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 guidelines 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