Florida Department of Education
CURRICULUM FRAMEWORK

Program Title: Sheet Metal Fabrication Technology
Occupational Area: Industrial Education

	Secondary	PSAV
Program Numbers	**8754100**	**I480506**
CIP Number	0648.050600	0648.050600
Grade Level	9-12, 30, 31	30, 31
Length	9 credits	1350 hours
Certification	SHEETMETAL @7 G METAL WORK @7 G	SHEETMETAL @7 G METAL WORK @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as sheet metal workers (89132704, machine helpers (619.687-014), template cutters (703.684-018).

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, and the layout, fabrication, erection, or installation and maintenance of items made of sheet steel, copper, stainless steel and aluminum using hand tools and machines.

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

Occupational completion points may be reached before the end of a secondary course. All outcomes and student performance standards 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:

8754110 - Sheet Metal Fabrication 1 (150)
8754120 - Sheet Metal Fabrication 2 (150)
8754130 - Sheet Metal Fabrication 3 (150) [450] OCP A
8754140 - Sheet Metal Fabrication 4 (150)
8754150 - Sheet Metal Fabrication 5 (150) [225] OCP B
8754160 - Sheet Metal Fabrication 6 (150) [225] OCP C
8754170 - Sheet Metal Fabrication 7 (150)
8754180 - Sheet Metal Fabrication 8 (150) [225] OCP D
8754190 - Sheet Metal Fabrication 9 (150) [225] OCP E

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

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in layout, cutting, forming, fabricating and installing mechanical, architectural, and specialty metal products.

III. **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).

SCANS Competencies: To accomplish the Secretary's Commission on Achieving Necessary Skills (SCANS) competencies, instructional strategies for this cluster 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, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate methods to improve students' personal qualities and higher-order thinking skills.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The standard length of this program is 1,350 hours.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - A (450 Hours)
SHEETMETAL HELPER 619.686-022

01.0 Demonstrate understanding of procedures and trade safety practices.
02.0 Read blueprints.
03.0 Lay out sheet metal.
04.0 Describe metals and their properties.
05.0 Describe the operation of metal working machines.
06.0 Perform metal fabrication operations.
07.0 Demonstrate appropriate communication skills.
08.0 Demonstrate appropriate math skills.
09.0 Demonstrate appropriate understanding of basic sciences.
10.0 Demonstrate employability skills.
11.0 Demonstrate an understanding of entrepreneurship.

OCCUPATIONAL COMPLETION POINT - B (225 Hours)
SHEETMETAL FABRICATOR

12.0 Fabricate mechanical systems.
13.0 Install mechanical systems.

OCCUPATIONAL COMPLETION POINT - C (225 Hours)
ARCHITECTURAL FABRICATOR 91714

14.0 Fabricate architectural/roofing sheetmetal.
15.0 Install architectural/roofing sheet metal.

OCCUPATIONAL COMPLETION POINT - D (225 Hours)
COMMERCIAL KITCHEN FABRICATOR 809.381-014

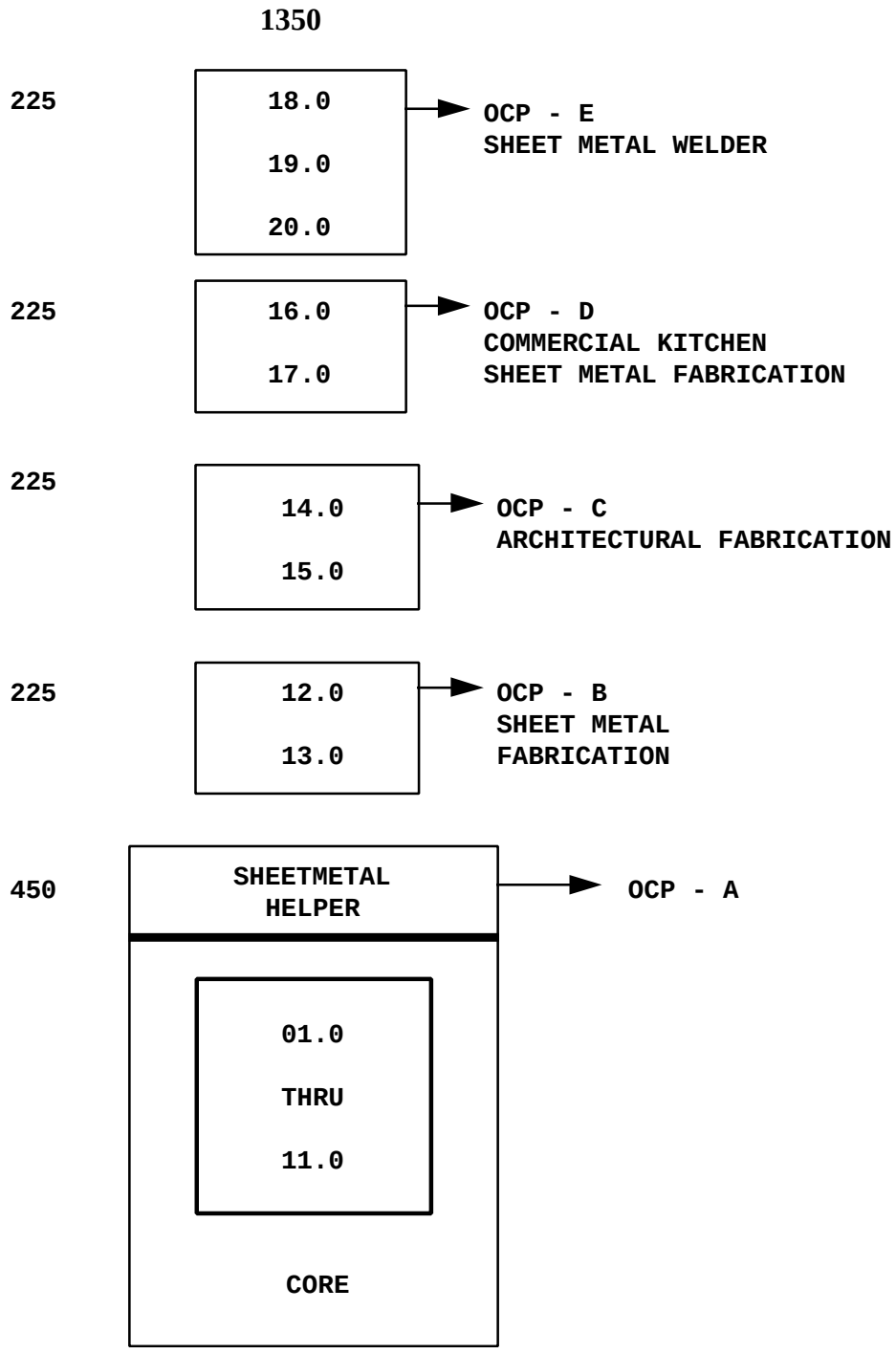
16.0 Fabricate specialty sheet metal.
17.0 Fabricate food and beverage dispensing equipment.

OCCUPATIONAL COMPLETION POINT - E (225 Hours)
SHEETMETAL WELDER - INDUSTRY TITLE

18.0 Weld sheet metal.
19.0 Perform gas welding and cutting operations.
20.0 Perform electric metal-bonding operations.

The following diagram illustrates the program structure:

SHEET METAL FABRICATION TECHNOLOGY



Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Sheet Metal Fabrication Technology
Secondary Number: 8754100
Postsecondary Number:

OCCUPATIONAL COMPLETION POINT - A

01.0 DEMONSTRATE UNDERSTANDING OF PROCEDURES AND TRADE SAFETY PRACTICES--The student will be able to:

01.01 Apply safety rules and procedures.
01.02 Explain school/class procedures.
01.03 Demonstrate use and care of tools.

02.0 READ BLUEPRINTS--The student will be able to:

02.01 Interpret detail drawings.
02.02 Read symbols.
02.03 List materials for fabrication from blueprints.
02.04 Develop shop drawings, drafting, sketching, and demonstrate computer usage and CAD operation.

03.0 LAY OUT SHEET METAL--The student will be able to:

03.01 Perform basic geometric construction
03.02 Use marking gages, center punches, scribes, surface gages, squares, dividers, protractors, and circumference rules.
03.03 Develop patterns using parallel line, radial line and triangulation.
03.04 Make metal fabrication sketches.
03.05 Read and measure with steel rules.
03.06 Read and measure with micrometers.
03.07 Read and measure with dial calipers.
03.08 Read and measure with universal bevel protractor.
03.09 Layout work place using marking gages, center punches, scribes, surface gages, squares, dividers, protractors, and circumference rules.
03.10 Perform flat pattern bracket layouts.
03.11 Perform cone development, construct radial line and use triangulation.
13.12 Lay out rectangular straight duct.
03.13 Lay out rectangular square throat and square heel duct elbow.
03.14 Lay out rectangular duct ogee offset.
03.15 Lay out rectangular taper duct (centerline taper).
03.16 Lay out rectangular duct Y branch.
03.17 Lay out round straight duct.
03.18 Lay out round duct elbow.
03.19 Lay out round duct Y branch.
03.20 Lay out round duct offset.
03.21 Lay out round duct taper (transitional).
03.22 Lay out round duct lateral (round tap).
03.23 Lay out batten seam metal roof panel and cap.
03.24 Lay out square hopper.
03.25 Lay out belt guard.

04.0 DESCRIBE METALS AND THEIR PROPERTIES--The student will be able to:

04.01 Describe the steelmaking process.
04.02 Describe the difference between ferrous and nonferrous metals.
04.03 Describe casting, alloys and forging.
04.04 Identify metals such as galvanized iron and steel, aluminum stainless steel, sheetmetal, copper and brass.
04.05 Identify properties of the most common metals.
04.06 Identify and describe common gages, shapes and dimensions of purchased materials.

05.0 DESCRIBE THE OPERATION OF METALWORKING MACHINES--The student will be able to:

05.01 Identify the purpose of various types of sheet metal shop equipment.
05.02 Identify types of drill presses.
05.03 Operate a drill press utilizing the correct drilling speed.
05.04 Operate a band saw utilizing the correct cutting speed.
05.05 Demonstrate clamping devices for securing stock for drilling.
05.06 Identify types and sizes of drill bits.
05.07 Use portable power saw equipment.
05.08 Use a cutoff or power hacksaw.
05.09 Use electric and air utility grinders.
05.10 Sharpen drill bits.
05.11 Select proper type of abrasive wheels for grinding machines.
05.12 Describe large belt sanders.
05.13 Describe power press brake.
05.14 Describe power metal shear.
05.15 Describe various manual brakes.
05.16 Describe bench grinders.
05.17 Describe beverly shear.
05.18 Describe unishear.

06.0 FABRICATE SPECIALTY SHEET METAL--The student will be able to:

06.01 Fabricate metal, edges and seams.
06.02 Use hand tools to cut, punch and shear metal.
06.03 Form sheetmetal using a brake, a folder, rolls and a turning machine.
06.04 Join metals using solder, rivets and mechanical fasteners.
06.05 Make fixtures as required (Micarta and Mild Steel).
06.06 Arrange proper setup in vise using safety devices.
06.07 Demonstrate ability to cut various shapes of metal stock.
06.08 Demonstrate ability to bend various shapes of metal stock.
06.09 Inspect fabricated parts.

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

07.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
07.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
07.03 Read and follow written and oral instructions.

07.04 Answer and ask questions coherently and concisely.
07.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
07.06 Demonstrate appropriate telephone/communication skills.

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

08.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
08.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
08.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
08.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
08.05 Demonstrate an understanding of federal, state and local taxes and their computation.
08.06 Solve job-related problems using calculators.

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

09.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
09.02 Draw conclusions or make inferences from data.
09.03 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.
09.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

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

10.01 Conduct a job search.
10.02 Secure information about a job.
10.03 Identify documents, which may be required when applying for a job interview.
10.04 Complete a job application form correctly.
10.05 Demonstrate competence in job interview techniques.
10.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
10.07 Identify acceptable work habits.
10.08 Demonstrate knowledge of how to make job changes appropriately.
10.09 Demonstrate acceptable employee health habits.
10.10 Demonstrate knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

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

11.01 Define entrepreneurship.
11.02 Describe the importance of entrepreneurship to the American economy.
11.03 List the advantages and disadvantages of business ownership.
11.04 Identify the risks involved in ownership of a business.
11.05 Identify the necessary personal characteristics of a successful entrepreneur.

11.06 Identify the business skills needed to operate a small business efficiently and effectively.

OCCUPATIONAL COMPLETION POINT - B

12.0 FABRICATE MECHANICAL SYSTEMS--The student will be able to:

12.01 Fabricate rectangular radius throat and radius heel duct elbow.
12.02 Fabricate rectangular square throat and square heel duct elbow.
12.03 Fabricate rectangular duct ogee offset.
12.04 Fabricate rectangular duct transition.
12.05 Fabricate rectangular duct Y branch.
12.06 Fabricate rectangular shoe tap.
12.07 Fabricate round straight duct.
12.08 Fabricate round duct elbow.
12.09 Fabricate round duct Y branch.
12.10 Fabricate round duct offset.
12.11 Fabricate round duct taper (transitional).
12.12 Fabricate round duct lateral (round tap).
12.13 Fabricate round saddle tap.
12.14 Fabricate single wall equipment casing/housing.
12.15 Fabricate flat S.
12.16 Fabricate bar S.
12.17 Fabricate drive cleat.
12.18 Fabricate pocket government lock.
12.19 Fabricate companion angle.
12.20 Fabricate flanged duct section.

13.0 INSTALL MECHANICAL SYSTEMS--The student will be able to:

13.01 Install rectangular duct system.
13.02 Install round duct system.
13.03 Install single wall equipment casing/housing.

OCCUPATIONAL COMPLETION POINT - C

14.0 FABRICATE ARCHITECTURAL/ROOFING SHEET METAL--The student will be able to:

14.01 Fabricate batten seam metal roof panel and cap.
14.02 Fabricate standing seam metal roof panel.
14.03 Fabricate metal flat-lock roof panel.
14.04 Fabricate ogee gutter.
14.05 Fabricate half-round gutter.
14.06 Fabricate rectangular downspout/conductor.
14.07 Fabricate offset in rectangular downspout/conductor.
14.08 Fabricate conductor head.
14.09 Fabricate flashing.
14.10 Fabricate roof coping.
14.11 Fabricate gravel stop fascia.
14.12 Fabricate metal siding panel.
14.13 Fabricate louver.
14.14 Fabricate metal ceiling panel.

15.0 INSTALL ARCHITECTURAL/ROOFING SHEET METAL--The student will be able to:

15.01 Install batten seam metal roof panel and cap.
15.02 Install standing seam metal roof panel.
15.03 Install metal flat-lock roof panel.
15.04 Install ogee gutter.
15.05 Install half-round gutter.
15.06 Install rectangular downspout/conductor.
15.07 Install offset in rectangular downspout/conductor.
15.08 Install conductor head.
15.09 Install flashing.
15.10 Install coping.
15.11 Install gravel stop fascia.
15.12 Install metal siding.

OCCUPATIONAL COMPLETION POINT - D

16.0 FABRICATE SPECIALTY SHEET METAL--The student will be able to:

16.01 Fabricate rectangular single blade damper in frame.
16.02 Fabricate rectangular tube.
16.03 Fabricate round tube.
16.04 Fabricate hollow metal letter.
16.05 Fabricate round duct support saddle (floor mounted).
16.06 Fabricate belt guard.
16.07 Fabricate blind/drapery pocket (cornice).

17.0 FABRICATE FOOD AND BEVERAGE DISPENSING EQUIPMENT--The student will be able to:

17.01 Fabricate counter top.
17.02 Fabricate shelf.
17.03 Fabricate cabinet shell.
17.04 Fabricate cabinet drawer.
17.05 Fabricate cabinet sliding door.
17.06 Fabricate sink and tub.

OCCUPATIONAL COMPLETION POINT - E

18.0 WELD SHEET METAL--The student will be able to:

18.01 Weld aluminum with gas tungsten arc welding (GTAW) equipment.
18.02 Weld aluminum with gas metal arc welding (GMAW) equipment.
18.03 Weld stainless steel with gas metal arc welding (GMAW) equipment.
18.04 Weld stainless steel with shielded metal arc welding (SMAW) equipment.

19.0 PERFORM GAS WELDING AND CUTTING OPERATIONS--The student will be able to:

19.01 Identify welding cylinders, regulators, hoses, pressure gages and torches.
19.02 Describe welding equipment safety procedures.
19.03 Demonstrate proper flame settings.
19.04 Demonstrate basic gas welding skills.
19.05 Demonstrate procedures for adjusting and operating the oxyacetylene cutting torch.
19.06 Demonstrate freehand and guide cutting of various metal thickness'.

19.07 Set up and operate a plasma arc-cutting machine.

20.0 PERFORM ELECTRIC METAL-BONDING OPERATIONS--The student will be able to:

20.01 Describe and demonstrate the spot and arc welding process.
20.02 Demonstrate basic procedures for safety adjusting and operating an arc welder, selecting a rod, striking and maintaining an arc, welding in various positions and clamping.
20.03 Set up and operate a spot welder.
20.04 Explain and demonstrate the MIG welding process.
20.05 Apply basic procedures for safety adjusting, operating, cleaning and maintaining MIG welding equipment.
20.06 Apply basic procedures for safely adjusting and operating a TIG welder, welding in various positions, selecting proper tips and choosing filler metal.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Title: Sheet Metal Fabrication 1
Course Number: 8754110
Course Credit: 1

01.0 DEMONSTRATE UNDERSTANDING OF PROCEDURES AND TRADE SAFETY PRACTICES--The student will be able to:

01.01 Apply safety rules and procedures.
01.02 Explain school/class procedures.
01.03 Demonstrate use and care of tools.

02.0 READ BLUEPRINTS--The student will be able to:

02.01 Interpret detail drawings.
02.02 Read symbols.
02.03 List materials for fabrication from blueprints.
02.04 Develop shop drawings, drafting, sketching, and demonstrate computer usage and CAD operation.

03.0 LAY OUT SHEET METAL--The student will be able to:

03.01 Perform basic geometric construction
03.02 Use marking gages, center punches, scribes, surface gages, squares, dividers, protractors, and circumference rules.
03.03 Develop patterns using parallel line, radial line and triangulation.
03.04 Make metal fabrication sketches.
03.05 Read and measure with steel rules.
03.06 Read and measure with micrometers.
03.07 Read and measure with dial calipers.
03.08 Read and measure with universal bevel protractor.
03.09 Layout work place using marking gages, center punches, scribes, surface gages, squares, dividers, protractors, and circumference rules.
03.10 Perform flat pattern bracket layouts.
03.11 Perform cone development, construct radial line and use triangulation.
03.12 Lay out rectangular straight duct.
03.13 Lay out rectangular square throat and square heel duct elbow.
03.14 Lay out rectangular duct ogee offset.
03.15 Lay out rectangular taper duct (centerline taper).
03.16 Lay out rectangular duct Y branch.
03.17 Lay out round straight duct.
03.18 Lay out round duct elbow.
03.19 Lay out round duct Y branch.
03.20 Lay out round duct offset.
03.21 Lay out round duct taper (transitional).
03.22 Lay out round duct lateral (round tap).
03.23 Lay out batten seam metal roof panel and cap.
03.24 Lay out square hopper.
03.25 Lay out belt guard.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Title: Sheet Metal Fabrication 2
Course Number: 8754120
Course Credit: 1

04.0 DESCRIBE METALS AND THEIR PROPERTIES--The student will be able to:

04.01 Describe the steelmaking process.
04.02 Describe the difference between ferrous and nonferrous metals.
04.03 Describe casting, alloys and forging.
04.04 Identify metals such as galvanized iron and steel, aluminum stainless steel, sheetmetal, copper and brass.
04.05 Identify properties of the most common metals.
04.06 Identify and describe common gages, shapes and dimensions of purchased materials.

05.0 DESCRIBE THE OPERATION OF METALWORKING MACHINES--The student will be able to:

05.01 Identify the purpose of various types of sheet metal shop equipment.
05.02 Identify types of drill presses.
05.03 Operate a drill press utilizing the correct drilling speed.
05.04 Operate a band saw utilizing the correct cutting speed.
05.05 Demonstrate clamping devices for securing stock for drilling.
05.06 Identify types and sizes of drill bits.
05.07 Use portable power saw equipment.
05.08 Use a cutoff or power hacksaw.
05.09 Use electric and air utility grinders.
05.10 Sharpen drill bits.
05.11 Select proper type of abrasive wheels for grinding machines.
05.12 Describe large belt sanders.
05.13 Describe power press brake.
05.14 Describe power metal shear.
05.15 Describe various manual brakes.
05.16 Describe bench grinders.
05.17 Describe beverly shear.
05.18 Describe unishear.

06.0 FABRICATE SPECIALTY SHEET METAL--The student will be able to:

06.01 Fabricate metal, edges and seams.
06.02 Use hand tools to cut, punch and shear metal.
06.03 Form sheetmetal using a brake, a folder, rolls and a turning machine.
06.04 Join metals using solder, rivets and mechanical fasteners.
06.05 Make fixtures as required (Micarta and Mild Steel).
06.06 Arrange proper setup in vise using safety devices.
06.07 Demonstrate ability to cut various shapes of metal stock.
06.08 Demonstrate ability to bend various shapes of metal stock.
06.09 Inspect fabricated parts.

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

07.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
07.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
07.03 Read and follow written and oral instructions.
07.04 Answer and ask questions coherently and concisely.
07.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
07.06 Demonstrate appropriate telephone/communication skills.

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

08.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
08.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
08.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
08.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
08.05 Demonstrate an understanding of federal, state and local taxes and their computation.
08.06 Solve job-related problems using calculators.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Title: Sheet Metal Fabrication 3
Course Number: 8754130
Course Credit: 1

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

09.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
09.02 Draw conclusions or make inferences from data.
09.03 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.
09.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

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

10.01 Conduct a job search.
10.02 Secure information about a job.
10.03 Identify documents, which may be required when applying for a job interview.
10.04 Complete a job application form correctly.
10.05 Demonstrate competence in job interview techniques.
10.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
10.07 Identify acceptable work habits.
10.08 Demonstrate knowledge of how to make job changes appropriately.
10.09 Demonstrate acceptable employee health habits.
10.10 Demonstrate knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

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

11.01 Define entrepreneurship.
11.02 Describe the importance of entrepreneurship to the American economy.
11.03 List the advantages and disadvantages of business ownership.
11.04 Identify the risks involved in ownership of a business.
11.05 Identify the necessary personal characteristics of a successful entrepreneur.
11.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Title: Sheet Metal Fabrication 4
Course Number: 8754140
Course Credit: 1

12.0 FABRICATE MECHANICAL SYSTEMS--The student will be able to:

12.01 Fabricate rectangular radius throat and radius heel duct elbow.
12.02 Fabricate rectangular square throat and square heel duct elbow.
12.03 Fabricate rectangular duct ogee offset.
12.04 Fabricate rectangular duct transition.
12.05 Fabricate rectangular duct Y branch.
12.06 Fabricate rectangular shoe tap.
12.07 Fabricate round straight duct.
12.08 Fabricate round duct elbow.
12.09 Fabricate round duct Y branch.
12.10 Fabricate round duct offset.
12.11 Fabricate round duct taper (transitional).
12.12 Fabricate round duct lateral (round tap).
12.13 Fabricate round saddle tap.
12.14 Fabricate single wall equipment casing/housing.
12.15 Fabricate flat S.
12.16 Fabricate bar S.
12.17 Fabricate drive cleat.
12.18 Fabricate pocket government lock.
12.19 Fabricate companion angle.
12.20 Fabricate flanged duct section.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Title: Sheet Metal Fabrication 5
Course Number: 8754150
Course Credit: 1

13.0 INSTALL MECHANICAL SYSTEMS--The student will be able to:

13.01 Install rectangular duct system.
13.02 Install round duct system.
13.03 Install single wall equipment casing/housing.

14.0 FABRICATE ARCHITECTURAL/ROOFING SHEET METAL--The student will be able to:

14.01 Fabricate batten seam metal roof panel and cap.
14.02 Fabricate standing seam metal roof panel.
14.03 Fabricate metal flat-lock roof panel.
14.04 Fabricate ogee gutter.
14.05 Fabricate half-round gutter.
14.06 Fabricate rectangular downspout/conductor.
14.07 Fabricate offset in rectangular downspout/conductor.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Title: Sheet Metal Fabrication 6
Course Number: 8754160
Course Credit: 1

14.0 FABRICATE ARCHITECTURAL/ROOFING SHEET METAL--The student will be able to:

14.08 Fabricate conductor head.
14.09 Fabricate flashing.
14.10 Fabricate roof coping.
14.11 Fabricate gravel stop fascia.
14.12 Fabricate metal siding panel.
14.13 Fabricate louver.
14.14 Fabricate metal ceiling panel.

15.0 INSTALL ARCHITECTURAL/ROOFING SHEET METAL--The student will be able to:

15.01 Install batten seam metal roof panel and cap.
15.02 Install standing seam metal roof panel.
15.03 Install metal flat-lock roof panel.
15.04 Install ogee gutter.
15.05 Install half-round gutter.
15.06 Install rectangular downspout/conductor.
15.07 Install offset in rectangular downspout/conductor.
15.08 Install conductor head.
15.09 Install flashing.
15.10 Install coping.
15.11 Install gravel stop fascia.
15.12 Install metal siding.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Title: Sheet Metal Fabrication 7
Course Number: 8754170
Course Credit: 1

16.0 FABRICATE SPECIALTY SHEET METAL--The student will be able to:

16.01 Fabricate rectangular single blade damper in frame.
16.02 Fabricate rectangular tube.
16.03 Fabricate round tube.
16.04 Fabricate hollow metal letter.
16.05 Fabricate round duct support saddle (floor mounted).
16.06 Fabricate belt guard.
16.07 Fabricate blind/drapery pocket (cornice).

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Title: Sheet Metal Fabrication 8
Course Number: 8754180
Course Credit: 1

17.0 FABRICATE FOOD AND BEVERAGE DISPENSING EQUIPMENT--The student will be able to:

17.01 Fabricate counter top.
17.02 Fabricate shelf.
17.03 Fabricate cabinet shell.
17.04 Fabricate cabinet drawer.
17.05 Fabricate cabinet sliding door.
17.06 Fabricate sink and tub.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Title: Sheet Metal Fabrication 9
Course Number: 8754190
Course Credit: 1

18.0 WELD SHEET METAL--The student will be able to:

18.01 Weld aluminum with gas tungsten arc welding (GTAW) equipment.
18.02 Weld aluminum with gas metal arc welding (GMAW) equipment.
18.03 Weld stainless steel with gas metal arc welding (GMAW) equipment.
18.04 Weld stainless steel with shielded metal arc welding (SMAW) equipment.

19.0 PERFORM GAS WELDING AND CUTTING OPERATIONS--The student will be able to:

19.01 Identify welding cylinders, regulators, hoses, pressure gages and torches.
19.02 Describe welding equipment safety procedures.
19.03 Demonstrate proper flame settings.
19.04 Demonstrate basic gas welding skills.
19.05 Demonstrate procedures for adjusting and operating the oxyacetylene cutting torch.
19.06 Demonstrate freehand and guide cutting of various metal thickness'.
19.07 Set up and operate a plasma arc-cutting machine.

20.0 PERFORM ELECTRIC METAL-BONDING OPERATIONS--The student will be able to:

20.01 Describe and demonstrate the spot and arc welding process.
20.02 Demonstrate basic procedures for safety adjusting and operating an arc welder, selecting a rod, striking and maintaining an arc, welding in various positions and clamping.
20.03 Set up and operate a spot welder.
20.04 Explain and demonstrate the MIG welding process.
20.05 Apply basic procedures for safety adjusting, operating, cleaning and maintaining MIG welding equipment.
20.06 Apply basic procedures for safely adjusting and operating a TIG welder, welding in various positions, selecting proper tips and choosing filler metal.