July 2001
Florida Department of Education
CURRICULUM FRAMEWORK

Program Title: Applied Welding Technologies
Program Type: Job Preparatory
Occupational Area: Industrial Education
Components: One Program with Six Occupational Completion Points

	Secondary	**PSAV**
Program Numbers	**8754500**	**I480500**
CIP Number	0648.050802	0648.050802
Grade Level	9-12, 30, 31	30, 31
Facility Code	245	245
CTSO	SkillsUSA-VICA	SkillsUSA-VICA
Co-op Method	Yes	Yes
Apprenticeship	Yes	Yes

I. **PURPOSE:** The purpose of this program is to prepare students for employment or advanced training in a variety of occupations in the welding industry.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Welding industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **PROGRAM STRUCTURE:** This program is a planned sequence of instruction consisting of six occupational completion points as follows: (1) Welder Helper (819.687-014), (2) Welder, Shielded Metal Arc (810.384-014), (3) Welder, Gas-Metal Arc (Industry), (4) Welder, Flux Cored Arc (Industry), (5) Welder, Gas Tungsten Arc (Industry), (6) Welder, Pipe (Industry). When the recommended sequence is followed, the structure will allow students to complete specified portions of the program for employment or to remain for advanced training. A student who completes the applicable competencies at any occupational completion point may either continue with the training or become an occupational completer.

The content includes, but is not limited to, leadership, communication skills, human relations and employability skills, safe and efficient

work practices, use of cutting and/or welding processes to fabricate parts, according to shop drawings or written specifications.

Students must complete the core, or demonstrate the mastery of skills standards contained in the core, before advancing to any of the intermediate or advanced courses

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Florida Department of Education
INTENDED OUTCOMES

	Secondary	**PSAV**
Program Number	**8754500**	**I480500**
CIP Number	0648.050802	0648.050802
Grade Level	9-12, 30, 31	30,31
Length	8 Credits	1170 Hours
Certification	WELDING @7 G METAL WORK @7 G	WELDING @7 G METAL WORK @7 G

Basic Skills
Math 9
Language 9
Reading 9

INTENDED OUTCOMES: After successfully completing appropriate course(s) for each occupational completion point of this program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - A (250 Hours)
WELDER HELPER - DOT 819.687-014

01.0 Apply basic shop skills.
02.0 Apply basic oxyfuel gas cutting principles and practices.
03.0 Apply basic shielded metal arc welding (SMAW) skills.
04.0 Demonstrate employability skills.
05.0 Demonstrate appropriate communication skills.
06.0 Demonstrate an understanding of entrepreneurship.
07.0 Demonstrate appropriate math skills.
08.0 Demonstrate appropriate understanding of basic science.
09.0 Apply intermediate oxyfuel gas cutting principles and practices

OCCUPATIONAL COMPLETION POINT - B (250 Hours)
WELDER, SHIELDED METAL ARC - DOT 810.384-014

10.0 Apply intermediate shielded metal arc welding (SMAW) skills.
11.0 Apply visual examination skills.
12.0 Apply drawing and welding symbol interpretation skill.
13.0 Identify metals.
14.0 Demonstrate arc cutting principles and practices.

OCCUPATIONAL COMPLETION POINT - C (125 Hours)
WELDER, GAS METAL ARC - INDUSTRY TITLE

15.0 Apply basic gas metal arc welding (GMAW) skills.

16.0 Apply intermediate gas metal arc welding (GMAW) skills.

OCCUPATIONAL COMPLETION POINT - D (100 Hours)
WELDER, FLUX CORED ARC - INDUSTRY TITLE

17.0 Apply flux cored arc welding (FCAW) skills.

OCCUPATIONAL COMPLETION POINT - E (175 Hours)
WELDER, GAS TUNGSTEN ARC - DOT 810.384-014

18.0 Apply basic gas tungsten arc welding (GTAW) skills.
19.0 Apply intermediate gas tungsten arc welding (GTAW) skills.

OCCUPATIONAL COMPLETION POINT -F (270 Hours)
WELDER, PIPE - INDUSTRY TITLE

20.0 Fabricate and weld carbon steel pipe joints.
21.0 Perform fabrication using welding skills.

Occupational completion points may be reached before the end of a secondary course. All outcomes must be completed to receive credit for an Occupational Completion Point (OCP). Listed below are the courses that comprise this program when offered at the secondary level:

8754510 - **WELDING TECH - 1** (150 HRS)
8754520 - **WELDING TECH - 2** (150 HRS) [250] OCP A
8754530 - **WELDING TECH - 3** (150 HRS)
8754540 - **WELDING TECH - 4** (150 HRS) [250] OCP B
8754550 - **WELDING TECH - 5** (150 HRS) [125] OCP C
8754560 - **WELDING TECH - 6** (150 HRS) [100] OCP D
8754570 - **WELDING TECH - 7** (150 HRS) [175] OCP E
8754580 - **WELDING TECH - 8** (150 HRS) [270] OCP F

III. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in various processes and techniques of welding and fabrication skills, including thermal cutting, Shielded Metal Arc Welding (SMAW), Gas Metal Arc Welding (GMAW), Flux Cored Arc Welding (FCAW), Gas Tungsten Arc Welding (GTAW), Certification Test Preparation, and use of current industry standards, practices and techniques.

IV. **SPECIAL NOTE: SkillsUSA**-VICA, Inc. is the appropriate Career and Technical Student Organization (CTSO) for providing leadership training and for reinforcing specific career and technical skills. Career and Technical Student Organizations, when provided, shall be an integral part of the career and technical instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, FAC.

Cooperative training - OJT is appropriate for this program. Whenever cooperative training - OJT is offered, the following are required for each student: a training plan, signed by the student, teacher, and employer, which includes instructional objectives and a list of on-the-job and in-school learning experiences; a workstation that reflects equipment, skills and tasks that are relevant to the occupation which the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic-skills grade levels required for adult vocational students to complete this program are: Mathematics 9.0, Language 9.0, Reading 9.0. These grade-level numbers correspond to grade-equivalent scores obtained on one of the state-designated basic-skills examinations. If a student does not meet the basic-skills level required for completion of the program, remediation should be provided concurrently through Vocational Preparatory Instruction (VPI). Please refer to the Rule for exemptions.

When a secondary student with a disability is enrolled in a vocational class with modifications to the curriculum framework, the particular outcomes and student performance standards, which the student must master to earn credit, must be specified on an individual basis. The job or jobs for which the student is being trained should be reflected in the student's desired postschool outcome statement on the Transition Individual Educational Plan (Transition IEP).

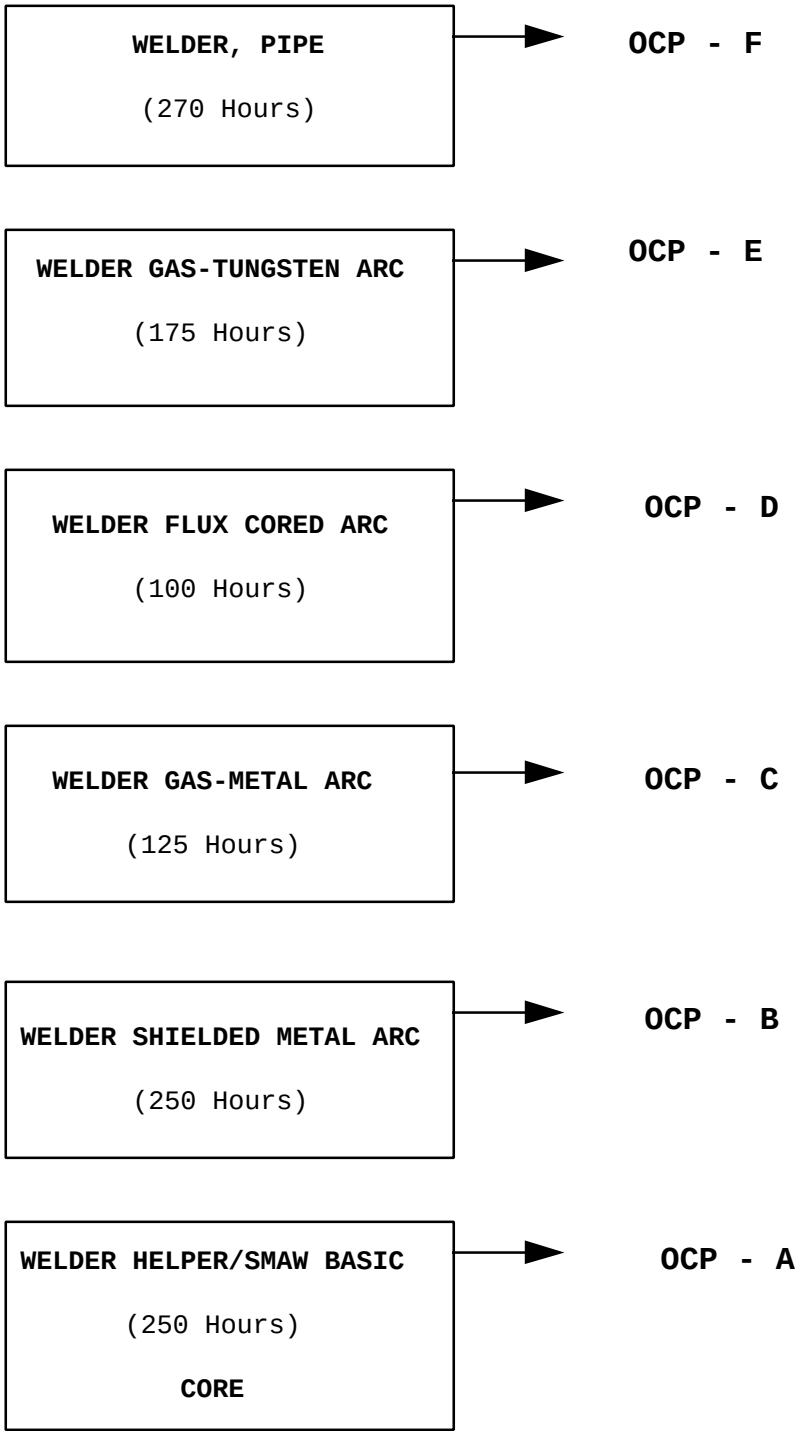
To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

SCANS Competencies: Instructional strategies for this program must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate the methods to improve students' personal qualifications and high-order thinking skills.

The standard length of this program is 1170 hours.

The following diagram illustrates the program structure:

APPLIED WELDING TECHNOLOGIES



July 2001
Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Applied Welding Technologies
Secondary Number: 8754500
Postsecondary Number: I480500

OCCUPATIONAL COMPLETION POINT - DATA CODE - A (250 Hours)
WELDER HELPER/SHIELDED METAL ARC BASIC - DOT CODE 819.687-014

01.0 APPLY BASIC SHOP SKILLS--The student will be able to:

01.01 Apply communications and leadership skills.
01.02 Apply safety and health practices.
01.03 Apply measuring skills.
01.04 Apply grinding skills.

02.0 APPLY BASIC OXYFUEL GAS CUTTING PRINCIPLES AND PRACTICES--The student will be able to:

02.01 Perform external inspections of equipment and accessories.
02.02 Make minor repairs to equipment and accessories.
02.03 Set up manual OFC operations for plain carbon steel.
02.04 Operate manual oxyfuel cutting equipment.
02.05 Perform straight cutting operations using manual oxyfuel cutting process on plain carbon steel.

03.0 APPLY BASIC SHIELDED METAL ARC WELDING (SMAW) SKILLS--The student will be able to:

03.01 Perform external inspections of SMAW equipment and accessories.
03.02 Make minor repairs to SMAW equipment and accessories.
03.03 Set up shielded metal arc welding operations on plain carbon steel.
03.04 Operate shielded metal arc welding equipment.
03.05 Make fillet welds, all positions, on plain carbon steel.

04.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

04.01 Conduct a job search.
04.02 Secure information about a job.
04.03 Identify documents, which may be required when applying for a job interview.
04.04 Complete a job application form correctly.
04.05 Demonstrate competence in job interview techniques.
04.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
04.07 Identify acceptable work habits.
04.08 Demonstrate knowledge of how to make job changes appropriately.
04.09 Demonstrate acceptable employee health habits.
04.10 Demonstrate knowledge of the "Florida Right-to-Know Law" as recorded in Florida Statutes Chapter 442.

05.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

05.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
05.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupational area.
05.03 Read and follow written and oral instructions.
05.04 Answer and ask questions coherently and concisely.
05.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
05.06 Demonstrate appropriate telephone/communication skills.

06.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

06.01 Define entrepreneurship.
06.02 Describe the importance of entrepreneurship to the American economy.
06.03 List the advantages and disadvantages of business ownership.
06.04 Identify the risks involved in ownership of a business.
06.05 Identify the necessary personal characteristics of a successful entrepreneur.
06.06 Identify the business skills needed to operate a small business efficiently and effectively.

07.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

07.01 Solve problems for volume, weight, area, circumference, metric conversions, decimals, percent, use of conversion charts and perimeter measurements for rectangles, squares, and cylinders.
07.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
07.03 Add, subtract, multiply and divide using fractions, decimals and whole numbers.
07.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
07.05 Demonstrate an understanding of federal, state and local taxes and their computation.

08.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

08.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
08.02 Draw conclusions or make inferences from data.
08.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
08.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

09.0 APPLY INTERMEDIATE OXYFUEL GAS CUTTING PRINCIPLES AND PRACTICES--The student will be able to:

09.01 Apply intermediate manual oxyfuel gas cutting skills.
09.02 Perform shape cutting operations on plain carbon steel.
09.03 Perform bevel cutting operations on plain carbon steel.
09.04 Remove weld metal on plain carbon steel using weld washing techniques.
09.05 Apply machine oxyfuel gas cutting (track burner) skills.
09.06 Perform safety inspections of equipment and accessories.
09.07 Make minor external repairs to equipment and accessories.
09.08 Set up for plain carbon steel machine OFC (track burner) operations.
09.09 Operate machine oxyfuel gas cutting (track burner) equipment.
09.10 Perform straight cutting operations on plain carbon steel.
09.11 Perform bevel cutting operations on plain carbon steel.

OCCUPATIONAL COMPLETION POINT - DATA CODE - B (250 Hours)
WELDER, SHIELDED METAL ARC - DOT CODE 810.384-014

10.0 APPLY INTERMEDIATE SHIELDED METAL ARC WELDING (SMAW) SKILLS--The student will be able to:

10.01 Make single “V” groove welds, all positions (visual inspection criteria, using (AWS) D1.1-96, 4.8.1 visual/inspection American Welding Society) on plain carbon steel with backing.
10.02 Perform 1G - 3G limited thickness qualification (bend) tests on plain carbon steel plate. (specification-use AWS D1.1-96, fig 4.30, 4.31 (will meet acceptance criteria AWS D1.1-96 -4.8.3.3)
10.03 Will perform destructive root and face bend specimens (AWS D1.1-96 Fig 4.12).

11.0 APPLY VISUAL EXAMINATION SKILLS--The student will be able to:

11.01 Examine cut surfaces and edges of prepared base metal parts.
11.02 Examine tack, intermediate pass and cover pass.

12.0 APPLY DRAWING AND WELDING SYMBOL INTERPRETATION SKILLS--The student will be able to:

12.01 Interpret basic elements of a drawing or sketch.
12.02 Interpret welding symbol information.
12.03 Fabricate parts from a drawing or sketch.

13.0 IDENTIFY METALS--The student will be able to:

13.01 Identify metals by appearance and weight.
13.02 Identify metals by spark test.
13.03 Classify metals by magnetic properties.
13.04 Identify metals by structural shapes.

14.0 DEMONSTRATE ARC CUTTING PRINCIPLES AND PRACTICES--The student will be able to:

14.01 Apply Manual Air Carbon Arc Gouging and Cutting (CAC-A) skills.
14.02 Perform safety inspections of equipment and accessories.
14.03 Make minor external repairs to equipment and accessories.

14.04 Set up plain carbon steel using manual air carbon arc gouging and cutting operations.
14.05 Operate manual air carbon arc cutting equipment.
14.06 Perform metal removal operations on plain carbon steel.
14.07 Apply manual Plasma Arc Cutting (PAC) skills.
14.08 Perform safety inspections of equipment and accessories.
14.09 Make minor repairs to equipment and accessories.
14.10 Set up for plain carbon steel, aluminum and stainless steel using plasma arc cutting operations.
14.11 Operate manual plasma arc cutting equipment.
14.12 Perform shape cutting operations on plain carbon steel, aluminum and stainless steel using plasma arc cutting process.

OCCUPATIONAL COMPLETION POINT - DATA CODE - C (125 Hours)
WELDER, GAS METAL ARC - INDUSTRY TITLE

15.0 APPLY BASIC GAS METAL ARC WELDING (GMAW) SKILLS--The student will be able to:

15.01 Perform external inspections of GMAW equipment and accessories.
15.02 Make minor repairs to GMAW equipment and accessories.
15.03 Set up gas metal arc welding operations for plain carbon steel.
15.04 Operate gas metal arc welding equipment.
15.05 Make short-circuiting transfer fillet welds, all positions, on plain carbon steel.
15.06 Make Groove welds, all positions, on plain carbon steel.

16.0 APPLY INTERMEDIATE GAS METAL ARC WELDING (GMAW) SKILLS--The student will be able to:

16.01 Make 1F Fillet- 2 Fillet spray transfer welds on plain carbon steel.
16.02 Make 1G Groove Spray transfer welds on plain carbon steel.
16.03 Set up (GMAW) gas metal arc welding equipment for aluminum, stainless steel.
16.04 Make groove welds 1G Groove position on aluminum.
16.05 Make fillet welds 1-3F position on stainless.
16.06 Make groove welds 1-2G position on stainless.

OCCUPATIONAL COMPLETION POINT - DATA CODE - D (100 Hours)
WELDER, FLUX CORED ARC - INDUSTRY TITLE

17.0 APPLY FLUX CORED ARC WELDING (FCAW) SKILLS--The student will be able to:

17.01 Perform safety inspections of equipment and accessories.
17.02 Make minor repairs to equipment and accessories.
17.03 Set up for plain carbon steel FCAW operations.
17.04 Operate flux cored arc welding equipment, self-shielded process.
17.05 Operate flux cored arc welding equipment, gas-shielded process, to make fillet welds, all positions, on plain carbon steel.
17.06 Operate flux covered arc welding equipment to make groove welds all positions, on plain carbon steel.

OCCUPATIONAL COMPLETION POINT - DATA CODE - E (175 Hours)
WELDER, GAS TUNGSTEN ARC - DOT CODE 819.384-010

18.0 APPLY BASIC GAS TUNGSTEN ARC WELDING (GTAW) SKILLS--The student will be able to:

18.01 Perform external inspections of GTAW equipment and accessories.
18.02 Make minor repairs to GTAW equipment and accessories.
18.03 Set up for plain carbon steel, aluminum and stainless steel GTAW operations.
18.04 Operate gas tungsten arc welding equipment.
18.05 Make fillet welds, all position, on plain carbon steel.

19.0 APPLY INTERMEDIATE GAS TUNGSTEN ARC WELDING (GTAW) SKILLS--The student will be able to:

19.01 Make groove welds, all positions, on plain carbon steel.
19.02 Make 1F Fillet - 2F Fillet welds on aluminum.
19.03 Make 1G Groove welds on aluminum.
19.04 Make 1F - 3F Fillet welds on stainless steel.
19.05 Make 1G - 2G Groove welds on stainless steel.

OCCUPATIONAL COMPLETION POINT - DATA CODE - F (270 Hours)
WELDER, PIPE - INDUSTRY TITLE

20.0 FABRICATE AND WELD PIPE JOINTS--The student will be able to:

20.01 Cut and prepare schedule 40 or 80 pipe for welding using current AWS specifications.
20.02 Tack and weld carbon steel pipe in the 1G position.
20.03 Tack and weld carbon steel pipe 2G position.
20.04 Tack and weld carbon steel pipe 5G position.
20.05 Tack and weld carbon steel pipe 6G position.

21.0 PERFORM FABRICATION USING WELDING SKILLS--The student will be able to:

21.01 Repair products of ferrous and non-ferrous metals.
21.02 Fabricate products of ferrous and non-ferrous metals using working drawings and/or blueprints.

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STUDENT PERFORMANCE STANDARDS

Course Title: Welding Technologies 1
Course Number: 8754510
Course Credit: 1

01.0 APPLY BASIC SHOP SKILLS--The student will be able to:

01.01 Apply communications and leadership skills.
01.02 Apply safety and health practices.
01.03 Apply measuring skills.
01.04 Apply grinding skills.

02.0 APPLY BASIC OXYFUEL GAS CUTTING PRINCIPLES AND PRACTICES--The student will be able to:

02.01 Perform external inspections of equipment and accessories.
02.02 Make minor repairs to equipment and accessories.
02.03 Set up manual OFC operations for plain carbon steel.
02.04 Operate manual oxyfuel cutting equipment.
02.05 Perform straight cutting operations using manual oxyfuel cutting process on plain carbon steel.

03.0 APPLY BASIC SHIELDED METAL ARC WELDING (SMAW) SKILLS--The student will be able to:

03.01 Perform external inspections of SMAW equipment and accessories.
03.02 Make minor repairs to SMAW equipment and accessories.
03.03 Set up shielded metal arc welding operations on plain carbon steel.
03.04 Operate shielded metal arc welding equipment.
03.05 Make fillet welds, all positions, on plain carbon steel.
03.06 Make groove welds.

04.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

04.01 Conduct a job search.
04.02 Secure information about a job.
04.03 Identify documents, which may be required when applying for a job interview.
04.04 Complete a job application form correctly.
04.05 Demonstrate competence in job interview techniques.
04.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
04.07 Identify acceptable work habits.
04.08 Demonstrate knowledge of how to make job changes appropriately.
04.09 Demonstrate acceptable employee health habits.
04.10 Demonstrate knowledge of the "Florida Right-to-Know Law" as recorded in Florida Statutes Chapter 442.

05.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

05.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
05.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupational area.
05.03 Read and follow written and oral instructions.
05.04 Answer and ask questions coherently and concisely.
05.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
05.06 Demonstrate appropriate telephone/communication skills.

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STUDENT PERFORMANCE STANDARDS

Course Title: Welding Technologies 2
Course Number: 8754520
Course Credit: 1

06.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

06.01 Define entrepreneurship.
06.02 Describe the importance of entrepreneurship to the American economy.
06.03 List the advantages and disadvantages of business ownership.
06.04 Identify the risks involved in ownership of a business.
06.05 Identify the necessary personal characteristics of a successful entrepreneur.
06.06 Identify the business skills needed to operate a small business efficiently and effectively.

07.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

07.01 Solve problems for volume, weight, area, circumference, metric conversions, decimals, percent, use of conversion charts and perimeter measurements for rectangles, squares, and cylinders.
07.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
07.03 Add, subtract, multiply and divide using fractions, decimals and whole numbers.
07.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
07.05 Demonstrate an understanding of federal, state and local taxes and their computation.

08.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

08.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
08.02 Draw conclusions or make inferences from data.
08.03 Identify health-related problems, which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
08.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

09.0 APPLY INTERMEDIATE OXYFUEL GAS CUTTING PRINCIPALS AND PRACTICES--The student will be able to:

09.01 Apply intermediate manual oxyfuel gas cutting skills.
09.02 Perform shape cutting operations on plain carbon steel.
09.03 Perform bevel cutting operations on plain carbon steel.
09.04 Remove weld metal on plain carbon steel using weld washing techniques.
09.05 Apply machine oxyfuel gas cutting (track burner) skills.
09.06 Perform safety inspections of equipment and accessories.

09.07 Make minor external repairs to equipment and accessories.
09.08 Set up for plain carbon steel machine OFC (track burner) operations.
09.09 Operate machine oxyfuel gas cutting (track burner) equipment.
09.10 Perform straight cutting operations on plain carbon steel.
09.11 Perform bevel cutting operations on plain carbon steel.

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STUDENT PERFORMANCE STANDARDS

Course Title: Welding Technologies 3
Course Number: 8754530
Course Credit: 1

10.0 APPLY INTERMEDIATE SHIELDED METAL ARC WELDING (SMAW) SKILLS--The student will be able to:

10.01 Make single "V" groove welds, all positions (visual inspection criteria, using (AWS) D1.1-96, 4.8.1 visual/inspection American Welding Society) on plain carbon steel with backing.
10.02 Perform 1G - 3G limited thickness qualification (bend) tests on plain carbon steel plate. (specification-use AWS D1.1-96, fig 4.30, 4.31 (will meet acceptance criteria AWS D1.1-96 - 4.8.3.3)
10.03 Will perform destructive root and face bend specimens (AWS D1.1-96 Fig 4.12).

11.0 APPLY VISUAL EXAMINATION SKILLS--The student will be able to:

11.01 Examine cut surfaces and edges of prepared base metal parts.
11.02 Examine tack, intermediate pass and cover pass.

12.0 APPLY DRAWING AND WELDING SYMBOL INTERPRETATION SKILLS--The student will be able to:

12.01 Interpret basic elements of a drawing or sketch.
12.02 Interpret welding symbol information.
12.03 Fabricate parts from a drawing or sketch.

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STUDENT PERFORMANCE STANDARDS

Course Title: Welding Technologies 4
Course Number: 8754540
Course Credit: 1

13.0 IDENTIFY METALS--The student will be able to:

13.01 Identify metals by appearance and weight.
13.02 Identify metals by spark test.
13.03 Classify metals by magnetic properties.
13.04 Identify metals by structural shapes.

14.0 DEMONSTRATE ARC CUTTING PRINCIPLES AND PRACTICES--The student will be able to:

14.01 Apply Manual Air Carbon Arc Gouging and Cutting (CAC-A) skills.
14.02 Perform safety inspections of equipment and accessories.
14.03 Make minor external repairs to equipment and accessories.
14.04 Set up plain carbon steel manual air carbon arc gouging and cutting operations.
14.05 Operate manual air carbon arc cutting equipment.
14.06 Perform metal removal operations on plain carbon steel.
14.07 Apply manual Plasma Arc Cutting (PAC) skills.
14.08 Perform safety inspections of equipment, accessories.
14.09 Make minor repairs to equipment and accessories.
14.10 Set up for plan carbon steel, aluminum and stainless steel using plasma arc cutting operations.
14.11 Operate manual plasma arc cutting equipment.
14.12 Perform shape cutting operations on plain carbon steel, aluminum and stainless steel using plasma arc cutting process.

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Course Title: Welding Technologies 5
Course Number: 8754550
Course Credit: 1

15.0 APPLY BASIC GAS METAL ARC WELDING (GMAW) SKILLS--The student will be able to:

15.01 Perform external inspections of GMAW equipment and accessories.
15.02 Make minor repairs to GMAW equipment and accessories.
15.03 Set up gas metal arc welding operations for plain carbon steel.
15.04 Operate gas metal arc welding equipment.
15.05 Weld plain carbon steel.
15.06 Make 3G Groove welds, all positions, on plain carbon steel.

16.0 APPLY INTERMEDIATE GAS METAL ARC WELDING (GMAW) SKILLS--The student will be able to:

16.01 Make 1F Fillet- 2 Fillet spray transfer welds on plain carbon steel.
16.02 Make 1G Groove Spray transfer welds on plain carbon steel.
16.03 Set up (GMAW) gas metal arc welding equipment for aluminum, stainless steel.
16.04 Groove welds 1G Groove position aluminum.
16.05 Fillet welds 1-3F position stainless.
16.06 Groove welds 1-2F position stainless.

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STUDENT PERFORMANCE STANDARDS

Course Title: Welding Technologies 6
Course Number: 8754560
Course Credit: 1

17.0 APPLY FLUX CORED ARC WELDING (FCAW) SKILLS--The student will be able to:

17.01 Perform safety inspections of equipment and accessories.
17.02 Make minor repairs to equipment and accessories.
17.03 Set up for plain carbon steel FCAW operations.
17.04 Operate flux cored arc welding equipment, self-shielded process.
17.05 Make fillet welds and groove welds, all positions, on plain carbon steel.
17.06 Operate flux cored arc welding equipment, gas-shielded process, to make fillet welds, all positions, on plain carbon steel.
17.07 Operate flux covered arc welding equipment to make groove welds all positions, on plain carbon steel.

18.0 APPLY BASIC GAS TUNGSTEN ARC WELDING (GTAW) SKILLS--The student will be able to:

18.01 Perform external inspections of GTAW equipment and accessories.
18.02 Make minor repairs to GTAW equipment and accessories.
18.03 Set up for plain carbon steel, aluminum and stainless steel GTAW operations.
18.04 Operate gas tungsten arc welding equipment.
18.05 Make fillet welds, all positions, on plain carbon steel.

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STUDENT PERFORMANCE STANDARDS

Course Title: Welding Technology 7
Course Number: 8754570
Course Credit: 1

19.0 APPLY INTERMEDIATE GAS TUNGSTEN ARC WELDING (GTAW) SKILLS--The student will be able to:

19.01 Make groove welds, all positions, on plain carbon steel.
19.02 Make 1F Fillet - 2F Fillet welds on aluminum.
19.03 Make 1G Groove welds on aluminum.
19.04 Make 1F - 3F Fillet welds on stainless steel.
19.05 Make 1G - 2G Groove welds on stainless steel.

20.0 FABRICATE AND WELD PIPE JOINTS--The student will be able to:

20.01 Cut and prepare schedule 40 or 80 pipe for welding using current AWS specifications.
20.02 Tack and weld carbon steel pipe in the 1G position.
20.03 Tack and weld carbon steel pipe 2G position.
20.04 Tack and weld carbon steel pipe 5G position.
20.05 Tack and weld carbon steel pipe 6G position.

July 2001
Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Title: Welding Technology 8
Course Number: 8754580
Course Credit: 1

21.0 PERFORM FABRICATION USING WELDING SKILLS--The student will be able to:

21.01 Repair products of ferrous and non-ferrous metals.
21.02 Fabricate products of ferrous and non-ferrous metals using working drawings and/or blue prints.