July 2001
Florida Department of Education
CLUSTER CURRICULUM FRAMEWORK

Program Title: Machining
Occupational Area: Industrial Education

Components: One Core, Four Occupational Completion Points

	Secondary	**PSAV**
Grade Level	9-12, 30, 31	30, 31
Facility Code	203	203
CTSO	SkillsUSA-VICA	SkillsUSA-VICA
Co-op Method	Yes	Yes
Apprenticeship	Yes	Yes

Basic Skills
Math 9
Language 8
Reading 9

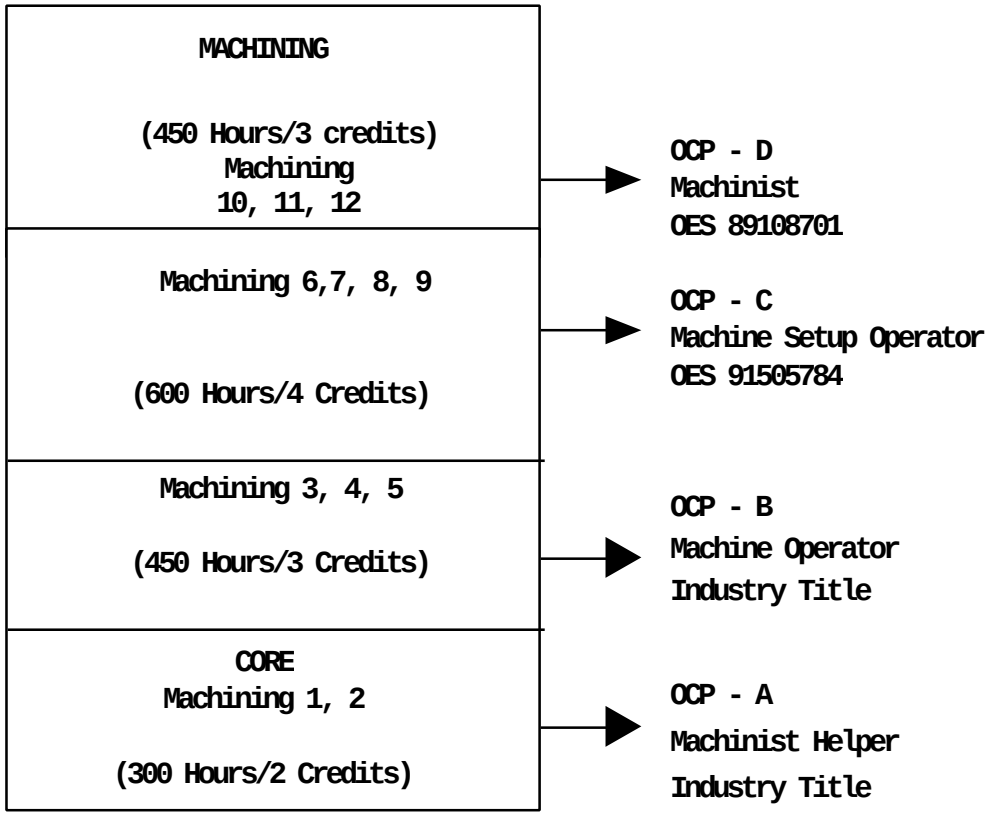
I. **PURPOSE:** The purpose of the program is to prepare students for employment or advanced training in the machining technology industry. This cluster prepares students for entry-level positions as: (1) an assistant machinist (OES 98999009) such as saw operator, crib attendant, drill-press operator, or deburrer; (2) machine operator (Industry Title) to operate equipment after setup, such as a lathe, mill, or grinder; (3) machine setup operator (OES 91505784) to set up and operate a mill, lathe, or grinder; and (4) machinist (OES 89108701) such as a beginning programmer, toolmaker, tool and die maker, or mold maker.

The program focuses on broad, transferable skills, stresses the understanding of all aspects of the machining industry, and demonstrates such elements of the industry as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

II. **STRUCTURE:** This program is a planned sequence of instruction consisting of four occupational completion points. The recommended sequence allows 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 program or terminate as an occupational completer.

The following diagram illustrates the cluster structure:

MACHINING



At the secondary level, the Machining program consists of the following courses:

MACHINING TECHNOLOGY - 12 secondary credits

8754010 Machining 1
8754020 Machining 2
8754030 Machining 3
8754040 Machining 4
8754050 Machining 5
8754060 Machining 6
8754070 Machining 7
8754080 Machining 8
8754090 Machining 9
8754091 Machining 10
8754092 Machining 11
8754093 Machining 12

III. **LABORATORY ACTIVITIES:** Classroom, shop, and laboratory activities are an integral part of this program. These activities include instruction in the use of the safety procedures, tools, equipment, materials, and processes found in the industry. Equipment and supplies should be provided to enhance hands-on experiences for students in the chosen occupation.

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.

V. 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 8.0, 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).

Efficient and safe work practices are critical in this cluster. For this reason, it may be useful to refer to the National Occupational Testing Institute for Machine Trades and standards from the National Tooling and Machining Association, 9300 Livingston Road, Ft. Washington, MD 20744. These standards are approved by The Metalworking Industry Skills Standards Board.

The programs in this cluster may be offered in postsecondary adult vocational (PSAV) courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

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.

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.

The standard length of this program is 1800 hours.

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Florida Department of Education
INTENDED OUTCOMES

Program Title: Machining

	Secondary	**PSAV**
Program Number	**8754000**	**I480503**
CIP Number	0648050302	0648050302
Grade Level	9-12, 30, 31	30, 31
Length	12 Credits	1,800 Hours
Certification	MACH SHOP @7 G METAL WORK @7 G TOOL DIE @7 G	MACH SHOP @7 G METAL WORK @7 G TOOL DIE @7 G

Basic-Skills
Math 9
Language 8
Reading 9

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

OCCUPATIONAL COMPLETION POINT - DATA CODE - A (300 HOURS)
MACHINIST HELPER - INDUSTRY TITLE

MACHINING 1

01.0 Maintain a work area.
02.0 Solve basic job-related math problems.
03.0 Interpret basic blueprint information.
04.0 Plan machining operations.
05.0 Perform basic measuring operations.
06.0 Maintain machines and tools.
07.0 Perform benchwork skills.

MACHINING 2

08.0 Set up and operate power saws.
09.0 Set up and operate pedestal grinders.
10.0 Set up and operate drill presses.
11.0 Demonstrate job communication skills.
12.0 Demonstrate employability skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE - B (450 HOURS)
MACHINE OPERATOR - INDUSTRY TITLE

MACHINING 3

13.0 Apply blueprint specifications to production.

14.0 Perform basic precision-measuring operations.
15.0 Sharpen machining tools.
16.0 Operate lathes.

MACHINING 4

17.0 Operate milling machines.

MACHINING 5

18.0 Operate grinding machines.

OCCUPATIONAL COMPLETION POINT - DATA CODE - C (600 HOURS)
MACHINE SETUP OPERATOR - OES 91505784

MACHINING 6

19.0 Solve advanced job-related math problems.
20.0 Interpret blueprints and machine operations.
21.0 Demonstrate inspection methods.

MACHINING 7

22.0 Use an arbor press.
23.0 Set up and operate lathes.
24.0 Set up and operate milling machines.

MACHINING 8

25.0 Set up and operate grinding machines.

MACHINING 9

26.0 Operate a computerized-numerical-control (CNC) machine.

OCCUPATIONAL COMPLETION POINT - DATA CODE - D (450 HOURS)
MACHINIST - OES 89108701

MACHINING 10

27.0 Set up and operate a computerized-numerical-control (CNC) machine.
28.0 Use computer-aided design/computer-aided manufacturing (CAD/CAM) processes.

MACHINING 11

29.0 Operate an electrical discharge machine (EDM).
30.0 Set up an EDM .

MACHINING 12

31.0 Perform advanced lathe operations.
32.0 Perform advanced milling operations.
33.0 Perform advanced grinding operations.
34.0 Set up and operate a tool and cutter grinder.
35.0 Set up and operate heat-treating furnaces.
36.0 Demonstrate an understanding of entrepreneurship.

July 2001
Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Machining
Secondary Number: 8754000
Postsecondary Number: I480503

OCCUPATIONAL COMPLETION POINT - DATA CODE - A - (300 Hours)
ASSISTANT MACHINIST - 98999009

01.0 MAINTAIN A WORK AREA--The student will be able to:

01.01 Dispose of scrap-metal chips, shavings, trash, and waste.
01.02 Maintain a shop area in a clean, orderly, and safe condition.
01.03 Comply with shop-safety rules and practices.
01.04 Comply with shop-operating guidelines.
01.05 Follow the guidelines on material-safety data sheets, including proper handling of hazardous waste and chemicals.

02.0 SOLVE BASIC JOB-RELATED MATH PROBLEMS--The student will be able to:

02.01 Solve job-related problems by adding, subtracting, multiplying, and dividing whole numbers, decimals, and common fractions.
02.02 Measure a workpiece and compare measurements with blueprint specifications, including tolerances.
02.03 Calculate the amount of material that should be removed to obtain correct limits for secondary operations.
02.04 Solve job-related problems using mathematical handbooks, charts, and tables.
02.05 Calculate machine speed and feed by using appropriate formulas.

03.0 INTERPRET BASIC BLUEPRINT INFORMATION--The student will be able to:

03.01 Interpret view concepts.
03.02 Interpret lines.
03.03 Read and interpret title blocks.
03.04 Read and interpret change orders on working and assembly prints.
03.05 Read and interpret abbreviations.

04.0 PLAN MACHINING OPERATIONS--The student will be able to:

04.01 Comply with safe and efficient work practices.
04.02 Perform layout for precision machine work by using layout instruments.
04.03 Describe the importance of quality assurance.

05.0 PERFORM BASIC MEASURING OPERATIONS--The student will be able to:

05.01 Comply with safe and efficient work practices.
05.02 Read and measure with rules and calipers.
05.03 Read and measure with micrometers.

05.04 Read and measure with vernier tools.
05.05 Use surface-plate techniques.

06.0 MAINTAIN MACHINES AND TOOLS--The student will be able to:

06.01 Comply with safe and efficient work practices.
06.02 Lubricate equipment parts.
06.03 Clean and store hand tools, cutters, fixtures, jigs, and attachments.
06.04 Inspect and repair hand tools.
06.05 Inspect drive pulleys or belts.
06.06 Select lubricants for machining operations.
06.07 Inspect equipment for safe operational conditions.
06.08 Store grinding wheels.
06.09 Store precision tools.
06.10 Inspect and adjust machine guards.
06.11 Inspect work areas to assure a safe working environment.

07.0 PERFORM BENCHWORK SKILLS--The student will be able to:

07.01 Comply with safe and efficient work practices.
07.02 Cut materials by using hand hacksaws.
07.03 Cut threads by using hand taps.
07.04 Cut threads by using dies.
07.05 Deburr workpieces.
07.06 Demonstrate filing techniques.

08.0 SET UP AND OPERATE POWER SAWS--The student will be able to:

08.01 Comply with safe and efficient work practices.
08.02 Remove and replace saw blades.
08.03 Select appropriate blades to perform given sawing operations.
08.04 Select and set speeds and feeds for given sawing operations.
08.05 Measure and cut material using a power saw.
08.06 Saw to scribed lines by using a metal band saw.
08.07 Cut and weld band-saw blades for contour sawing.
08.08 Set up and operate saws for angular cutting.

09.0 SET UP AND OPERATE PEDESTAL GRINDERS--The student will be able to:

09.01 Comply with safe and efficient work practices.
09.02 Identify the parts of the machine and explain their uses.
09.03 Set up support rests.
09.04 Dress grinding wheels.

10.0 SET UP AND OPERATE DRILL PRESSES--The student will be able to:

10.01 Identify the parts of a drill press and explain their uses.
10.02 Identify and set the machine controls.
10.03 Comply with safe and efficient work practices.
10.04 Select the proper tooling.
10.05 Set up and operate drill press for hole work, center drill, drill, ream, countersink, and counterbore.
10.06 Set drill presses for proper feed and speed for specified operations.

11.0 DEMONSTRATE JOB COMMUNICATION SKILLS--The student will be able to:

11.01 Write logical and understandable statements to convey information to coworkers and supervisors.
11.02 Read and follow written and oral instructions.
11.03 Answer and ask questions coherently and concisely.
11.04 Demonstrate appropriate telephone/communication skills.

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

12.01 Conduct a job search.
12.02 Secure information about a job.
12.03 Complete a job application form correctly.
12.04 Demonstrate competence in job interview techniques.
12.05 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
12.06 Identify acceptable work habits.
12.07 Demonstrate knowledge of how to make job changes appropriately.
12.08 Demonstrate acceptable employee grooming and hygiene habits.
12.09 Describe the purpose of Florida's "Right-to-Know" law, Florida Statutes, Chapter 442.

OCCUPATIONAL COMPLETION POINT - DATA CODE - B - (450 Hours)
MACHINE OPERATOR - INDUSTRY TITLE

13.0 APPLY BLUEPRINT SPECIFICATIONS TO PRODUCTION--The student will be able to:

13.01 Make shop sketches.
13.02 Identify the costs involved in product production.

14.0 PERFORM BASIC PRECISION-MEASURING OPERATIONS--The student will be able to:

14.01 Comply with safe and efficient work practices.
14.02 Read and measure with dial indicators.
14.03 Read and measure with gage blocks and adjustable gages.
14.04 Take readings using optical comparators.

15.0 SHARPEN MACHINING TOOLS--The student will be able to:

15.01 Comply with safe and efficient work practices.
15.02 Hand sharpen cutting tools by using abrasive stones.
15.03 Grind lathe tools to required angles.
15.04 Sharpen drills.

16.0 OPERATE LATHES--The student will be able to:

16.01 Identify the parts of a lathe and explain their uses.
16.02 Comply with safe and efficient work practices.
16.03 Set up an engine lathe.
16.04 Secure tools, tool holders, and fixtures or attachments.
16.05 Select and set feeds and speeds.
16.06 Set up lathes and face workpieces held in chucks.
16.07 Rough cut and finish cut with lathes.
16.08 Perform lathe filing to deburr parts.

16.09 Drill holes with lathes.
16.10 Countersink holes with lathes.
16.11 Ream holes with lathes.
16.12 Tap threads with lathes.
16.13 Die cut threads with lathes.
16.14 Counterbore holes with lathes.

17.0 OPERATE MILLING MACHINES--The student will be able to:

17.01 Identify the parts of a vertical milling machine and explain their uses.
17.02 Comply with safe and efficient work practices.
17.03 True up the head and align milling fixtures.
17.04 Select and set feeds and speeds for milling work.
17.05 Square up workpieces with a table vise.
17.06 Perform end milling.
17.07 Perform fly-cutting operations.
17.08 Drill holes with milling machines.
17.09 Perform reaming operations.
17.10 Perform form milling.
17.11 Mill an external radius.
17.12 Mill an angle.
17.13 Use an edge finder and wiggler.

18.0 OPERATE GRINDING MACHINES--The student will be able to:

18.01 Identify the parts of a grinding machine and explain their uses.
18.02 Comply with safe and efficient work practices.
18.03 Set up and grind parallel flat surfaces.

OCCUPATIONAL COMPLETION POINT - DATA CODE - C - (600 Hours)
MACHINE SETUP OPERATOR - OES 91505784

19.0 SOLVE ADVANCED JOB-RELATED MATH PROBLEMS--The student will be able to:

19.01 Solve job-related problems using basic formulas, geometry, and trigonometry.
19.02 Convert measurements from English to metric and from metric to English units.

20.0 INTERPRET BLUEPRINTS AND MACHINE OPERATIONS--The student will be able to:

20.01 Read and interpret blueprints, including those with geometric tolerancing.
20.02 Determine and interpret reference information used in performing machine work.
20.03 Comply with safe and efficient work practices.
20.04 Lay out radial and bolt hole circles.
20.05 Inspect, remove, and replace manufactured parts that need repair or machine work.
20.06 Select the most productive tool and tooling for a given operation.

21.0 DEMONSTRATE INSPECTION METHODS--The student will be able to:

21.01 Comply with safe and efficient work practices.

21.02 Measure with sine bars.

21.03 Take readings with hardness testers.
21.04 Explain the purpose of statistical process control (SPC).

22.0 USE AN ARBOR PRESS--The student will be able to:

22.01 Comply with safe and efficient work practices.
22.02 Set up and use an arbor press.

23.0 SET UP AND OPERATE LATHES--The student will be able to:

23.01 Comply with safe and efficient work practices.
23.02 Align lathe centers using accurate methods.
23.03 Bore holes with lathes.
23.04 Knurl parts with lathes.
23.05 Cut external threads with lathes.
23.06 Perform contour, angular, or radii cuts with lathes.
23.07 Set up the faceplate and dog.

24.0 SET UP AND OPERATE MILLING MACHINES--The student will be able to:

24.01 Identify the parts of vertical and horizontal milling machines and explain their uses.
24.02 Select the correct set up and operation for different milling machines.
24.03 Comply with safe and efficient work practices.
24.04 Cut external keyways.
24.05 Bore holes with boring head.
24.06 Mill cylindrical work.
24.07 Set up and perform slab mill operations.
24.08 Use digital readouts.
24.09 Perform straddle milling operations on the horizontal mill.
24.10 Set up and operate power tapping head.

25.0 SET UP AND OPERATE GRINDING MACHINES--The student will be able to:

25.01 Select the proper wheel.
25.02 Comply with safe and efficient work practices.
25.03 Inspect, balance, dress, and true grinding wheels.
25.04 Attach and align workpieces for grinding operations.
25.05 Set up and grind four sides square.
25.06 Select and set feeds and speeds of power-feed grinding machines.
25.07 Cut or part workpieces with grinding machines.
25.08 Set up and use angle plates.
25.09 Grind to a shoulder.
25.10 Grind a taper.

26.0 OPERATE A COMPUTERIZED-NUMERICAL-CONTROL (CNC) MACHINE--The student will be able to:

26.01 Identify parts of a CNC machine and explain their uses.
26.02 Follow safe and efficient work practices, including procedures sheets.
26.03 Identify unusual machine noises.
26.04 Adjust machine speeds and feeds according to specifications.
26.05 Inspect parts for correct dimensions./

OCCUPATIONAL COMPLETION POINT - DATA CODE - D - (450 Hours)
MACHINIST - OES 89108701

27.0 SET UP AND OPERATE A COMPUTERIZED-NUMERICAL-CONTROL (CNC) MACHINE--The student will be able to:

27.01 Comply with safe and efficient work practices.
27.02 Set up work holding devices.
27.03 Select proper cutting tools.
27.04 Write a basic program and apply basic programming skills.
27.05 Adjust appropriate cutting tools and tool offsets.
27.06 Machine parts to blueprint tolerances.

28.0 USE COMPUTER-AIDED DESIGN/COMPUTER-AIDED MANUFACTURING (CAD/CAM) PROCESSES--The student will be able to:

28.01 Identify parts of the machine and explain their uses.
28.02 Identify CAD/CAM processes.
28.03 Comply with safe and efficient work practices.
28.04 Create a multidimensional geometry of parts.
28.05 Create a CNC code from parts geometry.
28.06 Set up and manufacture parts.

29.0 OPERATE AN ELECTRICAL DISCHARGE MACHINE (EDM)--The student will be able to:

29.01 Identify parts of the machine and explain their uses.
29.02 Comply with safe and efficient work practices.
29.03 Follow procedure sheets.

30.0 SET UP AN EDM--The student will be able to:

30.01 Set up and adjust machine controls according to specifications .
30.02 Select and manufacture electrode .
30.03 Select flushing techniques .
30.04 Produce part according to specifications .
30.05 Perform wire EDM programming .

31.0 PERFORM ADVANCED LATHE OPERATIONS--The student will be able to:

31.01 Rechase threads with lathes.
31.02 Cut internal threads with lathes.
31.03 Set up and perform taper turning with taper attachments.
31.04 Set up and perform taper turning with the compound rest.
31.05 Cut internal tapered surfaces.
31.06 Set up and use follower and steady rests.

32.0 PERFORM ADVANCED MILLING OPERATIONS--The student will be able to:

32.01 Perform indexing operations using a dividing head.
32.02 Set up and operate rotary tables.

33.0 PERFORM ADVANCED GRINDING OPERATIONS--The student will be able to:

33.01 Set up grinders to run workpieces between centers.
33.02 Set up and use radius dressers.

33.03 Operate cylindrical grinders.
33.04 Set up and operate inside diameter (ID) grinders.

34.0 SET UP AND OPERATE A TOOL AND CUTTER GRINDER--The student will be able to:

34.01 Identify the parts of the machine and explain their uses.
34.02 Identify and select proper machine controls.
34.03 Comply with safe and efficient work practices.
34.04 Select proper work holding devices.
34.05 Perform truing, dressing, and forming operations to blueprint specifications.
34.06 Compute proper speeds.
34.07 Sharpen an end mill.
34.08 Sharpen a horizontal milling cutter .

35.0 SET UP AND OPERATE HEAT-TREATING FURNACES--The student will be able to:

35.01 Identify the parts of the machine and explain their uses.
35.02 Identify and select proper machine controls.
35.03 Comply with safe and efficient work practices.
35.04 Select and identify proper heat-treatment processes.
35.05 Perform a basic heat-treatment process to blueprint specifications.

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

36.01 Define entrepreneurship.
36.02 Describe the importance of entrepreneurship to the American economy.
36.03 List the advantages and disadvantages of business ownership.
36.04 Identify the risks involved in ownership of a business.
36.05 Identify the necessary personal characteristics of a successful entrepreneur.
36.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 2001
Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754010
Course Title: Machining 1
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies on how to maintain a work area, solve job-related math problems, interpret blueprints, operate planing machines, measure, perform maintenance on machines and tools, and use benchwork skills in the machining technology industry. There is no occupational completion point at the conclusion of the first course.

01.0 MAINTAIN A WORK AREA--The student will be able to:

01.01 Dispose of scrap-metal chips, shavings, trash, and waste. (LA.A.1.4.3), (LA.C.1.4.1)
01.02 Maintain a shop area in a clean, orderly, and safe condition.
01.03 Comply with shop-safety rules and practices.
01.04 Comply with shop-operating guidelines.
01.05 Follow the guidelines on material-safety data sheets, including proper handling of hazardous waste and chemicals. (LA.A.1.4.2), (LA.A.1.4.3)

02.0 SOLVE BASIC JOB-RELATED MATH PROBLEMS--The student will be able to:

02.01 Solve job-related problems by adding, subtracting, multiplying, and dividing whole numbers, decimals, and common fractions. (MA.A.1.4), (MA.A.2.4)
02.02 Measure a workpiece and compare measurements with blueprint specifications, including tolerances. (MA.A.1.4), (MA.B.2.4)
02.03 Calculate the amount of material that should be removed to obtain correct limits for secondary operations. (MA.B.1.4), (MA.B.2.4)
02.04 Solve job-related problems using mathematical handbooks, charts, and tables. (MA.D.1.4)
02.05 Calculate machine speed and feed by using appropriate formulas. (SC.C.1.4), (MA.D.1.4), (MA.D.2.4)

03.0 INTERPRET BASIC BLUEPRINT INFORMATION--The student will be able to:

03.01 Interpret view concepts. (MA.C.1.4)
03.02 Interpret lines. (MA.C.1.4), (MA.C.2.4)
03.03 Read and interpret title blocks. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4)
03.04 Read and interpret change orders on working and assembly prints. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4)
03.05 Read and interpret abbreviations. (MA.A.1.4), (LA.A.2.4.8)

04.0 PLAN MACHINING OPERATIONS--The student will be able to:

04.01 Comply with safe and efficient work practices. (LA.A.2.4.8)

04.02 Perform layout for precision machine work by using layout instruments. (MA.B.4.4)
04.03 Describe the importance of quality assurance. (LA.A.2.4.1), (LA.A.2.4.2)

05.0 PERFORM BASIC MEASURING OPERATIONS--The student will be able to:

05.01 Comply with safe and efficient work practices. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
05.02 Read and measure with rules and calipers. (MA.B.1.4), (MA.B.2.4), (MA.B.4.4)
05.03 Read and measure with micrometers. (MA.B.1.4), (MA.B.2.4), (MA.B.4.4)
05.04 Read and measure with vernier tools. (MA.B.1.4), (MA.B.2.4), (MA.B.4.4)
05.05 Use surface-plate techniques.

06.0 MAINTAIN MACHINES AND TOOLS--The student will be able to:

06.01 Comply with safe and efficient work practices. (LA.A.1.4.2), (LA.A.1.43), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
06.02 Lubricate equipment parts.
06.03 Clean and store hand tools, cutters, fixtures, jigs, and attachments.
06.04 Inspect and repair hand tools.
06.05 Inspect drive pulleys or belts.
06.06 Select lubricants for machining operations. (LA.A.1.4.2), (LA.A.1.43), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
06.07 Inspect equipment for safe operational conditions. (LA.C.1.4.1)
06.08 Store grinding wheels. (LA.C.1.4.1)
06.09 Store precision tools. (LA.C.1.4.1)
06.10 Inspect and adjust machine guards. (LA.C.1.4.1)
06.11 Inspect work areas to assure a safe working environment.

07.0 PERFORM BENCHWORK SKILLS--The student will be able to:

07.01 Comply with safe and efficient work practices. (LA.C.1.4.1), (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8)
07.02 Cut materials by using hand hacksaws. (LA.C.1.4.1), (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8)
07.03 Cut threads by using hand taps. (LA.C.1.4.1), (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8)
07.04 Cut threads by using dies. (LA.C.1.4.1), (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8)
07.05 Deburr workpieces. (LA.C.1.4.1), (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8)
07.06 Demonstrates filing techniques. (LA.C.1.4.1), (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8)

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754020
Course Title: Machining 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies on how to set up and operate power saws, pedestal grinders, and drill presses used in the operations in the machining technology industry. This course also includes development of competencies in communication and employability. Successful completion of Machining 1 and 2 will prepare students for OCCUPATIONAL COMPLETION POINT DATA CODE A - Assistant Machinist (OES 98999009).

08.0 SET UP AND OPERATE POWER SAWS--The student will be able to:

08.01 Comply with safe and efficient work practices. (LA.A.1.4.2.3), (LA.A.2.4.4), (LA.A.2.4.8)
08.02 Remove and replace saw blades. (LA.A.1.4.2.3), (LA.A.2.4.4), (LA.A.2.4.8)
08.03 Select appropriate blades to perform given sawing operations. (LA.A.1.4.2.3), (LA.A.2.4.4), (LA.A.2.4.8)
08.04 Select and set speeds and feeds for given sawing operations. (SC.C.1.4), (MA.B.2.4), (LA.A.1.4.2.3), (LA.A.2.4.4), (LA.A.2.4.8)
08.05 Measure and cut material using a power saw. (MA.B.1.4, (LA.A.1.4.2.3), (LA.A.2.4.4), (LA.A.2.4.8)
08.06 Saw to scribed lines by using a metal band saw. (LA.A.1.4.2.3), (LA.A.2.4.4), (LA.A.2.4.8)
08.07 Cut and weld band-saw blades for contour sawing. (LA.A.1.4.2.3), (LA.A.2.4.4), (LA.A.2.4.8)
08.08 Set up and operate saws for angular cutting. (LA.A.1.4.2.3), (LA.A.2.4.4), (LA.A.2.4.8)

09.0 SET UP AND OPERATE PEDESTAL GRINDERS--The student will be able to:

09.01 Comply with safe and efficient work practices. (LA.A.1.4.2.3), (LA.A.2.4.4), (LA.A.2.4.8)
09.02 Identify the parts of the machine and explain their uses. (LA.A.1.4.2.3), (LA.A.2.4.4), (LA.A.2.4.8)
09.03 Set up support rests. (LA.A.1.4.2.3), (LA.A.2.4.4), (LA.A.2.4.8)
09.04 Dress grinding wheels. (LA.A.1.4.2.3), (LA.A.2.4.4), (LA.A.2.4.8)

10.0 SET UP AND OPERATE A DRILL PRESSES--The student will be able to:

10.01 Identify the parts of a drill press and explain their uses. (LA.A.1.4.2.3), (LA.A.2.4.4), (LA.A.2.4.8)
10.02 Identify and set the machine controls. (LA.A.1.4.2.3), (LA.A.2.4.4), (LA.A.2.4.8)
10.03 Comply with safe and efficient work practices. (LA.A.1.4.2.3), (LA.A.2.4.4), (LA.A.2.4.8)
10.04 Select the proper tooling. (LA.A.1.4.2.3), (LA.A.2.4.4), (LA.A.2.4.8)

10.05 Set up and operate a drill press for hole work, center drill, drill, ream, countersink, and counterbore. (LA.A.1.4.2.3), (LA.A.2.4.4), (LA.A.2.4.8)
10.06 Set drill presses for proper feed and speed for specified operations. (SC.C.1.4), (MA.B.2.4), (LA.A.1.4.2.3), (LA.A.2.4.4), (LA.A.2.4.8)

11.0 DEMONSTRATE JOB COMMUNICATION SKILLS--The student will be able to:

11.01 Write logical and understandable statements to convey information to coworkers and supervisors. (LA.B.2.4.1.2), (LA.B.1.4.3)
11.02 Read and follow written and oral instructions. (LA.A.1.4.2), (LA.A.1.4.3)
11.03 Answer and ask questions coherently and concisely. (LA.C.1.4.1), (LA.C.1.4.3), (LA.C.3.4.2), (LA.C.3.4.4)
11.04 Demonstrate appropriate telephone/communication skills. (LA.C.3.4.2), (LA.C.3.4.4)

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

12.01 Conduct a job search. (LA.A.1.4.3), (LA.A.2.4.1), (LA.A.2.4.4), (LA.A.2.4.6), (LA.A.2.4.8), (LA.B.1.4.3), (LA.B.2.4.1), (LA.B.2.4.2), (LA.B.2.4.4), (LA.C.1.4.1), (LA.C.1.4.3), (LA.C.3.4.2), (AL.C.3.4.4), (LA.D.1.4.2), (LA.D.1.4.3), (LA.D.2.4.4)
12.02 Secure information about a job. (LA.A.1.4.3), (LA.A.2.4.1), (LA.A.2.4.4), (LA.A.2.4.6), (LA.A.2.4.8), (LA.B.1.4.3), (LA.B.2.4.1), (LA.B.2.4.2), (LA.B.2.4.4), (LA.C.1.4.1), (LA.C.1.4.3), (LA.C.3.4.2), (AL.C.3.4.4), (LA.D.1.4.2), (LA.D.1.4.3), (LA.D.2.4.4)
12.03 Complete a job application form correctly. (LA.A.1.4.3), (LA.A.2.4.1), (LA.A.2.4.4), (LA.A.2.4.6), (LA.A.2.4.8), (LA.B.1.4.3), (LA.B.2.4.1), (LA.B.2.4.2), (LA.B.2.4.4), (LA.C.1.4.1), (LA.C.1.4.3), (LA.C.3.4.2), (AL.C.3.4.4), (LA.D.1.4.2), (LA.D.1.4.3), (LA.D.2.4.4)
12.04 Demonstrate competence in job interview techniques. (LA.A.1.4.3), (LA.A.2.4.1), (LA.A.2.4.4), (LA.A.2.4.6), (LA.A.2.4.8), (LA.B.1.4.3), (LA.B.2.4.1), (LA.B.2.4.2), (LA.B.2.4.4), (LA.C.1.4.1), (LA.C.1.4.3), (LA.C.3.4.2), (AL.C.3.4.4), (LA.D.1.4.2), (LA.D.1.4.3), (LA.D.2.4.4)
12.05 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons. (LA.A.1.4.3), (LA.A.2.4.1), (LA.A.2.4.4), (LA.A.2.4.6), (LA.A.2.4.8), (LA.B.1.4.3), (LA.B.2.4.1), (LA.B.2.4.2), (LA.B.2.4.4), (LA.C.1.4.1), (LA.C.1.4.3), (LA.C.3.4.2), (AL.C.3.4.4), (LA.D.1.4.2), (LA.D.1.4.3), (LA.D.2.4.4)
12.06 Identify acceptable work habits. (LA.A.1.4.3), (LA.A.2.4.1), (LA.A.2.4.4), (LA.A.2.4.6), (LA.A.2.4.8), (LA.B.1.4.3), (LA.B.2.4.1), (LA.B.2.4.2), (LA.B.2.4.4), (LA.C.1.4.1), (LA.C.1.4.3), (LA.C.3.4.2), (AL.C.3.4.4), (LA.D.1.4.2), (LA.D.1.4.3), (LA.D.2.4.4)
12.07 Demonstrate knowledge of how to make job changes appropriately. (LA.A.1.4.3), (LA.A.2.4.1), (LA.A.2.4.4), (LA.A.2.4.6), (LA.A.2.4.8), (LA.B.1.4.3), (LA.B.2.4.1), (LA.B.2.4.2), (LA.B.2.4.4), (LA.C.1.4.1), (LA.C.1.4.3),

(LA.C.3.4.2), (AL.C.3.4.4), (LA.D.1.4.2), (LA.D.1.4.3), (LA.D.2.4.4)

12.08 Demonstrate acceptable employee grooming and hygiene habits. (LA.A.1.4.3), (LA.A.2.4.1), (LA.A.2.4.4), (LA.A.2.4.6), (LA.A.2.4.8), (LA.B.1.4.3), (LA.B.2.4.1), (LA.B.2.4.2), (LA.B.2.4.4), (LA.C.1.4.1), (LA.C.1.4.3), (LA.C.3.4.2), (AL.C.3.4.4), (LA.D.1.4.2), (LA.D.1.4.3), (LA.D.2.4.4)

12.09 Describe the purpose of Florida's "Right-to-Know" law, Florida Statutes, Chapter 442. (LA.A.1.4.3), (LA.A.2.4.1), (LA.A.2.4.4), (LA.A.2.4.6), (LA.A.2.4.8), (LA.B.1.4.3), (LA.B.2.4.1), (LA.B.2.4.2), (LA.B.2.4.4), (LA.C.1.4.1), (LA.C.1.4.3), (LA.C.3.4.2), (AL.C.3.4.4), (LA.D.1.4.2), (LA.D.1.4.3), (LA.D.2.4.4)

July 2001
Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754030
Course Title: Machining 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies for operations in the machining technology industry on how to apply blueprint specifications, do basic precision measuring, sharpen machine tools, and operate lathes set up by someone else. There is no occupational completion point at the conclusion of Machining 3.

13.0 APPLY BLUEPRINT SPECIFICATIONS TO PRODUCTION--The student will be able to:

13.01 Make shop sketches. (MA.C.1.4), (MA.C.2.4)
13.02 Identify the costs involved in product production. (MA.B.1.4), (MA.B.2.4), (MA.B.3.4), (MA.B.4.4), (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4)

14.0 PERFORM BASIC PRECISION-MEASURING OPERATIONS--The student will be able to:

14.01 Comply with safe and efficient work practices. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
14.02 Read and measure with dial indicators. (MA.B.1.4), (MA.B.2.4), (MA.B.4.4), (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
14.03 Read and measure with gage blocks and adjustable gages. (MA.B.1.4), (MA.B.2.4), (MA.B.4.4), (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
14.04 Take readings using optical comparators. (MA.B.1.4), (MA.B.2.4), (MA.B.4.4), (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)

15.0 SHARPEN MACHINING TOOLS--The student will be able to:

15.01 Comply with safe and efficient work practices. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
15.02 Hand sharpen cutting tools by using abrasive stones. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
15.03 Grind lathe tools to required angles. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
15.04 Sharpen drills. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)

16.0 OPERATE LATHES--The student will be able to:

16.01 Identify the parts of a lathe and explain their uses. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)

16.02 Comply with safe and efficient work practices. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)

16.03 Set up an engine lathe. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
16.04 Secure tools, tool holders, and fixtures or attachments. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
16.05 Select and set feeds and speeds. (SC.C.1.4), (MA.B.2.4), (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
16.06 Set up lathes and face workpieces held in chucks. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
16.07 Rough cut and finish cut with lathes. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
16.08 Perform lathe filing to deburr parts. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
16.09 Drill holes with lathes. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
16.10 Countersink holes with lathes. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
16.11 Ream holes with lathes. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
16.12 Tap threads with lathes. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
16.13 Die cut threads with lathes. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
16.14 Counterbore holes with lathes. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)

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STUDENT PERFORMANCE STANDARDS

Course Number: 8754040
Course Title: Machining 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies for operations in the machining technology industry on how to operate milling machines set up by someone else. There is no occupational completion point at the conclusion of Machining 4.

17.0 OPERATE MILLING MACHINES--The student will be able to:

17.01 Identify the parts of a vertical milling machine and explain their uses.
17.02 Comply with safe and efficient work practices.
17.03 True up the head and align milling fixtures.
17.04 Select and set feeds and speeds for milling work. (SC.C.1.4), (MA.B.2.4), (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
17.05 Square up workpieces with a table vise. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
17.06 Perform end milling. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
17.07 Perform fly-cutting operations. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
17.08 Drill holes with milling machines. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
17.09 Perform reaming operations. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
17.10 Perform form milling. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
17.11 Mill an external radius. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
17.12 Mill an angle. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
17.13 Use an edge finder and wiggler. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754050
Course Title: Machining 5
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the operation of grinding machines after setup by someone else. Completion of Machining 3, 4, and 5 prepares the student for **OCCUPATIONAL COMPLETION POINT - DATA CODE B, MACHINE OPERATOR--**Industry Title.

18.0 OPERATE GRINDING MACHINES--The student will be able to:

18.01 Identify the parts of a grinding machine and explain their uses. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
18.02 Comply with safe and efficient work practices. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
18.03 Set up and grind parallel flat surfaces. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754060
Course Title: Machining 6
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies on how to solve advanced math problems, measure, interpret blueprints, and inspect machine operations in machine setup and operation. There is no occupational completion point at the conclusion of Machining 6.

19.0 SOLVE ADVANCED JOB-RELATED MATH PROBLEMS--The student will be able to:

19.01 Solve job-related problems using basic formulas, geometry, and trigonometry. (MA.D.2.4), (MA.C.3.4)
19.02 Convert measurements from English to metric and from metric to English units. (MA.B.2.4)

20.0 INTERPRET BLUEPRINTS AND MACHINE OPERATIONS--The student will be able to:

20.01 Read and interpret blueprints, including those with geometric tolerancing. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
20.02 Determine and interpret reference information used in performing machine work. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
20.03 Comply with safe and efficient work practices. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
20.04 Lay out radial and bolt hole circles. (MA.B.1.4, (MA.B.2.4), (MA.B.4.4), (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
20.05 Inspect, remove, and replace manufactured parts that need repair or machine work. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
20.06 Select the most productive tool and tooling for a given operation. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)

21.0 DEMONSTRATE INSPECTION METHODS--The student will be able to:

21.01 Comply with safe and efficient work practices. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
21.02 Measure with sine bars. (MA.B.1.4), (MA.B.2.4), (MA.B.4.4), (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
21.03 Take readings with hardness testers. (SC.C.2.4), (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
21.04 Explain the purpose of statistical process control (SPC). (MA.E.1.4), (MA.E.2.4), (MA.E.3.4), (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)

July 2001
Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754070
Course Title: Machining 7
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies on how to set up and operate machines, including arbor presses, lathes, and milling machines. Completion of the second of three credits from the following list of outcomes and standards prepares the student for the next two courses in setup and operation of machines, which allows the student to complete the full set of outcomes and standards required of a Machine Set Up Operator. There is no occupational completion point at the conclusion of Machining 7.

22.0 USE AN ARBOR PRESS--The student will be able to:

22.01 Comply with safe and efficient work practices. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
22.02 Set up and use an arbor press. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)

23.0 SET UP AND OPERATE LATHES--The student will be able to:

23.01 Comply with safe and efficient work practices. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
23.02 Align lathe centers using accurate methods. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
23.03 Bore holes with lathes. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
23.04 Knurl parts with lathes. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
23.05 Cut external threads with lathes. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
23.06 Perform contour, angular, or radii cuts with lathes. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
23.07 Set up the faceplate and dog. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)

24.0 SET UP AND OPERATE MILLING MACHINES--The student will be able to:

24.01 Identify the parts of vertical and horizontal milling machines and explain their uses. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
24.02 Select the correct set up and operation for different milling machines. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
24.03 Comply with safe and efficient work practices. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
24.04 Cut external keyways. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
24.05 Bore holes with boring head. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)

24.06 Mill cylindrical work. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
24.07 Set up and perform slab mill operations. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
24.08 Use digital readouts. (MA.B.4.4), (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
24.09 Perform straddle milling operations on the horizontal mill. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
24.10 Set up and operate power tapping head. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)

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STUDENT PERFORMANCE STANDARDS

Course Number: 8754080
Course Title: Machining 8
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the set up and operation of grinding machines. There is no occupational completion point at the conclusion of Machining 8.

25.0 SET UP AND OPERATE GRINDING MACHINES--The student will be able to:

25.01 Select the proper wheel. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
25.02 Comply with safe and efficient work practices. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
25.03 Inspect, balance, dress, and true grinding wheels. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
25.04 Attach and align workpieces for grinding operations. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
25.05 Set up and grind four sides square. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
25.06 Select and set feeds and speeds of power-feed grinders. (SC.C.1.4), (MA.B.2.4), (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
25.07 Cut or part workpieces with grinding machines. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
25.08 Set up and use angle plates. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
25.09 Grind to a shoulder. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
25.10 Grind a taper. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)

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STUDENT PERFORMANCE STANDARDS

Course Number: 8754090
Course Title: Machining 9
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the operation of machines after set up by someone else. Completion of Machining 6, 7, 8, and 9 prepares the student for **OCCUPATIONAL COMPLETION POINT - DATA CODE C, MACHINE SETUP OPERATOR--OES** 91505784.

26.0 OPERATE A COMPUTERIZED-NUMERICAL-CONTROL (CNC) MACHINE--The student will be able to:

26.01 Identify parts of a CNC machine and explain their uses(s). (SC.H.3.4), (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
26.02 Follow safe and efficient work practices, including procedures sheets. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
26.03 Identify unusual machine noises. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
26.04 Adjust machine speeds and feeds according to specifications. (SC.C.1.4), (MA.B.2.4), (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)
26.05 Inspect parts for correct dimensions. (LA.A.1.4.2), (LA.A.1.4.3), (LA.A.2.4.4), (LA.A.2.4.8), (LA.C.1.4.1)

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STUDENT PERFORMANCE STANDARDS

Course Number: 8754091
Course Title: Machining 10
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the operation of computerized numerical controlled (CNC) machines and create CNC code form parts geometry. The student will learn safe operating procedures.

27.0 SET UP AND OPERATE A COMPUTERIZED-NUMERICAL-CONTROL (CNC) MACHINE--The student will be able to:

27.01 Comply with safe and efficient work practices.
27.02 Set up work holding devices.
27.03 Select proper cutting tools.
27.04 Write a basic program and apply basic programming skills.
27.05 Adjust appropriate cutting tools and tool offsets.
27.06 Machine parts to blueprint tolerances.

28.0 USE COMPUTER-AIDED DESIGN/COMPUTER-AIDED MANUFACTURING (CAD/CAM) PROCESSES--The student will be able to:

28.01 Identify parts of the machine and explain their uses.
28.02 Identify CAD/CAM processes.
28.03 Comply with safe and efficient work practices.
28.04 Create a multidimensional geometry of parts.
28.05 Create a CNC code from parts geometry.
28.06 Set up and manufacture parts.

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STUDENT PERFORMANCE STANDARDS

Course Number: 8754092
Course Title: Machining 11
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the operation of Electrical Discharge Machines (EDM) machines and perform advanced lathe and milling operations.

29.0 OPERATE AN ELECTRICAL DISCHARGE MACHINE (EDM)--The student will be able to:

29.01 Identify parts of the machine and explain their uses.
29.02 Comply with safe and efficient work practices.
29.03 Follow procedure sheets.

30.0 SET UP AN EDM--The student will be able to:

30.01 Set up and adjust machine controls according to specifications .
30.02 Select and manufacture electrode .
30.03 Select flushing techniques .
30.04 Produce part according to specifications .
30.05 Perform wire EDM programming .

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STUDENT PERFORMANCE STANDARDS

Course Number: 8754093
Course Title: Machining 12
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in advanced grinding operations, heat-treating and the basics of entrepreneurship. The student will also learn safe operating practices. Successful completion of Machining 10, 11 and 12 will prepare students for OCCUPATIONAL COMPLETION POINT DATA CODE D - MACHINIST - OES 89108701
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31.0 PERFORM ADVANCED LATHE OPERATIONS--The student will be able to:

31.01 Rechase threads with lathes.
31.02 Cut internal threads with lathes.
31.03 Set up and perform taper turning with taper attachments.
31.04 Set up and perform taper turning with the compound rest.
31.05 Cut internal tapered surfaces.
31.06 Set up and use follower and steady rests.

32.0 PERFORM ADVANCED MILLING OPERATIONS--The student will be able to:

32.01 Perform indexing operations using a dividing head.
32.02 Set up and operate rotary tables.

33.0 PERFORM ADVANCED GRINDING OPERATIONS--The student will be able to:

33.01 Set up grinders to run workpieces between centers.
33.02 Set up and use radius dressers.
33.03 Operate cylindrical grinders.
33.04 Set up and operate inside diameter (ID) grinders.

34.0 SET UP AND OPERATE A TOOL AND CUTTER GRINDER--The student will be able to:

34.01 Identify the parts of the machine and explain their uses.
34.02 Identify and select proper machine controls.
34.03 Comply with safe and efficient work practices.
34.04 Select proper work holding devices.
34.05 Perform truing, dressing, and forming operations to blueprint specifications.
34.06 Compute proper speeds.
34.07 Sharpen an end mill.
34.08 Sharpen a horizontal milling cutter .

35.0 SET UP AND OPERATE HEAT-TREATING FURNACES--The student will be able to:

35.01 Identify the parts of the machine and explain their uses.
35.02 Identify and select proper machine controls.
35.03 Comply with safe and efficient work practices.
35.04 Select and identify proper heat-treatment processes.

35.05 Perform a basic heat-treatment process to blueprint specifications.

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

36.01 Define entrepreneurship.
36.02 Describe the importance of entrepreneurship to the American economy.
36.03 List the advantages and disadvantages of business ownership.
36.04 Identify the risks involved in ownership of a business.
36.05 Identify the necessary personal characteristics of a successful entrepreneur.
36.06 Identify the business skills needed to operate a small business efficiently and effectively.