Indiana Department of Education
Academic Standards Course Framework

WELDING TECHNOLOGY I

Welding Technology I includes classroom and laboratory experiences that develop a variety of skills in oxy-fuel cutting and Shielded Metal Arc welding. This course is designed for individuals seeking careers in Welding, Technician, Sales, Design, Research or Engineering. Emphasis is placed on safety at all times. OSHA standards and guide lines endorsed by the American Welding Society (AWS) are used. Instructional activities emphasize properties of metals, safety issues, blueprint 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.

- DOE Code: 5776
- Recommended Grade Level: Grade 11-12
- Recommended Prerequisites: None
- Credits: 2-3 credits per semester, maximum of 6 credits.
- Counts as a Directed Elective or Elective for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- This course is aligned with postsecondary courses for Dual Credit:
    - Ivy Tech
        - INDT 114- Introductory Welding
        - WELD 108- Shielded Metal Arc Welding I
    - Vincennes University
        - WELD 101- Oxy-Acetylene Welding
        - WELD 103-Gas Metal Arc Welding

Dual Credit

This course provides the opportunity for dual credit for students who meet postsecondary requirements for earning dual credit and successfully complete the dual credit requirements of this course.

Application of Content and Multiple Hour Offerings

Intensive laboratory applications are a component of this course and may be either school based or work based or a combination of the two. Work-based learning experiences should be in a closely related industry setting. Instructors shall have a standards-based training plan for students participating in work-based learning experiences. When a course is offered for multiple hours per semester, the amount of laboratory application or work-based learning needs to be increased proportionally.

Career and Technical Student Organizations (CTSOs)

Career and Technical Student Organizations are considered a powerful instructional tool when integrated into Career and Technical Education programs. They enhance the knowledge and skills students learn in a course by allowing a student to participate in a unique program of career and leadership development. Students should be encouraged to participate in SkillsUSA, the CTSO for this area.

Content Standards

Domain – Workplace Competency

Core Standard 1 Students establish appropriate workplace behaviors and characteristics to prepare for

completion of further education in welding training programs.

Standards

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

Domain – Career Development

Core Standard 2 Students apply and adapt appropriate personal and professional skills to effectively manage welding careers.

Standards

WTI-2.1 Establish a personal career goal and develop objectives for achieving the goal

WTI-2.2 Evaluate employment and career pathway opportunities related to established career interest(s)

WTI-2.3 Create a continuing education plan that identifies further education and training options

WTI-2.4 Prepare for exams leading to certifications recognized by business and industry

WTI-2.5 Develop skills needed to enter the workforce

WTI-2.6 Evaluate resources that keep workers current in the career field

WTI-2.7 Demonstrate skills and attitudes needed for lifelong learning

WTI-2.8 Apply effective money management strategies

Domain – Safety and Health in Welding

Core Standard 3 Students integrate proper safety procedures in class activities and projects to meet professional and governmental standards.

Standards

WTI-3.1 Apply safe practices according to American National Standards Institute safety standards

WTI-3.2 Utilize proper safe operation practices in work area

WTI-3.3 Demonstrates proper use and inspection of ventilation equipment

WTI-3.4 Demonstrates proper Hot Zone operation

WTI-3.5 Select proper procedures actions for working in confined spaces

WTI-3.6 Demonstrates proper use of precautionary labeling and MSDS information

WTI-3.7 Demonstrates proper inspection and operation of equipment used for each welding and thermal cutting process used

Domain – Drawing and Welding Symbol Interpretation

Core Standard 4 Students interpret technical drawings and documents to perform welding processes to specifications.

Standards

WTI-4.1 Analyze and interpret blueprints

WTI-4.2 Interprets basic elements of a drawing or sketch

WTI-4.3 Interprets welding symbol information

WTI-4.4 Fabricates parts from a drawing or sketch

Domain – Manual and Mechanized Oxyfuel Cutting

Core Standard 5 Students create sound manual and automatic oxyfuel cuts on materials to meet industry standards.

Standards

WTI-5.1 Perform manual and automatic oxyfuel gas cutting

WTI-5.2 Performs safety inspections of manual oxy fuel gas cutting (OFC) equipment and accessories

WTI-5.3 Makes minor external repairs to manual OFC equipment and accessories

WTI-5.4 Sets up for manual OFC operations on carbon steel

WTI-5.5 Operates manual OFC equipment on carbon steel

WTI-5.6 Performs straight, square edge cutting operations in the flat position on carbon steel

WTI-5.7 Performs shape, square edge cutting operations in the flat position on carbon steel

WTI-5.8 Performs straight, bevel edge cutting operations in the flat and position on carbon steel

WTI-5.9 Performs scarfing and gouging operations to remove base and weld metal, in flat and horizontal positions on carbon steel

WTI-5.10 Performs safety inspections of mechanized OFC equipment and accessories

WTI-5.11 Makes minor external repairs to mechanized OFC equipment and accessories

WTI-5.12 Sets up for mechanized OFC operations on carbon steel

WTI-5.13 Operates mechanized OFC equipment on carbon steel

WTI-5.14 Performs straight, square edge cutting operations in the flat position on carbon steel using mechanized OFC

WTI-5.15 Performs straight, bevel edge cutting operations in the flat position on of carbon steel using mechanized OFC

WTI-5.16 Examines tacks, root passes, intermediate layers, and completed welds

Domain – Shielded Metal Arc Welding

Core Standard 6 Students execute appropriate Shielded Metal Arc welds on a variety of industrial metal to meet industry standards.

Standards

WTI-6.1 Apply Shielded Metal Arc Welding (SMAW) welding process fundamentals to actual lab experiences

WTI-6.2 Set up for SMAW operations on carbon steel

WTI-6.3 Operate SMAW equipment on carbon steel

WTI-6.4 Make fillet welds in all positions on carbon steel

WTI-6.5 Make groove welds in all positions on carbon steel

WTI-6.6 Pass SMAW welder performance qualification test (2G and 3G, uphill, limited thickness test plates) on carbon steel

Domain – Welding Inspection and Testing

Core Standard 7 Students evaluate various weld stages to meet inspection criteria.

Standards

WTI-7.1 Examine cut surfaces and edges of prepared base metal parts

WTI-7.2 Examine tacks, intermediate layers, and completed welds