



WELDING TECHNOLOGY/WELDER

CIP Code 48.0508

This document is a program of study for Welding Technology/Welder programs at the secondary and postsecondary level. This program of study is considered a framework, not a curriculum. From this framework educators may use this as a tool to provide structure for developing learning modules, unit plans or daily lesson plans that meet the tasks or standards within the program of study. This program of study is based on research, experience and many resources. The goal is to train a workforce that is skilled, knowledgeable and able to meet the needs of the industry today and well into the future.

Opportunities in the welding field are endless and can be extremely rewarding – and because it is widely used in construction, manufacturing and many other industries, employers have a constant need for skilled welders. Welding is an important part of our nation’s growth and stability. In fact, for those who are involved in the welding industry, there is a strong conviction that a large part of the U.S. economy is dependent on welding and that continued advances in the field help to drive this nation’s productivity and strengthen its financial stability.

Welding is the most common way of permanently joining metal parts. In this process, heat is applied to metal pieces, melting and fusing them to form a permanent bond. Because of its strength, welding is used in shipbuilding, automobile manufacturing and repair, aerospace applications and thousands of other manufacturing activities. Welding also is used to join beams when constructing buildings, bridges and other structures and to join pipes in pipelines, power plants and refineries. Other applications include the manufacturing of small electronic devices, medical components and nanotechnology – the latest development to revolutionize the world of materials.

Welders who know a variety of welding methods using a wide array of tools and procedures could find themselves working on oil platforms in the Gulf of Mexico, on top of the tallest buildings in New York City, on the U.S. Navy’s newest aircraft carrier or operating a welding business. Welding employment opportunities are diverse and skilled welders can choose from a variety of openings both nationally and internationally. Welding and joining technology offers immediate job prospects with potential for growth and promotion. Welding career pathways also include college where students can consider a field of study in welding engineering or metallurgy.

Assumptions of This Program of Study

Graduates of this program of study will receive high quality training in order to meet the needs of business and industry. In addition, the skills taught should include the seamless integration of academic concepts with technical competencies, providing the linkage from conceptual to contextual learning. Furthermore, the skills taught should offer the requisite aptitudes for job advancement, security and portability. Completing a welding program will prepare career and technical education students for gainful entry-level employment as:

- Welders
- Welding Technicians
- Welding Supervisors

- Welding Inspectors
- Quality Assurance and Non-Destructive Testers
- Welding Estimator
- Repair Technicians
- Construction Welders
- Industrial and Production Welding
- Welders Helpers
- Welding Sales and Services Representative

Students will demonstrate the ability to:

- Write clear, concise, legible and accurate technical reports
- Communicate orally in the language of the construction industry to customers, co-workers and supervisors
- Perform basic manipulative skills of the trade
- Interpret plans, drawings, codes and specifications, lines, symbols and abbreviations on working drawings or blueprints
- Analyze specifications and contract drawings
- Make accurate labor and material estimations for a building project
- Describe various types of materials and methods available to the career field of welding
- Describe business functions and principles
- Describe the complexity of the welding industry
- Describe the complex interrelationships among numerous trades and professions within the industry
- Stay current with any new technology or codes related to the welding industries

High-quality programs should meet the following standards:

- Promote **positive working relationships**
- Implement a **curriculum** that fosters all areas of skill development
- Use **appropriate** and **effective teaching approaches**
- Provide **ongoing assessments** of student progress
- Employ and support qualified **teaching staff**
- Establish and maintain relationships and use resources of the **community**
- Provide a safe and healthy learning **environment**
- Implement strong program organization and supervision policies that result in **high-quality teaching and learning**
- Integrate academic skills and aptitudes necessary for postsecondary education, gainful employment and a foundation of **lifelong learning**

Academic Rigor

Research shows that career success requires the same level of college-prep courses as postsecondary success requires. The Department of Education's focus is to ensure that every student graduates prepared for college and a career. In order to be successful in this program of study, students should follow the academic sequence as determined by Pennsylvania's high school reform efforts.

Resources Used for This Program of Study

- MAVCC (Multistate Academic Vocational Curriculum Consortium)
<http://www.mavcc.org/>
- NOCTI (National Occupational Competency Testing Institute <http://www.nocti.org/>)
- O*NET <http://online.onetcenter.org/>
- Pennsylvania Approved Certifications for Industry-Recognized Certifications for Career and Technical Education Programs
http://www.portal.state.pa.us/portal/server.pt/community/instructional_resources/7392/industry-recognized_certifications_for_career_and_technical_education_programs/507887
- Pennsylvania Department of Labor & Industry High Priority Occupations
http://www.portal.state.pa.us/portal/server.pt/community/high_priority_occupations/12910
- VTECS (A Consortium of Innovative Career and Workforce Development Resources)
<http://www.vtecs.org/>

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Pennsylvania CIP

An instructional program that prepares individuals to apply technical knowledge and skills in gas, arc, shielded and non-shielded metal arc, brazing, flame cutting and plastic welding. Hand, semi-automatic and automatic welding processes are also included in the instruction. Students learn safety practices and types and uses of electrodes and welding rods; properties of metals; blueprint reading; electrical principles; welding symbols and mechanical drawing; use of equipment for testing welds by ultrasonic methods and destruction and hardness testing; use of manuals and specification charts; use of portable grinders and chemical baths for surface cleaning; positioning and clamping; and welding standards established by the American Welding Society, American Society of Mechanical Engineers and American Bureau of Ships.

Integrate Academic Career Education and Work Standards for Student Success

As students participate in career exploration activities and rigorous studies from elementary grades through graduation, they learn to appreciate the relationship between their classroom learning and the skills needed within the workplace. The academic and workplace skills within the Academic Standards for Career Education and Work are expected to be addressed within classrooms and achieved by all students throughout Pennsylvania. No student should leave secondary education without a solid foundation in these Standards.

http://www.portal.state.pa.us/portal/server.pt/community/state_board_of_education/8830/state_academic_standards/529102

CEW Standards Tool Kit for teachers to implement CEW Standards
www.pacareerstandards.com

Pennsylvania Approved Certifications

http://www.portal.state.pa.us/portal/server.pt/community/instructional_resources/7392/industry-recognized_certifications_for_career_and_technical_education_programs/507887

The Program of Study Documents

- Crosswalk Template for Task Alignment (excel) – Welding Technology/Welder – Instructions: Indicate the number code(s) of your school’s program competency or competencies aligned to each program of study competency.
- Crosswalk Template for Task Alignment (pdf) – Welding Technology/Welder – Instructions: Indicate the number code(s) of your school’s program competency or competencies aligned to each program of study competency.
- Scope and Sequence Template (word) – Enter secondary technical Program of Study courses. Postsecondary courses will be determined when the Statewide Articulation Agreement for this Program of Study is complete.
- Scope and Sequence Template (pdf) – Enter secondary technical Program of Study courses. Postsecondary courses will be determined when the Statewide Articulation Agreement for this Program of Study is complete.
- PA Academic Standards/Eligible Content Alignment Task List (excel) – Welding Technology/Welder – Crosswalk of PA Academic Standards/Eligible Content for Reading, Writing, Speaking and Listening (RWSL), Math, and Science aligned to Program of Study Secondary Competency List. (coming soon)
- PA Academic Standards/Eligible Content Alignment Task List (pdf) – Welding Technology/Welder – Crosswalk of PA Academic Standards/Eligible Content for Reading, Writing, Speaking and Listening (RWSL), Math, and Science aligned to Program of Study Secondary Competency List. (coming soon)

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