DACUM Research Chart for Precision Machinist

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Duties	Tasks				
A Review Job Process	A-1 Review work order	A-2 Review blueprint/ drawing	A-3 Clarify job require-ments	A-4 Identify special processes (e.g., plating, coating, heat-treating)	A-5 Identify machine(s) to use
B Develop Machining Processes	B-1 Identify machine sequence (e.g., lathe, drillpress)	B-2 Obtain machine tooling	B-3 Fabricate special tools	B-4 Determine feed & speed for machining operations	B-5 Determine rough part dimensions
C Obtain Raw Materials	C-1 Identify raw material type & size	C-2 Complete raw material requisition	C-3 Transport raw material to site	C-4 Receipt-inspect raw material	C-5 Layout raw material
D Perform Job Setup	D-1 Layout part profile	D-2 Build work-holding fixtures	D-3 Install work-holding device (e.g., fixture, vice, chuck)	D-4 Secure raw material into work-holding device	D-5 Verify calibration of measuring tools
E Manufacture Machine Parts*	E-1 Position cutting tool	E-2 Establish reference points/datum	E-3 Determine material to remove	E-4 Set cut depth	E-5 Rough part IAW machining processes
	E-13 Prepare technical reports	E-14 Participate in shop-specific training			
F Perform Lathe Operations	F-1 Machine part face	F-2 Machine part chamfer	F-3 Center drill machine parts	F-4 Turn ID/OD (e.g., length, taper, threads)	F-5 Drill holes in parts
	F-13 Perform part honing or lapping	F-14 Perform parting operations			
G Perform Milling Machine Operations	G-1 Perform fly cut/milling operation	G-2 Perform drilling operation (e.g., bolt circles, hole pattern)	G-3 Machine counter bore/ countersink	G-4 Machine part angles (e.g., taper, bevels, chamfers)	G-5 Perform index milling
H Perform Surface Grinder Operation	H-1 Ring test grinding wheel	H-2 Balance grinding wheel	H-3 Install grinding wheel	H-4 Dress grinding wheel	H-5 Perform grinding operation (e.g., topsurface, grooves, radius)
I Perform Sawing Operations	I-1 Select saw blade (e.g., pitch, rake, thickness)	I-2 Cut & weld saw blade	I-3 Mount saw blade (e.g., set guides, set tensions)	I-4 Break in saw blade	I-5 Cut parts profile (e.g., miter, angles, radius)
J Perform Drill Press Operations	J-1 Select drill press tooling	J-2 Sharpen drill bit	J-3 Center drill part	J-4 Set drill depths	J-5 Select tool bit rotation

*Tasks in this duty apply to the lathe, milling machine, surface grinder, saw, and drill press.

A-6 Identify machine tooling						
C-6 Saw raw material	C-7 Mark excess raw material	C-8 Restock excess raw material				
D-6 Verify calibration of equipment	D-7 Indicate (align) stock materials	D-8 Set up cutting tools into machine	D-9 Top off cutting fluids	D-10 Set machine controls (e.g., feed, speed)	D-11 Set up machine guard	
E-6 Adjust feed & speeds	E-7 Take in-process measurements	E-8 Troubleshoot machine tooling issues	E-9 Perform finishing operations	E-10 Deburr finished part	E-11 Polish finished part	E-12 Verify finished parts (e.g., dimension, features)
F-6 Machine part groves (e.g., ID, OD, faces)	F-7 Perform knurling operation	F-8 Machine phonographic finish	F-9 Perform tapping operation	F-10 Cut key ways	F-11 Grind part profiles	F-12 Burnish part profiles
G-6 Perform milling machine finishing operation (e.g., tapping, burnishing, reaming)	G-7 Perform pocket milling (e.g., holes, slots, circles, groves)		G-8 Perform boring operation			
J-6 Perform drilling operations (e.g., tap, bore, ream, counter bore/sink)	J-7 Perform drill press finishing operations (e.g., chamfering, spot facing, honing)					

Acronyms

IAW	In Accordance With
ID/OD	Inside Diameter/Outside Diameter
MSDS	Material Safety Data Sheets
OEM	Original Equipment Manufacturer
OSHA	Occupational Safety & Health Administration
PM	Preventative Maintenance
PPE	Personal Protective Equipment
QA	Quality Assurance
TIR	Total Indicator Runout

Duties	Tasks				
K Perform Bench Work	K-1 Perform filing operations (e.g., thread, flat, round)	K-2 Perform hand grinding operations (e.g., disc, orbital, belt)	K-3 Perform layout operations (e.g., scribe lines, arcs, bolt circles)	K-4 Perform lapping operations	
	K-5 Perform hand drilling operations	K-6 Perform hand tapping operations	K-7 Hand grind tool bits		
L Perform Precision Measurements	L-1 Perform thread measurements	L-2 Perform surface finish measurements	L-3 Perform height measurements	L-4 Perform angular measurements	L-5 Perform gear measurements
	L-6 Perform inside dimension measurements	L-7 Perform outside dimension measurements	L-8 Perform material hardness test	L-9 Perform runout measurements	
M Maintain Shop Equipment	M-1 Perform equipment PM (e.g., daily, monthly)	M-2 Inspect hand tools	M-3 Perform equipment calibration	M-4 Maintain equipment cleanliness	M-5 Maintain equipment fluid levels (e.g., hydraulic, coolant)
	M-6 Perform lockout/tagout procedures	M-7 Inspect equipment guards			

General Knowledge and Skills

Knowledge of tooling geometry
Time management skills
Decision making skills
Learning skills
Fabrication skills
Drafting skills
Knowledge of part handling techniques
Knowledge of special processes (e.g. plating, heat treating, coating)
Regulatory knowledge (OSHA, EPA)
Knowledge of shop rules
Knowledge of machine safety
Basic math knowledge
MSDS knowledge
Machine-specific knowledge
Material knowledge
Knowledge of cutting tools
Communication skills
Troubleshooting skills
Interpersonal skills
Problem solving skills
Blueprint reading skills
Organizational skills
Mechanical knowledge
Precision measuring skills
Analytical skills
Computer knowledge
Knowledge of tooling materials
Metallurgical knowledge
Knowledge of trade theory
Technical writing skills
Knowledge of grinding wheels
Knowledge of work holding devices
Knowledge of hand tool usage

Worker Behaviors

Persistent
Knowledgeable
Creative
Team Player
Good listener
Able to compromise
Open-minded
Attentive
Consistent
Positive
Honest
Trustworthy
Able to follow directions
Detail-oriented
Safety-oriented
Mature
Dependable
Punctual
Ambitious
Organized
Good listener
Sense of humor
Self-starter
Patient
Able to handle stress
Team player
Adaptable
Healthy
Loyal
Willing to help others

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Tools, Equipment, Supplies and Materials

Laptop/computer
PPE
Mobile phone
Machinery's Handbook
Microsoft Office software
Equipment-specific technical manuals
Scientific calculator
Emory cloth
Shop rags/gloves
Drill bits
Parting tool
Carbide inserts
Knurling tool
Taps & dies
Rollaround toolbox
Reamers
Hand tools (e.g. Allen wrenches, rubber mallet, ball peen hammer)
Counter bore/sink
Measuring tools:
- Micrometers
- Indicator
- Tape measure
- Vernier calipers
- Depth micrometers
- Protractors
- Precision squares
- Combination squares
- Angle finder
- Steel scales

Heat treat oven
Hardness tester
Extractors
Profilometer
Refractormeter
Gauge blocks
Pin gauges
Thread pitch gauges
Radius gauges
Broom
Coal shovel
Pedestal grinder
Horizontal lathe
Key seater
Vertical mill
Shop press
Magnetic drill
Vertical turret lathe
Horizontal boring mill
Blanchard grinder
Broach
Metal brake
Band saw
Shim stock
Files
Rubber mat
Sand blaster
Digital readouts
Oxyacetylene torches
Flashlight

Future Trends and Concerns

Perception of the trade unchanged
Competitive wages
Good job security
Improved working conditions
Industry competition
Foreign competition
Struggling economy
Growing material/product costs
Lack of skilled trades candidates
Regulatory challenges
Cost of energy
Infrastructure
Succession planning
Nano technology