

Appendix A

WORK PROCESSES AND RELATED INSTRUCTION MACHINIST (NIMS Certified) O*NET/SOC CODE: 51-4041.00 RAPIDS CODE: 0296CB

General Housekeeping and Maintenance

Given maintenance, cleaning and housekeeping checklist as well as verbal instructions, clean, maintain and respond appropriately to safety hazards on all bench work tools and conventional and CNC machine tools. Maintain the cleanliness of the general work area.

Preventative Maintenance - Machine Tools

Given a specific machine tool, the learner will locate, check and fill all applicable lubrication reservoirs, check for proper oil pressure and check that all lubrication points are functioning properly. Check the general condition of the equipment and make routine adjustments as stated in the maintenance schedule.

Tooling Maintenance

- r. Diagnose tooling in various conditions and take the correct steps to put the tooling back in service.

Perform cutter-sharpening operations.

Understand insert identification nomenclature and index or change inserts.

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Work Process: MACHINIST

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This schedule is attached to and a part of these Standards for the above identified occupation.

1. TERM OF APPRENTICESHIP

The term of the occupation shall be 4 Year with an OJL attainment of 8000 hours supplemented by the required hours of related instruction.

2. RATIO OF APPRENTICES TO MENTORS

One (1) Apprentice may be employed in each department and/or jobsite employing one (1) qualified Mentor.

3. APPRENTICE WAGE SCHEDULE

Apprentices shall be paid a progressively increasing schedule of wages based on a percentage of the current Mentor wage rate.

Note: Sponsoring Employers will show their Mentor wage rate on the Employer Acceptance Agreement

4. SCHEDULE OF WORK EXPERIENCE (See attached Work Process Schedule)

The Sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

5. SCHEDULE OF RELATED INSTRUCTION (See attached Related Instruction Outline)

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Work Process: MACHINIST

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Description: Sets up and operates conventional, special-purpose, and numerical control (NC) machines and machining centers to fabricate metallic and nonmetallic parts, and fits and assembles machined parts into complete units, applying knowledge of machine shop theory and procedures, shop mathematics, machinability of materials, and layout techniques: Studies blueprints, sketches, drawings, manuals, specifications, or sample part to determine dimensions and tolerances of finished workpiece, sequence of operations, and setup requirements. Measures, marks, and scribes dimensions and reference points on material or workpiece as guides for subsequent machining. Selects, aligns, and secures holding fixtures, cutting tools, attachments, accessories, and materials on machines, such as mills, lathes, jig borers, grinders, and shapers. Calculates and sets controls to regulate machining factors, such as speed, feed, coolant flow, and depth and angle of cut, or enters commands to retrieve, input, or edit computerized machine control media. Starts and observes machine operation to detect malfunctions or out-of-tolerance machining, and adjusts machine controls or control media as required. Verifies conformance of finished workpiece to specifications, using precision measuring instruments. Sets up and operates machine on trial run to verify accuracy of machine settings or programmed control data. Fits and assembles parts into complete assembly, using jigs, fixtures, surface plate, surface table, handtools, and power tools. Verifies dimensions and alignment of assembly, using measuring instruments, such as micrometers, height gauges, and gauge blocks. May install machined replacement parts in mechanisms, machines, and equipment, and test operation of unit to ensure functionality and performance. May operate welding equipment to cut or weld parts. May develop specifications from general description and draw sketch of part or product to be fabricated. May confer with engineers, production personnel, programmers, or others to resolve machining or assembly problems.

ON-THE-JOB TRAINING:

	<u>APPROXIMATE HOURS</u>
A. <u>TOOL CRIB</u>	500
1. Learning names of raw materials and names and use of tools, jigs, fixtures and gauges.	
B. <u>DRILLS</u>	500
1. Power and radial drilling, tapping, ream-lapping, counterboring and countersinking, grinding drills, lubricants, cutting, speeds and feeds, safety.	
C. <u>LATHE - ENGINE</u>	1500
1. Chucking, use of face plate, mandrel, steady rest and follow rest, centering, straight turning, facing taper, turning with taper attachment, offset tail stock and compound, drilling, reaming.	

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D. <u>MILLING MACHINE</u>	1000
1. Plain, vertical and universal. Selection of cutters, methods of holding work, vise, clamps, dividing head, circular table - plain or slab, milling, sawing, boring, fly cutter milling, vertical head, keyway cutting, slotting, spline milling, rack cutting, cutter milling, gear cutting, gang milling, form milling, speeds and feed, lubricants, safety.	
E. <u>SHAPER AND PLANER</u>	500
1. Methods of holding work, vise, clamps, dividing head, surface and angle cutting, keyway cutting, squaring, dovetailing, speeds and feeds, grinding tools, safety.	
F. <u>SURFACE GRINDER</u>	300
1. Safety, selection of grinding wheels, speeds and feeds, mounting wheels, magnetic chuck, dressing wheels, plain or surface grinding, angle grinding, squaring.	
G. <u>UNIVERSAL GRINDER</u>	500
1. Safety, mounting wheels, speeds and feeds, dressing wheels, straight, taper, angle face, form and hole grinding.	
H. <u>CUTTER GRINDER</u>	600
1. Safety, mounting wheels, setting up indexing attachments, clearance angles for various types of cutters and reamers, setting up for these angles, grinding plain, spiral and end mills, reamers, form cutters.	
I. <u>HEAT TREATMENT</u>	100
1. Kinds of steel, S.A.E. classification, how to harden, draw, case and pack harden and anneal, use of pyrometer and color chart, hardness tests, quenching baths, and safety.	
J. <u>BENCH WORK</u>	500
1. Filing, scraping, chipping, layout and assembly, use of gauge blocks and dial indicator, vernier height gauge, lapping, tapping and threading, lubricants, inspection, safety.	
K. <u>GENERAL MACHINERY REPAIR</u>	2000
1. Inspection and adjusting, removing and replacing broken and worn parts of machine tools, scraping bearings and ways and rebuilding machines, welding.	
L. TOTAL HOURS	8000

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RELATED INSTRUCTION OUTLINE MACHINIST

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Related instruction - This instruction may include, but not be limited to:

Note: Due to regional and local code differences and climate conditions, duration of instructional competencies/modules are suggested estimates.

Safety
Mathematics
Basic Blueprint Reading and Sketching
Tools and Equipment
Engine Lathes
Drives
Air Conditioning and Air Compressors
Drill Press
Radial Drill Press
Shaper
Planer
Farrel Wheel Borer
Grinding Technology
Magnaflux Unit
Wheel Press
Wheel Lathe
Bench Layouts
V Block and Clamp
Jack Screw
Journal Bearings

TOTAL HOURS 576