Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Automotive Machine Shop
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I480513**
CIP Number	0648.050301
Grade Level	30, 31
Length	960 Hours
SOC	51-4041
Certification	AUTO MACH @7 G
	METAL WORK @7 G
	AUTO IND @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as automotive machinists, DOT 600.280-034, or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, remanufacture of automotive engines to original factory specifications, make judgments on when to re-machine or replace components, re-machine components for engine rebuild, recognize metal fatigue, and manufacture unusual or special parts when necessary.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive 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 cleaning, inspecting, grinding, drilling, honing, and reassembling automotive parts with an emphasis on accuracy.

III. **SPECIAL NOTE:** SkillsUSA, 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 10.0, 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.

Federal and state legislation requires the provision of accommodations for students with disabilities to meet individual needs and ensure equal access. Adult students with disabilities must self-identify and request such services. 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.

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.

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.

This program may be offered in courses. Vocational 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 960 hours.

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

OCCUPATIONAL COMPLETION POINT - A

DISASSEMBLY AND CLEANING TECHNICIAN (360) (SOC 51-4041)

01.0 Explain the principles of power.
02.0 Identify and use precision and non-precision hand tools.
03.0 Explain proper cleaning methods.
04.0 Disassemble and inspect engines.
05.0 Clean automotive engine components.
19.0 Demonstrate appropriate math skills.
21.0 Demonstrate employability skills.

OCCUPATIONAL COMPLETION POINT - B

HEAD AND BLOCK RECONDITIONING TECHNICIAN (100) (SOC 51-4041)

06.0 Surface grind heads.
08.0 Machine connecting rods and main bearing caps for finish honing.
09.0 Remachine cylinder walls.
10.0 Service pistons.
12.0 Perform magnaflux nondestructive testing.
18.0 Demonstrate appropriate communication skills.
20.0 Demonstrate appropriate understanding of basic science.

OCCUPATIONAL COMPLETION POINT - C

CRANK SHAFT GRINDING AND ROD RECONDITIONING TECHNICIAN (100) (SOC 51-4041)

07.0 Machine finish complete head.
11.0 Service brake drums, disc brake system, and shoes.
13.0 Service crankshaft.
14.0 Service flywheels and clutches.

OCCUPATIONAL COMPLETION POINT - D

AUTOMOTIVE MACHINIST (400) (SOC 51-4041)

15.0 Operate engine lathe.
16.0 Operate milling machine.
17.0 Operate drill press.
22.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Automotive Machine Shop
Secondary Number:
Postsecondary Number: I480513

01.0 EXPLAIN THE PRINCIPLES OF POWER--The student will be able to:

01.01 Demonstrate understanding of internal combustion engines.
01.02 Demonstrate understanding of concepts of heat, pressure, and compression as they relate to the internal combustion engine.
01.03 Explain differences between two and four cycle engines.
01.04 Demonstrate understanding of shop safety procedures.

02.0 IDENTIFY AND USE PRECISION AND NON-PRECISION HAND TOOLS--The student will be able to:

02.01 Select and use personal safety equipment.
02.02 Select, use and maintain taps, dies, hones, drills and reamers.
02.03 Select, use and maintain punches, saws, chisels and files.
02.04 Select and use micrometers, calipers, dial indicators, depth gauges, boring gauges and plastigage.

03.0 EXPLAIN PROPER CLEANING METHODS--The student will be able to:

03.01 Identify types of soils.
03.02 Demonstrate understanding of chemicals and processes used for cleaning, including emulsion, parts washers, and cold and hot tanks.
03.03 Explain glass bead cleaning.

04.0 DISASSEMBLE AND INSPECT ENGINES--The student will be able to:

04.01 Remove and disassemble cylinder heads.
04.02 Remove and disassemble crankshafts, camshafts, rods and pistons.
04.03 Inspect all parts and compare to acceptable tolerances.

05.0 CLEAN AUTOMOTIVE ENGINE COMPONENTS--The student will be able to:

05.01 Perform hot tank block cleaning.
05.02 Perform hot tank head cleaning.
05.03 Perform hot tank crankshaft cleaning.
05.04 Perform hot tank camshaft cleaning.
05.05 Bead clean valves and head.
05.06 Explain and demonstrate appropriate safety behavior while performing hot tank cleaning.

06.0 SURFACE GRIND HEADS--The student will be able to:

06.01 Set up and operate grinder.
06.02 Dress grinder wheel.
06.03 Inspect and replace grinder wheel.
06.04 Inspect finished heads.

07.0 MACHINE FINISH COMPLETE HEAD--The student will be able to:

07.01 Set up I.D.L. Machining Center to replace valve guides and seats.
07.02 Machine guides to proper size.
07.03 Machine valve seats.
07.04 Replace valve seats.

08.0 MACHINE CONNECTING RODS AND MAIN BEARING CAPS FOR FINISH HONING--The student will be able to:

08.01 Mark all rods and caps.
08.02 Check for bends and cracks.
08.03 Straighten rods.
08.04 Grind caps with rod and cap grinder.
08.05 Hone all rods.
08.06 Hone main bearing surfaces.

09.0 REMACHINE CYLINDER WALLS--The student will be able to:

09.01 Inspect cylinder blocks for damage.
09.02 Repair damaged areas.
09.03 Measure all cylinder bores.
09.04 Machine cylinder bores.
09.05 Hone cylinder walls.
09.06 Resleeve cylinder walls.

10.0 SERVICE PISTONS--The student will be able to:

10.01 Clean and inspect pistons.
10.02 Resize ring grooves.
10.03 Expand pistons (peening and knurling).
10.04 Fit piston pins.

11.0 SERVICE BRAKE DRUMS, DISC BRAKE SYSTEM AND SHOES--The student will be able to:

11.01 Clean, inspect and measure components to be machined.
11.02 Set up and operate brake machining center.

12.0 PERFORM MAGNAFLUX NON-DESTRUCTIVE TESTING--The student will be able to:

12.01 Demonstrate understanding of magnaflux testing theory.
12.02 Perform testing by magnetizing with contacts.
12.03 Perform testing by magnetizing with coil.
12.04 Perform testing by magnetizing with a yoke.
12.05 Perform dye penetrate test.
12.06 Maintain testing equipment.

13.0 SERVICE CRANKSHAFTS--The student will be able to:

13.01 Check shaft in place.
13.02 Check shaft out of engine.
13.03 Straighten crankshaft.
13.04 Grind crankshaft.

14.0 SERVICE FLYWHEELS AND CLUTCHES--The student will be able to:

14.01 Inspect flywheels and clutch plates for wear and fatigue.

14.02 Measure and grind flywheels and clutch plates.

15.0 OPERATE ENGINE LATHE--The student will be able to:

15.01 Perform turning operations.
15.02 Perform facing operations.
15.03 Perform boring operations.
15.04 Perform drilling operations.

16.0 OPERATE MILLING MACHINE--The student will be able to:

16.01 Perform face milling operations
16.02 Perform climb operations.
16.03 Perform conventional operations.
16.04 Perform end operations.

17.0 OPERATE DRILL PRESS--The student will be able to:

17.01 Sharpen drills.
17.02 Perform drilling operations in press.

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

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

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

19.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares and cylinders.
19.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
19.03 Add, subtract, multiply and divide using fractions, decimals and whole numbers.
19.04 Determine the correct purchase price, including sales tax for a materials list containing a minimum of six items.
19.05 Demonstrate an understanding of federal, state and local taxes and their computation.

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

20.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
20.02 Draw conclusions or make inferences from data.
20.03 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.
20.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

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

21.01 Conduct a job search.
21.02 Secure information about a job.
21.03 Identify documents, which may be required when applying for a job interview.
21.04 Complete a job application form correctly.
21.05 Demonstrate competence in job interview techniques.
21.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
21.07 Identify acceptable work habits.
21.08 Demonstrate knowledge of how to make appropriate job changes.
21.09 Demonstrate acceptable employee health habits.
21.10 Demonstrate knowledge of the "Right-To-Know Law" as recorded in (29 CFR-1910.1200).

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

22.01 Define entrepreneurship.
22.02 Describe the importance of entrepreneurship to the American economy.
22.03 List the advantages and disadvantages of business ownership.
22.04 Identify the risks involved in ownership of a business.
22.05 Identify the necessary personal characteristics of a successful entrepreneur.
22.06 Identify the business skills needed to operate a small business efficiently and effectively.