



Appendix A4

WORK PROCESS SCHEDULE

AND

RELATED INSTRUCTION OUTLINE

FOR THE OCCUPATION OF:

CNC MACHINIST

(EXISTING TITLE: CNC OPERATOR – MILLING AND TURNING)

O*NET-SOC CODE: 51-4034.00 RAPIDS CODE: 1094CB



Appendix A4

WORK PROCESS SCHEDULE CNC MACHINIST (Existing Title: CNC Operator – Milling and Turning) O*NET-SOC CODE: 15-4034.00 RAPIDS CODE: 1094CB

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 occupation shall be defined by the attainment of all competencies of the position, which would be reasonably expected to occur within 2 to 3 years of OJL, supplemented by 144 hours of related instruction during the apprenticeship. The sponsor may recognize prior-learning achievements or demonstration of competencies to account for related instruction or OJL hours.

3. RATIO OF APPRENTICES TO JOURNEYWORKERS

The apprentice to journeyworker ratio is: 1 Apprentice to 1 Journeyworker per worksite.

4. APPRENTICE WAGE SCHEDULE

Apprentices shall be paid a progressively increasing schedule of wages. Apprentices' starting wage should be a minimum of \$14.77 per hour. The journeyworker wage is \$21.63 per hour, which is to be paid to the apprentice after completion of the apprenticeship. The starting wage and journeyworker wage may be adjusted to accommodate each employer and shall be uploaded into the Rapids database. This wage scale is specifically for Denver, CO, and may vary based on minimum wage laws in different geographic locations, which will be indicated on Appendix D.

Term:

1 st Period	Starting Wage (0-18 months)	\$14.77/hr
2 nd Period	On level (18-36 months)	\$15.87/hr
Completion	Full Competency	\$21.63/hr

5. PROBATIONARY PERIOD

Every apprentice selected for apprenticeship will serve a probationary period of 500 hours.

6. SELECTION PROCEDURES

Please see page 15.



WORK PROCESS SCHEDULE
CNC MACHINIST
(Existing Title: CNC Operator – Milling and Turning)
O*NET-SOC CODE: 15-4034.00 RAPIDS CODE: 1094CB

Description: CNC Machinists set up, program, and operate large, computer-controlled industrial equipment called machines tools. They use this equipment to form useful parts from metal, plastic, or other raw materials. These parts are incorporated into finished products with a wide variety of applications from jump seats on a commercial airplane to the shells of a laptop computer. CNC Machinists are responsible for safely and efficiently operating equipment, keeping equipment in proper working order, and producing parts that meet quality standards.

On-The-Job Training: Apprentices will receive training in the various work experiences listed below. The order in which this training is given will be determined by the flow of work on the job and will not necessarily be in the order listed.

Ratings are:

- (4) Exceeds Expectations (Advanced)
- (3) Meets Expectations (Proficient)
- (2) Meets Some Expectations (Emerging)
- (1) Does Not Yet Meet Expectations (Novice)
- (0) Not applicable (No Skill)

4. Exceeds Expectations (Advanced): Consistently exceeds performance standard established for the time in position. Achieves results above and beyond what is required. Extends themselves in their roles to exceed personally and as a team to achieve exceptional results.

3. Meets Expectations (Proficient): Employee meets all expectations in a fully satisfactory way and is proficient in the outlined competencies.

2. Meets Some Expectations (Emerging): Meets the performance standards established for time in position. Handles routine tasks & some unexpected situations with the usual amount of supervision. Can continue to develop with coaching, training or more experience to gain proficiency.

1. Does Not Yet Meet Expectations (Novice): Occasionally meets some of the objectives related to this goal but does not meet others in a fully satisfactory way. This performance level generally indicates the need for additional coaching, training or other plan for performance improvements.

0. Not Applicable (No Skill): Training in this competency has not yet begun.

Apprentices need to receive a “3” or better in each competency in order to complete the apprenticeship.



Apprentice Competency Evaluation

Core Competencies	Required for this employer (yes/no)	Rating	Supervisor Sign-off	Date
<p>Safety <i>Understands and upholds safe workplace practices in a manufacturing environment</i></p> <ul style="list-style-type: none"> ● Adheres to employer’s safety protocols including those relating to personal protective equipment (PPE) and material handling. ● Practices safe machine operation including use of interlocks, single block, equipment guards, and lock-out/tag-out. ● Identifies potential safety hazards and reports them to the appropriate personnel. ● Uses, stores, and maintains tools, equipment, and chemicals according to OSHA and EPA standards. ● Understands Safety Data Sheets (SDS) and accesses them when necessary. 				
<p>Organization <i>Conducts general housekeeping and cleanup. Maintains a tidy, organized workspace.</i></p> <ul style="list-style-type: none"> ● Conducts housekeeping and clean up when assigned or reminded. ● Conducts housekeeping and clean up when a workspace becomes dirty and disorganized. ● Maintains a clean workspace with tools and equipment that are ready for the next job. ● Understands methodologies such as lean manufacturing and 5S. 				
<p>Technical Drawings <i>Reads and interprets technical drawings, including dimensions and tolerances</i></p> <ul style="list-style-type: none"> ● Understands types of lines, revision levels, and title block information. ● Identifies section views and projection views. ● Visualizes connection between views on simple drawings. ● Communicates with others effectively regarding information contained in technical drawings. 				
<p>Quality Inspection <i>Tests and inspects parts or products to evaluate whether they meet specifications.</i></p>				



<ul style="list-style-type: none"> • Accurately uses hand measurement tools including calipers and micrometers. • Records quality measurements. • Inspects products and determines if they meet quality standards and specifications. • Understands dimensions, tolerances, and specification limits. • Verifies calibration of measurement tools. 				
<p>Work Orders <i>Reads and interprets work orders to prepare for quality inspection and support of production.</i></p> <ul style="list-style-type: none"> • Keeps work orders associated with the relevant raw materials and finished products. • Identifies basic information on work orders including customer name, order number, part number, and anticipated ship date. • Verifies the certification of material and outside processes. • Provides quality documentation (i.e. first article inspection report) with finished products per customer requirements. 				
<p>Reporting and Record Keeping <i>Records quality production, or operational data in an Enterprise Resource Planning (ERP) system or similar system.</i></p> <ul style="list-style-type: none"> • Understands the importance of accurate reporting and record keeping. • Accurately documents the movement of material and steps accomplished • Navigates the company's Enterprise Resource Planning (ERP) or similar system to access quality, production, or operational data. • Navigates the company's ERP or similar system to enter data. 				
<p>Secondary Operations <i>Performs secondary operations on parts including drilling, grinding and deburring.</i></p> <ul style="list-style-type: none"> • Completes secondary operations with oversight and instruction. • Selects proper tools and procedures for routine operations. • Prepare and set work up for secondary operations. • Uses file tools, deburring tools, and other hand finishing tools. 				



<ul style="list-style-type: none"> Independently completes secondary operations according to customer requirements. 				
<p>CNC Mill Operation <i>Operates a CNC mill safely, efficiently, and effectively.</i></p> <ul style="list-style-type: none"> Follows proper startup procedures including checking coolant concentration, oil, etc. Safely operates CNC mills. Avoids crashing machine. Understand G Code. Understands machine axes and home position. Engages emergency shut-down procedures when necessary. Identifies the parts of a CNC mill and their function. Efficiently operates CNC mills. Changes tool values as necessary and replaces tooling as necessary. Demonstrates proper insert use and replaces inserts when necessary. Demonstrates proper tool holder selection. 				
<p>CNC Lathe Operation <i>Operates a CNC lathe safely, efficiently, and effectively.</i></p> <ul style="list-style-type: none"> Follows proper startup procedures including checking coolant concentration, oil, etc. Safely operates CNC lathes. Avoids crashing machine. Understand G Code. Understands machine axes and home position. Identifies the parts of a CNC lathe and their function. Efficiently operates CNC lathes. Changes tool values as necessary and replaces tooling as necessary. Demonstrates proper insert use and replaces inserts when necessary. Demonstrates proper tool holder selection. 				
<p>Equipment Setup <i>Sets up new processes on CNC machines safely, efficiently, and effectively.</i></p> <ul style="list-style-type: none"> Can explain the steps required to setup a new process on a CNC machine. Demonstrates awareness of clearance. Locate and set up appropriate fixtures. 				



<ul style="list-style-type: none"> Independently set up proven processes on CNC machines. 				
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In addition to completing all core competencies, an apprentice based on the employer's assigned role will complete the following additional competencies.

Optional Competencies	Required for this employer (yes/no)	Rating	Supervisor Sign-off	Date
<p>Job Planning <i>Reviews and makes edits to process plans.</i></p> <ul style="list-style-type: none"> Understand systematic process planning. Reviews and makes edits to process plans that require multiple operations. Create a process plan. 				
<p>Process Control <i>Follows process plans to achieve consistent, repeatable results.</i></p> <ul style="list-style-type: none"> Follows process plans to achieve consistent, repeatable results in quality, quantity, delivery, and cost. Can explain why quality, quantity, delivery, and cost are key performance indicators of a manufacturing operation. Compares actual production rate vs. planned production rate and notifies appropriate individuals of delays, under-production, or potential additional capacity. Compares actual quality vs. planned quality and notifies appropriate individuals of significant deviations. Compares actual cost of production vs. planned cost of production and notifies appropriate individuals of significant deviations. 				
<p>Programming <i>Develops simple programs using CAM software. Edits simple G code programs.</i></p> <ul style="list-style-type: none"> Describes the functions and use of basic G codes. Identifies coordinates on a blueprint with respect to a part/origin. Using the principles of Cartesian coordinates, develops a program for the manufacture of a simple part. 				



<ul style="list-style-type: none"> • Calculates and implements speeds and feeds for proper tool life and surface finish. • Draws and edits basic geometric shapes and constructions. • Creates tool paths for contour milling, pocketing, drilling, and tapping. 				
<p>Maintenance <i>Works independently and with maintenance personnel to keep equipment in proper working order.</i></p> <ul style="list-style-type: none"> • Accomplishes preventative maintenance tasks, such as fluid changes, filter changes, and lubrication. • Documents preventive maintenance tasks accomplished. • Notifies appropriate maintenance personnel of potential problems with equipment or machine function, need for routine maintenance, or concerns about unusual sounds, vibrations, smells or production errors. • Provides maintenance personnel with relevant information to aid in timely and complete resolution of reactive maintenance. 				

Apprenticeship Competencies – Career Readiness

In addition to mastering all the essential technical competencies outlined in the work processes, an apprentice must consistently demonstrate growth and proficiency in the following career readiness competencies to complete the apprenticeship.

Apprentices will be evaluated in these competencies semi-annually, and the supervisor will initial and date the accomplishment of the career ready competency at each review.

Ratings are:

- (4) Exceeds Expectations (Advanced)
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0. Not Applicable (No Skill): Training in this competency has not yet begun.

Apprentices need to receive a “3” or better in each competency in order to complete the apprenticeship.

ENTREPRENEURIAL SKILLS	Required for this employer (yes/no)	Rating	Supervisor Sign-off	Date
Critical Thinking/Problem Solving <ul style="list-style-type: none"> ● Recognize that problems can be identified, and possible solutions can be generated ● Define the problem using a variety of strategies ● Make connections between information gathered and personal experiences to apply and/or test solutions 				
Creativity / Innovation <ul style="list-style-type: none"> ● Demonstrate curiosity, imagination and eagerness to learn more ● Build on personal experience to specify a challenging problem to investigate ● Engage in novel approaches, moves, directions, ideas and/or perspectives 				
Inquiry <ul style="list-style-type: none"> ● Recognize and describe cause-and-effect relationships and patterns in everyday experiences ● Investigate to form hypotheses, make observations and draw conclusions ● Test hypotheses/prototype with planned process for getting feedback 				
Risk Taking <ul style="list-style-type: none"> ● Demonstrate a willingness to try new things ● Demonstrate flexibility, imagination and inventiveness in taking on tasks and activities ● Innovate from failure, connect learning across domains and recognize new opportunities 				



PERSONAL SKILLS	Required for this employer (yes/no)	Rating	Supervisor Sign-off	Date
Self-Management / Self Awareness <ul style="list-style-type: none"> • Accurately recognize one’s own emotions, thoughts and values and how they influence behavior • Appropriately express one’s own emotions, thoughts and values and identify how they influence behavior • Assess personal strengths and limitations, with a well-grounded sense of confidence, optimism and a ‘growth mindset’ 				
Self-Direction <ul style="list-style-type: none"> • Recognize personal characteristics, preferences, thoughts and strengths • Pursue opportunities to engage and learn interests • Apply knowledge to set goals, make informed decisions and transfer to new contexts 				
Adaptability / Flexibility <ul style="list-style-type: none"> • Recognize emotional response to ideas that differ from one’s own • Regulate reactions to differing perspectives • Look for and value in different perspectives expressed by others 				
Perseverance / Resilience <ul style="list-style-type: none"> • Resist distractions, maintain attention, and continue the task at hand through frustration or challenges • Set goals and develop strategies to remain focused on learning goals • Focus on learning goals by employing motivation and familiar strategies for engagement and evaluate progress, making necessary changes to stay the course 				

CIVIC/INTERPERSONAL SKILLS	Required for this employer (yes/no)	Rating	Supervisor Sign-off	Date
Collaboration / Teamwork <ul style="list-style-type: none"> • Recognize how personal actions have had a positive or negative impact on others with feedback as needed • Recognize how members of a community rely on each other, considering personal contributions as applicable 				



<ul style="list-style-type: none"> Follow a process identified by others to help generate ideas, negotiate roles and responsibilities, and respects consensus in decision making 				
<p>Communication</p> <ul style="list-style-type: none"> Articulate personal strengths and challenges using different forms of communication to express oneself Consider purpose, formality of context and audience, and distinct cultural norms when planning content, mode, delivery and expression Establish goals for communication and plan out steps accordingly 				
<p>Global / Cultural Awareness</p> <ul style="list-style-type: none"> Compare attitudes and beliefs as an individual to others Identify and explain multiple perspectives (cultural, global) when exploring events, ideas and issues Plan and evaluate complex solutions to global challenges that are appropriate to their contexts using multiple disciplinary perspectives (such as cultural, historical and scientific) 				
<p>Ethics</p> <ul style="list-style-type: none"> Takes great care with organizational data Does not disclose any kind of personal or sensitive organizational information; understands that all data is confidential Demonstrates honesty and integrity in all interactions. If an error is made, prioritizes minimal impact to the organization over their own reputation 				

PROFESSIONAL SKILLS	Required for this employer (yes/no)	Rating	Supervisor Sign-off	Date
<p>Task/Time Management</p> <ul style="list-style-type: none"> Articulate task requirements and identify deadlines Develop and utilize basic task and time-management strategies effectively Demonstrate task-management attributes associated with producing high-quality products including the abilities to: 1) Work positively and ethically 2) Manage time and projects effectively 3) Multi-task 4) Clearly communicate with others 				



<p>Self-Advocacy</p> <ul style="list-style-type: none"> • Appropriately express a range of emotions to communicate personal ideas/needs • Ask questions to develop further personal understanding • Demonstrate confidence in sharing ideas/feelings 				
<p>Work Ethic</p> <ul style="list-style-type: none"> • Complete tasks with ongoing support • Seek clarity on tasks and needs occasional support • Demonstrate skill in assigned tasks and completes with little or no support 				

ACADEMIC SKILLS	Required for this employer (yes/no)	Rating	Supervisor Sign-off	Date
<p>Core Academic Foundation</p> <ul style="list-style-type: none"> • Begins to use math and literacy skills to inform work • Uses math and literacy skills to perform job tasks with frequent checks by supervisor • Independently and consistently use math and literacy skills to perform tasks (with occasional checks for quality) 				



RELATED INSTRUCTION OUTLINE
CNC MACHINIST
(Existing Title: CNC Operator – Milling and Turning)
O*NET-SOC CODE: 15-4034.00 RAPIDS CODE: 1094CB

Related instruction - The curriculum is defined as a variety of classes, around which the exams and projects are based. By defining the related instruction this way, all related instruction competencies required of the students are met through a combination of coursework and/or hands-on exercises. Employers will select relevant courses for related instruction in the topics outlined below, totaling **at least 144 hours** over the duration of the apprenticeship. Selection of required topics and associated training time may vary by employer and apprentice. Employer may add additional occupation specific courses as necessary over and above those specified below.

RELATED INSTRUCTION	Approximate Hours
Apprenticeship Orientation	15
Workplace Essentials	45
Employer Onboarding	10
Safety	10
Organization	5
Technical Drawings	10
Quality Inspection	15
Work Orders	5
Reporting and Record Keeping	10
Secondary Operations	10
CNC Mill Operation	15
CNC Lathe Operation	15
Equipment Setup	15
TOTAL RI HOURS	180

COURSE DESCRIPTIONS

Apprenticeship Orientation (15 hours)

Introduction to career-readiness to prepare students for working in a professional environment: apprenticeship and workplace expectations with a focus on growth mindset.

Workplace Essentials (45 hours)

Skills in common computer applications, effective workplace communication, time management, and conflict resolution.

Employer Onboarding (10 hours)

Orientation training provided to new employees by the employer

Safety (10 hours)

Understands and upholds safe workplace practices in a manufacturing environment.



Organization (5 hours)

Conducts general housekeeping and cleanup. Maintains a tidy, organized workspace.

Technical Drawings (10 hours)

Reads and interprets technical drawings, including dimensions and tolerances.

Quality Inspection (15 hours)

Uses measurement tools to identify defects and ensure compliance with tolerances and specifications.

Work Orders (5 hours)

Reads and interprets work orders to prepare for production.

Reporting and Record Keeping (10 hours)

Records quality, production, or operational data in an Enterprise Resource Planning (ERP) system or similar system.

Secondary Operations (10 hours)

Performs secondary operations on parts including drilling, grinding, and deburring.

CNC Mill Operation (15 hours)

Operates a CNC mill safely, efficiently, and effectively.

CNC Lathe Operation (15 hours)

Operates a CNC lathe safely, efficiently, and effectively.

Equipment Setup (15 hours)

Sets up new processes on CNC machines safely, efficiently, and effectively.



SELECTION PROCEDURES

1. Apprenticeship opportunities are shared with students enrolled in CareerWise and its affiliated programs.
 2. Interested applicants complete the application process outlined in the apprenticeship recruitment notice. All suitably qualified applicants can apply to the apprenticeship opportunity.
 3. All applicants that meet the minimum qualifications will be selected for an employer interview.
 4. At the time of interview, applicants will be asked the same set of questions to ensure each applicant is treated equally.
 5. Applicants shall be rated and ranked based on interview scores.
- If required by the employer, the top candidates may be invited for a second interview.
6. The applicants will be notified of the hiring decision in a timely manner and all applicants will be treated equally with regard to notifications.
 7. All records regarding the selection of apprentices will be forwarded to and maintained by the Sponsor (see Sponsor Requirements Guide).

Direct Entry:

The Sponsor may allow direct entry applicants that are part of an employer's incumbent workforce, a qualified pre-apprenticeship program, or Job Corps graduates whose training, similarly, qualifies them for the occupation.