

QUALIFICATION FILE

CNC Operator – Vertical Machining Centre

☒ Short Term Training (STT) ☐ Long Term Training (LTT) ☐ Apprenticeship

☐ Upskilling ☐ Dual/Flexi Qualification ☐ For ToT ☐ For ToA

☐ General ☒ Multi-skill (MS) ☐ Cross Sectoral (CS) ☐ Future Skills ☐ OEM

NCrF/NSQF Level: 4

Submitted By:

Capital Goods and Strategic Skill Council

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Section 1: Basic Details

1.	Qualification Name	CNC Operator – Vertical Machining Centre														
2.	Sector/s	Capital Goods and Manufacturing														
3.	Type of Qualification: ☐ New ☒ Revised ☐ Has Electives/Options ☐ OEM	NQR Code & version of existing/previous qualification: (change to previous, once approved) 2022/CCM/CGSC/06602 V3.0		Qualification Name of existing/previous version: CNC Operator – Vertical Machining Centre												
4.	a. OEM Name b. Qualification Name (Wherever applicable)															
5.	National Qualification Register (NQR) Code &Version (Will be issued after NSQC approval)	QG-04-CG-03926-2025-V2-CGSSC V4.0	6. NCrF/NSQF Level: 4													
7.	Award (Certificate/Diploma/Advance Diploma/ Any Other (Wherever applicable specify multiple entry/exits also & provide details in annexure)	Certificate														
8.	Brief Description of the Qualification	A CNC Operator - Vertical Machining Centre is responsible for setting up Vertical Machining Centre (VMC), cutting tools and work holding devices for machining a variety of metal and non-metal components as per the given specifications.														
9.	Eligibility Criteria for Entry for Student/Trainee/Learner/Employee	a. Entry Qualification & Relevant Experience: <table border="1"> <thead> <tr> <th>S. No.</th> <th>Academic/Skill Qualification (with Specialization - if applicable)</th> <th>Required Experience (with Specialization - if applicable)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12th grade pass or equivalent</td> <td>No Experience required.</td> </tr> <tr> <td>2</td> <td>Completed 2nd year of 3-year diploma (after 10th) or equivalent</td> <td>No Experience required.</td> </tr> <tr> <td>3</td> <td>10th grade pass with two years of any combination of NTC/NAC/CITS or equivalent.</td> <td>No Experience required.</td> </tr> </tbody> </table>			S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)	1	12th grade pass or equivalent	No Experience required.	2	Completed 2nd year of 3-year diploma (after 10th) or equivalent	No Experience required.	3	10th grade pass with two years of any combination of NTC/NAC/CITS or equivalent.	No Experience required.
S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)														
1	12th grade pass or equivalent	No Experience required.														
2	Completed 2nd year of 3-year diploma (after 10th) or equivalent	No Experience required.														
3	10th grade pass with two years of any combination of NTC/NAC/CITS or equivalent.	No Experience required.														

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18.	Is the Job Role Amenable to Persons with Disability	☐ Yes ☒ No If “Yes”, specify applicable type of Disability:	
19.	How Participation of Women will be Encouraged	Yes via Industry or College Engagement	
20.	Are Greening/ Environment Sustainability Aspects Covered (Specify the NOS/Module which covers it)	☐ Yes ☒ No To be incorporated later	
21.	Is Qualification Suitable to be Offered in Schools/Colleges	Schools ☐ Yes ☐ No Colleges ☒ Yes ☐ No	
22.	Name and Contact Details of Submitting / Awarding Body SPOC (In case of CS or MS, provide details of both Lead AB & Supporting ABs)	Name: Ridhima Email : technicaladvisors@cgssc.org Website: www.cgssc.org Contact No.: +91-8882907092	
23.	Final Approval Date by NSQC: 30 th April 2025	24. Validity Duration: 3 Years	25. Next Review Date: 30 th April 2028

Section 2: Module Summary

NOS/s of Qualifications

(In exceptional cases these could be described as components)

Mandatory NOS/s:

Specify the training duration and assessment criteria at NOS/ Module level. For further details refer curriculum document.

Th.-Theory Pr.-Practical OJT-On the Job Man.-Mandatory Training Rec.-Recommended Proj.-Project Vi-Viva

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/ Non-Core	NCrF/N SQF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) (if applicable)
1.	Bridge Module & Follow the health and safety practices at work	CSC/N1335 NOS Version- 2.0	Non-Core	3	2	25	35	-	-	60	30	70	-	-	100	15
2.	Coordinate with co-workers to achieve work efficiency.	CSC/N1336 : Version No. – 2.0	Non-Core	3	1	10	20	-	-	30	30	70	-	-	100	10
3.	Set the CNC VMC for	CSC/N0123	Core	4	5	40	80			150	30	70	-	-	100	35

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/ Non-Core	NCrF/N SQF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) (if applicable)
	operations	: Version No. – 2.0						30								
4.	Carry out machining using the Advanced Digital CNC VMC.	CSC/N0116 , v3.0	Core	4	6	45	105	30		180	30	70	-	-	100	35
5.	Employability Skills (30 hours)	DGT/VSQ/N 0101- Version No. – 1.0	Non-Core	4	1	12	18	-	-	30	20	30	-	-	50	5
Duration (in Hours) / Total Marks					15	132	258	60		450	140	310	-	-	450	100

Elective NOS/s:

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/ Non-Core	NCrF/N SQF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) (if applicable)
1.																
2.																
Duration (in Hours) / Total Marks																

Optional NOS/s:

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/ Non-Core	NCrF/N SQF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) (if applicable)
1.																
2.																
Duration (in Hours) / Total Marks																

3.	Tools and Equipment Required for Training	☒ Yes ☐ No (If “Yes”, details to be provided in Annexure)
4.	In Case of Revised Qualification, Details of Any Upskilling Required for Trainer	NA

Section 4: Assessment Related

Assessor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	Diploma in Mechanical with 3 years of relevant industry experience specialization in CNC Operator – Vertical Machining Centre (Practical Skills and knowledge required in the relevant field). B. Tech in Mechanical with 2 years of relevant industry experience specialization in CNC Operator – Vertical Machining Centre (Practical Skills and knowledge required in the relevant field).
Proctor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	B. Tech in Mechanical/ Electronics/ Mechatronics with 6 years of relevant experience. M. Tech in Mechanical/ Electronics/ Mechatronics with 4 years of relevant experience.
Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	B. Tech in Mechanical/ Electronics/ Mechatronics with 8 years of relevant experience. M. Tech in Mechanical/ Electronics/ Mechatronics with 4 years of relevant experience.
Assessment Mode (Specify the assessment mode)	Formative, Summative & Skill Assessment
Tools and Equipment Required for Assessment	☒ Same as for training ☐ Yes ☐ No (details to be provided in Annexure-if it is different for Assessment)

Section 5: Evidence of the need for the Qualification

Provide Annexure/Supporting documents name.

1.	Latest Skill Gap Study (not older than 2 years) (Yes/No): No
2.	Latest Market Research Reports or any other source (not older than 2 years) (Yes/No): No (Industry driven)
3.	Government /Industry initiatives/ requirement (Yes/No): Yes
4.	Number of Industry validation provided: 11
5.	Estimated nos. of persons to be trained and employed: 1809
	Evidence of Concurrence/Consultation with Line Ministry/State Departments: Yes If “No”, why:

Section 6: Annexure & Supporting Documents Check List

Specify Annexure Name / Supporting document file name

1.	Annexure: NCrf/NSQF level justification based on NCrf level/NSQF descriptors <i>(Mandatory)</i>	Q File
2.	Annexure: List of tools and equipment relevant for qualification <i>(Mandatory, except in case of online course)</i>	Q File
3.	Annexure: Detailed Assessment Criteria <i>(Mandatory)</i>	Q File
4.	Annexure: Assessment Strategy <i>(Mandatory)</i>	Q File
5.	Annexure: Blended Learning <i>(Mandatory, in case selected Mode of delivery is “Blended Learning”)</i>	NA
6.	Annexure: Multiple Entry-Exit Details <i>(Mandatory, in case qualification has multiple Entry-Exit)</i>	NA
7.	Annexure: Acronym and Glossary <i>(Optional)</i>	Available
8.	Supporting Document: Model Curriculum <i>(Mandatory – Public view)</i>	Attached
9.	Supporting Document: Career Progression <i>(Mandatory - Public view)</i>	Attached
10.	Supporting Document: Occupational Map <i>(Mandatory)</i>	Attached
11.	Supporting Document: Assessment SOP <i>(Mandatory)</i>	Available in QP
12.	Any other document you wish to submit:	NA

Annexure: Evidence of Level

NCrF/NSQF Level Descriptors	Key requirements of the job role/ outcome of the qualification	How the job role/ outcomes relate to the NCrF/NSQF level descriptor	NCrF/NSQF Level
Professional Theoretical Knowledge/Process	Wide-ranging specialized theoretical learning requirements • Process of preparing for setting the CNC VMC machine • Process of setting the CNC VMC machine • Process of preparing for machining activities on VMC • Process of performing machining operations	The job involves a range of theoretical understanding and practical skills as can be seen from the job requirements given in the adjacent cell. The skills include setting up CNC VMC for carrying out machining operations	4
Professional and Technical Skills/ Expertise/ Professional Knowledge	• Knowledge of applicable documentation requirements in the job role. • Know how to use of the relevant Personal Protective Equipment (PPE) • Understand the common terminology associated with VMCs • Knowledge of of different types of VMCs • Knowledge of following the recommended machining sequences and procedures • Understand the importance and procedures to be followed to ensure that tools and equipment are in a safe and usable condition • Understand different methods and equipment used for carrying out various VMC machining operations • Knowledge of common terminology used in VMC machining • Knowledge of the working parts of the VMC	As indicated by the knowledge and understanding requirements mentioned in the adjacent cell, the job holder needs to have a knowledge of setting up CNC VMC for carrying out machining operations.	4

Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	• set the zero-referencing return position on the machine • check the readiness of components and cutters • check the availability of appropriate cutting, measuring and hand tools as per the job requirements • check that all the measuring equipment are calibrated and approved for usage • align the work-holding device appropriately • plan the activities to be performed in a logical sequence • conduct the preliminary check of the readiness of the vertical machining centre • select the appropriate cutting, measuring tools and hand tools as per the job requirements	As indicated by the performance criteria in the adjacent cell, the job holder needs to have wide-ranging knowledge of setting up CNC VMC for carrying out machining operations.	4
Broad Learning Outcomes/Core Skill	Logical and mathematical skills • Follow the technical specification and appropriate procedures. • Perform work-related calculations Collecting and organising information • Use the standard templates and tools for documenting work • Collect the relevant information concerning the setting up of CNC VMC for carrying out machining operations and carry out the appropriate documentation.	The job holder requires logical and relevant mathematical skills for planning and managing the production process As indicated by the performance criteria in the adjacent cell, the job involves collecting the relevant information and preparation of appropriate documents, as required in the job role.	4
Responsibility	• Responsible for determining the work requirements	A CNC Operator - Vertical	4

	- Responsible for cleaning the CNC VMC machine using the recommended cleaning agent and accessories - Responsible for setting the zero-referencing return position on the machine - Responsible to pre-set the tooling using setting jigs/fixtures - Responsible to set tool datum, position, length, offset and radius compensation - Responsible for carrying out relevant documentation as per the organisational procedure. - Responsible for planning the activities to be performed in a logical sequence	Machining Centre is responsible for setting up Vertical Machining Centre (VMC), cutting tools and work holding devices for machining a variety of metal and non-metal components as per the given specifications. The individual conducts trial runs, proves the program in single block mode, and performs the necessary checks before allowing the machine to operate in full program run mode.	
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Annexure: Tools and Equipment (Lab Set-Up)

List of Tools and Equipment

Batch Size: 20-25 Nos

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1	Chairs/Tables	Standard	25
2	Computer with internet	Standard	25
3	LCD projector with screen	Standard	1
4	Trainer chair and Table	Standard	1
5	Demonstration table pin up boards	Standard	1
6	White board with marker	Standard	1

7	CNC Controlled Vertical Machining Centre	3-Axes	1
8	Measuring Instruments	External Micrometer, Internal Micrometer, Depth Micrometer, Digital Vernier, Dial Vernier, Protractor, Slip Gauge, Bore/Hole Gauge, Thread Gauge, Plug Gauge, Radius/Profile Gauge, Dial Test Indicators (DTI), Surface Finish Equipment, Templates	1 Each
9	Machine Vice	Standard	1
10	Angle Plate	Standard	1
11	Indexing Head/Device	Standard	1
12	Fire Extinguisher	Standard	1
13	Safety Gloves (Rubber)	Standard	25
14	Ear Plugs	Standard	25
15	Safety Shoes & Helmet	Standard	25
16	Goggles	Standard	25
17	First-Aid Kit	Standard	2

Classroom Aids

The aids required to conduct sessions in the classroom are:

1. Computer / Laptop
2. Whiteboard and marker
3. Projector

Annexure: Industry Validations Summary

Provide the summary information of all the industry validations in table. This is not required for OEM qualifications.

S. No	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID	LinkedIn Profile (if available)
1	Wangfeng Aluminium Wheel (India) Pvt. Ltd.	Sanjeev Chaudhary	HR Head	Plot No. 15 to 18, Sec-8, Industrial Model TWP,Bawal, Haryana - 123501	8750231400		
2	Palak Plastic Pvt.Ltd.	Hem Chander Yadav	Director	Plot No. 25, Sec-3, Phase 1, IMT, Bawal, Rewari, Haryana - 123501	0124-4019506	palakplastic@gmail.com	
3	Hay Industry	Harshit Yadav	HR Head	504/4, Gali No. 4, Near Rajendra Hospital, Om Nagar, Gurugram,Haryana-122001	9212154114	industryhay@gmail.com	
4	AG Enterprises	Durgesh Gupta	Manager -HR	Room No. 1,2 nd Floor,Plot No. 345, Sector-08,IMT, Manesar, Gurugram Haryana -122051	8750279555	bd@agenterpriseshr.com	
5	Hans Enterprises	OP Yadav	Sr. OP Manager	Cyberwalk, Plot No.CP 9,Tower E,GF,Cabin No4, Sec-5,IMT,Manesar, Gurugram Haryana	8750801333	Enterprisesghans@gmail.com	
6	Palak Plastic Pvt.Ltd.	Sunil Kumar	Director	Plot No.345, Sec-8, IMT, Manesar, Gurugram Haryana-122051	9810075433	sunilyadav7143@gmail.com	
7	Revent	Krishnakant Shukla	DGM-Training	Forging Division, unit 2nd, Begumpur, Khataula, Post Office-Khandsa,,Gurugram ,	9262708933	Krishnakant.shukla@reventengineering.com	

				Haryana-122004			
8	Sudhir Foundation	Ravi Prakash	DGM-Training	Plot No.93, Sector-8,IMT,Manesar,Gurugram , Haryana-122051	7988101508	965sudhirfoundation@gmail.com	
9	JBM Group	Rajeev Kumar Sharma	VP-Head Skill Development – JBM Group	JBM Auto Limited,Skill Development Centre, Plot No.16, sector-20B, Faridabad, (Haryana)- 121007	8860281177	Rajeev.sharma@jbmggroup.com	
10	Subros	Pawan Yadav	HR Head	Plot No. 395-396, Sec-8, Phase-3, IMT Manesar, Gurugram, - 122050	9818148609	p.yadav@subros.com	
11	Texmaco	Rajeev Gupta	Chief Business Officer	Belgharia,24 Parganas(North), Kolkata-700056	7042644994	Rajeev.gupta@texmaco.in	

Annexure: Training & Employment Details

Training and Employment Projections:

Year	Total Candidates		Women		People with Disability	
	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities
2022-2023	3631	1326	363	133	36	13
2023-2024	3994	1459	399	146	40	15

2024-2025	4394	1604	439	160	44	16
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Data to be provided year-wise for next 3 years

Training, Assessment, Certification, and Placement Data for previous versions of qualifications:

Qualification Version	Year	Total Candidates				Women				People with Disability			
		Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed
	2022-2023	521	521	487	341	52	52	49	34	5	5	5	3
	2023-2024	1151	1151	1034	724	115	115	103	72	12	12	10	7
	2024-2025	3301	1903	1722	1205	330	190	172	121	33	19	17	12

Applicable for revised qualifications only, data to be provided year-wise for past 3 years.

List Schemes in which the previous version of Qualification was implemented:

1. PMKVY 4.0 CSM STT
2. Non PMKVY
3. TNSDC
4. Fee Based
5. NABARD
6. MSSDS
7. GSDM
8. SDIS Orissa State Skilling Scheme
9. NULM
10. SDIS DDU GKY

Content availability for previous versions of qualifications: PH, FG

☐ Participant Handbook ☐ Facilitator Guide ☐ Digital Content ☐ Qualification Handbook ☐ Any Other:

Languages in which Content is available: Hindi

NSQ Approved

Annexure: Blended Learning

Blended Learning Estimated Ratio & Recommended Tools:

Refer NCVET “Guidelines for Blended Learning for Vocational Education, Training & Skilling” available on:

<https://ncvet.gov.in/sites/default/files/Guidelines%20for%20Blended%20Learning%20for%20Vocational%20Education,%20Training%20&%20Skilling.pdf>

Annexure: Detailed Assessment Criteria

Detailed assessment criteria for each NOS/Module are as follows:

CSC/N1335: Follow the health and safety practices at the work

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Maintain personal health and safety</i>	7	12	-	-
PC1. follow the recommended practices to ensure protection from infections and transmission to others, such as the use of hand sanitiser and face mask	2	3	-	-
PC2. check the work conditions, assess the potential health and safety risks, and take appropriate measures to mitigate them	1	2	-	-
PC3. select and use the appropriate Personal Protective Equipment (PPE) relevant to the task and work conditions	1	2	-	-
PC4. follow the recommended techniques while lifting and moving heavy objects to avoid injury	1	3	-	-

PC5. follow the manufacturer's instructions and workplace safety guidelines while working on heavy machinery, tools and equipment	2	2	-	-
<i>Assist in hazard management</i>	4	10	-	-
PC6. identify existing and potential hazards at work	1	1	-	-
PC7. assess the potential risks and injuries associated with the identified hazards	1	3	-	-
PC8. coordinate with the supervisor or other relevant personnel to prevent or minimise the identified hazards	1	3	-	-
PC9. handle hazardous materials safely and store them in the designated storage	1	3	-	-
<i>Check the first aid box, firefighting and safety equipment</i>	3	7	-	-
PC10. check the first aid box to ensure it is updated with the relevant first aid supplies	1	2	-	-
PC11. check and test the firefighting and various safety equipment to ensure they are in usable condition	1	3	-	-
PC12. coordinate with the supervisor for the repair and replacement of firefighting and safety equipment	1	2	-	-
<i>Assist in waste management</i>	3	8	-	-
PC13. segregate waste into appropriate categories	1	3	-	-
PC14. recycle the recyclable waste appropriately	1	3	-	-
PC15. dispose of the non-recyclable waste in an environment-friendly manner, complying with the applicable regulations	1	2	-	-
<i>Follow the fire safety guidelines</i>	3	12	-	-

PC16. use the appropriate type of fire extinguisher to extinguish different types of fires safely	1	4	-	-
PC17. follow the recommended practices for a safe rescue during a fire emergency	1	4	-	-
PC18. coordinate with the fire department to request assistance to extinguish a serious fire	1	4	-	-
<i>Follow the emergency and first-aid procedures</i>	7	12	-	-
PC19. follow the organisational health and safety guidelines during workplace emergencies to ensure own and co-workers' safety	1	2	-	-
PC20. follow the recommended practices to minimise loss to organisational property during an emergency	1	3	-	-
PC21. follow the recommended procedure to free a person from electrocution	1	2	-	-
PC22. administer appropriate first aid to the injured personnel	1	2	-	-
PC23. perform Cardiopulmonary Resuscitation (CPR) on a potential victim of cardiac arrest	1	2	-	-
PC24. coordinate with the emergency services to request medical assistance for seriously injured/ ill personnel requiring professional medical attention or hospitalisation	2	1	-	-
<i>Carry out relevant documentation and review</i>	3	9	-	-
PC25. carry out appropriate documentation following a health and safety incident at work, including all the required information	1	3	-	-
PC26. coordinate with the relevant personnel to review health and safety conditions at work regularly or following an incident	1	3	-	-

PC27. assist in implementing appropriate changes to improve the health and safety conditions at work	1	3	-	-
NOS Total	30	70	-	-

CSC/N1336: Coordinate with co-workers to achieve work efficiency

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Work effectively with co-workers</i>	20	43	-	-
PC1. plan daily tasks at work to ensure their timely completion and efficient use of time	2	4	-	-
PC2. carry out work responsibilities adhering to the limits of authority	2	4	-	-
PC3. follow the supervisor's instructions to ensure adherence to the applicable quality standards and timescales	2	4	-	-
PC4. coordinate with the co-workers to achieve the work objectives efficiently	2	4	-	-
PC5. prepare the relevant documents and reports as per the supervisor's instructions, providing appropriate information clearly and systematically	2	4	-	-

PC6. coordinate with the supervisor or relevant personnel to deal with out of authority tasks and concerns	2	4	-	-
PC7. mentor and assist subordinates in the execution of their work responsibilities	2	4	-	-
PC8. identify possible disruptions to work through coordination with the relevant stakeholders and take appropriate preventive measures	2	4	-	-
PC9. use various resources efficiently to ensure maximum utilisation and minimum wastage	2	4	-	-
PC10. follow the recommended practices to avoid and resolve conflicts at work	1	4	-	-
PC11. follow the relevant organisational policies to ensure disciplined behaviour with maximum productivity at work	1	3	-	-
<i>Communicate effectively with co-workers</i>	6	15	-	-
PC12. follow the organisational policy for the efficient and timely dissemination of information to the authorised personnel	2	5	-	-
PC13. communicate clearly and politely to ensure effective communication with co-workers	2	5	-	-
PC14. follow the appropriate techniques for active listening during interactions	2	5	-	-
<i>Practice inclusion at work</i>	4	12	-	-

PC15. empathise with Persons with Disabilities (PwD)	2	6	-	-
PC16. adopt gender-neutral behaviour at work	2	6	-	-
NOS Total	30	70	-	-

CSC/N0120: Set up the CNC turning machine for operations

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Prepare for setting the CNC turning machine</i>	11	30	-	-
PC1. use the relevant information from engineering drawings concerning the work to be undertaken for setting up the CNC machine	1	4	-	-
PC2. determine the job specifications by referring to job instruction sheet/job card, component drawing, work drawing, planning documentation; quality control documents; operation sheets, component drawings; approved sketches/illustrations, process drawing, etc.	1	4	-	-
PC3. analyse the component drawings and approved sketches/ illustrations/ reference charts/ tables/ graphs/ machining/ assembly drawings to determine the machining requirements	1	4	-	-

PC4. extract the relevant information such as tapping sizes and threads; feeds and speeds; component ratings; machining symbols and tolerances from reference charts, tables, graphs	1	4	-	-
PC5. check the process sheet and match it with the received drawings and other specifications	1	2	-	-
PC6. identify the tool requirements from the tooling layout and assess their suitability	1	2	-	-
PC7. check the availability of required cutting, measuring and hand tools	1	2	-	-
PC8. select the appropriate work holding/ fixturing device as per the job requirement	1	2	-	-
PC9. ensure the correct and latest part program is uploaded onto the CNC system	1	2	-	-
PC10. check the runout of chuck and the taper of tailstock are as recommended	1	2	-	-
PC11. pre-set the tooling appropriately using setting jigs/fixtures	1	2	-	-
<i>Set the CNC turning machine</i>	19	40	-	-
PC12. check the measuring equipment to ensure they are calibrated and approved for use	1	2	-	-
PC13. check the tools and fixtures to ensure they are calibrated appropriately, and free from damage	1	2	-	-

PC14. mount tools in the correct position in the tool holder, turrets, magazine or carousel	1	2	-	-
PC15. check that tools have the required tool number in relation to the operating program	1	2	-	-
PC16. enter all the relevant tool data in the operating program and also part-program for cutting parts using the appropriate commands	1	2	-	-
PC17. set tool datum, position, length, offset and radius compensation, maintaining the recommended margin for error rectification	1	2	-	-
PC18. mount the work holding device/fixture onto the machine and set it according to the machine datum and reference points	1	2	-	-
PC19. set the machine tool operating parameters such as hydraulic pressure and clamping according to the component requirements	1	2	-	-
PC20. set the CNC machine in the correct operating mode, and enter the tooling data by accessing the program edit facility	1	2	-	-
PC21. conduct trial runs using single block run, dry run, and feed and speed override controls	1	2	-	-
PC22. check the geometrical accuracies of component such as diameter on multiple points, taper, surface finishing, groove depths and widths, drill depth, Outer Diameter (OD)/Inner Diameter (ID), threading quality and dimensions	1	2	-	-

PC23. check the allowable grinding margin on OD and ID	1	2	-	-
PC24. prove the program tool in single block mode and transfer the program to the machine	1	2	-	-
PC25. conduct multiple trial runs before allowing the machine to operate in full program run mode, and make appropriate adjustments to offsets to ensure accuracy in the critical parameters of the components to be machined	1	2	-	-
PC26. carry out necessary documentation as per the organisational procedure for the handover of the machine	1	2	-	-
PC27. follow the appropriate troubleshooting steps to resolve issues experienced with setting up of the tooling, work holding devices and proving the program	1	2	-	-
PC28. check if the CNC turning/lathe machine responds to emergency commands and actions	1	2	-	-
PC29. check the tools/ fixtures for damage during the prove-out	1	2	-	-
PC30. carry out appropriate documentation with respect to the setting of the machine and checks conducted	1	2	-	-
PC31. coordinate with an expert to resolve any issues encountered while setting up the CNC machine	-	2	-	-

NOS Total	30	70	-	-
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CSC/N0123: Set the CNC VMC for operations

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Prepare for setting CNC VMC machine</i>	13	35	-	-
PC1. determine how the CNC VMC machine needs to be set up by referring to the appropriate sources of job specification documents such as approved engineering drawings, component drawings and sketches, process specifications, quality control documents, etc.	1	4	-	-
PC2. prepare the work area for setting the CNC VMC machine according to the as given specifications and applicable procedure	1	4	-	-
PC3. clean the CNC VMC machine using the recommended cleaning agent and accessories	1	4	-	-
PC4. check the coolant and lubricant have the recommended levels, and replenish them, as required	1	4	-	-
PC5. check the machine sub-systems to ensure they their functioning as expected	1	2	-	-
PC6. set the zero referencing return position on the machine	1	2	-	-

PC7. check the readiness of components and cutters	1	2	-	-
PC8. check the availability of appropriate cutting, measuring and hand tools as per the job requirements	1	2	-	-
PC9. check that all the measuring equipment are calibrated and approved for usage	1	2	-	-
PC10. identify tool requirements from tooling layout and assess their suitability for producing various features and profiles	1	2	-	-
PC11. select the suitable work holding or fixturing device as per the job requirement	-	1	-	-
PC12. ensure the tools and fixtures are free from breakage and damage and calibrated appropriately	1	2	-	-
PC13. check the correct and latest part-program is uploaded onto the CNC system	1	2	-	-
PC14. pre-set the tooling using setting jigs/fixtures	1	2	-	-
<i>Set the CNC VMC machine</i>	17	35	-	-
PC15. mount and set the required work-holding devices, work-piece and cutting tools	1	1	-	-
PC16. align the work-holding device appropriately	1	1	-	-

PC17. position cutters according to the workpiece, tool presetter, and cutter Revolutions Per Minute (RPM); check the machine guards and safety switches/devices/ mechanisms are installed and working appropriately	1	2	-	-
PC18. set the recommended linear/table feed rate, cutting fluid flow rate, depth of cut for roughing and finishing	1	2	-	-
PC19. check that the tools have the recommended tool number in relation to the operating program	1	2	-	-
PC20. enter all the relevant tool data in the operating program on the CNC VMC	1	2	-	-
PC21. set tool datum, position, length, offset and radius compensation	1	2	-	-
PC22. mount the work holding device/fixture onto the machine	1	2	-	-
PC23. set the work holding device/fixture in relation to the machine datum and reference points	1	2	-	-
PC24. set the machine tool operating parameters such as hydraulic pressure and clamping according to the component requirements	1	2	-	-
PC25. set the machine in the correct operating mode, and enter the tooling data by accessing the program edit facility	1	2	-	-

PC26. conduct trial runs using the single block run, dry run, feed and speed override controls	1	2	-	-
PC27. prove the program tool in the single block mode	1	2	-	-
PC28. measure and correct the dimensions of the first component before allowing the machine to operate in full program run mode	1	2	-	-
PC29. record the dimensions of the first component as per the organizational procedure	-	1	-	-
PC30. check for safe electrical power supply and insulation of power cables	1	2	-	-
PC31. check interlocking, and security of pipes and couplings	-	1	-	-
PC32. check the oil level, temperature and pressure are as recommended	1	2	-	-
PC33. carry out relevant documentation as per organisational procedure	-	1	-	-
PC34. coordinate with an expert to resolve any complex issues encountered while setting up the CNC VMC machine	1	2	-	-
NOS Total	30	70	-	-

CSC/N0116: Carry out machining using the Advanced Digital CNC VMC.

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Prepare for machining activities on VMC</i>	10	30	-	-
PC1. determine the job specification by referring to job instruction sheet/job card; work drawings and instructions; planning documentation; quality control documents; instructions from supervisor, etc.	1	2	-	-
PC2. analyse the component drawings and approved sketches/ illustrations/ reference charts/ tables/ graphs/ machining/ assembly drawings to determine the machining requirements	1	2	-	-
PC3. identify the incorrect and inconsistent information in the job specification documents	1	2	-	-
PC4. coordinate with the relevant personnel for the rectification of incorrect and inconsistent information in the job specification documents, following the organizational procedure	-	1	-	-
PC5. identify the type of raw materials or components required for the job, including the quality and quantity requirements	1	2	-	-
PC6. select the appropriate raw materials/ components/ workpieces with the recommended limits and tolerances, and surface texture requirements	-	1	-	-

PC7. check the raw material or components to be used to ensure they are free from foreign objects, dirt or other contamination	1	2	-	-
PC8. plan the activities to be performed in a logical sequence	-	1	-	-
PC9. select the required tools and check them to ensure they are not worn out or damaged	1	2	-	-
PC10. extract the relevant information such as tapping sizes and threads; feeds and speeds; component ratings; machining symbols and tolerances from reference charts, tables, graphs	-	1	-	-
PC11. prepare the work area for the machining operations as per the operational specification and applicable procedures	1	2	-	-
PC12. conduct the preliminary check of the readiness of the vertical machining centre	-	2	-	-
PC13. select the appropriate cutting, measuring tools and hand tools as per the job requirements	1	2	-	-
PC14. ensure all the measuring equipment are calibrated and approved for usage	-	2	-	-
PC15. set the workpieces/ components using the appropriate positioning and/or holding devices and support mechanisms as per the job requirements	1	2	-	-
PC16. coordinate with the supervisor or relevant personnel to resolve any issues identified with the tools, equipment and workpieces/ components	1	2	-	-

PC17. check the operating program is at the correct start point and the workpiece is clear of the machine spindle	-	2	-	-
<i>Perform machining operations</i>	18	38	-	-
PC18. load and unload components using the pre- determined fixtures or work holding devices/ fixtures as per the work instructions	1	2	-	-
PC19. carry out a trial run by taking back the tool offsets by a minimum amount, keeping margin error rectification	1	1	-	-
PC20. measure the critical parameters of the machined component such as length, width, flatness and cylindricity without removing it from the machine	-	1	-	-
PC21. correct the offsets based on the measurements by accessing the program edit facility and entering the appropriate tooling data, such as offsets compensation and radius compensation	1	1	-	-
PC22. conduct multiple trial runs and subsequent adjustment of offsets to ensure accuracy in the critical parameters of the machined components	-	1	-	-
PC23. measure the component after unloading to check for accuracy in the critical parameters as per the job specifications	1	1	-	-

PC24. produce machined components with the required features such as flat, square, parallel and angular faces, open-ended or enclosed recesses, etc	-	1	-	-
PC25. follow the recommended machining sequence and procedure as per the job specifications	1	2	-	-
PC26. identify the error codes and inbuilt alarms on equipment and take appropriate action to resolve them as per operating manual/organizational guidelines	1	2	-	-
PC27. carry out regular inspects during the machining process as per the recommended inspection frequency	1	2	-	-
PC28. record the measured values as per the organisational procedure	1	2	-	-
PC29. use the relevant Industry 4.0 manufacturing technologies to ensure interconnectivity, automation, machine learning, and real-time data collection and analysis	1	2	-	-
PC30. identify inconsistencies in dimensions due to tool wear and correct the offsets accordingly	1	2	-	-
PC31. adjust the machine settings whenever required to maintain the required accuracy	1	2	-	-
PC32. identify the need of sharpening or replacing the tools	-	1	-	-

PC33. sharpen or replace the worn-out/ damaged tools, using the necessary equipment and following the relevant safety guidelines	-	1	-	-
PC34. perform the relevant maintenance checks on the machine and carry out maintenance after the machining operations	-	1	-	-
PC35. follow the organisational procedure while handling the machined components	1	2	-	-
PC36. ensure the machined components conform to the applicable quality standards	1	2	-	-
PC37. store the appropriate tools and equipment after use at the designated location	1	1	-	-
PC38. comply with the applicable turnaround time to achieve the production targets	1	2	-	-
PC39. coordinate with the appropriate personnel to report any issues with machining operations and resolve them promptly to ensure minimum or no impact on machining operations	1	2	-	-
PC40. carry out necessary documentation such as entries in the logbook on the completion of machining operations	1	2	-	-
PC41. follow the applicable health and safety guidelines to maintain the work area in a safe and hygienic condition after the completion of work	-	1	-	-
PC42. ensure compliance with the applicable national and international standards	1	1	-	-

<i>Use resources optimally</i>	2	2	-	-
PC43. optimise the usage of electricity and other resources in various tasks and processes	1	1	-	-
PC44. connect the electrical tools and equipment safely, and turn them off when not in use	1	1	-	-
NOS Total	30	70	-	-

DGT/VSQ/N0101: Employability Skills (30 Hours)

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Introduction to Employability Skills</i>	1	1	-	-
PC1. understand the significance of employability skills in meeting the job requirements	-	-	-	-
<i>Constitutional values – Citizenship</i>	1	1	-	-
PC2. identify constitutional values, civic rights, duties, personal values and ethics and environmentally sustainable practices	-	-	-	-
<i>Becoming a Professional in the 21st Century</i>	1	3	-	-

PC3. explain 21st Century Skills such as Self- Awareness, Behavior Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and cultural awareness, emotional awareness, continuous learning mindset etc.	-	-	-	-
<i>Basic English Skills</i>	2	3	-	-
PC4. speak with others using some basic English phrases or sentences	-	-	-	-
<i>Communication Skills</i>	1	1	-	-
PC5. follow good manners while communicating with others	-	-	-	-
PC6. work with others in a team	-	-	-	-
<i>Diversity & Inclusion</i>	1	1	-	-
PC7. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC8. report any issues related to sexual harassment	-	-	-	-
<i>Financial and Legal Literacy</i>	3	4	-	-
PC9. use various financial products and services safely and securely	-	-	-	-

PC10. calculate income, expenses, savings etc.	-	-	-	-
PC11. approach the concerned authorities for any exploitation as per legal rights and laws	-	-	-	-
<i>Essential Digital Skills</i>	4	6	-	-
PC12. operate digital devices and use its features and applications securely and safely	-	-	-	-
PC13. use internet and social media platforms securely and safely	-	-	-	-
<i>Entrepreneurship</i>	3	5	-	-
PC14. identify and assess opportunities for potential business	-	-	-	-
PC15. identify sources for arranging money and associated financial and legal challenges	-	-	-	-
<i>Customer Service</i>	2	2	-	-
PC16. identify different types of customers	-	-	-	-
PC17. identify customer needs and address them appropriately	-	-	-	-
PC18. follow appropriate hygiene and grooming standards	-	-	-	-
<i>Getting ready for apprenticeship & Jobs</i>	1	3	-	-

PC19. create a basic biodata	-	-	-	-
PC20. search for suitable jobs and apply	-	-	-	-
PC21. identify and register apprenticeship opportunities as per requirement	-	-	-	-
NOS Total	20	30	-	-

Assessment Parameters:

Assessment Plan:

1. Components of Assessment:

- Each subject will be assessed in three components: Theory (40% weightage), Practical (40% weightage), and On-job Training (OJT, 20% weightage).

2. Passing Parameters:

- To pass the semester, students must meet both the assessment parameters given below.

Parameter 1 - Weighted Semester Score:

- Students must achieve a minimum of 60% in the weighted average score across all three components (Theory, Practical, and OJT) for each subject.

Parameter 2 - Individual Component Score:

- Students need to score at least 40% in each individual component (Theory, Practical, and OJT) of every subject.

Annexure: Assessment Strategy

This section includes the processes involved in identifying, gathering, and interpreting information to evaluate the Candidate on the required competencies of the program.

Mention the detailed assessment strategy in the provided template.

<1. Assessment System Overview:

- Batches assigned to the assessment agencies for conducting the assessment on SIP or email
- Assessment agencies send the assessment confirmation to VTP/TC looping SSC
- Assessment agency deploys the ToA certified Assessor for executing the assessment
- SSC monitors the assessment process & records

2. Testing Environment:

- Check the Assessment location, date and time
- If the batch size is more than 30, then there should be 2 Assessors.
- Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.

3. Assessment Quality Assurance levels/Framework:

- Question bank is created by the Subject Matter Experts (SME) are verified by the other SME
- Questions are mapped to the specified assessment criteria
- Assessor must be ToA certified & trainer must be ToT Certified

4. Types of evidence or evidence-gathering protocol:

- Time-stamped & geotagged reporting of the assessor from assessment location
- Centre photographs with signboards and scheme specific branding

5. Method of verification or validation:

- Surprise visit to the assessment location

6. Method for assessment documentation, archiving, and access

- Hard copies of the documents are stored

On the Job:

1. Each module (which covers the job profile of CNC Operator – Vertical Machining Centre) will be assessed separately.
2. The candidate must score 60% in each module to successfully complete the OJT.
3. Tools of Assessment that will be used for assessing whether the candidate is having desired skills and etiquette of dealing with customers, understanding needs & requirements, assessing the customer and perform Soft Skills effectively:
 - Videos of Trainees during OJT
 -
4. Assessment of each Module will ensure that the candidate is able to:
 - Effective engagement with the customers

- Understand the working of various tools and equipment
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Annexure: Acronym and Glossary

Acronym

Acronym	Description
AA	Assessment Agency
AB	Awarding Body
ISCO	International Standard Classification of Occupations
NCO	National Classification of Occupations
NCrF	National Credit Framework
NOS	National Occupational Standard(s)
NQR	National Qualification Register
NSQF	National Skills Qualifications Framework
OJT	On the Job Training

Glossary

Term	Description
National Occupational Standards (NOS)	NOS define the measurable performance outcomes required from an individual engaged in a particular task. They list down what an individual performing that task should know and also do.
Qualification	A formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards
Qualification File	A Qualification File is a template designed to capture necessary information of a Qualification from the perspective of NSQF compliance. The Qualification File will be normally submitted by the awarding body for the qualification.
Sector	A grouping of professional activities on the basis of their main economic function, product, service or technology.
Long Term Training	Long-term skilling means any vocational training program undertaken for a year and above. https://ncvet.gov.in/sites/default/files/NCVET.pdf