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ABSTRACT

This Ohio Competency Analysis Profile (OCAP), derived from a modified Developing a Curriculum (DACUM) process, is a current comprehensive and verified employer competency program list for machine trades. Each unit (with or without subunits) contains competencies and competency builders that identify the occupational, academic, and employability skills needed to enter this occupational area. Within that outline are three levels of items: core, advancing, and futuring. Core items are essential to entry-level employment. Advancing items are needed to advance in a given occupation. Futuring items are needed to enter and remain in a given occupation 3 to 4 years from now. This profile contains 18 units: (1) orientation; (2) measuring workpieces; (3) inspecting workpieces; (4) benchwork; (5) layouts; (6) power saws ; (7) drilling machines; (8) grinding machines; (9) milling machines; (10) lathes and turning machines; (11) computer numerical controlled (CNC) lathes and turning center; (12) CNC mills and machining center; (13) electrical discharged machines; (14) heat treating; (15) superabrasives; (16) contemporary tooling; (17) advanced machining tooling; and (18) employability skills. (NLA)

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OCCAP

OHIO'S COMPETENCY ANALYSIS PROFILE

MACHINE TRADES

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What is OCAP?

"A comprehensive and verified employer competency list will be developed and kept current for each program." This is the second objective of Imperative 2 of the *Action Plan for Accelerating the Modernization of Vocational Education: Ohio's Future at Work*. Ohio's Competency Analysis Profile (OCAP) lists are the Division of Vocational and Career Education's response to that objective. OCAP lists evolve from a modified DACUM process involving business, industry, labor, and community agency representatives from throughout Ohio. The OCAP process is directed by the Vocational Instructional Materials Laboratory at The Ohio State University's Center on Education and Training for Employment.

How is OCAP used?

Each OCAP contains units (with and without subunits), competencies, and competency builders that identify the occupational, academic, and employability skills needed to enter a given occupation or occupational area. Within that outline there are three levels of items: core, advancing, and futuring. Core items are essential to entry-level employment. These items are required to be taught and will be the basis for questions on the state vocational competency tests (scheduled to begin in FY93). Advancing items (marked with one asterisk) are needed to advance in a given occupation. Futuring items (marked with two asterisks) are needed to enter and remain in a given occupation three to four years from now.

Districts may add as many units, subunits, competencies, and competency builders as desired to reflect local employment needs, trends, and specialties. Local advisory committees should be actively involved in the identification and verification of additional items. Using OCAP lists, instructors will be able to formulate their courses of study and monitor competency gains via the new competency testing program.

The **Employability Skills** portion of this list was verified by the following employer panel:

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OHIO COMPETENCY ANALYSIS PROFILE

MACHINE TRADES

UNIT 1: Orientation

COMPETENCY 1.0.1: Use and care for personal safety equipment

COMPETENCY BUILDERS:

- 1.0.1.1 Wear eye, ear, and respiratory protection according to Occupational Safety and Health Administration (OSHA) specifications
- 1.0.1.2 Wear proper hand and foot protection according to OSHA specifications
- 1.0.1.3 Wear appropriate clothing according to OSHA specifications

COMPETENCY 1.0.2: React to fire emergencies according to local fire code

COMPETENCY BUILDERS:

- 1.0.2.1 Distinguish types of fires
- 1.0.2.2 Locate fire alarms and exits
- 1.0.2.3 Locate and demonstrate use of fire blankets and stretchers
- 1.0.2.4 Locate and demonstrate use of fire extinguishers

COMPETENCY 1.0.3: React to emergency and injury situations

COMPETENCY BUILDERS:

- 1.0.3.1 Interpret shop safety plan
- 1.0.3.2 Demonstrate all steps of shop safety plan
- 1.0.3.3 Identify nature of injury
- 1.0.3.4 Respond to injury accidents

COMPETENCY 1.0.4: Minimize hazardous situations according to federal and state regulations

COMPETENCY BUILDERS:

- 1.0.4.1 Maintain clean and safe work stations
- 1.0.4.2 Read material safety data sheet (MSDS) labels on hazardous materials and follow directions exactly
- 1.0.4.3 Interpret personal safety rights according to shop's Right-to-Know plan

* Advancing
** Futuring

Machine Trades--10/91

COMPETENCY 1.0.5: Maintain tools and equipment

COMPETENCY BUILDERS:

- 1.0.5.1 Perform visual check of grounding and cord condition on all machinery
- 1.0.5.2 Demonstrate proper care and maintenance procedures for each hand tool and machine and related equipment
- 1.0.5.3 Check for proper mounting of all safety shields and/or machine guards according to OSHA specifications

UNIT 2: Measuring Workpieces

COMPETENCY 2.0.1: Read different measuring systems

COMPETENCY BUILDERS:

- 2.0.1.1 Use English system of measurement
- 2.0.1.2 Use metric system of measurement

COMPETENCY 2.0.2: Select and use measuring tools

COMPETENCY BUILDERS:

- 2.0.2.1 Identify appropriate applications of measuring tools
- 2.0.2.2 Use steel rules
- 2.0.2.3 Use tape measure
- 2.0.2.4 Use inside diameter (ID), outside diameter (OD), and hermaphrodite calipers
- 2.0.2.5 Use dividers
- 2.0.2.6 Use combination square set
- 2.0.2.7 Use pitch gage
- 2.0.2.8 Use center gage
- 2.0.2.9 Use drill point gage
- 2.0.2.10 Use depth gage
- 2.0.2.11 Use tool gage
- 2.0.2.12 Use Acme thread gage
- 2.0.2.13 Use protractor and depth gage
- 2.0.2.14 Use Go/No-Go gage
- 2.0.2.15 Use snap gage
- 2.0.2.16 Use surface gage
- 2.0.2.17 Use feeler gage
- 2.0.2.18 Use combination depth-and-angle gage
- 2.0.2.19 Use plug-and-ring gage
- 2.0.2.20 Use taper hole gage
- 2.0.2.21 Use hole gage
- 2.0.2.22 Use telescoping gage
- 2.0.2.23 Use inside micrometer
- 2.0.2.24 Use outside micrometer
- 2.0.2.25 Use vernier calipers
- 2.0.2.26 Use depth micrometer

(continued)

* Advancing
** Futuring

(continued)

- 2.0.2.27 Use cylindrical square
- 2.0.2.28 Use thread wire
- 2.0.2.29 Use Jo blocks
- 2.0.2.30 Use sine bar
- 2.0.2.31 Use universal bevel protractor
- 2.0.2.32 Use dial caliper
- 2.0.2.33 Use indicator
- 2.0.2.34 Use bore gage
- 2.0.2.35 Use height micrometer
- 2.0.2.36 Use special micrometers
- 2.0.2.37 Use electronic measuring devices
- 2.0.2.38 Use optical comparator
- 2.0.2.39 Calibrate and maintain tools

UNIT 3: Inspecting Workpieces

COMPETENCY 3.0.1: Inspect rectangular workpiece according to print specifications, dimensions, and tolerances

COMPETENCY BUILDERS:

- 3.0.1.1 Select proper measuring devices
- 3.0.1.2 Check accuracy

COMPETENCY 3.0.2: Inspect round workpiece according to print specifications, dimensions, and tolerances

COMPETENCY BUILDERS:

- 3.0.2.1 Select proper measuring devices
- 3.0.2.2 Check accuracy

COMPETENCY 3.0.3: Inspect angular workpiece according to print specifications, dimensions, and tolerances

COMPETENCY BUILDERS:

- 3.0.3.1 Select proper measuring devices
- 3.0.3.2 Check accuracy

COMPETENCY 3.0.4: Inspect internal dimensions according to print specifications, dimensions, and tolerances

COMPETENCY BUILDERS:

- 3.0.4.1 Select proper measuring devices
- 3.0.4.2 Check accuracy

* Advancing
** Futuring

Machine Trades--10/91

UNIT 4: Benchwork

COMPETENCY 4.0.1: Use hand tools according to Occupational Safety and Health Administration (OSHA) specifications

COMPETENCY BUILDERS:

- 4.0.1.1 Follow proper safety and maintenance procedures
- 4.0.1.2 Use files
- 4.0.1.3 Tap a through hole
- 4.0.1.4 Tap a blind hole
- 4.0.1.5 Cut a thread-die
- 4.0.1.6 Cut a workpiece with a hacksaw
- 4.0.1.7 Ream a hole with a hand reamer
- 4.0.1.8 Select and use chisels
- 4.0.1.9 Polish a workpiece with grit paper
- 4.0.1.10 Remove a broken tap
- 4.0.1.11 Select and install heli-coil
- 4.0.1.12 Select and use wrenches
- 4.0.1.13 Select and use hammers
- 4.0.1.14 Select and use screwdrivers
- 4.0.1.15 Select and use pin punches
- 4.0.1.16 Select and use transfer punches
- 4.0.1.17 Select and use pliers
- 4.0.1.18 Select and use handstamps
- 4.0.1.19 Select proper work-holding device
- 4.0.1.20 Select and use handpress

COMPETENCY 4.0.2: Use power hand tools according to OSHA specifications

COMPETENCY BUILDERS:

- 4.0.2.1 Follow proper safety and maintenance procedures
- 4.0.2.2 Drill a hole with a hand drill
- 4.0.2.3 Use hand grinder
- 4.0.2.4 Use broaches
- 4.0.2.5 Select and use presses

UNIT 5: Layouts

COMPETENCY 5.0.1: Perform basic layouts according to print specifications, dimensions, and tolerances

COMPETENCY BUILDERS:

- 5.0.1.1 Use inside diameter (ID), outside diameter (OD), and hermaphrodite calipers
- 5.0.1.2 Lay out with combination square
- 5.0.1.3 Lay out with scribe, divider, and trammel
- 5.0.1.4 Use surface plate
- 5.0.1.5 Use surface gage
- 5.0.1.6 Use layout fluid
- 5.0.1.7 Use V-blocks
- 5.0.1.8 Use clamps
- 5.0.1.9 Use angle plate
- 5.0.1.10 Use parallels
- 5.0.1.11 Use punches
- 5.0.1.12 Use transfer method tools
- 5.0.1.13 Use layout hammer
- 5.0.1.14 Use machinist's square

COMPETENCY 5.0.2: Perform precision layouts according to print specifications, dimensions, and tolerances

COMPETENCY BUILDERS:

- 5.0.2.1 Use surface plate
- 5.0.2.2 Use surface gage
- 5.0.2.3 Use sine bar
- 5.0.2.4 Use Jo blocks
- 5.0.2.5 Use sine plate*
- 5.0.2.6 Use sine vise*
- 5.0.2.7 Use planer gage
- 5.0.2.8 Use angle-gage blocks*
- 5.0.2.9 Use indicators
- 5.0.2.10 Use universal bevel protractor*

UNIT 6: Power Saws

COMPETENCY 6.0.1: Perform preventive maintenance according to manufacturer's specifications

COMPETENCY BUILDERS:

- 6.0.1.1 Follow proper safety procedures
- 6.0.1.2 Clean and lubricate power saw
- 6.0.1.3 Check power saw for wear and alignment

* Advancing
** Futuring

Machine Trades--10/91

COMPETENCY 6.0.2: Operate power saw according to manufacturer's specifications

COMPETENCY BUILDERS:

- 6.0.2.1 Select power saw
- 6.0.2.2 Select proper blade
- 6.0.2.3 Secure workpiece
- 6.0.2.4 Weld blade
- 6.0.2.5 Store blade
- 6.0.2.6 Install blade
- 6.0.2.7 Set blade speed and feeds
- 6.0.2.8 Mount and use attachment
- 6.0.2.9 Cut a straight line
- 6.0.2.10 Make an angular saw cut
- 6.0.2.11 Make an internal saw cut*
- 6.0.2.12 Make a contour saw cut*

UNIT 7: Drilling Machines

COMPETENCY 7.0.1: Perform preventive maintenance according to manufacturer's specifications

COMPETENCY BUILDERS:

- 7.0.1.1 Follow proper safety procedures
- 7.0.1.2 Clean and lubricate drilling machine
- 7.0.1.3 Check drilling machine for wear and alignment

COMPETENCY 7.0.2: Sharpen drill bit to proper geometry

COMPETENCY BUILDERS:

- 7.0.2.1 Follow proper safety procedures
- 7.0.2.2 Select and dress conventional grinding wheel
- 7.0.2.3 Grind drill bit

COMPETENCY 7.0.3: Mount workpiece securely and safely

COMPETENCY BUILDERS:

- 7.0.3.1 Select work-holding device
- 7.0.3.2 Mount and align work-holding device
- 7.0.3.3 Secure workpiece

* Advancing
** Futuring

COMPETENCY 7.0.4: Operate drilling machine according to manufacturer's specifications

COMPETENCY BUILDERS:

- 7.0.4.1 Select drilling machine
- 7.0.4.2 Change feed and speeds
- 7.0.4.3 Change chuck and sleeve
- 7.0.4.4 Set up coolants
- 7.0.4.5 Center drill
- 7.0.4.6 Drill workpiece to specified size
- 7.0.4.7 Ream hole
- 7.0.4.8 Counterbore
- 7.0.4.9 Countersink
- 7.0.4.10 Spot face
- 7.0.4.11 Angle drill
- 7.0.4.12 Spade drill
- 7.0.4.13 Power tap
- 7.0.4.14 Use boring head*
- 7.0.4.15 Deburr and polish
- 7.0.4.16 Hone and lap

UNIT 8: Grinding Machines

COMPETENCY 8.0.1: Perform preventive maintenance according to manufacturer's specifications

COMPETENCY BUILDERS:

- 8.0.1.1 Follow proper safety procedures
- 8.0.1.2 Clean and lubricate grinding machine
- 8.0.1.3 Check grinding machine for wear and alignment

COMPETENCY 8.0.2: Set up grinding machine according to manufacturer's specifications

COMPETENCY BUILDERS:

- 8.0.2.1 Select grinding machine
- 8.0.2.2 Select conventional grinding wheel
- 8.0.2.3 Mount, true, dress, and balance grinding wheel
- 8.0.2.4 Select work-holding device
- 8.0.2.5 Mount work-holding device
- 8.0.2.6 Mount and secure workpiece

* Advancing
** Futuring

Machine Trades--10/91

COMPETENCY 8.0.3: Operate grinding machines according to manufacturer's specifications

COMPETENCY BUILDERS:

- 8.0.3.1 Operate pedestal and/or bench grinder
- 8.0.3.2 Operate outside diameter (OD) and/or inside diameter (ID) grinder*
- 8.0.3.3 Operate surface grinder
- 8.0.3.4 Operate tool and cutter grinder
- 8.0.3.5 Operate lapping machine*
- 8.0.3.6 Operate honing machine*
- 8.0.3.7 Operate belt disc sander

UNIT 9: Milling Machines

COMPETENCY 9.0.1: Perform preventive maintenance according to manufacturer's specifications

COMPETENCY BUILDERS:

- 9.0.1.1 Follow proper safety procedures
- 9.0.1.2 Clean and lubricate milling machine
- 9.0.1.3 Check milling machine for wear and alignment

COMPETENCY 9.0.2: Set up milling machine according to manufacturer's specifications

COMPETENCY BUILDERS:

- 9.0.2.1 Select milling machine
- 9.0.2.2 Indicate head
- 9.0.2.3 Select conventional cutter
- 9.0.2.4 Mount tool holders and tools
- 9.0.2.5 Select speeds and feeds
- 9.0.2.6 Select and indicate work-holding device
- 9.0.2.7 Mount work-holding device
- 9.0.2.8 Mount and secure workpiece
- 9.0.2.9 Select cutting fluids

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* Advancing
** Futuring

COMPETENCY 9.0.3: Perform milling operations according to print specifications, dimensions, and tolerances

COMPETENCY BUILDERS:

- 9.0.3.1 Use edge finder and wiggler
- 9.0.3.2 Mill flat surfaces
- 9.0.3.3 Use power feed accessories
- 9.0.3.4 Mill a key way
- 9.0.3.5 Perform climb and conventional milling
- 9.0.3.6 Index work with dividing head
- 9.0.3.7 Center drill and drill hole on a vertical mill
- 9.0.3.8 Bore hole with boring head
- 9.0.3.9 Mill an angular surface
- 9.0.3.10 Mill a dovetail
- 9.0.3.11 Tap workpiece
- 9.0.3.12 Ream workpiece
- 9.0.3.13 Plane mill
- 9.0.3.14 Gang mill
- 9.0.3.15 Straddle mill
- 9.0.3.16 Form mill*
- 9.0.3.17 Use rotary table*
- 9.0.3.18 Use angle plate*
- 9.0.3.19 Use sine plate*
- 9.0.3.20 Cut gears*

UNIT 10: Lathes and Turning Machines

COMPETENCY 10.0.1: Perform preventive maintenance according to manufacturer's specifications

COMPETENCY BUILDERS:

- 10.0.1.1 Follow proper safety procedures
- 10.0.1.2 Clean and lubricate lathe and turning machine
- 10.0.1.3 Check lathe and turning machine for wear and alignment

COMPETENCY 10.0.2: Grind cutting tool to specified geometry

COMPETENCY BUILDERS:

- 10.0.2.1 Select proper grinding machine and wheel type
- 10.0.2.2 Select tool blank
- 10.0.2.3 Grind tool blank to proper geometry

* Advancing
** Futuring

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COMPETENCY 10.0.3: Set up turning operations according to manufacturer's specifications

- 10.0.3.1 Select lathes
- 10.0.3.2 Select work-holding device
- 10.0.3.3 Mount work-holding device
- 10.0.3.4 Mount and secure workpiece
- 10.0.3.5 Set up and mount tool holders
- 10.0.3.6 Select feeds and speeds

COMPETENCY 10.0.4: Operate turning operations according to print specifications, dimensions, and tolerances

COMPETENCY BUILDERS:

- 10.0.4.1 Mount and true workpiece in 3-jaw and 4-jaw chucks
- 10.0.4.2 Mount workpiece between centers
- 10.0.4.3 Mount workpiece on face plate
- 10.0.4.4 Install and mount workpiece in collets
- 10.0.4.5 Align centers
- 10.0.4.6 Face workpiece
- 10.0.4.7 Turn outside diameter
- 10.0.4.8 Turn workpiece to shoulder
- 10.0.4.9 Turn inside diameter (ID) and outside diameter (OD) taper
- 10.0.4.10 Knurl workpiece
- 10.0.4.11 Cut off workpiece with parting tool
- 10.0.4.12 Cut with forming tool
- 10.0.4.13 Bore inside diameters
- 10.0.4.14 Cut right-hand and left-hand threads (ID and OD)
- 10.0.4.15 Center drill and drill workpiece
- 10.0.4.16 Use steady rests
- 10.0.4.17 Use follower rest
- 10.0.4.18 Ream workpiece
- 10.0.4.19 Counterbore
- 10.0.4.20 Countersink
- 10.0.4.21 Chamfer
- 10.0.4.22 File and polish workpiece
- 10.0.4.23 Cut a double-lead screw
- 10.0.4.24 Use miscellaneous stops

COMPETENCY 10.0.5: Mount tools and set up turret turning machine according to manufacturer's specifications

COMPETENCY BUILDERS:

- 10.0.5.1 Select tool sequence
- 10.0.5.2 Check swing radius for tool clearance

UNIT 11: Computer Numerical Controlled (CNC) Lathes and Turning Center

COMPETENCY 11.0.1: Perform preventive maintenance according to manufacturer's specifications

COMPETENCY BUILDERS:

- 11.0.1.1 Follow proper safety procedures
- 11.0.1.2 Clean and lubricate CNC equipment
- 11.0.1.3 Check CNC equipment for wear and alignment

COMPETENCY 11.0.2: Prepare program according to print specifications, dimensions, and tolerances

COMPETENCY BUILDERS:

- 11.0.2.1 Write a program manually in word address format
- 11.0.2.2 Write a program manually in conversational program with CAD/CAM systems
- 11.0.2.3 Program at machine using manual data input (MDI) process

COMPETENCY 11.0.3: Load program and set up machine according to manufacturer's specifications

COMPETENCY BUILDERS:

- 11.0.3.1 Load program from MDI and off-line programming station
- 11.0.3.2 Select, mount, and prepare work-holding device
- 11.0.3.3 Mount and secure workpiece
- 11.0.3.4 Set up reference and clearance points
- 11.0.3.5 Select and mount tooling
- 11.0.3.6 Set tooling

COMPETENCY 11.0.4: Manufacture workpiece according to print specifications, dimensions, and tolerances

COMPETENCY BUILDERS:

- 11.0.4.1 Dry-run machine
- 11.0.4.2 Run part
- 11.0.4.3 Inspect part

UNIT 12: Computer Numerical Controlled (CNC) Mills and Machining Center

COMPETENCY 12.0.1: Perform preventive maintenance according to manufacturer's specifications

COMPETENCY BUILDERS:

- 12.0.1.1 Follow proper safety procedures
- 12.0.1.2 Clean and lubricate CNC equipment
- 12.0.1.3 Check CNC equipment for wear and alignment

COMPETENCY 12.0.2: Prepare program according to print specifications, dimensions, and tolerances

COMPETENCY BUILDERS:

- 12.0.2.1 Write a program manually in word address format
- 12.0.2.2 Write a program manually in conversational program with CAD/CAM system*

COMPETENCY 12.0.3: Load program and set up machine according to manufacturer's specifications

COMPETENCY BUILDERS:

- 12.0.3.1 Load program from manual data input (MDI) and off-line programming station
- 12.0.3.2 Set up reference and clearance points
- 12.0.3.3 Select work-holding device
- 12.0.3.4 Mount and indicate work-holding device
- 12.0.3.5 Mount and secure workpiece
- 12.0.3.6 Select and mount tooling
- 12.0.3.7 Set tooling

COMPETENCY 12.0.4: Manufacture workpiece according to print specifications, dimensions, and tolerances

COMPETENCY BUILDERS:

- 12.0.4.1 Dry-run machine
- 12.0.4.2 Run part
- 12.0.4.3 Inspect part

UNIT 13: Electrical Discharge Machines (EDMs)

COMPETENCY 13.0.1: Perform preventive maintenance according to manufacturer's specifications

COMPETENCY BUILDERS:

- 13.0.1.1 Follow proper safety procedures
- 13.0.1.2 Clean and lubricate EDM
- 13.0.1.3 Check EDM for wear and alignment

COMPETENCY 13.0.2: Select and prepare electrodes according to manufacturer's specifications

COMPETENCY BUILDERS:

- 13.0.2.1 Select electrode material
- 13.0.2.2 Machine electrode

COMPETENCY 13.0.3: Set up machine according to manufacturer's specifications

COMPETENCY BUILDERS:

- 13.0.3.1 Mount electrode
- 13.0.3.2 Select work-holding device
- 13.0.3.3 Mount work-holding device
- 13.0.3.4 Mount and secure workpiece
- 13.0.3.5 Set machine controls to workpiece and electrode specifications

COMPETENCY 13.0.4: Operate EDM according to print specifications, dimensions, and tolerances

COMPETENCY BUILDERS:

- 13.0.4.1 Adjust dielectric fluid
- 13.0.4.2 Set flushing pressure
- 13.0.4.3 Spark-in electrode
- 13.0.4.4 Run part
- 13.0.4.5 Inspect part

UNIT 14: Heat Treating

COMPETENCY 14.0.1: Perform preventive maintenance according to manufacturer's specifications

COMPETENCY BUILDERS:

- 14.0.1.1 Follow proper safety procedures
- 14.0.1.2 Clean and inspect heat-treating equipment
- 14.0.1.3 Check quenching tank for coolant type and level

* Advancing
** Futuring

Machine Trades--10/91

COMPETENCY 14.0.2: Operate heat-treating equipment according to manufacturer's specifications and print specifications, dimensions, and tolerances

COMPETENCY BUILDERS:

- 14.0.2.1 Harden and temper carbon steel workpiece
- 14.0.2.2 Flame-harden workpiece
- 14.0.2.3 Case-harden low carbon workpiece
- 14.0.2.4 Anneal workpiece
- 14.0.2.5 Normalize workpiece
- 14.0.2.6 Test workpiece for hardness

UNIT 15: Superabrasives

COMPETENCY 15.0.1: Grind with superabrasives

COMPETENCY BUILDERS:

- 15.0.1.1 Set up and operate grinding machine with diamond wheel
- 15.0.1.2 Set up and operate grinding machine with cubic boron nitride (CBN) wheel

COMPETENCY 15.0.2: Machine with superabrasives

COMPETENCY BUILDERS:

- 15.0.2.1 Set up and operate lathe with polycrystalline diamond (PCD) tool
- 15.0.2.2 Set up and operate lathe with polycubic boron nitride (PCBN) tool

UNIT 16: Contemporary Tooling

COMPETENCY 16.0.1: Perform turning operations with indexable tooling according to manufacturer's specifications

COMPETENCY BUILDERS:

- 16.0.1.1 Select tool holder and insert according to American National Standards Institute (ANSI) and International Standards Organization (ISO) standards
- 16.0.1.2 Set up and operate turning machine with indexable tooling

COMPETENCY 16.0.2: Perform milling operations with indexable tooling according to manufacturer's specifications

COMPETENCY BUILDERS:

- 16.0.2.1 Select cutter body and insert(s) according to ANSI and ISO standards
- 16.0.2.2 Set up and operate milling machine with indexable tooling

COMPETENCY 16.0.3: Preset tooling according to manufacturer's specifications

COMPETENCY BUILDERS:

- 16.0.3.1 Calibrate presetting equipment
- 16.0.3.2 Preset tooling

UNIT 17: Advanced Machining Technology

COMPETENCY 17.0.1: Investigate wire electrical discharge machines (EDMs)

COMPETENCY BUILDERS:

- 17.0.1.1 Identify wire EDM applications
- 17.0.1.2 Illustrate operational principles

COMPETENCY 17.0.2: Investigate laser cutting machines

COMPETENCY BUILDERS:

- 17.0.2.1 Identify laser cutting machine applications
- 17.0.2.2 Illustrate operational principles

COMPETENCY 17.0.3: Investigate plasma arc cutting

COMPETENCY BUILDERS:

- 17.0.3.1 Identify plasma arc cutting applications
- 17.0.3.2 Illustrate operational principles

COMPETENCY 17.0.4: Investigate water-jet cutting

COMPETENCY BUILDERS:

- 17.0.4.1 Identify water-jet cutting applications
- 17.0.4.2 Illustrate operational principles

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COMPETENCY 17.0.5: Investigate automated manufacturing

COMPETENCY BUILDERS:

- 17.0.5.1 Identify automated manufacturing
- 17.0.5.2 Illustrate operational principles

UNIT 18: Employability Skills

SUBUNIT 18.1: Career Development

COMPETENCY 18.1.1: Investigate career options

COMPETENCY BUILDERS:

- 18.1.1.1 Determine interests and aptitudes
- 18.1.1.2 Identify career options
- 18.1.1.3 Research occupations matching interests and aptitudes
- 18.1.1.4 Select career(s) that best match(es) interests and aptitudes
- 18.1.1.5 Identify advantages and disadvantages of career options, including nontraditional careers
- 18.1.1.6 Assess differences in wages, annual incomes, and job opportunities based on geographic location
- 18.1.1.7 Develop a career plan

COMPETENCY 18.1.2: Analyze potential barriers to employment

COMPETENCY BUILDERS:

- 18.1.2.1 Identify common barriers to employment
- 18.1.2.2 Develop strategies to overcome employment barriers

UNIT 18: Employability Skills

SUBUNIT 18.2: Decision Making and Problem Solving

COMPETENCY 18.2.1: Apply decision-making techniques in the workplace

COMPETENCY BUILDERS:

- 18.2.1.1 Identify the decision to be made
- 18.2.1.2 Compare alternatives
- 18.2.1.3 Determine consequences of each alternative
- 18.2.1.4 Make decisions based on values and goals
- 18.2.1.5 Evaluate the decision made

COMPETENCY 18.2.2: Apply problem-solving techniques in the workplace

COMPETENCY BUILDERS:

- 18.2.2.1 Diagnose the problem and its causes
- 18.2.2.2 Identify alternatives and their consequences in relation to the problem
- 18.2.2.3 Examine multicultural and nonsexist dimensions of problem solving
- 18.2.2.4 Utilize resources to explore possible solutions to the problem
- 18.2.2.5 Compare and contrast the advantages and disadvantages of each solution
- 18.2.2.6 Determine appropriate action
- 18.2.2.7 Evaluate results

UNIT 18: Employability Skills

SUBUNIT 18.3: Work Ethic

COMPETENCY 18.3.1: Evaluate the relationship of self-esteem to work ethic

COMPETENCY BUILDERS:

- 18.3.1.1 Identify special characteristics and abilities in self and others
- 18.3.1.2 Identify internal and external factors that affect self-esteem

COMPETENCY 18.3.2: Analyze the relationship of personal values and goals to work ethic both in and out of the workplace

COMPETENCY BUILDERS:

- 18.3.2.1 Distinguish between values and goals
- 18.3.2.2 Determine the importance of values and goals
- 18.3.2.3 Evaluate how values affect goals
- 18.3.2.4 Identify short-term and long-term goals
- 18.3.2.5 Prioritize personal goals
- 18.3.2.6 Describe how personal values are reflected in work ethic
- 18.3.2.7 Describe how interactions in the workplace affect personal work ethic
- 18.3.2.8 Examine how life changes affect personal work ethic

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COMPETENCY 18.3.3: Demonstrate work ethic

COMPETENCY BUILDERS:

- 18.3.3.1 Examine factors that influence work ethic
- 18.3.3.2 Exhibit characteristics that reflect an appropriate work ethic

UNIT 18: Employability Skills

SUBUNIT 18.4: Job-Seeking Skills

COMPETENCY 18.4.1: Prepare for employment

COMPETENCY BUILDERS:

- 18.4.1.1 Identify traditional and nontraditional employment sources
- 18.4.1.2 Utilize employment sources
- 18.4.1.3 Research job opportunities, including nontraditional careers
- 18.4.1.4 Interpret equal employment opportunity laws
- 18.4.1.5 Explain the critical importance of personal appearance, hygiene, and demeanor throughout the employment process
- 18.4.1.6 Prepare for generic employment tests and those specific to an occupation/organization

COMPETENCY 18.4.2: Design a résumé

COMPETENCY BUILDERS:

- 18.4.2.1 Identify personal strengths and weaknesses
- 18.4.2.2 List skills and/or abilities, career objective(s), accomplishments/achievements, educational background, and work experience
- 18.4.2.3 Demonstrate legible written communication skills using correct grammar, spelling, and concise wording
- 18.4.2.4 Complete résumé using various formats
- 18.4.2.5 Secure references

COMPETENCY 18.4.3: Complete and process job application forms

COMPETENCY BUILDERS:

- 18.4.3.1 Explain the importance of an application form
- 18.4.3.2 Identify ways to obtain job application forms
- 18.4.3.3 Describe methods for handling illegal questions on job application forms
- 18.4.3.4 Demonstrate legible written communications skills using correct grammar, spelling, and concise wording
- 18.4.3.5 Return application to proper person, request interview, and follow up

COMPETENCY 18.4.4: Demonstrate interviewing skills

COMPETENCY BUILDERS

- 18.4.4.1 Investigate interview environment and procedures
- 18.4.4.2 Explain the critical importance of personal appearance, hygiene, and demeanor
- 18.4.4.3 Demonstrate question and answer techniques
- 18.4.4.4 Demonstrate methods for handling difficult and/or illegal interview questions

COMPETENCY 18.4.5: Secure employment

COMPETENCY BUILDERS:

- 18.4.5.1 Identify present and future employment opportunities within an occupation/organization
- 18.4.5.2 Research the organization/company
- 18.4.5.3 Use follow-up techniques to enhance employment potential
- 18.4.5.4 Compare and evaluate job offers

UNIT 18: Employability Skills

SUBUNIT 18.5: Job Retention Skills

COMPETENCY 18.5.1: Analyze the organizational structure of the workplace

COMPETENCY BUILDERS:

- 18.5.1.1 Identify and evaluate employer expectations regarding job performance, work habits, attitudes, personal appearance, and hygiene
- 18.5.1.2 Be aware of and obey all company policies and procedures
- 18.5.1.3 Examine the role/relationship between employee and employer
- 18.5.1.4 Recognize opportunities for advancement and reasons for termination

COMPETENCY 18.5.2: Maintain positive relations with others

COMPETENCY BUILDERS:

- 18.5.2.1 Exhibit appropriate work habits and attitude
- 18.5.2.2 Identify behaviors to establish successful working relationships
- 18.5.2.3 Cooperate and compromise through teamwork and group participation
- 18.5.2.4 Identify alternatives for dealing with harassment, bias, and discrimination based on race, color, national origin, sex, religion, handicap, or age

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UNIT 18: Employability Skills

SUBUNIT 18.6: Job Advancement

COMPETENCY 18.6.1: Analyze opportunities for personal and career growth

COMPETENCY BUILDERS:

- 18.6.1.1 Determine opportunities within an occupation/organization
- 18.6.1.2 Compare and contrast other opportunities
- 18.6.1.3 List benefits of job advancement
- 18.6.1.4 Evaluate factors involved when assuming a new position within or outside an occupation/organization

COMPETENCY 18.6.2: Exhibit characteristics needed for advancement

COMPETENCY BUILDERS:

- 18.6.2.1 Display a positive attitude
- 18.6.2.2 Demonstrate knowledge of a position
- 18.6.2.3 Perform quality work
- 18.6.2.4 Adapt to changing situations and technology
- 18.6.2.5 Demonstrate capability for different positions
- 18.6.2.6 Participate in continuing education/training programs
- 18.6.2.7 Respect, accept, and work with ALL individuals in the workplace

UNIT 18: Employability Skills

SUBUNIT 18.7: Technology in the Workplace

COMPETENCY 18.7.1: Assess the impact of technology in the workplace

COMPETENCY BUILDERS:

- 18.7.1.1 Cite how past business/industry practices have influenced present business/industry processes
- 18.7.1.2 Investigate the use of technology in the workplace
- 18.7.1.3 Analyze how present skills can be applied to learning new technologies

COMPETENCY 18.7.2: Use a variety of technological applications

COMPETENCY BUILDERS:

- 18.7.2.1 Explore basic mathematical, scientific, computer, and technological principles
- 18.7.2.2 Use technology to accomplish assigned tasks
- 18.7.2.3 Create solutions to problems using technical means

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UNIT 18: Employability Skills

SUBUNIT 18.8: Lifelong Learning

COMPETENCY 18.8.1: Apply lifelong learning to individual situations

COMPETENCY BUILDERS:

- 18.8.1.1 Define lifelong learning
- 18.8.1.2 Identify factors that cause the need for lifelong learning

COMPETENCY 18.8.2: Adapt to change

COMPETENCY BUILDERS:

- 18.8.2.1 Analyze the effects of change
- 18.8.2.2 Identify reasons why goals change
- 18.8.2.3 Describe the importance of flexibility when reevaluating goals
- 18.8.2.4 Evaluate the need for continuing education/training

UNIT 18: Employability Skills

SUBUNIT 18.9: Economic Education

COMPETENCY 18.9.1: Analyze global enterprise systems

COMPETENCY BUILDERS:

- 18.9.1.1 Identify characteristics of various enterprise systems
- 18.9.1.2 Examine the relationship between competition, risk, and profit
- 18.9.1.3 Illustrate how supply and demand influence price

COMPETENCY 18.9.2: Evaluate personal money management

COMPETENCY BUILDERS:

- 18.9.2.1 Describe the need for personal management records
- 18.9.2.2 Identify methods of taxation
- 18.9.2.3 Analyze how credit affects financial security
- 18.9.2.4 Compare types and methods of investments
- 18.9.2.5 Prepare a personal budget
- 18.9.2.6 Be an informed and responsible consumer
- 18.9.2.7 Analyze the effects of advertising on the consumer

UNIT 18: Employability Skills

SUBUNIT 18.10: Balancing Work and Family

COMPETENCY 18.10.1: Analyze the effects of family on work

COMPETENCY BUILDERS:

- 18.10.1.1 Recognize how family values, goals, and priorities are reflected in the workplace
- 18.10.1.2 Identify present and future family structures and responsibilities
- 18.10.1.3 Describe personal and family roles
- 18.10.1.4 Analyze concerns of working parent(s)
- 18.10.1.5 Examine how family responsibilities can conflict with work
- 18.10.1.6 Resolve family-related conflicts
- 18.10.1.7 Explain how to use support systems/community resources to help resolve family-related conflicts

COMPETENCY 18.10.2: Analyze the effects of work on family

COMPETENCY BUILDERS:

- 18.10.2.1 Identify responsibilities associated with paid and nonpaid work
- 18.10.2.2 Compare the advantages and disadvantages of multiple incomes
- 18.10.2.3 Examine how work can conflict with family responsibilities
- 18.10.2.4 Describe how work-related stress can affect families
- 18.10.2.5 Identify family support systems and resources

UNIT 18: Employability Skills

SUBUNIT 18.11: Citizenship in the Workplace

COMPETENCY 18.11.1: Exercise the rights and responsibilities of citizenship in the workplace

COMPETENCY BUILDERS:

- 18.11.1.1 Identify the basic rights and responsibilities of citizenship
- 18.11.1.2 Examine the history and contributions of all racial, ethnic, and cultural groups

COMPETENCY 18.11.2: Cooperate with others in the workplace

COMPETENCY BUILDERS:

- 18.11.2.1 Identify situations in which compromise is necessary
- 18.11.2.2 Examine how individuals from various backgrounds contribute to work-related situations
- 18.11.2.3 Demonstrate initiative to facilitate cooperation
- 18.11.2.4 Give and receive constructive criticism to enhance cooperation

UNIT 18: Employability Skills

SUBUNIT 18.12: Leadership

COMPETENCY 18.12.1: Evaluate leadership styles appropriate for the workplace

COMPETENCY BUILDERS:

- 18.12.1.1 Identify characteristics of effective leaders
- 18.12.1.2 Compare leadership styles
- 18.12.1.3 Demonstrate effective delegation skills
- 18.12.1.4 Identify opportunities to lead in the workplace

COMPETENCY 18.12.2: Demonstrate effective teamwork skills

COMPETENCY BUILDERS:

- 18.12.2.1 Identify the responsibilities of a valuable group member
- 18.12.2.2 Exhibit open-mindedness
- 18.12.2.3 Identify methods of involving each member of a team
- 18.12.2.4 Contribute to the efficiency and success of a group
- 18.12.2.5 Determine ways to motivate others

COMPETENCY 18.12.3: Utilize effective communication skills

COMPETENCY BUILDERS:

- 18.12.3.1 Demonstrate the importance of listening
- 18.12.3.2 Demonstrate assertive communication
- 18.12.3.3 Recognize the importance of verbal and nonverbal cues and messages
- 18.12.3.4 Analyze written material
- 18.12.3.5 Prepare written material
- 18.12.3.6 Give and receive feedback
- 18.12.3.7 Articulate thoughts
- 18.12.3.8 Use appropriate language

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UNIT 18: Employability Skills

SUBUNIT 18.13: Entrepreneurship

COMPETENCY 18.13.1: Evaluate the role of small business in the economy

COMPETENCY BUILDERS:

- 18.13.1.1 Identify the benefits of small business to a community
- 18.13.1.2 Analyze opportunities for small business in a community

COMPETENCY 18.13.2: Examine considerations of starting a business

COMPETENCY BUILDERS:

- 18.13.2.1 Research a business idea
- 18.13.2.2 Compare various ways to become a small business owner
- 18.13.2.3 Investigate factors to consider in financing a new business
- 18.13.2.4 Evaluate entrepreneurship as a career option

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