

# Welding Technology

## *Recommended High School Courses/Levels*

- Reading level 10.8
- Math Courses
  - Algebra I – First year
  - Geometry – Second year
  - Trigonometry/Algebra II – Third year
- Science Courses
  - Chemistry - Second year
  - Physics - Third year

*\*relates to student's years in program at ICTC and expectations during that year*

*\*detailed list of math skills noted in academic skills*

## *Recommendations for Success*

- Size and shape discrimination
- Able to withstand outside elements, including exposure to intense heat and cold as well as tolerate heights
- Structural and mechanical visualization/reasoning skills
- Manual dexterity including fine motor skills
- Excellent eye-hand-foot coordination
- Physical stamina; able to lift 60 lbs or more.
- Adjust to noisy working conditions
- Able to work in confined spaces
- Follow safety rules and precautions
- Reasoning skills – both inductive and deductive
- Good attendance
- Homework completion



*\*This document is strictly intended to provide an overview of the program and to be used as an informative tool. Essentials skills is a tool to assist districts, parents, and students in the decision making process for program decisions, transition planning, and possible placement here at ICTC.*

*\*This document is not intended to and should not be used as a screening tool for student placement.*



**American Welding Society**  
**THE STRENGTH OF WELDING**

Indiana County Career and Technology Center	Program Area Welding Technology
<b>Objective of field</b>	Welding Technology curriculum provides excellent preparation for those whose career goals include becoming a welding, mechanical or metallurgical engineer, welding technician, or a specialized practitioner.
<b>Classroom Tests</b>	*CEP students – 28 for one semester First Year – 42 for the year Second Year – 31 for the year Third Year – 46 for the year *Career Exploration Program offered in 9 <sup>th</sup> grade
<b>Certification Tests</b>	NOCTI – Welding Technology written and performance assessments American Welding Society – AWS – EG2, EG3, EG4, at least eight performance based tests within each of these 3 categories.
<b>Books</b>	3 textbooks – 1 student purchased (approximately \$40.00) <u>Welding Principles and Practices</u> <u>Print Reading for Welding</u> <u>Welding Workbook</u>
<b>Lecture Time</b>	First year/CEP students – 1 hour, 3 times a week Second Year – 1 hour, 3 times a week Third Year – 1 hours, 3 times a week
<b>Co-op/Clinical</b>	<ul style="list-style-type: none"> <li>- Discipline record containing no more than 3 O.S.S. days</li> <li>- Good attendance</li> <li>- Instructor's recommendations</li> <li>- Parental permission</li> <li>- Reliable car</li> <li>- Skills necessary for the position</li> <li>- Must have successfully passed employability workshop</li> <li>- Must have completed and passed Junior and Senior blueprint reading with a minimum of 77% average on homework and competencies</li> </ul>
<b>Homework</b>	<ul style="list-style-type: none"> <li>- Study for safety and unit tests</li> <li>- Reading assignments</li> <li>- Study guides</li> <li>- Chapter reviews</li> <li>- Oral presentations</li> <li>- Internet assignments</li> <li>- Blueprint reading</li> <li>- Homework average is 3-5 hours per week depending on grade level</li> </ul>
<b>Task Lists</b>	CEP students – 31 per semester First Year– 42 for the year Second Year – 112 for the year Third Year – 63 for the year
<b>Planned Courses</b>	<ul style="list-style-type: none"> <li>- Metallurgy "Study of Metals" (First year)</li> <li>- Oxy-fuel Cutting (First and second year)</li> <li>- Oxy-fuel Welding/Brazing (First and second year)</li> <li>- Beginning Blueprint Reading (Second year)</li> <li>- Intermediate Blueprint Reading (Second year)</li> <li>- Gas Metal Arc Welding (MIG) (Second and third year)</li> <li>- Gas Tungsten Arc Welding (Heli-Arc/TIG) (Second and third year)</li> <li>- Advanced Blueprint Reading (Third year)</li> <li>- Basic Safe Work Practices (All three years)</li> <li>- Safe Fabrication Equipment Operations (All three years)</li> <li>- Shielded Metal Arc Welding "Stick" (All three years)</li> <li>- Welding Inspection (All three years)</li> </ul>
<b>Prerequisites</b>	<ul style="list-style-type: none"> <li>- Hand/eye coordination</li> <li>- Algebra and Trigonometry fundamentals</li> <li>- Geometry</li> <li>- Measure in both fractions/decimals</li> <li>- No fear of heights</li> <li>- Good mechanical aptitude</li> <li>- Manual dexterity</li> <li>- Hand-eye-foot coordination</li> <li>- Fine motor skills</li> <li>- Able to lift 60 pounds</li> <li>- Tolerate high temperatures</li> </ul>

<b>Academic Skills</b>	<p><u>Reading Level</u> 10.8</p> <p><b>*Math Skills</b></p> <ul style="list-style-type: none"> <li>- Fractions/decimals (add, subtract, multiply, divide)</li> <li>- Order of operations</li> <li>- Sine, Cosine/Tangent</li> <li>- Pythagorean Theorem</li> <li>- Special triangles</li> <li>- Application of Trigonometry/Inverse Trigonometry angles</li> <li>- Formulas</li> <li>- Conversion of Linear measurement to US Customary to metric and vice versa</li> </ul>
<b>Soft Skills</b>	<ul style="list-style-type: none"> <li>- Listening</li> <li>- Reasoning (inductive/deductive)</li> <li>- Human relations</li> <li>- Able to work with others</li> <li>- Critical thinking</li> </ul>
<b>Computer Skills</b>	<p>Microsoft products (Word and PowerPoint)</p>
<b>Physical Requirements</b>	<ul style="list-style-type: none"> <li>- Lift 60 pounds</li> <li>- Tolerate extreme temperature</li> <li>- No fear of heights</li> <li>- Hand-eye-foot coordination</li> <li>- Manual dexterity</li> <li>- Tolerate loud noise levels</li> <li>- Work in confined spaces</li> </ul>
<b>Vocational Testing Essential Aptitudes for lab recommended levels</b>	<ul style="list-style-type: none"> <li>- Structural mechanical visualization/reasoning</li> <li>- Discrimination by size/shape</li> <li>- Gross/fine motor skills</li> <li>- Manual dexterity</li> <li>- Retention of mechanical and structural detail</li> </ul>
<b>Job Duties</b>	<p>Set up, operate, or tend welding, soldering, or brazing machines or robots that weld, braze, solder, or heat treat metal products, components, or assemblies.</p>
<b>Training</b>	<p>Welding has evolved into a sophisticated science and technology. Skills developed in ICTC's Welding Technology program are immediately transferable to a professional career as a welder or as a student enrolled at a community/technical college, university or other post-secondary institution. Additionally, the curriculum provides excellent preparation for those whose career goals include becoming a welding, mechanical or metallurgical engineer.</p>
<b>Uniform Requirements</b>	<p><b>Student's expense</b></p> <ul style="list-style-type: none"> <li>- Welding helmet</li> <li>- High top (8 inch or more) leather work boots (steel toes are recommended)</li> <li>- 100% cotton clothing <ul style="list-style-type: none"> <li>- denim long sleeve work shirt/pants</li> <li>- t-shirts (no sleeveless tank tops, silk screened appliqués, or flannel)</li> <li>- all undergarments must be 100% cotton as well</li> </ul> </li> </ul>
<b>Articulation/Agreements (refer to course catalog for more)</b>	<ul style="list-style-type: none"> <li>- Westmoreland County Community College</li> <li>- Penn College</li> <li>- Dual Enrollment Program with Penn Highlands Community College – (Blueprint Reading, Welding 1)</li> <li>- 3 credits per class</li> </ul>
<b>Employment/Job Outlook</b>	<ul style="list-style-type: none"> <li>- According to the Department of Labor, employment of welding, soldering, and brazing workers is expected to grow slower than average for all occupations over the 2004-2014 period. Despite this, job prospects should be excellent, as employers report difficulty finding enough qualified people to fill current vacancies. In addition, many openings are expected to arise as a large number of workers retire over the next decade.</li> <li>- Median hourly earnings of welders, cutters, solderers, and brazers were \$14.72 in May 2004. The middle 50 percent earned between \$11.90 and \$18.05. The lowest 10 percent had earnings of less than \$9.79, while the top 10 percent earned over \$22.20. The range of earnings of welders reflects the wide range of skill levels. <a href="http://www.bls.gov/oco/ocos226.htm">http://www.bls.gov/oco/ocos226.htm</a></li> </ul> <p><b>Career Opportunities</b></p> <ul style="list-style-type: none"> <li>- Arc Welder Apprentice</li> <li>- Combination Welder Apprentice</li> <li>- Experimental Welder (R&amp;D)*</li> <li>- Weld Inspector*</li> <li>- Welding Technician*</li> <li>- Welder – Fitter Apprentice*</li> <li>- Welding Engineer*</li> </ul> <p><b>*Post-secondary education required</b></p>
<b>How to find out more?</b>	<ul style="list-style-type: none"> <li>- <a href="http://online.onetcenter.org/find/http://www.ictc.ws/Secondary/at/p_home.htm">http://online.onetcenter.org/find/http://www.ictc.ws/Secondary/at/p_home.htm</a></li> <li>- US Department of Labor <a href="http://stats.bls.gov/oco/ocos223.htm">http://stats.bls.gov/oco/ocos223.htm</a></li> <li>- <a href="http://online.onetcenter.org/">http://online.onetcenter.org/</a></li> </ul>

\* ICTC Requirements – Courses listed and performance expectations