APPENDIX A

WELDER (INDUSTRIAL)

D.O.T. CODE 810.384-014
O*NET CODE 51-4121.06

As Revised for MACNY, The Manufacturers Association

This training outline is the current standard for Work Processes and Related Instruction. Changes in technology, regulations, and safety/health issues may result in the need for additional on-the-job or classroom training.

WORK PROCESSES

		Approximate Hours
A.	General Shop Techniques	1,000

1. Follow all safety procedures and policies, including but not limited to Lock-Out/Tag-Out, Hazardous Materials, Right-to-Know, Safety Data Sheets (SDS), Personal Protective Equipment (PPE)
2. Understand oral and written work instructions
3. Understand different welding processes
4. Assist experienced welders
5. Simple blueprint reading and fabrication
   Become familiar with American Welding Society (AWS)/ American National Standards Institute (ANSI) codes and standards
6. Acquire general understanding of cosmetic grinding

B.	Oxyacetylene Welding and Cutting/Plasma Arc Cutting /Shielded Metal Arc Welding (SMAW)	300

1. Follow all safety procedures and policies
2. Perform a variety of cutting on different thicknesses of carbon steels
3. Soldering
4. Brazing

5. Basic oxyacetylene welding
6. Set up templates and use burning table
7. Lay out job
8. Select and set up welding equipment
9. Perform different welds on a variety of metals
10. Clean and measure welds
11. Select filler material(s)

C. Gas Tungsten Arc Welding (GTAW) aka TIG (Tungsten Inert Gas) 2,700

1. Follow all safety procedures and policies
2. Set up fixtures for complicated welding assemblies
3. Reading blueprints for advanced welding
4. Understand, set up, and use inert gas as a backing
5. Select and set up all equipment needed to weld
6. Weld steel, stainless steel, aluminum or other alloys
7. Weld aluminum with Alternating Current (AC) and argon shielding
8. Weld aluminum with Direct Current (DC) and helium shielding
9. Weld of dissimilar metals
10. Demonstrate knowledge of filler metals and their applications
11. Weld to AWS/ANSI codes and standards
12. Demonstrate basic knowledge of TIG torches, parts, machines

D. Gas Metal Arc Welding (GMAW) aka MIG (Metal Inert Gas) 1,200

1. Follow all safety procedures and policies
2. Select and set up all equipment needed to weld
3. Weld steel, stainless steel, aluminum or other alloys
4. Demonstrate knowledge of filler metals and their applications
5. Weld to AWS/ANSI codes and standards
6. Demonstrate basic knowledge of MIG torches, parts, machinery
7. Preventative/predictive maintenance and minor equipment repair

E. Alternate Welding Processes (optional*) 1,000

1. Follow all safety procedures and policies
2. Select and set up all equipment needed to weld
3. Weld steel, stainless steel, aluminum or other alloys
4. Use proper filler metals
5. Conform to AWS/ANSI codes and standards

6. Demonstrate knowledge of robotic welding
7. Demonstrate knowledge of advanced aluminum GMAW
8. Demonstrate knowledge of electron beam welding
9. Demonstrate knowledge of plasma welding
10. Demonstrate knowledge of spot welding

F. Layout and Fixtures / Job Preparation 500

1. Plan work site layout, and work area layout
2. Design and build jigs, fixtures, and templates
3. Ensure lay out complies with applicable welding specifications and/or accepted shop practice

G. Inspection and Quality Control 1,000

1. Use precision measuring instruments, such as gauges, calipers, comparators
2. Work with thin gauge materials
3. Work to tight tolerances
4. Use staging techniques
5. Read and understand welding process specifications
6. Become familiar with weld inspection techniques

TOTAL HOURS 8,000

*If optional components are not selected, the hours should be devoted to further mastery of the required work processes.

Apprenticeship work processes are applicable only to training curricula for apprentices in approved programs. Apprenticeship work processes have no impact on classification determinations under Article 8 or 9 of the Labor Law. For guidance regarding classification for purposes of Article 8 or 9 of the Labor Law, please refer to http://www.labor.state.ny.us/workerprotection/publicwork/PDFs/Article8FAQS.pdf.

APPENDIX B

WELDER (INDUSTRIAL)

RELATED INSTRUCTION

Safety and Health

Topics to be covered include, but are not limited to:

Avoiding Overexposure to Fumes
Burn Protection
Electrical Safety
Fire and Explosion Prevention
First Aid – minimum 6.5 hours every 3 years
Good Housekeeping
Lockout/Tagout
Proper Lifting Techniques
Proper Use of Personal Protective Clothing and Equipment
Protecting Against Noise
Radiation Protection
Right-to-Know/~~Material~~ Safety Data Sheets for All Materials Used on the Job
Safeguarding Vision
Scaffold/Platform Safety (if applicable)

Blueprints

Basic Blueprint Reading
Advanced Blueprint Reading
Weld Symbols
Reading Welding Charts
Reading Codes and Standards
Layout

Mathematics

Fundamentals
Trade Applications
Precision Measurement

Trade Theory and Science

Safe Use and Care of Hand and Power Tools
Safe Use and Care of Equipment and Machines
Terminology
Metals Used in the Trade and Their Properties
Fundamentals of Electricity

Oxyacetylene Welding and Cutting
GTAW
GMAW
SAW (If Work Process "E" on Appendix A is selected)
Fixtures and Fixture Design
Heat Treatment
Inspection and Quality Control
Welding Non-Ferrous Materials
American Welding Society Certification Course (optional)

Other Workplace Skills

Sexual Harassment Prevention Training – minimum 3 hours

Other Related Courses as Necessary

A minimum of 144 hours of Related Instruction is required for each apprentice for each year