



Required Apprenticeship Core Competencies

Core Competency: The common occupational industry-wide duties (most important areas of responsibilities including foundation knowledge, skills, abilities, and other characteristics: KSAO) in which performance must be demonstrated to an established standard in order to be credentialed as a journey level worker in the selected occupation.

- NIMS Certified Machinist: Journey Level Core Competencies
- NIMS Certified Machine Builder: Journey Level Core Competencies
- NIMS Certified Press Setup/Operator- Stamping: Journey Level Core Competencies
- NIMS Certified CNC Setup/Programmer - Turning: Journey Level Core Competencies
- NIMS Certified CNC Setup/Programmer - Milling: Journey Level Core Competencies
- NIMS Certified CNC Setup/Programmer - Milling and Turning: Journey Level Core Competencies
- NIMS Certified Tool and Die Maker: Journey Level Core Competencies
- NIMS Certified CNC Operator- Turning: Journey Level Core Competencies
- NIMS Certified Mold Maker: Journey Level Core Competencies
- NIMS Certified Maintenance, Service and Repair: Journey Level Core Competencies

NIMS Certified Machinist: Journey Level Core Competencies

Machinist Core Competencies		NIMS Credentials
1.	Identify & Demonstrate Usage of Machine Safety & Personal Protective Equipment	Measurement, Materials, and Safety Level I
2.	Demonstrate Compliance with Lock-out/Tag-out Procedure and OSHA Requirements and Guidelines	
3.	Machine Operations & Material Handling, Hazardous Materials Handling & Storage	
4.	Part Inspection	
5.	Process Control	
6.	Process Adjustment - Single Part Production	
7.	Participation in Process Adjustment & Improvement	
8.	Manual Operations: Layout	Job Planning, Benchwork, and Layout Level I
9.	Manual Operations: Benchwork	
10.	Sawing	
11.	Job Process Planning	Drill Press Skills Level I
12.	Drilling Operations	
13.	Turning Operations: Turning Between Centers Level I	Turning Between Centers Level I
14.	Turning Operations: Turning Between Centers Level II	Turning Between Centers Level II
15.	Turning Operations: Chucking Level I	Chucking Level I
16.	Turning Operations: Chucking Level II	Chucking Level II
17.	Milling: Square Up a Block	Milling Level I
18.	Manual Milling: Vertical & Horizontal Level I	
19.	Manual Milling: Vertical & Horizontal Level II	Milling Level II
20.	Surface Grinding, Grinding Wheel Safety	Grinding Level I
21.	Surface Grinding, Horizontal Spindle, Reciprocating Table Level I	
22.	Surface Grinding, Horizontal Spindle, Reciprocating Table Level II	
23.	CNC Programming - Milling and/or CNC Programming -Turning	CNC Milling and / or CNC Turning Level I
24.	CNC: Write a Simple CNC Milling and/or CNC Turning Program and Review Tool Path	
25.	CNC: Operate a CNC Milling Machine and/or Operate a CNC Lathe	
26.	General Housekeeping & Maintenance	Included in all Machining Credentials
27.	Preventative Maintenance-Machine Tools	
28.	Tooling Maintenance	

NIMS Certified Machine Builder: Journey Level Core Competencies

Machine Builder Core Competencies		NIMS Credentials
1.	Identify & Demonstrate Usage of Machine Safety & Personal Protective Equipment	Measurement, Materials, and Safety Level I
2.	Demonstrate Compliance with Lock-out/Tag-out Procedure and OSHA Requirements and Guidelines	
3.	Machine Operations & Material Handling, Hazardous Materials Handling & Storage	
4.	Part Inspection	
5.	Process Control	
6.	Process Adjustment - Single Part Production	
7.	Participation in Process Adjustment & Improvement	
8.	Manual Operations: Layout	Job Planning, Benchwork, and Layout Level I
9.	Manual Operations: Benchwork	
10.	Sawing	
11.	Job Process Planning	Drill Press Skills Level I
12.	Drilling Operations	
13.	Turning Operations: Turning Between Centers Level I	Turning Between Centers Level I
14.	Turning Operations: Turning Between Centers Level II	Turning Between Centers Level II
15.	Turning Operations: Chucking Level I	Chucking Level I
16.	Turning Operations: Chucking Level II	Chucking Level II
17.	Milling: Square Up a Block	Milling Level I
18.	Manual Milling: Vertical & Horizontal Level I	
19.	Manual Milling: Vertical & Horizontal Level II	Milling Level II
20.	Surface Grinding, Grinding Wheel Safety	Grinding Level I
21.	Surface Grinding, Horizontal Spindle, Reciprocating Table Level I	
22.	Surface Grinding, Horizontal Spindle, Reciprocating Table Level II	Grinding Level II
23.	CNC Programming - Milling and/or CNC Programming -Turning	CNC Milling and / or CNC Turning Level I
24.	CNC: Write a Simple CNC Milling and/or CNC Turning Program and Review Tool Path	
25.	CNC: Operate a CNC Milling Machine and/or Operate a CNC Lathe	
26.	General Housekeeping & Maintenance	Included in all Machining Credentials
27.	Preventative Maintenance-Machine Tools	
28.	Tooling Maintenance	
29.	Job Process Planning (Machine Building Level II and Level III)	NIMS Credentialing Achievement Records Level II and Level III
30.	Job Planning - Layout (Machine Building Level II and Level III)	
31.	Parts Identification and Preparation	
32.	Preparation for Assembly-Level Base of Machine	
33.	Measure & Verify Bearing Surfaces	
34.	Surface Preparation	
35.	Bolt Hole Preparation	
36.	Install Bearings & Shafts to Housing	

37.	Select & Install Gears; Match, Align, Secure, & Pin Mating Parts	
38.	Install Components for Fluids & Air	
39.	Install Mechanical Components on Machine	
40.	Install Drive Systems	
41.	Performance Test Sub-Assembly	
42.	Mount, Align, & Secure Sub-Assemblies	
43.	Set Machine Adjustments	
44.	Install Machine Guarding	
45.	Verify Machine Operation	
46.	Tear Down Machine for Shipment (if applicable)	

NIMS Certified Press Setup/Operator- Stamping: Journey Level Core Competencies

Press Setup Operator - Stamping Core Competencies		NIMS Credentials
1.	Identify & Demonstrate Usage of Machine Safety and Personal Protective Equipment	Metalforming Level I
2.	Awareness of Lock-out and Tag-out Procedures	
3.	Hazardous Materials Handling & Storage, including EPA, Hazmat, and OSHA	
4.	General Housekeeping & Maintenance	
5.	Read Job Process Plan	
6.	Identify & Respond to Warning Signals during Production Operations	
7.	Part Inspection	
8.	Process Control	
9.	Explain the Continuous Improvement Process	
10.	Measure, Chart & Evaluate Product Using SPC Principles	
11.	Part Inspection Using Standard Inspection Equipment	At least one of the following:
12.	Monitor Process, Record Required Production Data, Respond to Problems	Operate with Single Hit Tooling
13.	Select, Load & Restart Materials	Operate with Compound Dies
14.	Adjust Press and/or Required In-Line Equipment	Operate with Progressive Dies
15.	Operate Press with Required Tooling	Operate with Deep Draw Dies
16.	Adjust Lubrication System, Fill & Refill the Lubrication System	Operate with Transfer Dies
17.	Set-Up & Test Safety Systems	Parts Inspection and Quality Control
18.	Set-Up & Adjust Lubrication & Coolant Systems, Fill & Refill the Lubrication System	and at least one of the following:
19.	Set-Up & Operate Press with Required Tooling	Set Up with Single Hit Tooling
20.	Explain & Verify Operation of Sensors	Set Up with Compound Dies
21.	Explain Press Components & In-Line Components	Set Up with Progressive Dies
22.	Explain Fundamental Die Theory	Set Up with Deep Draw Dies
23.	Detect Raw Material Defects	Set Up With Transfer Dies
24.	Explain Basic Material Properties & Qualities	
25.	Verify Product Quality	
26.	Troubleshoot Running Processes	

NIMS Certified CNC Setup/Programmer - Turning: Journey Level Core Competencies

CNC Setup Programmer - Turning Core Competencies		NIMS Credentials
1.	Identify & Demonstrate Usage of Machine Safety & Personal Protective Equipment	Measurement, Materials, and Safety Level I
2.	Demonstrate Compliance with Lock-out/Tag-out Procedures and OSHA Requirements and Guidelines	
3.	Machine Operations & Material Handling, Hazmat Materials Handling and Storage, including EPA, Hazmat, and OSHA	
4.	Part Inspection	
5.	Perform the Inspection of Parts	
6.	Process Control	
7.	Process Adjustment - Single Part Production	
8.	Participation in Processes Improvement	
9.	Manual Operations: Layout	Job Planning, Benchwork, and Layout Level I
10.	Manual Operations: Benchwork	
11.	Sawing	
12.	Job Process Planning	Drill Press Skills Level I
13.	Drilling Operations	
14.	Turning Operations: Turning Between Centers	Turning Between Centers Level I
15.	Turning Operations: Chucking	Chucking Level I
16.	CNC Programming - Turning	CNC Turning Level I
17.	CNC: Write a Simple CNC Turning Program and Review Tool Path	
18.	CNC: Operate a CNC Lathe Level I	
19.	CNC: Operate a CNC Lathe Level II	CNC Turning Level II
20.	CNC: Advanced Manual Programming	CNC Turning Level III
21.	Use Manufacturing Modeling Software to Create Programs	
22.	General Housekeeping & Maintenance	Included in all Machining Credentials
23.	Preventative Maintenance - Machine Tools	
24.	Tooling Maintenance	

NIMS Certified CNC Setup/Programmer - Milling: Journey Level Core Competencies

CNC Setup Programmer - Milling Core Competencies		NIMS Credentials
1.	Identify & Demonstrate Usage of Machine Safety & Personal Protective Equipment	Measurement, Materials, and Safety Level I
2.	Demonstrate Compliance with Lock-out/Tag-out Procedures and OSHA Requirements and Guidelines	
3.	Machine Operations & Material Handling, Hazmat Materials Handling and Storage, including EPA, Hazmat, and OSHA	
4.	Part Inspection	
5.	Perform the Inspection of Parts	
6.	Process Control	
7.	Process Adjustment - Single Part Production	
8.	Participation in Processes Improvement	
9.	Manual Operations: Layout	
10.	Manual Operations: Benchwork	
11.	Sawing	
12.	Job Process Planning	
13.	Drilling Operations	Drill Press Skills Level I
14.	Milling: Square Up a Block	Milling Level I
15.	Manual Milling: Vertical & Horizontal Level I	Milling Level II
16.	Manual Milling: Vertical & Horizontal Level II	
17.	CNC: Programming - Milling	CNC Milling Level I
18.	CNC: Write a Simple CNC Milling Program and Review Tool Path	
19.	CNC: Operate a CNC Milling Machine level I	
20.	CNC: Operate a CNC Milling Machine Level II or CNC Machining Center	CNC Milling Level II
21.	CNC: Advanced Manual Programming	CNC Milling Level III
22.	Use Manufacturing Modeling Software to Create Programs	
23.	General Housekeeping & Maintenance	Included in all Machining Credentials
24.	Preventative Maintenance - Machine Tools	
25.	Tooling Maintenance	

NIMS Certified CNC Setup/Programmer - Milling and Turning: Journey Level Core Competencies

CNC Setup Programmer - Milling& Turning Core Competencies		NIMS Credentials
1.	Identify & Demonstrate Usage of Machine Safety & Personal Protective Equipment	Measurement, Materials, and Safety Level I
2.	Demonstrate Compliance with Lock-out/Tag-out Procedures and OSHA Requirements and Guidelines	
3.	Machine Operations & Material Handling, Hazmat Materials Handling and Storage, including EPA, Hazmat, and OSHA	
4.	Part Inspection	
5.	Perform the Inspection of Parts	
6.	Process Control	
7.	Process Adjustment - Single Part Production	
8.	Participation in Processes Improvement	
9.	Manual Operations: Layout	
10.	Manual Operations: Benchwork	
11.	Sawing	
12.	Job Process Planning	
13.	Drilling Operations	Drill Press Skills Level I
14.	Milling: Square Up a Block	Milling Level I
15.	Manual Milling: Vertical & Horizontal Level I	
16.	CNC: Programming - Milling	CNC Milling Level I
17.	CNC: Write a Simple CNC Milling Program and Review Tool Path	
18.	CNC: Operate a CNC Milling Machine level I	
19.	CNC: Operate a CNC Milling Machine Level II or CNC Machining Center	CNC Milling Level II
20.	CNC: Advanced Manual Programming	CNC Milling Level III
21.	Use Manufacturing Modeling Software to Create Milling Programs	
22.	Turning Operations: Turning Between Centers	Turning Between Centers
23.	Turning Operations: Chucking	Chucking Level I
24.	CNC Programming - Turning	CNC Turning Level I
25.	CNC: Write a Simple CNC Turning Program and Review Tool Path	
26.	CNC: Operate a CNC Lathe Level I	
27.	CNC: Operate a CNC Lathe Level II or Turning Center	
28.	CNC: Advanced Manual Programming	CNC Turning Level III
29.	Use Manufacturing Modeling Software to Create Programs	
30.	General Housekeeping & Maintenance	
31.	Preventative Maintenance - Machine Tools	Included in all Machining Credentials
32.	Tooling Maintenance	

NIMS Certified Tool and Die Maker: Journey Level Core Competencies

(Guideline Standards Under Development)

- Job Process Planning
- Manual Operations: Benchwork
- Manual Operations: Layout
- Turning Operations: Turning Between Centers
- Turning Operations: Chucking
- Milling: Square Up a Block
- Surface Grinding, Grinding Wheel Safety
- Surface Grinding, Horizontal Spindle, Reciprocating Table
- Drill Press
- CNC Basic Programming
- Part Inspection
- Process Control
- Participation in Process Adjustment & Improvement
- Identify & Demonstrate Usage of Machine Safety & Personal Protective Equipment
- Machine Operations & Material Handling, Hazardous Materials Handling & Storage
- General Housekeeping & Maintenance
- Preventive Maintenance-Machine Tools
- Tooling Maintenance
- Manual Milling: Vertical & Horizontal
- Cylindrical Grinding
- Sawing
- Lock-out, Tag-out Procedures
- Review Design, Part Print & Customer Quality Standards
- Determine Required Process Plan to Complete Die/Tool in Allotted Time
- Explain/Describe Metallurgical Theory-Determine Heat Treating Requirements
- Lay Out Details for Manual Machining Operations
- Machine Details to Die Design Prints Using Standard Tool Room Equipment
- Prepare Details for CNC Operations & EDM Processes
- Use Hand Tools on Contoured Steel from CNC Milling Operations
- Grind/Mill or Wire EDM All Other Details to Finished Size After Heat Treat
- Mount Form Steels, Form Pads, Trim Details & Pierce Station to Die Set
- Dry Run Die to Stop Blocks
- Assemble Die for Development Process
- Describe/Explain Sensor Function
- Set-Up Die in Tryout Press
- Spot Form Steels
- Develop & Validate Trim Lines
- Develop & Validate Draws & Forms
- Validate Part
- Make Adjustments As Determined from First Tryout
- Mount All Remaining Die Details to Die Set
- Assemble Die for Final Tryout
- Set-Up All Dies in Tryout Press
- Perform Corrective Actions Required to Assure Stamped Part Conformance
- Assure Production Readiness of Die or Tool

NIMS Certified CNC Operator- Turning: Journey Level Core Competencies

(Guideline Standards Under Development)

- Job Process Planning
- Manual Operation: Benchwork
- Turning Operations: Turning Between Centers
- Turning Operations: Chucking
- Drilling Operations
- CNC Programming
- CNC: Write Simple CNC Program & Review Tool Path
- CNC: Operate a CNC Lathe
- Machine Power Tapping: Taper Reaming & Pipe Tapping
- Part Inspection
- Machine Operations & Material Handling
- Hazardous Materials Handling and Storage, including EPA, Hazmat, & OSHA
- General Housekeeping & Maintenance
- Preventative Maintenance - Machine Tools
- Tooling Maintenance
- Process Control
- Process Adjustment - Single Part Production
- Participation in Process Improvement
- Identify & Demonstrate Usage of Machine Safety & Personal Protective Equipment
- Lock-out, Tag-out Procedures
- Turning: Between Centers Taper Turning
- Turning: Chucking, O.D. & I.D. Tapers Using a Taper Attachment
- Perform Inspection of Parts
- Turning Operations: Manual Contour Turning
- Turning Operations: Steady Rest Turning & Boring
- Turning Operations: Follower Rest Turning
- Turning Operations: Difficult Materials
- CNC: Advanced Manual Programming
- Use Manufacturing Modeling Software to Create Programs
- CNC: Turning Centers

NIMS Certified Mold Maker: Journey Level Core Competencies

(Guideline Standards Under Development)

- Job Process Planning
- Manual Operations: Benchwork
- Manual Operations: Layout
- Turning Operations: Turning Between Centers
- Turning Operations: Chucking
- Milling: Square Up a Block
- Surface Grinding, Grinding Wheel Safety
- Surface Grinding, Horizontal Spindle, Reciprocating Table
- Drill Press
- CNC Basic Programming
- Part Inspection
- Process Control
- Participation in Process Adjustment & Improvement
- Identify & Demonstrate Usage of Machine Safety & Personal Protective Equipment
- Machine Operations & Material Handling, Hazardous Materials Handling & Storage
- General Housekeeping & Maintenance
- Preventative Maintenance-Machine Tools
- Tooling Maintenance
- Manual Milling: Vertical & Horizontal
- Cylindrical Grinding
- Sawing
- Review Design & Data Sheet
- Develop Initial Manufacturing Plan
- Determine Process to Meet Due Date
- Lay Out Work Pieces
- Perform Rough Machining
- Explain/Describe Metallurgical Theory-Determine Heat Treating Requirements
- Produce Electrodes & Operate Electrical Discharge Machines
- Perform Finish Machining & Prefit Components
- Define & Polish Product Area
- Pre-Assemble & Inspect Base
- Pressure Test for Leaks
- Install Ejector Pins & Return Pins
- Install Necessary Hardware
- Describe/Explain Sensor Function
- Lock-out, Tag-out Procedures

NIMS Certified Maintenance, Service and Repair: Journey Level Core Competencies

(Guideline Standards Under Development)

- Prepare Machine Maintenance Schedule
- Confirm Frequency of Checks
- Perform Broad Scan Visual Inspection
- Confirm Proper Operation & Operating Performance
- Be Sensitive to Changes in Operating Conditions
- Confirm Operation of Machine Safety Devices
- Perform Fluids Change
- Locate Check Points & Grease Points
- Check Particulate Matter
- Clean Up Spills
- Select Proper Fluid Types
- Filters
- Verify Controller Functions-Level II
- Verify Machine Diagnostic Capabilities-Level II
- Confirm Accuracy of All Instrumentations
- Create a Project Plan
- Troubleshoot Project
- Use a Computer as Diagnostic Tool
- Maintain Records
- Be Sensitive to Heat Build-Up, Odors, and Variations in Part Consistency
- Seal Fluid Leaks
- Identify Contamination Sources
- Verify Controller Functions-Level III
- Verify Machine Diagnostic Capabilities-Level III
- Confirm Operation of All Gauges
- Inspect & Confirm Condition of Bearing
- Repair Shafts & Bores for Mountings
- Install Bearings
- Verify Bearings Installation
- Select and Replace Gearing
- Check Heat of Operation
- Verify Operation of Sensors
- Verify Volt & Amperage Capacity
- Replace Damaged Electrical Components
- Replace Electronic Components
- Confirm Structural Integrity
- Verify Balance, Leveling, Squareness, Parallelism & Perpendicularity, Pitch, Yaw, & Roll
- Use Solder
- Diagnose Welding Needs
- Use Alternative Technologies
- Machine Operations & Material Handling, Hazardous Materials Handling & Storage
- Lock-out, Tag-out Procedures