

## Welding: GMAW and FCAW

<b>Course Credit</b>	1.0
<b>Grade Levels</b>	9-12
<b>Prerequisites</b>	

**Welding: GMAW and FCAW** introduce metal arc and flux-cored arc welding processes. Emphasis is placed on safe operating practices, handling, and storage of compressed gasses. Process principles, component identification, various welding techniques, and base and filler metal identification are introduced. This course aims to prepare students to perform GMAW and FCAW welds in various positions.

Career and Technical Student Organizations are integral, co-curricular components of each career and technical education course. These organizations enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and access opportunities for personal and professional growth. Students in the Architecture and Construction career cluster affiliate with SkillsUSA.

Foundational standards, shown in the table below, are an important part of every course. Through these standards, students learn and apply safety concepts, explore career opportunities and requirements, practice the skills needed to succeed in the workplace, develop leadership qualities and take advantage of the opportunities afforded by Career and Technical Student Organizations (CTSOs), and learn and practice essential digital literacy skills. The foundational standards are to be incorporated throughout the course.

Each foundational standard completes the stem “*Students will...*”

### Foundational Standards

1. Incorporate safety procedures in handling, operating, and maintaining tools and machinery; handling materials; utilizing personal protective equipment; maintaining a safe work area; and handling hazardous materials and forces.
2. Demonstrate effective workplace and employability skills, including communication, awareness of diversity, positive work ethic, problem-solving, time management, and teamwork.
3. Explore the range of careers available in the field and investigate their educational requirements, and demonstrate job-seeking skills including resume-writing and interviewing.

4. Advocate and practice safe, legal, responsible, and ethical use of information and technology tools specific to the industry pathway.
5. Participate in a Career and Technical Student Organization (CTSO) to increase knowledge and skills and to enhance leadership and teamwork.

## WELDING: GMAW AND FCAW CONTENT STANDARDS

Each content standard completes the stem “*Students will...*”

### Welding Drawings and Symbols

1. Identify and interpret welding symbols and their placement on blueprints.
2. Describe welding detailed drawings and identify basic drawing elements and features.
  - a. Interpret the object views used to depict welding details.  
*Examples: plan, elevation, section views*
3. Identify and explain how to interpret dimensional information, notes, and a bill of materials in welding detail drawings.

### Characteristics and Properties of Metals

4. Describe the composition and classification systems for a variety of ferrous and non-ferrous metals, including low-alloy steel, common-grade steel, and specialty-grade steel.
  - a. Describe the physical and mechanical characteristics of metals and how they impact welding methods and procedures.
  - b. Explain how to identify base metals in field conditions.
5. Identify the common structural shapes of metal, including structural steel and beam shapes, pipe and tubing types, and rebar.

**Heating  
Metals**

6. Identify and describe methods used to preheat metal for welding and the devices and products used to measure temperature of materials during welding.
  - a. Explain interpass temperature control and post heating processes.

**Plate Welding**

7. Produce basic GMAW and FCAW weld beads.
8. Describe equipment control and welding procedures for GMAW and FCAW.
9. Demonstrate the welding procedures needed to produce fillet welds using FCAW welding techniques.