
Appendix A

CNC Operator - CNC Operator –Milling

WORK PROCESS SCHEDULE

AND

RELATED INSTRUCTION OUTLINE



Appendix A

WORK PROCESS SCHEDULE CNC Operator - Milling

O*NET-SOC CODE: 51-4035.00

RAPIDS CODE: 1097CB

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

1. APPRENTICESHIP APPROACH

Time-based

☒ Competency-based

Hybrid

2. TERM OF APPRENTICESHIP

The term of the apprenticeship is reasonably expected to be completed within **one** academic calendar years with an on-the-job learning (OJL) attainment of all competencies of the position, supplemented by the minimum recommended 249 hours of related instruction per year.

3. RATIO OF APPRENTICES TO JOURNEYWORKERS

The apprentice to journeyworker ratio is: 1 Apprentice to 1 Mentor.

4. APPRENTICE WAGE SCHEDULE

Apprentices shall be paid a progressively increasing schedule of wages based on either a percentage or a dollar amount of the current hourly journeyworker wage rate, which is: **\$18.00**/per hour.

1 Year Term:

Period	Wage (Hourly)	Description	Competencies
1	\$15.50	6 months or 1000 hours	10
2	\$16.00	6 months or 1000 hours	10

All apprentices will start at or above local jurisdiction minimum wage levels. Apprentices will receive a wage increase of \$1 per hour upon successful completion of 1000 hours of OJT.

5. PROBATIONARY PERIOD

Applicants selected for apprenticeship will serve a probationary period of **500** hours.



6. SELECTION PROCEDURES

Selection Procedures Consist of the Following:

1. Completion of Employer Application for Apprenticeship.
2. Demonstrated on-time Workplace attendance.
3. Demonstrated Safety Practices On-the-Job.
4. Recommended by Direct Supervisor.
5. Successful Completion of Oral Interview.



WORK PROCESS SCHEDULE

CNC Operator - Milling

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ALL CORE COMPETENCIES WILL BE EVALUATED BY DEMONSTRATION

CNC Operator - Milling	
Job Description: Set up, operate, or tend milling or planing machines to mill, plane, shape, groove, or profile metal or plastic work pieces.	
RAPIDS Code: 1097CB	O*NET Code: 51-4035.00
Estimated Program Length:	
Apprenticeship Type: <input checked="" type="checkbox"/> Competency-Based <input type="checkbox"/> Time-Based <input type="checkbox"/> Hybrid	

Suggested On-the-Job Learning Outline

Mount materials or workpieces onto production equipment.		
Competencies	Date Completed	Initial
Position and secure workpieces on machines, using holding devices, measuring instruments, hand tools, and hoists.		
Remove products or workpieces from production equipment.		
Competencies	Date Completed	Initial
Remove workpieces from machines, and check to ensure that they conform to specifications, using measuring instruments such as microscopes, gauges, calipers, and micrometers.		
Align parts or workpieces to ensure proper assembly.		
Competencies	Date Completed	Initial
Verify alignment of workpieces on machines, using measuring instruments such as rules, gauges, or calipers.		
Feed materials or products into or through equipment.		
Competencies	Date Completed	Initial
Move cutters or material manually or by turning handwheels or engage automatic feeding mechanisms to mill workpieces to specifications.		
Monitor equipment operation to ensure that products are not flawed.		
Competencies	Date Completed	Initial
Observe milling or planing machine operation and adjust controls to ensure conformance with specified tolerances.		
Set equipment controls to meet cutting specifications.		
Competencies	Date Completed	Initial
Select cutting speeds, feed rates, and depths of cuts, applying knowledge of metal properties and shop mathematics.		
Move controls to set cutting specifications, to position cutting tools and workpieces in relation to each other, and to start machines.		
Determine production equipment settings.		
Competencies	Date Completed	Initial
Select cutting speeds, feed rates, and depths of cuts, applying knowledge of metal properties and shop mathematics.		



Read work orders or other instructions to determine product specifications or materials requirements.		
Competencies	Date Completed	Initial
Study blueprints, layouts, sketches, or work orders to assess workpiece specifications and to determine tooling instructions, tools and materials needed, and sequences of operations.		
Review blueprints or other instructions to determine operational methods or sequences.		
Competencies	Date Completed	Initial
Study blueprints, layouts, sketches, or work orders to assess workpiece specifications and to determine tooling instructions, tools and materials needed and sequences of operations.		
Calculate dimensions of workpieces, products, or equipment.		
Competencies	Date Completed	Initial
Compute dimensions, tolerances, and angles of workpieces or machines according to specifications and knowledge of metal properties and shop mathematics.		
Operate grinding equipment.		
Competencies	Date Completed	Initial
Replace worn tools, using hand tools, and sharpen dull tools, using bench grinders.		
Replace worn equipment components.		
Competencies	Date Completed	Initial
Replace worn tools, using hand tools, and sharpen dull tools, using bench grinders.		
Sharpen cutting or grinding tools.		
Competencies	Date Completed	Initial
Replace worn tools, using hand tools, and sharpen dull tools, using bench grinders.		
Mount attachments or tools onto production equipment.		
Competencies	Date Completed	Initial
Select and install cutting tools and other accessories according to specifications, using hand tools or power tools.		
Mount attachments and tools, such as pantographs, engravers, or routers, to perform other operations, such as drilling or boring.		
Adjust equipment controls to regulate coolant flow.		
Competencies	Date Completed	Initial
Turn valves or pull levers to start and regulate the flow of coolant or lubricant to work areas.		
Select production equipment according to product specifications.		
Competencies	Date Completed	Initial
Select and install cutting tools and other accessories according to specifications, using hand tools or power tools.		
Record operational or production data.		
Competencies	Date Completed	Initial
Record production output.		
Construct patterns, templates, or other work aids.		
Competencies	Date Completed	Initial
Make templates or cutting tools.		



RELATED INSTRUCTION OUTLINE

CNC Operator - Milling

O*NET-SOC CODE: 51-4035.00 RAPIDS CODE: 1097CB

Source:

Tooling U-SME provides both related technical instruction and on-the-job training hours. This platform has developed its Learning Management System (LMS) to accommodate user-friendly apprenticeship training for manufacturing middle skill occupations.

LIST OF COURSES:

Tooling U-SME Department	Tooling U-SME Class	Hours
Abrasives	Grinding Processes, Safety, Theory, Fluids, Variables, Wheel Selection and Geometry, Abrasive Finishing Processes, Dressing and Truing	13.5
Additive Manufacturing	Additive Manufacturing Safety, Processes, Methods and Materials, Additive Manufacturing Supply Chain and Managing the Supply Chain	7.5
Adhesives	Basics of the Bonding Process	1.5
CNC	Introduction to CNC Machines, History, Definitions; CNC Lathe Basics, Coordinates, Specs, Control Panel Functions, Offsets, and Programming Calculations; Basics of G Code Programming; Introduction to CAD and CAM for Machining; Creating a CNC Turning Program; Canned Cycles, Lathe Canned Cycles	19.5
CNC Controls: Fanuc	Fanuc Mill: Control Panel Overview, Offsets, Zero Locating, Execution, Storage, First Part Runs	9
Coatings	Processes for Applying Coatings	1.5
Composites	Overview, Safety, Repair Methods, Inspection and Defect Prevention for Composite Processing	6
Electrical Systems	Safety for Electrical Work	1.5
Fasteners	Safety for Assembly, Understanding Torque	3
Hydraulics and Pneumatics	Safety for Hydraulics and Pneumatics, Pneumatic Control Valves	3
Industrial Internet of Things (IIoT)	Cybersecurity for Manufacturing Basics	1.5
Inspection	Basic Measurement, Calibration Fundamentals, Tolerance, Measuring System Analysis; Blueprint Reading, Print Types, Engineering Drawings; Calibration and Documentation, In-line Inspection Applications; Introduction to CMM Arms and Inspection; Inspecting a Cylindrical Part, Optical Comparators; Introduction to GD&T, Major Rules, Applications; Hole and Thread Standards and Inspection, Surface Texture and Inspection	25.5
Lean	Lean Manufacturing, Lean Culture, 5S Overview, troubleshooting; Six Sigma Goals and Tools; Management Tools: Product and Process Design; Continuous Process Improvement: Managing Flow, Identifying and Eliminating Waste; Total Quality Management and SPC Overview; Value Stream Mapping: The Current and Future State	18
Manual Machining	Manual Mill and Engine Lathe Basics; Benchwork and Layout Operations; Threading, Taper Turning on the Engine Lathe	7.5



Materials	Introduction to Physical and Mechanical Properties; Intro to Metals, Exotic Alloys; Polymer Composite Processes and Hardness Testing; Classification of Steel, Essentials of Heat Treatment	10.5
Mechanical Systems	Safety for Mechanical Work, Lubricant Fundamentals	3
Metal Cutting	Safety for Metal Cutting, Cutting Processes, Theory, Fluids, Safety, Tool Materials; Speed and Feed for the Lathe; Prints for Metal Cutting Operations, Deburring Processes Overview of Machine Tools and Optimizing Tool Life and Processes; Carbide Grade Selection and ANSI Insert Selection	19.5
Motor Controls	Control Devices and Deceleration Methods; Symbols and Diagrams for Motors, Logic and Line Diagrams	6
PLCs	Basic Programming for PLCs, Diagrams and Programs	3
Press Brake	Press Brake Safety	1.5
Quality	ISO 9000 Review, ISO 9001 2015 Review; Intro to Supply Chain Management, Quality and Customer Service, Internal Audits; Process, Product, Production System and Equipment/Tool Design and Development	13.5
Rigging	Rigging Inspection and Safety	1.5
Robotics	Introduction to Robotics, Safety, Applications, Components, Troubleshooting and Maintenance	9
Safety	Introduction to OSHA, Personal Protective Equipment, Respiratory Safety; Bloodborne Pathogens, Flammable/Combustible Liquids; Hand and Power Tool and Powered Industrial Truck Safety, Lockout/Tagout Procedures, SDS and Hazard Communications; CDC Workplace Infection Safety and Prevention, Fire Safety and Prevention; Environmental Safety Hazards and Arc Flash Safety	19.5
Shop Essentials (Applied Mathematics)	Math Fundamentals, Fractions & Decimals, Units of Measurement; Algebra Fundamentals; Geometry: Lines and Angles, Triangles, Overview, Circles & Polygons; Trigonometry: The Pythagorean Theorem, Overview, Sine, Cosine, Tangent, Sine Bar Applications; Statistics; Concepts of Calculus; Manufacturing Process Applications: Part I & Part II	24
Soldering	Safety for Soldering	1.5
Supervisor Essentials	Essentials of Communication and Personal Effectiveness	3
Welding	What Is Oxyfuel Welding and Safety?; Welding Safety Essentials, Math Fundamentals, Electrical Safety; Introduction to Welding and Welding Processes, Fabrication Processes	12
Workforce Essentials	Manufacturing	1.5
Workholding	Chucks, Collets, and Vises	1.5
	Total	249