Florida Department of Education
Curriculum Framework

Program Title: **Welding Technology - Advanced**
Program Type: **Career Preparatory**
Career Cluster: **Manufacturing**

Career Certificate Program		
Program Number	J400410	
CIP Number	0648050806	
Grade Level	30, 31	
Program Length	750 hours	
Teacher Certification	Refer to the **Program Structure** section	
CTSO	SkillsUSA	
SOC Codes (all applicable)	Please see the CIP to SOC Crosswalk located at the link below.	
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml	
Basic Skills Level	Computation (Mathematics): 9	Communications (Reading and Language Arts): 9

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the manufacturing career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the manufacturing career cluster. This program offers a broad foundation of knowledge and skills to prepare students for employment in the welding industry.

The content includes but is not limited to planning, management, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety and environmental issues.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of two occupational completion points.

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3)(b), F.S.

The standard length of this program is 750 hours. **Welding Technology** is a core program. It is recommended that students successfully complete **Welding Technology** or demonstrate mastery of the outcomes in that program prior to enrollment in the **Welding Technology - Advanced** program**.**

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the postsecondary program structure:

OCP	Course Number	Course Title	Teacher Certification	Length
A	PMT0075	Advanced Welder 1	METAL WORK 7G WELDING @7 7G	600 hours
B	PMT0076	Advanced Welder 2		150 hours

National Standards

Industry or National Standards corresponding to the standards and/or benchmarks for the Welding Technology - Advanced program can be found using the following link: https://www.aws.org/certification/page/home

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline, or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social, and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership, and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

01.0 Apply intermediate shielded metal arc welding (SMAW) pipe welding (Class-B Pipe Welder) skills.
02.0 Apply and understand fabrication techniques using pipe fitting techniques.
03.0 Apply advanced gas-tungsten arc welding (GTAW) pipe skills.
04.0 Apply advanced gas-tungsten arc welding (GTAW) and shielded metal arc welding (SMAW) heavy-wall pipe skills.
05.0 Apply emerging welding technologies.

Florida Department of Education
Student Performance Standards

Program Title: **Welding Technology - Advanced**
Career Certificate Program Number: **J400410**

Course Description: The Advanced Welder 1 course prepares students for entry into the welding industry. Students explore career opportunities and requirements of a professional welder. Content emphasizes advanced skills key to the success of working in the welding industry. Students study intermediate and advanced Shielded Metal Arc Welding (SMAW) Class-B Pipe Welder, pipe fitting fabrication techniques and advanced Gas Tungsten Arc Welding (GTAW) skills.

Course Number: PMT0075 **Occupational Completion Point: A** **Advanced Welder 1 – 600 Hours**	
01.0	Apply intermediate shielded metal arc welding (SMAW) pipe welding (Class-B Pipe Welder) skills. The student will be able to:
01.01	Make SMAW equipment ready for open-root V-groove pipe welds.
01.02	Identify and explain open-root V-grove pipe welding techniques with SMAW equipment.
01.03	Perform open-root V-groove pipe welds in the following positions using SMAW equipment. 1-GR, 2-G, 5-G, 6-G.
02.0	Apply and understand fabrication techniques using pipe fitting techniques. The student will be able to:
02.01	Apply and understand pipe fitting take-outs / take-offs for pipe fittings.
02.02	Identify and explain the different types of pipe fittings and their usage.
02.03	Identify and explain welding symbols and a standard legend on mechanical drawings.
02.04	Identify elevations and directions on a set of mechanical drawings.
03.0	Apply advanced gas-tungsten arc welding (GTAW) pipe skills. The student will be able to:
03.01	Prepare GTAW equipment to create welds with low alloy (Carbon Steel), stainless steel pipe and filler metal.
03.02	Identify and explain open-root V-groove pipe welding techniques with GTAW equipment.
03.03	Perform open-root V-groove welds on low alloy (carbon steel) and stainless-steel pipe in the following positions using GTAW equipment. 1-GR, 2-G, 5-G, 6-G.
04.0	Apply advanced gas-tungsten arc welding (GTAW) and shielded metal arc welding (SMAW) heavy-wall pipe skills. The student will be able to:
04.01	Identify and explain open-root V-groove pipe welding techniques on heavy wall pipe with GTAW/SMAW equipment.
04.02	Identify and explain Pre and Post weld heat treatment on the different types of alloy metals.
04.03	Make open-root V-groove welds on heavy wall carbon steel pipe root and hot pass using different techniques and filler metals such as, Key holing, washing or soaking, back feeding in the 1-G, 2-G,5-G, 6-G positions with GTAW equipment.

04.04	Make V-groove multi-pass welds on heavy wall pipe using the GTAW/SMAW welding processes in the 2-G, 5-G, 6-G positions.

Course Description: The Advanced Welder 2 course is designed to prepare advanced welders for entry into emerging welding industries. Students explore career opportunities and requirements of a professional welder. Content emphasizes advance skills key to the success of working in the welding industry. Students study emerging technologies directly related to geographically relevant welding needs of business and industry.

Course Number: PMT0076 Occupational Completion Point: B Advanced Welder 2 – 150 Hours	
05.0	Apply emerging welding technologies. The student will be able to:
05.01	Research and identify careers and workforce needs that employ emerging welding technologies.
05.02	Identify the skills required to work within careers that use emerging welding technologies.
05.03	Apply skills and competencies needed to successfully use emerging welding technologies such as, but not limited to: Pulse Welding, Robotics, Submerged Welding, Adaptive Welding, Hybrid Laser-Arc Welding (HLAW), etc.

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools, and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate, and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

SkillsUSA is the co-curricular career and technical student organization(s) providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Basic Skills

In Career Certificate Programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Computation (Mathematics) and Communications (Reading and Language Arts). These grade level numbers correspond to a grade equivalent score obtained on a state designated basic skills examination.

Adult students with disabilities, as defined in Section 1004.02, Florida Statutes, may be exempted from meeting the Basic Skills requirements (Rule 6A-10.040). Students served in exceptional student education (except gifted) as defined in s. 1003.01, F.S., may also be exempted from meeting the Basic Skills requirement. Each school district and Florida College System Institution must adopt a policy addressing procedures for exempting eligible students with disabilities from the Basic Skills requirement as permitted in Section 1004.91, F.S.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities to meet individual needs and ensure equal access. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

Note: postsecondary curriculum and regulated secondary programs cannot be modified.