**Welding**

Skilled welders are in great demand. The Welding Program is designed to educate students to their highest level of competency in the welding field. Any students who works well with their hands, enjoys creating objects and taking pride in accomplishing tasks using their own talents should enjoy welding and working with metals. Upon completion of the three year program, the students will be able to enter the job market with completers welding certificate, listing all phases of welding they have accomplished. They have an opportunity to enter welding contests sponsored by the American Welding Society and SkillsUSA, and earn a welder’s certification. Students who are motivated, have good eye-hand coordination and good vision, with basic math skills should succeed in this program.

*Certifications: NCCER/NCCER/ASME/Forklift*

*Articulations: State-Wide Agreement*

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**Median yearly earnings:**

- **$35,000**
- **$50,000 - $100,000**
- **$150,000+**

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**Career Pathways**

- **Level 1**
  - SMAW, GMAW, FCAW Welding Tasks
  - Certified Welder
  - Experienced Pipe Fitters
  - Pipe Welders

- **Level 2**
  - Welding Engineer
  - (Additional Training)

- **Level 3**
  - Certified Pipe Welder

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**Post-Secondary Opportunities**

- WCCC
- Laurel Business Institute
- Pennsylvania State University

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**Entry Level Completion:**

- welder/fitter, equipment repair shop, fabrication, Boiler Makers and Pipe Fitters Apprenticeships
## WELDING SCOPE & SEQUENCE

### LEVEL 1

<table>
<thead>
<tr>
<th>Duties</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation &amp; Safety</td>
<td>35</td>
</tr>
<tr>
<td>Oxyacetylene Cutting</td>
<td>40</td>
</tr>
<tr>
<td>Weld Quality</td>
<td>30</td>
</tr>
<tr>
<td>Base Metal Preparation</td>
<td>20</td>
</tr>
<tr>
<td>SMAW Equipment &amp; Set-up, SMAW Electrodes</td>
<td>50</td>
</tr>
<tr>
<td>Joint Design, SMAW Fillet Welds</td>
<td>80</td>
</tr>
<tr>
<td>Groove Welds</td>
<td>60</td>
</tr>
<tr>
<td>Plasma Arc Cutting, Manual Carbon Arc Cutting</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td><strong>360</strong></td>
</tr>
</tbody>
</table>

### LEVEL 2

<table>
<thead>
<tr>
<th>Duties</th>
<th>Hours</th>
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<tbody>
<tr>
<td>Gas Metal Arc Welding</td>
<td>80</td>
</tr>
<tr>
<td>GMAW Plate/Steel</td>
<td>80</td>
</tr>
<tr>
<td>Visual Examination &amp; Destructive Testing, Weld Qualifications</td>
<td>35</td>
</tr>
<tr>
<td>Detailed Drawings with Welding Symbols, Welding Symbols</td>
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</tr>
<tr>
<td>Flux-Cored Arc Welding</td>
<td>60</td>
</tr>
<tr>
<td>Oxyacetylene Welding</td>
<td>45</td>
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<td></td>
<td><strong>360</strong></td>
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### YEAR 3

<table>
<thead>
<tr>
<th>Duties</th>
<th>Hours</th>
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<tbody>
<tr>
<td>GTAW I</td>
<td>70</td>
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<tr>
<td>Plasma Arc Manual</td>
<td>20</td>
</tr>
<tr>
<td>GTAW II</td>
<td>100</td>
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<tr>
<td>SMAW Pipe</td>
<td>120</td>
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<tr>
<td>Brazing</td>
<td>20</td>
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<tr>
<td>GMAW Aluminum</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td><strong>360</strong></td>
</tr>
</tbody>
</table>

Students must be able to complete a math curriculum that includes a basic understanding of Applied Math. This includes whole number addition, subtraction, multiplication, and division. Students should have a basic understanding of Algebra, ratios, decimals, percentages, and fractions.
Tasks:

- Light, adjust, and shut down an oxyacetylene welding torch in adherence with safety standards.
- Lay beads on flat plate with no filler rod
- Lay beads on flat plate with filler rod
- Weld an outside corner joint in the flat position
- Set up, adjust cutting flame, and shut down oxyacetylene cutting equipment
- Make 90 degree cut and restart a cut on mild steel
- Make a flame beveled cut on mild steel plate
- Cut holes in mild steel
- Lay out a pattern on mild steel plate and cut the pattern to specifications
- Cut a pipe bevel by hand
- Set up and cut a 30 degree bevel with a track-type torch
- Prepare a PAC machine for operation
- Set up and shut down GTAW equipment for welding mild or stainless steel
- Perform safety inspections of GMAW of equipment and accessories, set up wire on a spool type GMAW wire

Tools used in this occupation:

- **Hammers** — Claw hammers; Soft face hammers; Tinner’s hammers
- **Blow torch** — Acetylene torches; Cutting torches
- **Hand Tools** -- Screwdrivers, Pliers, Wrenches, Rulers, Brushes, Tape Measures, Squares, Straight Edges, Air Compressors
- **Power Tools** – Drills, Saws, Grinders
- **Welding Equipment** -- Plasma Cutter, Gas Welders, Electric Welding Equipment

Technology used in this occupation:

- **Facilities management software** — Shop management software
- **Word processing software** – Microsoft Office
- **Project management software** — Hard Dollar HD Project Estimating; Maxwell Systems Quest Estimator; Tradesman’s Software Master Estimator

Knowledge

- **Mathematics** — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.
- **Design** — Knowledge of design techniques, tools, and principles involved in producing a weldment using technical plans, blueprints, drawings, and models.
- **Customer and Personal Service** — Knowledge of principles and processes for providing customer and personal services.
- **Mechanical** — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.
- **English Language** — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.
Skills

**Active Listening** — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

**Critical Thinking** — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

**Judgment and Decision Making** — Considering the relative costs and benefits of potential actions to choose the most appropriate one.

**Speaking** — Talking to others to convey information effectively.

**Time Management** — Managing one's own time and the time of others. Prepare and mark time or job sheet, reports, or records.

**Visualization** — The ability to imagine how something will look after it is moved around or when its parts are moved or rearranged.

**Control Precision** — The ability to quickly and repeatedly adjust the controls of a machine or a vehicle to exact positions.

**Estimating the Quantifiable Characteristics of Products, Events, or Information** — Estimating sizes, distances, and quantities; or determining time, costs, resources, or materials needed to perform a work activity.

**Controlling Machines and Processes** — Using either control mechanisms or direct physical activity to operate machines or processes (not including computers or vehicles).

**Getting Information** — Observing, receiving, and otherwise obtaining information.

**Communicating with Supervisors, Peers, or Subordinates** — Providing information to supervisors, coworkers, and subordinates by telephone, in written form, e-mail, or in person.

The Fayette County Career & Technical Institute does not discriminate on the basis of race, color, national origin, sex, disability, or age in its programs or activities.

The Fayette County Career & Technical Institute is accredited by the Commission on Secondary Schools of the Middle States Association of Colleges and Schools, 3624 Market St., Philadelphia, PA 19104. (267-284-5000)