WHITEWATER CAREER CENTER
CULINARY ARTS

Scope and Sequence
Curriculum Outline

Career Program: Welding Technology II
DOE Code: 5778
Career Cluster: Manufacturing
Recommended Grade Levels: 12
Prerequisites: Welding Technology I
High School Credits: 3 per semester (6 total per school year)
Additional Information: Counts as a Directed Elective or Elective for the General, Core 40, Academic Honors and Technical Honors diplomas

Program Description: Successful students in Welding Technology II complete the AWS Sense Level 1 certification. Welding Technology II builds on the skills covered in Welding Technology I. OSHA standards and guidelines endorsed by the American Welding Society (AWS) are used to emphasize safety at all times. Instructional activities emphasize properties of metals, safety issues, print reading, electrical principles, welding symbols, and mechanical drawing through projects and exercises that teach students how to weld and be prepared for college and career success. Upon completion of this program, students enter full-time employment, enter apprenticeships, and pursue 2 and 4-year postsecondary degrees such as welding technology and welding engineering.

Alignment: Indiana Department of Education Academic Standards Course Framework; American Welding Society (AWS) SENSE Level I – Entry Welder Certification; American Welding Society (AWS) SENSE Level I – Entry Welder Training Achievement Record; Ivy Tech Community College (dual credit agreement); *Welding Skills* (Moniz, 5th Edition) textbook materials

Companion Documents: WCC Welding Technology II Program Syllabus; WCC High School Pathway Plan; WCC Program Description Guide

Curriculum Content Summary:

- Gas Metal Arc Welding
- Gas Tungsten Arc Welding
- Manual Plasma Arc Cutting and Air Carbon Arc Cutting
- Workplace Competency

Content	Indiana DOE Standards	Knowledge & Skills *(Based on AWS)*	Example Activities	Time Frame	Evaluation / Certification
DOMAIN Gas Metal Arc Welding **Core Standard I** Student creates appropriate welds on a variety of industrial metals using Gas Metal Arc Welding and cutting processes to meet industry standards	**WTII-1.1** Demonstrate and practice ALL SAFETY RULES that apply to welding **WTII- 1.2** Communicate all common welding terms **WTII-1.3** Apply metallurgy fundamentals to welding processes **WTII-1.4** Performs safety inspections of GMAW equipment and accessories **WTII-1.5** Makes minor external repairs to GMAW equipment and accessories **WTII-1.6** Sets up for GMAW-S operations on carbon steel **WTII-1.7** Operates GMAW-S equipment on carbon steel **WTII-1.8** Makes fillet welds in all positions on carbon steel **WTII-1.9** Makes groove welds in all positions on carbon steel **WTII- 1.10** Passes GMAW-S welder performance qualification test on carbon steel **WTII-1.11** Sets up for GMAW (spray) operations on carbon steel **WTII-1.12** Operates GMAW (spray) equipment on carbon steel **WTII-1.13** Makes fillet welds in the 1F and 2F positions on carbon steel **WTII-1.14** Makes groove welds in the 1G position on carbon steel **WTII-1.15** Passes GMAW (spray) welder performance qualification test on carbon steel **WTII-1.16** Apply Flux Cored Arc Welding (FCAW / Gas Shielded and Self Shielded) process fundamentals **WTII-1.17** Performs safety inspections of FCAW equipment and accessories **WTII-1.18** Makes minor external repairs to FCAW equipment and accessories	• Performs safety inspections of GMAW equipment and accessories • Makes minor external repairs to GMAW equipment and accessories • Sets up for GMAW-S operations on carbon steel • Operates GMAW-S equipment on carbon steel • Makes fillet welds in all positions on carbon steel • Makes groove welds in all positions on carbon steel • Passes GMAW-S welder performance qualification test on carbon steel • Sets up for GMAW (spray) operations on carbon steel • Operates GMAW (spray) equipment on carbon steel • Makes fillet welds in the 1F and 2F positions on carbon steel • Makes groove welds in the 1G position on carbon steel • Passes GMAW (spray) welder performance qualification test on carbon steel • Performs safety inspections of FCAW equipment and accessories • Makes minor external repairs to FCAW equipment and accessories • Sets up for FCAW-G/GM operations on carbon steel • Operates FCAW-G/GM equipment on carbon steel • Makes fillet welds in all positions on carbon steel • Makes groove welds in all positions on carbon steel • Passes FCAW-G/GM welder performance qualification test on carbon steel • Sets up for FCAW-S operations on carbon steel • Operates FCAW-S equipment on carbon steel • Makes fillet welds in all positions on carbon steel • Makes groove welds in all positions on carbon steel • Passes FCAW-S welder performance qualification test on carbon steel	• Welding equipment safe use demonstrations and practice • GMAW machine set up and operation • Perform fillet and groove welds in the horizontal, vertical and overhead positions, using GMAW – short circuit transfer • Read AWS blueprint EDU-3 - layout material according to the print, cut out material using Plasma Arc Cutting, and assemble • Perform fillet and groove welds in the flat and horizontal positions, using GMAW – spray transfer • Read AWS blueprint EDU-2 - layout material according to the print, cut out material using Oxy-Fuel cutting and assemble • FCAW machine set up and operation • Perform fillet and groove welds in the horizontal, vertical and overhead positions, using FCAW-G– (Gas Shielded) • Perform fillet and groove welds in the horizontal, vertical and overhead positions, using FCAW-S– (Self Shielded)	25 weeks Reinforced all year through continued practice	• AWS Sense Level 1 Mods 5 and 6 written tests • Multiple practical evaluations for GMAW and FCAW fillet and grove welds across all applicable positions • AWS GMAW workmanship sample using short circuit transfer • AWS GMAW workmanship sample using spray transfer • AWS FCAW-G 3G certification test • AWS FCAW-S 3G certification test • Daily Activity Log • Classroom work • Dual Credit • Weekly participation

Content	Indiana DOE Standards *(continued)*	Knowledge & Skills *(Based on AWS)*	Example Activities	Time Frame	Evaluation / Certification
DOMAIN Gas Metal Arc Welding ***-Continued-***	**WTII-1.19** Sets up for FCAW- G/GM operations on carbon steel (Gas Shielded) **WTII-1.20** Operates FCAW- G/GM equipment on carbon (Gas Shielded WTII-1.21 Makes fillet welds in all positions on carbon steel (Gas Shielded) **WTII-1.22** Makes groove welds in all positions on carbon steel (Gas Shielded) **WTII-1.23** Passes FCAW-G/GM welder performance qualification test on carbon steel (Gas Shielded) **WTII-1.24** Sets up for FCAW- S operations on carbon steel (Self Shielded) **WTII-1.25** Operates FCAW- S equipment on carbon (Self Shielded) **WTII-1.26** Makes fillet welds in all positions on carbon steel (Self Shielded) **WTII-1.27** Makes groove welds in all positions on carbon steel (Self Shielded) **WTII-1.28** Passes FCAW- S welder performance qualification test on carbon steel (Self Shielded)				

Content	Indiana DOE Standards	Knowledge & Skills *(Based on AWS)*	Example Activities	Time Frame	Evaluation / Certification
DOMAIN Gas Tungsten Arc Welding **Core Standard 2** Students create appropriate Gas Tungsten Arc Welds on a variety of industrial metals to meet industry standards	**WTII-2.1** Apply Gas Tungsten Arc Welding (GTAW) process fundamentals **WTII-2.2** Performs safety inspections of GTAW equipment and accessories **WTII-2.3** Makes minor external repairs to GTAW equipment and accessories **WTII-2.4** Sets up for GTAW operations on carbon steel, austenitic steel, and aluminum **WTII-2.5** Operates GTAW equipment on carbon steel, austenitic steel, and aluminum **WTII-2.6** Create fillet welds in all positions on carbon steel **WTII-2.7** Makes groove welds in all positions on carbon steel **WTII-2.8** Makes fillet welds in the 1F, 2F and 3F positions on austenitic stainless steel **WTII-2.9** Makes groove welds, in the 1G and 2G positions on austenitic stainless steel **WTII-2.10** Makes fillet welds in the 1F and 2F positions on aluminum **WTII-2.11** Makes groove welds in the 1G position on aluminum **WTII-2.12** Passes GTAW welder performance qualifications test on carbon steel, austenitic stainless steel, and aluminum	• Performs safety inspections of GTAW equipment and accessories • Makes minor external repairs to GTAW equipment and accessories • Sets up for GTAW operations on carbon steel • Operates GTAW equipment on carbon steel • Makes fillet welds in all positions on carbon steel • Makes groove welds in all positions on carbon steel • Passes GTAW welder performance qualification test on carbon steel • Sets up for GTAW operations on austenitic stainless steel • Operates GTAW equipment on austenitic stainless steel • Makes fillet welds in the 1F, 2F and 3F positions on austenitic stainless steel • Makes groove welds in the 1G and 2G positions on austenitic stainless steel • Passes GTAW welder performance qualification test on austenitic stainless steel	• GTAW welding equipment safe use demonstrations and practice • GTAW machine set up and operation • Perform fillet and groove welds in the horizontal, vertical and overhead positions, on Carbon Steel using GTAW • Read AWS blueprint EDU-3 - layout test material and cut out test plates using Plasma Arc Cutting • Perform fillet and groove welds in the horizontal, vertical and overhead positions, on Stainless Steel using GTAW • Read AWS blueprint EDU-4 - layout material according to the print, cut out material using Plasma Arc Cutting, and assemble • Perform fillet and groove welds in the horizontal and vertical positions, on Aluminum using GTAW • Read AWS blueprint EDU-5 - layout material according to the print, cut out material using Plasma Arc Cutting, and assemble	9 weeks Reinforced all year through continued practice	• AWS Sense Level 1 Mod 9 written test • Multiple practical evaluations for fillet and grove welds with GTAW on Carbon Steel, Stainless Steel and Aluminum across all applicable positions • AWS GTAW workmanship sample for Carbon Steel • AWS GTAW workmanship sample for Stainless Steel • AWS GTAW workmanship sample for Aluminum • Daily Activity Log • Classroom work • Dual Credit • Weekly participation

Content	Indiana DOE Standards	Knowledge & Skills *(Based on AWS)*	Example Activities	Time Frame	Evaluation / Certification
DOMAIN Manual Plasma Arc Cutting and Air Carbon Arc Cutting **Core Standard 3** Students create appropriate Manual Plasma Arc Cutting and Air Carbon Arc Cutting processes on a variety of industrial metal to meet industry standards.	**WTII-3.1** Performs safety inspections of manual PAC equipment and accessories **WTII-3.2** Makes minor external repairs to manual PAC equipment and accessories **WTII-3.3** Sets up for manual Pac operations on carbon Steel, austenitic stainless steel, and aluminum **WTII-3.4** Operates manual Pac equipment on carbon steel, stainless steel, and aluminum **WTII-3.5** Performs straight, square cutting operations, in the flat position on carbon steel, stainless steel, and aluminum **WTII-3.6** Performs shape, edge cutting operations in the flat position on carbon steel, stainless steel, and aluminum **WTII-3.7** Performs safety inspections of manual CAC-A equipment and accessories **WTII-3.8** Makes minor external repairs to manual CAC- A equipment and accessories **WTII-3.9** Sets up manual CAC-A scarfing and gouging operations on carbon steel **WTII-3.10** Operates manual CAC-A equipment on carbon steel **WTII-3.11** Performs scarfing and gouging operations to remove base and weld metal, in the flat and horizontal positions on carbon steel	• Performs safety inspections of manual PAC equipment and accessories • Makes minor external repairs to manual PAC equipment and accessories • Sets up for manual PAC operations on carbon steel, austenitic stainless steel and aluminum • Operates manual PAC equipment on carbon steel, austenitic stainless steel, and aluminum • Performs straight, square edge cutting operations in the flat and horizontal positions on carbon steel, austenitic stainless steel and aluminum • Performs shape, square edge cutting operations in the flat and horizontal positions on carbon steel, austenitic stainless steel and aluminum • Performs safety inspections of manual CAC-A equipment and accessories • Makes minor external repairs to manual CAC-A equipment and accessories • Sets up for manual CAC-A scarfing and gouging operations on carbon steel • Operates manual CAC-A equipment on carbon steel • Performs scarfing and gouging operations to remove base and weld metal in the flat and horizontal positions on carbon steel	• Plasma Arc Cutting equipment safe use demonstrations and practice. • PAC machine set up and operation • Cut out and polish plasma 2D sculpture project • Utilize PAC to cut material for ALL welding application throughout the entire year • Carbon Arc Cutting/ Gouging equipment safe use demonstrations and practice. • CAC-A set up and operation • Perform CAC-A on Carbon steel	2 weeks Reinforced all year through continued practice	• AWS Sense Level 1 Mod 8 written test • PAC 2D sculpture • PAC all required pieces for AWS workmanship samples • Practical PAC cutting evaluation of shapes across all material types utilized in the program • Daily Activity Log • Classroom work • Dual Credit • Weekly participation

Additional content from Welding Technology I reinforced in Welding Technology II

Content	Indiana DOE Standards	Knowledge & Skills *(Based on AWS)*	Example Activities	Time Frame	Evaluation / Certification
DOMAIN Workplace Competency **Core Standard I** Students establish appropriate workplace behaviors and characteristics to prepare for completion of further education in welding training programs	**WTI-1.1** Allocate the appropriate resources for task completion **WTI-1.2** Demonstrate effective interpersonal skills **WTI-1.3** Develop leadership skills **WTI-1.4** Establish positive relationships with people from diverse backgrounds **WTI-1.5** Research, analyze, and use data for work assignments **WTI-1.6** Apply effective critical thinking, decision making, and problem-solving techniques **WTI-1.7** Select and use appropriate tools and technology **WTI-1.8** Implement quality assurance measures and safeguards **WTI-1.9** Follows verbal instructions to complete work assignments **WTI-1.10** Follows written instructions to complete work assignments **WTI-1.11** Demonstrate effective listening and speaking skills **WTI-1.12** Perform appropriate mathematical calculations correctly **WTI-1.13** Exhibit a responsible work ethic **WTI-1.14** Demonstrate accepted standards for ethical behavior **WTI-1.15** Perform housekeeping duties **WTI-1.16** Prepares time or job cards, reports or records	• Prepares time or job cards, reports or records • Performs housekeeping duties • Follows verbal instructions to complete work assignments • Follows written instructions to complete work assignments	• SkillsUSA membership • Skill competitions • Student ambassadors • National Technical Honor Society	Reinforced all year through continued practice	• Daily Activity Log • Classroom work • Dual Credit • Weekly participation • Work Ethic Certification • Essential Skills Evaluation • Technical Skills Evaluation