

EMPLOYABILITY SKILLS: **Manufacturing Production**

(Including Tool Room/Machinist Apprentice, Manual Machinist, Machine Operator, Entry-level CNC Machinist, CNC Set-up Tech and Customer Service)

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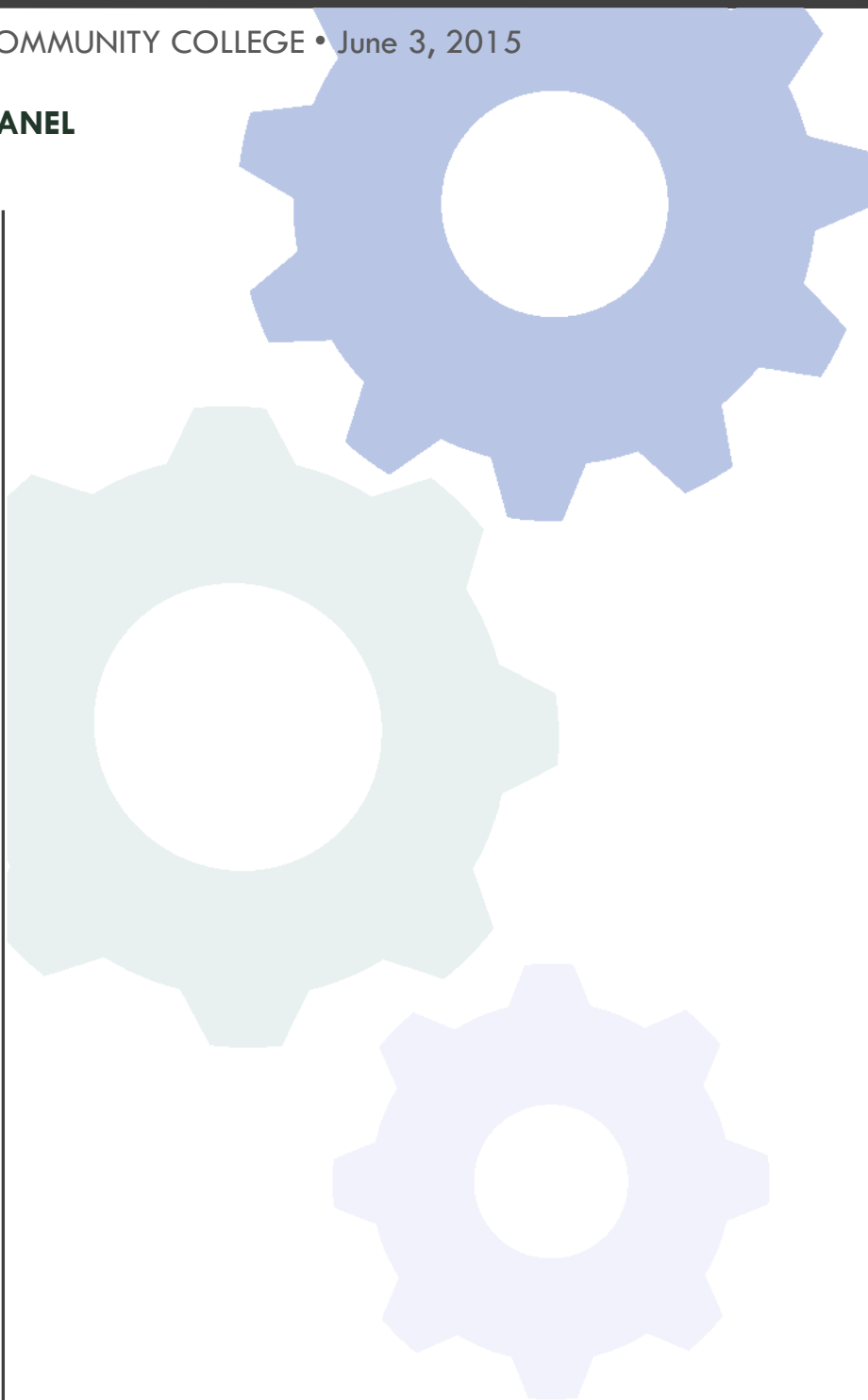
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Employability Skills Profile: Manufacturing Production

Job Path:

The intent of these findings is to assist in understanding the employability skills necessary for success within our local manufacturing community as we consider development of a stackable manufacturing program to meet workforce needs. Many job titles and paths exist within our diverse manufacturing community including the areas of quality inspection, shipping & inventory control, customer service/sales, design and engineering, and production. For the purpose of this study, the panel selected two main occupational areas in which to base their feedback: Production and Customer Service. Within the production area, the panelists identified several occupations of greatest need: Tool Room/Machinist Apprentice, Manual Machinist, Machine Operator, Entry-level CNC Machinist, CNC Setup Tech, Welder, Quality Inspector and Sales. The panel stated that these occupations met the threshold for livable wage, and required less than 2 years of training upon hire. Further study is needed in order to best synthesize the greatest workforce need in terms of these occupations.

Future Trends & Concerns

- There is a stigma surrounding manufacturing jobs and people don't understand the reality of the work or opportunity. People need to understand that college isn't for everybody- there are other viable pathways in manufacturing
- Employers who sponsor apprenticeships are finding their employees do not want to pursue additional training required (in spite of incentives)
- Pervading sense of entitlement amongst current candidate pool, especially younger workers and union workers. (some)
- GED is sorely disappointing (as a measure of ability)
- Soft skills are lacking
 - ◇ Difficult to find good soft skills in new workers
 - ◇ Lack of soft skills is prevents ability for workers to advance to leadership roles
 - ◇ Workers who come with soft skills could be hired as a leader (less experience required)
 - ◇ "Promote to highest level of incompetence" - some with less experience can be promoted vs those with more if soft skills allow
- Struggle to find committed people
- Employers like to see/start manual machine operator prior to moving to CNC

Workplace Expectations

- Workers are expected to stay at their assigned work area and focus on the "job at hand"; not wander around and waste time talking and distracting work associates
- Workers are expected to know their job description and understand their duties (when available)
- Phone use is limited to emergency calls only
- No digital music players/ear jacks/ headphones allowed in a manufacturing setting (for some)
- Communicate early and often about work or failures
- Workers who "own" their own learning will be more successful

Attendance

- Be there and on time
- Prepare in advance for snow (find reasons to come, not excuses for why not)

Appearance

- Personal Hygiene- "don't hide it with perfume"
- Dress
 - ◇ No baggy/loose clothing
 - ◇ No jewelry
 - ◇ Proper PPE (steel toe for some)
- No facial hair (for some). This is a safety concern if the worker needs to wear respirator or weld.
- Hair up, if long.
- No shorts (for some)
- Close toed shoes
- Clean cut appearance (more important for CSR)

Employability Skills Chart: Manufacturing Production

June 3, 2015

Duties

Tasks



A Demonstrate Workplace Safety	A1 Follow safety procedures	A2 Be mentally alert	A3 Be aware of surroundings	A4 Demonstrate knowledge of equipment	A5 Report safety problems	A6 Wear appropriate attire/PPE	
	6	6 4 1	3	1 3	3	1	1 1 1
B Committed to Quality	B1 Complete all tasks with consistent high quality	B2 Participate in on-going training/learning	B3 Initiate action to resolve operating problems/inefficiencies	B4	B5	B6	
	6	6 1	4	1			
C Take Professional Responsibility	C1 Comply with company policies	C2 Protect company assets	C3 Report to work as scheduled (M-F, meetings)	C4 Meet production schedule	C5 Minimize negative impacts of private life on work	C6 Take accountability for own actions	C7 Complete all tasks to meet standards/expectations
	2	1	2	4 6	3 3	5 8 2	1 3
D Demonstrate Personal Integrity	D1 Respond appropriately to situations of right and wrong	D2 Protect confidential information	D3 Care about improving company operations	D4	D5	D6	
	9	3	4 3				
E Demonstrate Workplace Social Skills	E1 Speak openly and honestly with co-workers	E2 Work well with others	E3 Avoid inappropriate behavior (i.e. sexual harassment)	E4 Be a team player	E5 Listen actively to supervisor's comments and requests	E6 Treat everyone respectfully	E7 Ask for help when needed
	3	2 6	5 3 4	2 2 2	7 1	1 2 4	1 1 1
F Pursue Professional Development/Improvement	F1 Accept feedback without defensiveness	F2 Learn from critiques	F3 Adapt to changes in work situations	F4 Be willing to learn continuously	F5 Show interest in learning more	F6	
	5 6 8	1 5	6 1 4	1 6			
G Demonstrate Time Management Skills	G1 Demonstrate ability to plan ahead	G2 Meet work schedules (e.g. on time arriving, returning from breaks, lunch)	G3 Use time efficiently	G4 Respect other people's time	G5	G6	
	1 1		4 3	2			
H Make Good Decisions	H1 Recognize need for more information (know when you don't know)	H2 Evaluate own solutions	H3 Identify underlying problems	H4 Prioritize work based on business needs	H5	H6	
	4	3 6 1	1 2	3 1	1 5 1		

Legend

.....Critical Duty

.....Critical Task

.....Training Most Needed by New Workers

.....Training Most Needed by Veteran Workers

Note: Numbers represent total votes from 10 of the 10 panelists.

Employability Skills Profile: Manufacturing

Knowledge & Skills

- Communication skills
 - ◇ Good listening skills
 - ◇ Verbal and non-verbal
 - ◇ Write notes in common language (as a means to retain knowledge)
- Computer Skills
 - ◇ Apple—adapt cross platform (helpful)
 - ◇ Locate resources online
 - ◇ Navigate internet
 - ◇ Windows file structure
- Job Planning
 - ◇ Blue Print Reading
- Keyboarding skills
 - ◇ Hunt and peck (for some employers)
 - ◇ 25 wpm (for some employers)
- Math
 - ◇ Basic Measurements (e.g., dial calipers, micrometers, thread go and no-go gauges)
 - ◇ Basic shop math
 - * Add/Subtract (counting skill is lacking)
 - * Multiply/Divide
 - * Fractions and Decimal Conversion
 - * Standard/ metric conversion
 - ◇ Trigonometry (a plus)
- Manufacturing Skills
 - ◇ 3D Visualization
 - ◇ Job travelers
 - ◇ Know when to act with in scope of duties
 - ◇ Lean manufacturing principals
 - ◇ Mechanical skills
- ◇ Problem solving skills
- ◇ SPC fundamentals
- ◇ Speeds and feeds
- Organizational skills
 - ◇ Keep a clean and well organized work area
 - ◇ Tools
- Recognize signs of where and when to change tool
- Reading skills
 - ◇ Blueprints
 - ◇ SDS sheets
 - ◇ Operator manuals
 - ◇ Read and document control plans/instructions
- Software
 - ◇ MS Word- write up/documentation, use spell check, ignore grammar check
 - ◇ MS Excel- use spreadsheets
 - ◇ CAD/CAM (knowledge of what it is)
 - ◇ E-drawings- view AutoCAD, but not edit
- Time management skills
- Tools
 - ◇ Recognize signs of where and when to change tool
 - ◇ Use tools competently
- Writing skills
 - ◇ Communicate succinctly
 - ◇ Grammar/Spelling Skills: Spell check
 - ◇ Legible
 - ◇ Write documentation to be understood: notes, phrases

Traits & Behaviors

- Ability to listen and retain information (and apply later)
- Accountable
- Accurate *
- Analytical/logical
- Confident
- Continuous improvement
- Cooperative
- Creative
- Customer oriented
- Dependable
- Detail-oriented
- Diligent
- Efficient
- Efficiency minded
- Engaged
- Enthusiastic
- Ethical
- Focused
- Functions under pressure
- Humble
- Innovative
- Inquisitive
- Learner (not necessarily quick, but must be willing and able to learn)
- Manual dexterity
- Mechanically inclined
- Observant
- Patient
- Positive attitude
 - ◇ "Can do it" attitude
 - ◇ "Hit the ground running kind of attitude"
- Professional
- Punctual
 - ◇ Attendance
 - ◇ Start & stop times
- Reliable
- Respectful (for chain of command)
- Responsible
- Self-motivated
- Self-starter
- Sense of urgency
- Stress tolerant
- Takes pride in work
- Team Player (Team spirit)
- Thick-skinned (some)
- Willing to participate

Hiring Requirements

- H.S. Diploma/GED (some businesses)
- Background check - Convictions-any felonies (no-armed robbery, assault, fraud, theft) (some businesses)
- Must Pass Drug Test-pre-employment & random (some when warranted) (some businesses)
- Good positive attitude (employers looking for it)
- Must pass basic skills, aptitude test, mechanical

Most Disappointing/Lacking in New Hires

- Poor attitude, work ethic
- Willingness to participate
- Lack of aspiration
- Lack of enthusiasm
- Lack of commitment
- Lack of creativity—need to be more than two-dimensional
- Candidates look great on paper, book smart, but can't apply what they learned (used OCC as example)
- Computer skills should not be assumed. One employer voiced experience in hiring individuals who over-sold their basic computer abilities.
- Reliability
- Practical knowledge

Hiring Barriers

- Failing drug test or declining to take drug test are grounds for dismissal (for some businesses)

Certification/Licensure

Mandatory

- N/A
- College credentials not necessary
- Valid driver's license
- DD 214 (only if military)

Helpful/Useful

- Forklift
- First Aid/CPR
- OSHA 10

Physical Attributes

In order to perform the necessary functions of the job, the worker must be able to:

- Stand for minimum of 8 hrs
- Lift up to 35-50 lbs. without help

The following factors would hinder a person's ability and/or prevent them from being able to perform the job:

- Wheelchair bound - it would be physically impossible to perform the duties of the position from a wheelchair. The exception to this would be CAD drafters— they can work from home, and the position does not require the same physical demands.
- Color Blind - Not an issue unless the position includes electrical work. Need to be able to differentiate colors of wires.
- Deaf - Safety issue, need to hear the machines to detect and prevent problems. Depending the company, they can make accommodations.
- Blind - Deal breaker. Cannot perform the duties of the position without the ability to see.
- Missing limb - Depends on the limb, arm could be a problem. Accommodation could be provided.
- Hand mobility - Essential to perform the duties of the position.
- Dexterity - Essential to perform the duties of the position.

Noteworthy Quotes

- "Take a hit for the team"
 - ◇ It's important to know when team performance outweighs individual performance. Need to be able to let go of ego.
- "Little things count for a lot"
- "Communication is super huge!"

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- Struggle to find committed people
- Employers like to see/start manual machine operator prior to moving to CNC
- Manual machinists/tool makers—can't find skilled workers
- Entitlement is not just an issue with youth, but also with more mature workers, especially in union environments.
- Youth today—everything is now, they expect pay with out experience, they are missing ambition, big sense of entitlement, lack of work ethic
- Troubleshooting: new workers have a tendency to race to answer rather than evaluating all the evidence and facts at hand. Quick solutions not always the best ones.
- New workers don't realize the cost of crashing a machine
- Defensive behavior creates inefficiency
- Personal problems affecting work—employers would rather have employees share unresolved issues with them to attempt a solution than to have it creep into job performance or force a work separation.
- Workers focus on developing themselves rather the company—makes it difficult to maintain good people.
- Need to develop individuals that are more company minded, multifunctional. Cross training is becoming more important.
- Workers need to use the experience and knowledge of those on the floor, trust co-workers.
- Lack of team spirit is a concern

Acronyms

- 5S: Sort, Set in order, Shine, Standardize, Sustain
- CAD: Computer Aided Design
- CDC: Centers for Disease Control and Prevention
- CMM: Coordinate Measurement Machine
- CNC: Computer Numerical Control
- CSR: Customer Service Representative
- DOT: Department of Transportation
- EPA: United States Environmental Protection Agency
- ERP: Enterprise Resource Planning (software system)
- ESD: Electrostatic Discharge
- ESL: English as a Second Language
- FAA: Federal Aviation Administration
- FDA: United States Food and Drug Administration
- GLP: Good Laboratory Practice
- GMP: Good Manufacturing Practice
- G & M: G Programming Coding System (Gerber format); Modal Code
- ISO: International Organization for Standardization
- MIG: Metal Inert Gas
- MS: Microsoft
- MSDS: Material Safety Datasheet
- NFPA: National Fire Protection Agency
- OSHA: Occupational Safety & Health Administration
- PLC: Programmable Logic Controllers
- PPE: Personal Protective Equipment
- SOP: Standard Operating Procedure
- SPC: Statistical Process Control
- TIG: Tungsten Inert Gas
- USDA: United States Department of Agriculture

Manufacturing Potential Career Path

Entry Level → Advanced

Category	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Shipping/ Inventory Control	Packaging (2)	Shipping Helper	Receiver Shipper Shipping Clerk	Packer/Shipper		
Production	Parts Cleaner Saw Operator Drill Operator (1)					
	Material Handler	Quality Inspector (Entry)			Quality Inspector (5)	
	Parts Loader	Manual Machine Operator		Manual Machinist (4)		
	CNC Operator (2)	Machine Operator (4) Tool Room/Machinist Apprentice (4)	CNC Machinist (Entry) Sheet Metal Fabricator (2)	Grinding Setup Tech (2)	Setup Tech (2)	CNC Setup (5)
		Grinder (Entry Level) (1)		Grinder (3)		
				Entry Programmer (1)		Programmer (4)
Welding	Welder (4)					
Assembly	Painter Helper	Assembler	Assembly Lead			
	Secondary Operations	Assembly Tech				
Maintenance	Maintenance Person (1) Facilities (1) Equipment Maintenance (Entry—start to support production mechanic)	Electrical Maintenance				
Engineering	CAD Operator (1)	Product Engineer/Expert (2) *				
Customer Service	Administrative Assistant Customer Service Rep (1)	Sales (4)	Production Scheduler (2)			

Please note: The categories and job titles listed are representative of manufacturing occupations which typically require two years or less of training with required experience varying per company and position. Titles marked with an (*) may require more than two years. Titles noted in bold indicate greater need by employers with number of employer votes noted in (#). It is not always necessary for a person to move through each of these phases of advancement to reach a particular position level.

Onondaga Community College wishes to extend a special “thank you” to the following businesses for donating their expertise to the development of this employability profile for Manufacturing and to all of the managers and supervisors who served on this employer panel. Our program will be better because of your direction and guidance.



This employability profile was validated by local employers based upon the *Chart of Employability Skills* sponsored by the Alaska Processing Industries Careers Consortium, 2003, the *Employability Skills: Manufacturing* developed at Raritan Valley Community College, and the workplace behavior categories determined by Learning Resources Inc. OCC's Workforce Development Programs have been funded under a United States Department of Labor TAACCCT Grant whose purpose is to facilitate greater employment by improving education. For more information visit: