Program Information & Skill Alignment Chart for:
Welding Technology – CIP Code 48.0508
Mount Joy/ Willow Street Campus

Form to be submitted to IU 13 with PIF

Program Description	Welding in the manufacturing sector has been key for over 100 years. With innovations in technology, welding education is constantly evolving with the future needs of the industry. During your year of instruction, we will learn Occupational Safety, Principles of Welding, Welding Drawing and Weld Symbol Interpretation, Visual Examination/ Inspection/Testing, Shielded Metal Arc Welding, Gas Tungsten Arc Welding, Gas Metal Arc Welding, Flux Core Arc Welding, Plasma Arc Cutting, Carbon Arc Cutting, and OFC cutting processes. Learning to work in a team, but also being a critical thinker is an industry must in today's competitive manufacturing market. Welding is a high paced and inherently dangerous occupation, which requires focus and an ability to adapt and learn in an ever-changing environment. Opportunities for student engagement with industry representatives to understand safety culture, employer expectations, and other skills growth initiatives will be explored.	
Program Information (costs, certifications, uniform)	Textbook- (Provided) • G-W Welding Fundamentals (Fifth Edition) **Uniforms**- • Leather Safety Toe Work Boots that extend above the ankle • Black LCCTC uniform T-shirts and Long sleeve T-shirts • Dark Blue Work Pants (Must be 100% cotton) Program Opportunities/Certifications • NOCTI Cert • OSHA 10 • AWS Sense Level I	
Program Outline & Pathways	**State Program of Study Task Outline** • Occupational Orientation and Safety • Principles of Welding • Welding, Drawing, and Weld Symbol Interpretation • Visual Examination, Inspection, and Testing of welds • Shielded Metal Arc Welding (SMAW) • Gas Metal Arc Welding (GMAW) • Flux Cored Arc Welding (FCAW) • Gas Tungsten Arc Welding (GTAW) • Manual Oxy-fuel Gas Cutting (OFC) • Mechanized Oxy-fuel Gas Cutting (OFC) • Manual Plasma Arc Cutting (PAC) • Manual Air Carbon Arc Cutting (CAC-A)	**Pathways** • Welding Engineer 4-year college degree • Welder • Welder/Fabricator • Pipefitter/Welder • Production Welder • Aerospace • High Performance Auto Fabricator • Structural Welder • Boilermaker • Millwright • Industrial Maintenance Mechanic • Underwater Welder (w/additional training) **Post-secondary options/ Continuing Education** 2-year programs Thaddeus Stevens Technical College Harrisburg Community College Reading Area Community College Penn College of Technology

		4-year Programs Penn State Harrisburg University
Other Information	Student/Teacher Ratio- 20:1 (Student total is 40 with 2 instructors) **Learning Goals** • Develop a strong work ethic and daily performance objectives • Come to class prepared to learn • Research professional organizations within the field of Welding to access professional resources, and investigate career paths. • Maintain proper organization and safe operation of welding equipment and work area • Demonstrate the ability to work without direct supervision • Practice appropriate observation techniques, link observations to solve complex problems, and communicate findings using industry specific terminology • Follow industry specifications and practices • Follow industry and employer expectations • Identify the components of and documents used in safety and hazardous communication • Identify the tools and safe practices for using them • Be able to adapt to a high tempo work environment <u>SOAR Articulation</u> SOAR is a Pennsylvania Department of Education (PDE) program which enables high school students who successfully complete a PDE approved career and technical program to earn college credits. The number of credits available varies by school, program and from one school year to another. Please discuss these options with your counselor. <u>Pennsylvania College of Technology</u> 15 Credits	

Student Name: _____ District: _____

Skill Alignment Chart for:

Welding Technology – CIP Code: 48.0508

Educational and Physical Attributes	Program Expectations	Present Education Level and Current Supports
Program Safety / Physical Considerations	• Sitting, standing, walking, and repetitive tasks • Climb ladders, work at heights • Ability to lift 50-70 lbs. • Hand/Eye coordination • Ability to work independently • Excellent self-discipline to focus for extended periods • Visual acuity • Depth perception • Fine motor dexterity • Spatial awareness	
Action/Need:		

Program Environment *Indoor/outdoor* *Dust/dirt/fume/noise etc.* *Layout of room – theory/lab*	The industry is typically hot, heavy, dirty, and dangerous. That is why it pays so well. Noise above 100 dB requires ear protection.	
Action/Need:		
Typical level of support	IU13 support teachers and paraeducators check in on classrooms for brief periods of time throughout the day, often once or twice a day. IU13 learning support teachers may support 4-6 programs. IU13 emotional support teachers support their students in all programs throughout the building. Paraeducators may support 7-10 programs. The learning center is available at designated times for testing accommodations, study groups, work completion support, and instructional groups on IEP goal areas. Time spent in the learning center limits time spent in labs, so students must make the most of their brief time in the learning center. Services are at an itinerant level. IU13 teachers and paraeducators are unable to be in every program all day due to the itinerant nature. It is not a co-taught structure.	
Action/Need:		
Reading / ELA levels Example 1 From Welding Fundamentals Text Book: Welding is a group of processes used to join metallic or nonmetallic materials. The most common welding processes use heat to join the base metal (metal to be welded). Welding can also be done using heat and pressure or using pressure alone. A filler material may or may not be added to the weld joint.	• G-W Textbook is at the 12th grade level • Online Curriculum is at the 12th-grade level. • INTEGRATE KNOWLEDGE/ IDEAS GRADES 11-12 • Standard CC.3.5.11-12.G. Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem. • Standard CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible. • Standard CC.3.5.11-12.I. Synthesize information from a range of sources into a coherent understanding.	

Example 2 From the D1.1 Structural Welding Code for Steel: In addition to the requirements of :!:_.9.3.3 the following applies to weld terminations subject to cyclic (fatigue) loading. For connections and details with cyclic forces on outstanding elements of a frequency and magnitude that would tend to cause progressive failure initiating at a point of maximum stress at the end of the weld, fillet welds shall be returned around the side or end for a distance not less than two times the nominal weld size.	• Standard CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words. • Standard CC.3.5.11-12.E. Analyze the structure of the relationships among concepts in a text. • Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure • Standard CC.2.2.HS.A.13 Apply and extend the properties of exponents to solve problems with rational exponents. Write expressions in equivalent forms to solve problems	
Action/Need:		
Writing Levels Example: Work order document with precision step-by-step work completed	• Technical Writing • Write informative or explanatory texts, including the narration of technical processes, etc. • Research/Draw evidence from informational texts for research.	
Action/Need:		
Math Levels Example 1. Typically, four weld passes are required to weld this type of weld joint in the horizontal position. How many inches of weld are required to complete the entire weld on one end of the pipe? Hint: A welder will need to weld the circumference four times. Round up to the nearest tenth inch. Example 2. A welding process has a travel speed of 12 mm/sec.	Math Associated Vocabulary ADDITION, SUBTRACTION, DIVISION, DECIMAL, FRACTIONS MULTIPLICATION, RATIO, TRIGONOMETRY, GEOMETRY, DIAMETER, CIRCUMFERENCE, RADIUS $x + \frac{1}{2}y = \frac{9}{2}$ $\frac{1}{4}x - \frac{1}{6}y = \frac{5}{6}$	

How many inches/minute is this? Round to the nearest whole number.

Example 3. What is the volume of a pipe that is 100 mm in diameter and 1000 mm in length? Round to the nearest cubic millimeter.

Geometry Formulas

cuemath

Square	Triangle	Circle
$A = x^2$	$A = \frac{1}{2} b\,h$	$A = \pi r^2$
Rectangle	Eclipse	Trapezoid
$A = b\,h$	$A = \pi ab$	$A = \frac{(a+b)}{2} h$

C = circumference

r = radius

d = diameter

$d = 2 \times r$

$\pi = 3.14$

$C = \pi \times d$ or $C = 2 \times \pi \times r$

Fraction of a Measurement

$\frac{1}{4}$ yard = ____ inches

$\frac{1}{4}$ yard = $\frac{1}{4} \times 1$ yard

$= \frac{1}{4} \times 36$ inches

$= \frac{36}{4}$ inches

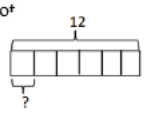
$=$ 9 inches

$\frac{1}{6}$ foot = ___ inches

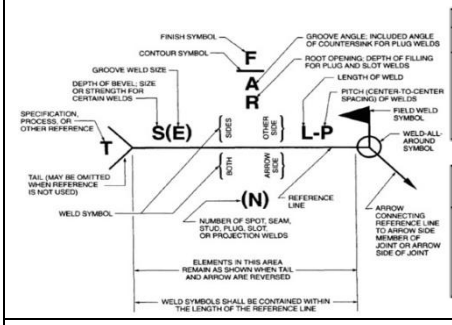
$\frac{1}{6}$ foot = $\frac{1}{6} \times 1$ foot

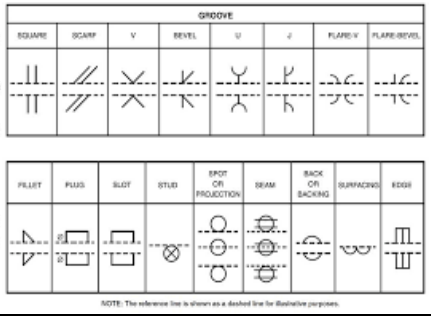
$= \frac{1}{6} \times 12$ inches

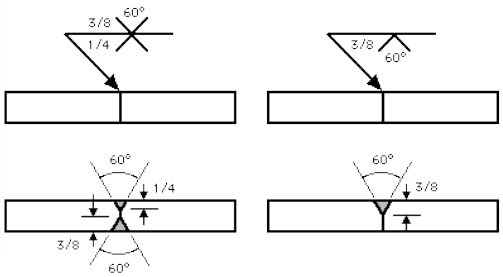
$=$ 2 inches



Welding Symbol and Blueprint interpretation:







Action/Need:

Theory time	• Lecture 1-2 hours a week • Computer assignments 2 hours a week • Weekly math assignments	
Action/Need:		
Homework *Amount per night*	• 1 hour recommended • Required if not completed during class	
Action/Need:		
Lab Time *Guided vs Independent Work*	• 4-5 Hours of Independent lab work daily	
Action/Need:		
Tests *NOCTI testing – Y/N* *Frequency of tests/quizzes*	• NOCTI Testing pre-test, final • Hands-on assessment • Marking period exams • Weekly formative assessments • Skills grade assessments	
Action/Need:		

Behavioral Expectations *Executive Function* *Organizational skills*	• Ability to work independently • Ability to work in small groups • Excellent problem-solving skills • Self-control • Follows oral and written directions • Time management skills • Critical thinking skills • Attention to detail • Safety Conscious • Situationally Aware	
Action/Need:		
Other *Skills specific to the Career Co-op\Internship*	• Mechanical Ability • Willingness to learn • Great attendance • Ability to work overtime • Must pass a drug test • Have driver's license/reliable transportation • Maintain Academic Standing • Being able to pass an onsite welding test	
Action/Need:		

*District Representative Signature*_____ *Date* _____