse and Complex Environments
 1. Recognize the relationship of the individual to human heritage and culture.
 2. Demonstrate an awareness of the relationship of the individual to the biological and physical environment.
 3. Develop an awareness of self as an individual member of a multicultural global community.

Technical Competencies:

1. Identify, inspect, and maintain Gas Tungsten Arc Welding (GTAW) machines; identify, select, and store GTAW electrodes and filler rods.
2. Explain the principles of GTAW and the effects of variables on the GTAW process.
3. Explain the theory and application of Plasma Arc Cutting.

4. Demonstrate the necessary manipulative skills needed to apply the Gas Tungsten Arc on various joint designs, on plate with both ferrous and non-ferrous metals.
5. Identify, inspect, and maintain Gas Metal Arc Welding (GMAW) machines; identify, select, and store GMAW electrodes.
6. Explain principles of GMAW and the effects of variables on the GMAW process.
7. Explain the theory and applications of GMAW and related processes such as Flux Core Arc Welding (FCAW) and Submerged Arc Welding (SAW) and metallurgy.
8. Demonstrate the manipulative skills of Gas Metal Arc Welding on ferrous and non-ferrous metal and on joint designs on plate in all positions, including the welding of groove welds.
9. Explain and read occupationally specific prints for welders and fabricate from a blueprint.
10. Explain the certification process in welding.
11. Test to certification standards on all types of welding.
12. Demonstrate a working knowledge of materials used in welding.
13. Demonstrate a working knowledge of oxy-fuel identification, set-up, inspection, and maintenance; including identification, selection and care, principles of operation, and effects of variables for manual and mechanized oxy-fuel cutting, welding, and brazing.
14. Identify, inspect, and maintain Shielded Metal Arc Welding (SMAW) electrodes.
15. Explain the principles of SMAW and the effects of variable on the SMAW process to weld plate and pipe.
16. Demonstrate the manipulative skills to perform fillet welds in all positions.
17. Demonstrate the manipulative skills to perform groove welds in all positions.
18. Practice safety procedures for all types of welding.

Certificate - Welder Helper

Upon completion of this program, the graduate can:

1. Gain a working knowledge of materials used in welding.
2. Learn and practice safety procedures for all types of welding.
3. Identify, inspect, and maintain Gas Tungsten Arc Welding (GTAW) machines; as well as identify, select, and store GTAW electrodes and filler rods.
4. Explain the principles of GTAW and the effects of variables on the GTAW process. OR
5. Identify, inspect, and maintain Gas Metal Arc Welding (GMAW) machines; as well as identify, select, and store GMAW electrodes.
6. Explain principles of GMAW and the effects of variables on the GMAW process. OR
7. Identify, inspect, and maintain Shielded Metal Arc Welding (SMAW) electrodes.
8. Explain the principles of SMAW and the effects of variable on the SMAW process to weld plate and pipe.

Certificate - Gas Welder

Upon completion of this program, the graduate can:

1. Gain a working knowledge of oxy-fuel identification, set-up, inspection, and maintenance; including identification, selection and care, principles of operation, and effects of variables for manual and mechanized oxy-fuel cutting, welding, and brazing.
2. Gain a working knowledge of materials used in welding.

Certificate - Arc Cutter

Upon completion of this program, the graduate can:

1. Explain the theory and application of Plasma Arc Cutting.
2. Gain a working knowledge of oxy-fuel identification, set-up, inspection, and maintenance; including identification, selection and care, principles of operation, and effects of variables for manual and mechanized oxy-fuel cutting, welding, and brazing.
3. Gain a working knowledge of materials used in welding.

Certificate - Tack Welder

Upon completion of this program, the graduate can:

1. Identify, inspect, and maintain Gas Tungsten Arc Welding (GTAW) machines; as well as identify, select, and store GTAW electrodes and filler rods.
2. Explain the principles of GTAW and the effects of variables on the GTAW process.
3. Explain the theory and application of Plasma Arc Cutting.
4. Acquire the necessary manipulative skills needed to apply the Gas Tungsten Arc on various joint designs, on plate with both ferrous and non-ferrous metals.

OR

5. Identify, inspect, and maintain Gas Metal Arc Welding (GMAW) machines; as well as identify, select, and store GMAW electrodes.
6. Explain principles of GMAW and the effects of variables on the GMAW process.

OR

7. Identify, inspect, and maintain Shielded Metal Arc Welding (SMAW) electrodes.
8. Explain the principles of SMAW and the effects of variable on the SMAW process to weld plate and pipe.

AND

9. Explain and read occupationally specific prints for welders and fabricate from a blueprint.
10. Gain a working knowledge of materials used in welding.
11. Learn and practice safety procedures for all types of welding.

Certificate - Production Line Welder

Upon completion of this program, the graduate can:

1. Gain a working knowledge of oxy-fuel identification, set-up, inspection, and maintenance; including identification, selection and care, principles of operation, and effects of variables for manual and mechanized oxy-fuel cutting, welding, and brazing.
2. Gain a working knowledge of materials used in welding.
3. Identify, inspect, and maintain Gas Tungsten Arc Welding (GTAW) machines; as well as identify, select, and store GTAW electrodes and filler rods.
4. Explain the principles of GTAW and the effects of variables on the GTAW process.
5. Explain the theory and application of Plasma Arc Cutting.
6. Acquire the necessary manipulative skills needed to apply the Gas Tungsten Arc on various joint designs, on plate with both ferrous and non-ferrous metals.
7. Identify, inspect, and maintain Gas Metal Arc Welding (GMAW) machines; as well as identify, select, and store GMAW electrodes.
8. Explain principles of GMAW and the effects of variables on the GMAW process.
9. Gain a working knowledge of materials used in welding.
10. Learn and practice safety procedures for all types of welding.
11. Identify, inspect, and maintain Shielded Metal Arc Welding (SMAW) electrodes.
12. Explain the principles of SMAW and the effects of variable on the SMAW process to weld plate and pipe.

Certificate - Arc Welder

Upon completion of this program, the graduate can:

1. Gain a working knowledge of oxy-fuel identification, set-up, inspection, and maintenance; including identification, selection and care, principles of operation, and effects of variables for manual and mechanized oxy-fuel cutting, welding, and brazing.
2. Gain a working knowledge of materials used in welding.
3. Identify, inspect, and maintain Gas Tungsten Arc Welding (GTAW) machines; as well as identify, select, and store GTAW electrodes and filler rods.
4. Explain the principles of GTAW and the effects of variables on the GTAW process.
5. Explain the theory and application of Plasma Arc Cutting.
6. Acquire the necessary manipulative skills needed to apply the Gas Tungsten Arc on various joint designs, on plate with both ferrous and non-ferrous metals.
7. Identify, inspect, and maintain Gas Metal Arc Welding (GMAW) machines; as well as identify, select, and store GMAW electrodes.
8. Explain principles of GMAW and the effects of variables on the GMAW process.
9. Explain and read occupationally specific prints for welders and fabricate from a blueprint.
10. Gain a working knowledge of materials used in welding.
11. Learn and practice safety procedures for all types of welding.
12. Identify, inspect, and maintain Shielded Metal Arc Welding (SMAW) electrodes.
13. Explain the principles of SMAW and the effects of variable on the SMAW process to weld plate and pipe.

Certificate - Pipeline Welder

Upon completion of this program, the graduate can:

1. Identify, inspect, and maintain Gas Tungsten Arc Welding (GTAW) machines; as well as identify, select, and store GTAW electrodes and filler rods.
2. Explain the principles of GTAW and the effects of variables on the GTAW process.
3. Explain the theory and application of Plasma Arc Cutting.
4. Acquire the necessary manipulative skills needed to apply the Gas Tungsten Arc on various joint designs, on plate with both ferrous and non-ferrous metals.
5. Identify, inspect, and maintain Gas Metal Arc Welding (GMAW) machines; as well as identify, select, and store GMAW electrodes.
6. Explain principles of GMAW and the effects of variables on the GMAW process.
7. Acquire the manipulative skills of Gas Metal Arc Welding on ferrous and non-ferrous metal and on joint designs on plate in all positions, including the welding of groove welds.
8. Explain and read occupationally specific prints for welders and fabricate from a blueprint.
9. Explain the certification process in welding.
10. Test to certification standards on all types of welding.
11. Gain a working knowledge of materials used in welding.
12. Gain a working knowledge of oxy-fuel identification, set-up, inspection, and maintenance; including identification, selection and care, principles of operation, and effects of variables for manual and mechanized oxy-fuel cutting, welding, and brazing.
13. Identify, inspect, and maintain Shielded Metal Arc Welding (SMAW) electrodes.
14. Explain the principles of SMAW and the effects of variable on the SMAW process to weld plate and pipe.
15. Acquire the manipulative skills to perform fillet welds in all positions.
16. Acquire the manipulative skills to perform groove welds in all positions.
17. Learn and practice safety procedures for all types of welding.

Certificate - AWS National Skills Standards Level I

Upon completion of this program, the graduate can:

1. Identify, inspect, and maintain Gas Tungsten Arc Welding (GTAW) machines; as well as identify, select, and store GTAW electrodes and filler rods.
2. Explain the principles of GTAW and the effects of variables on the GTAW process.
3. Explain the theory and application of Plasma Arc Cutting.
4. Acquire the necessary manipulative skills needed to apply the Gas Tungsten Arc on various joint designs, and on plate with both ferrous and non-ferrous metals.
5. Identify, inspect, and maintain Gas Metal Arc Welding (GMAW) machines; as well as identify, select, and store GMAW electrodes.
6. Explain principles of GMAW and the effects of variables on the GMAW process.
7. Acquire the manipulative skills of Gas Metal Arc Welding on ferrous and non-ferrous metal and on joint designs on plate in all positions, including the welding of groove welds.
8. Explain and read occupationally specific prints for welders and fabricate from a blueprint.
9. Explain the certification process in welding.
10. Test to certification standards on all types of welding.
11. Gain a working knowledge of materials used in welding.
12. Gain a working knowledge of oxy-fuel identification, set-up, inspection, and maintenance; including identification, selection and care, principles of operation, and effects of variables for manual and mechanized oxy-fuel cutting, welding, and brazing.
13. Identify, inspect, and maintain Shielded Metal Arc Welding (SMAW) electrodes.
14. Explain the principles of SMAW and the effects of variable on the SMAW process to weld plate and pipe.
15. Acquire the manipulative skills to perform fillet welds in all positions.
16. Acquire the manipulative skills to perform groove welds in all positions.
17. Learn and practice safety procedures for all types of welding.

Outlines:

AAS Welding Technology

ENG	101	Writing I	3
MT	110	Applied Mathematics OR	3
MT	145	Contemporary College Mathematics OR	(3)
MT	150	College Algebra	(3)
		Heritage/Humanities/Foreign Language	3

PHY	151	Introduction to Physics AND	3
PH	161	Introductory Physics Laboratory I OR Science	1 (3)
PY	110	General Psychology OR	3
SOC	101	Introduction to Sociology	(3)
COM	252	Introduction to Interpersonal Communication OR	3
COM	181	Basic Public Speaking	(3)
		Computer Literacy	0-3
		General Education Total Credits	18 –22

Required

WLD	100	Oxy-Fuel Systems OR	2
WLD	110	Cutting Processes	(2)
WLD	101	Oxy-Fuel Systems Lab OR	2
WLD	111	Cutting Processes Lab	(3)
WLD	120	Shielded Metal Arc Welding (SMAW)	2
WLD	121	Shielded Metal Arc Welding (SMAW) Fillet Laboratory	3
WLD	123	Shielded Metal Arc Welding (SMAW) Groove Welds with Backing Lab OR	3
WLD	225	Shielded Metal Arc Welding (SMAW) Open Groove Lab	(3)
WLD	130	Gas Tungsten Arc Welding (GTAW)	2
WLD	131	Gas Tungsten Arc Welding (GTAW) Fillet Lab	3
WLD	133	Gas Tungsten Arc Welding (GTAW) Groove Lab	3
WLD	140	Gas Metal Arc Welding (GMAW)	2
WLD	141	Gas Metal Arc Welding (GMAW) Fillet Lab	3
WLD	143	Gas Metal Arc Welding (GMAW) Groove Lab	3
WLD	170	Blueprint Reading for Welding	2
WLD	171	Blueprint Reading for Welding Lab	3
WLD	220	Welding Certification	2
WLD	221	Welding Certification Lab	3
WLD	298	Welding Practicum OR	1-6
WLD	299	Cooperative Work Experience	(1-6)
		Technical Electives	3
		Subtotal	42-48
		Total Credits	60-70

**Diploma
Combination Welder**

ENG	101	Writing I OR	3
TEC	200	Technical Communications	(3)
MT	110	Applied Mathematics OR	3
MT	115	Technical Mathematics OR	(3)
MT	145	Contemporary College Mathematics OR	(3)
MT	150	College Algebra	(3)
		Computer Literacy	0-3
		General Education Total Credits	6-9

Required

WLD	100	Oxy-Fuel Systems OR	2
WLD	110	Cutting Processes	(2)
WLD	101	Oxy-Fuel Systems Lab OR	2
WLD	111	Cutting Processes Lab	(3)
WLD	120	Shielded Metal Arc Welding (SMAW)	2
WLD	121	Shielded Metal Arc Welding (SMAW) Fillet Laboratory	3
WLD	123	Shielded Metal Arc Welding (SMAW) Groove Welds with Backing Lab OR	3
WLD	225	Shielded Metal Arc Welding (SMAW) Open Groove Lab	(3)
WLD	130	Gas Tungsten Arc Welding (GTAW)	2
WLD	131	Gas Tungsten Arc Welding (GTAW) Fillet Lab	3
WLD	133	Gas Tungsten Arc Welding (GTAW) Groove Lab	3
WLD	140	Gas Metal Arc Welding (GMAW)	2
WLD	141	Gas Metal Arc Welding (GMAW) Fillet Lab	3

WLD	143	Gas Metal Arc Welding (GMAW) Groove Lab	3
WLD	170	Blueprint Reading for Welding	2
WLD	171	Blueprint Reading for Welding Lab	3
WLD	220	Welding Certification	2
WLD	221	Welding Certification Lab	3
WLD	298	Welding Practicum OR	1-6
WLD	299	Cooperative Work Experience	(1-6)
		Technical Elective	2-3
		Subtotal	41-48
		Total Credits	47-57

***Technical Electives:**

WPP	200	Workplace Principles	3
WLD	151	Basic Welding A	2
WLD	161	Submerged Arc Welding Lab	1
WLD	181	Advanced Welding Systems Lab	1
WLD	191	Plasma Arc Welding Systems Lab	1
WLD	147	Flux Cored Arc Welding Lab	1
WLD	145	Gas Metal Arc Welding Aluminum Lab	1
WLD	251	Welding Automation Lab	1
WLD	253	Pipe Fitting and Template Development Lab	1
WLD	229	Shielded Metal Arc Welding Pipe Lab B	3
WLD	239	Orbital Tube Welding	1
WLD	240	Materials Technology	2
BEX	100	Basic Electricity for Non-Majors	3
BEX	101	Basic Electricity Lab for Non-Majors	2
FEX	100	Fundamentals of Electricity for Non-Majors	3

*This list is not all inclusive. Other courses may be approved at the discretion of the program coordinator.

**Certificate
Welder Helper**

WLD	151	Basic Welding A OR	2
WLD	120	Shielded Metal Arc Welding (SMAW) AND	(2)
WLD	121	Shielded Metal Arc Welding (SMAW) Fillet Laboratory OR	(3)
WLD	130	Gas Tungsten Arc Welding (GTAW) AND	(2)
WLD	131	Gas Tungsten Arc Welding (GTAW) Fillet Laboratory OR	(3)
WLD	140	Gas Metal Arc Welding (GMAW) AND	(2)
WLD	141	Gas Metal Arc Welding (GMAW) Fillet Laboratory OR	(3)
WLD	152	Basic Welding B	(5)
		Total Credits	2-5

Gas Welder

WLD	100	Oxy-Fuel Systems	2
WLD	101	Oxy-Fuel Systems	2
		Total Credits	4

ARC Cutter

WLD	110	Cutting Processes	2
WLD	111	Cutting Processes Laboratory	3
		Total Credits	5

Tack Welder

WLD	170	Blueprint Reading for Welding	2
WLD	171	Blueprint Reading for Welding Laboratory	3
WLD	151	Basic Welding A OR	2
WLD	120	Shielded Metal Arc Welding (SMAW) AND	(2)
WLD	121	Shielded Metal Arc Welding (SMAW) Fillet Laboratory OR	(3)
WLD	130	Gas Tungsten Arc Welding (GTAW) AND	(2)

WLD	131	Gas Tungsten Arc Welding (GTAW) Fillet Laboratory OR	(3)
WLD	140	Gas Metal Arc Welding (GMAW) AND	(2)
WLD	141	Gas Metal Arc Welding (GMAW) Fillet Laboratory OR	(3)
WLD	152	Basic Welding B	(5)
		Total Credits	7-10

Production Line Welder

WLD	130	Gas Tungsten Arc Welding (GTAW)	2
WLD	131	Gas Tungsten Arc Welding (GTAW) Fillet Laboratory	3
WLD	140	Gas Metal Arc Welding (GMAW)	2
WLD	141	Gas Metal Arc Welding (GMAW) Fillet Laboratory	3
WLD	100	Oxy-Fuel Systems OR	2
WLD	110	Cutting Processes	(2)
WLD	101	Oxy-Fuel Systems Laboratory OR	2
WLD	111	Cutting Processes Laboratory	(3)
WLD	120	Shielded Metal Arc Welding (SMAW)	2
WLD	121	Shielded Metal Arc Welding (SMAW) Fillet Laboratory	3
		Total Credits	19-20

ARC Welder

WLD	100	Oxy-Fuel Systems OR	2
WLD	110	Cutting Processes	(2)
WLD	101	Oxy-Fuel Systems Laboratory OR	2
WLD	111	Cutting Processes Laboratory	(3)
WLD	120	Shielded Metal Arc Welding (SMAW)	2
WLD	121	Shielded Metal Arc Welding (SMAW) Fillet Laboratory OR	3
WLD	123	Shielded Metal Arc Welding (SMAW) Groove Welds with Backing Laboratory OR	(3)
WLD	225	Shielded Metal Arc Welding (SMAW) Open Groove Laboratory	(3)
WLD	130	Gas Tungsten Arc Welding (GTAW)	2
WLD	131	Gas Tungsten Arc Welding (GTAW) Fillet Laboratory OR	3
WLD	133	Gas Tungsten Arc Welding (GTAW) Groove Laboratory	(3)
WLD	140	Gas Metal Arc Welding (GMAW)	2
WLD	141	Gas Metal Arc Welding (GMAW) Fillet Laboratory OR	3
WLD	143	Gas Metal Arc Welding (GMAW) Fillet Groove Laboratory	(3)
WLD	170	Blueprint Reading for Welding	2
WLD	171	Blueprint Reading for Welding Laboratory	3
		Total	24-25

Pipeline Welder

WLD	100	Oxy-Fuel Systems OR	2
WLD	110	Cutting Processes	(2)
WLD	101	Oxy-Fuel Systems Laboratory OR	2
WLD	111	Cutting Processes Laboratory	(3)
WLD	120	Shielded Metal Arc Welding (SMAW)	2
WLD	130	Gas Tungsten Arc Welding (GTAW)	2
WLD	140	Gas Metal Arc Welding (GMAW)	2
WLD	170	Blueprint Reading for Welding	2
WLD	171	Blueprint Reading for Welding Laboratory	3
WLD	220	Welding Certification	2
WLD	221	Welding Certification Laboratory	3
WLD	227	Shielded Metal Arc Welding (SMAW) Pipe Laboratory A	3
WLD	235	Gas Tungsten Arc Welding (GTAW) Pipe Laboratory A	3
WLD	245	Gas Metal Arc Welding (GMAW) Pipe Laboratory A	3

Recommended Electives:

WLD	229	Shielded Metal Arc Welding (SMAW) Pipe Laboratory B	(3)
WLD	237	Gas Tungsten Arc Welding (GTAW) Pipe Laboratory B	(3)
WLD	247	Gas Metal Arc Welding (GMAW) Pipe Laboratory B	(3)
WLD	253	Pipe Fitting and Template Development Lab	(1)

Total

29-40

AWS National Skills Standards Level I

WLD	100	Oxy-Fuel Systems OR	2	
WLD	110	Cutting Processes	(2)	
WLD	101	Oxy-Fuel Systems Laboratory OR	2	
WLD	111	Cutting Processes Laboratory	(3)	
WLD	120	Shielded Metal Arc Welding (SMAW)	2	
WLD	121	Shielded Metal Arc Welding (SMAW) Fillet Laboratory	3	
WLD	123	Shielded Metal Arc Welding (SMAW) Groove Welds with Backing Laboratory OR		3
WLD	225	Shielded Metal Arc Welding (SMAW) Open Groove Laboratory	(3)	
WLD	130	Gas Tungsten Arc Welding (GTAW)	2	
WLD	131	Gas Tungsten Arc Welding (GTAW) Fillet Laboratory	3	
WLD	133	Gas Tungsten Arc Welding (GTAW) Groove Laboratory	3	
WLD	140	Gas Metal Arc Welding (GMAW)	2	
WLD	141	Gas Metal Arc Welding (GMAW) Fillet Laboratory	3	
WLD	143	Gas Metal Arc Welding (GMAW) Fillet Groove Laboratory	3	
WLD	170	Blueprint Reading for Welding	2	
WLD	171	Blueprint Reading for Welding Laboratory	3	
		Total	33-34	

Dates of Actions:

Approved: March 2004

Revised: May 2007