Welding: SMAW II

Course Credit	1.0
Grade Levels	10-12
Prerequisites	Welding: SMAW I

Welding: SMAW II presents information and skills needed to weld pipes and plates of various kinds. Topics include SMAW open-root pipe welds, plate welding, and stainless steel and carbon steel welding. The course also incorporates information about gas tungsten arc (tungsten inert gas) welding.

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: SMAW II
CONTENT STANDARDS

Each content standard completes the stem *"**Students will**..."*

SMAW Open-Root Pipe Welds	1. Explain the basic concepts of open-root shielded metal arc welding (SMAW) of pipe. a. Prepare the area, materials, and equipment for shielded metal arc welding. 2. Produce SMAW weld profiles in all open-root pipe welding positions.
SMAW Plate Welds	3. State the basic concepts of open-root shielded metal arc welding (SMAW) of plate. 4. Prepare the area, base metal, equipment, and materials for SMAW of plate with backing strip and open groove. 5. Demonstrate open-root V-groove plate welding positions and SMAW plate-welding techniques. a. Complete root and fill passes using SMAW techniques.
SMAW – Carbon Steel Pipe	6. Describe the basic concepts of open-root SMAW of carbon-steel pipe. a. Prepare the area, materials, and equipment for SMAW carbon-steel pipe welding.

GTAW Welds for Low Alloy and Stainless Steel Pipe	7. Describe how to prepare the area, materials, and equipment for low alloy and stainless steel pipe welding using the gas tungsten arc welding process. 8. Describe open-root V-groove pipe welding positions and GTAW pipe-welding techniques. a. Describe the techniques used to apply GTAW to low alloy and stainless steel pipe. b. Explain how to make the root pass with a gas backing. c. Describe the techniques required to produce open-root GTAW low alloy and stainless steel pipe welds in various positions.
SMAW Welds for Stainless Steel Plate and Pipe Grooves	9. Describe special considerations for shielded metal arc welding (SMAW) of various types of stainless steel and identify electrodes to be used for each type. a. Explain principles of stainless steel metallurgy. b. Describe methods for controlling carbide precipitation. c. Describe the selection and storage of stainless steel electrodes. 10. State the basic concepts of SMAW of stainless steel. a. Explain how to prepare the area, materials, and equipment for SMAW of stainless steel. 11. Describe open-root V-groove plate and pipe welding positions and SMAW stainless steel welding techniques. a. State general considerations for handling electrodes for SMAW of stainless steel. b. Describe how to make the root pass. c. Describe the techniques required to produce open-root V-groove SMAW stainless steel plate welds in 1G, 2G, 3G, and 4G positions. d. Describe the techniques required to produce open-root V-groove SMAW stainless steel pipe welds in 1G-ROTATED, 2G, 5G, and 6G positions.