



QUALIFICATION FILE

CONVENTIONAL AND CNC MACHINIST

- ☐ 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: 3.5

Submitted By:

NETTUR TECHNICAL TRAINING FOUNDATION

23/24, II PHASE, PEENYA INDUSTRIAL AREA,

BENGALURU – 560058, KARNATAKA

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Section 1: Basic Details

1.	Qualification Name	Conventional and CNC Machinist								
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)		Qualification Name of existing/previous version: Conventional and CNC Machinist						
4.	a. OEM Name b. Qualification Name (Wherever applicable)	NA								
5.	National Qualification Register (NQR) Code & Version (Will be issued after NSQC approval)	QG-3.5-CG-00774-2023-V1-NTTF		6. NCrF/NSQF Level: 3.5						
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	The Candidate will be able to operate Conventional and CNC Machine Tools. The subjects covered in this Programme are - CNC Technology, Production technology, Electrical Technology, Metrology, Material Technology, CAD, and Intensive Practice on Conventional and CNC Machine Tools.								
9.	Eligibility Criteria for Entry for Student/Trainee/Learner/Employee	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> 10th Grade Pass OR 8th Grade pass with 2-year relevant experience OR Previous relevant Qualification of NSQF level 2.5 with 2-years of relevant experience OR Previous relevant Qualification of NSQF level 3 with 1-year of relevant experience </td> <td>NA</td> </tr> </tbody> </table>			S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)	1	10 th Grade Pass OR 8 th Grade pass with 2-year relevant experience OR Previous relevant Qualification of NSQF level 2.5 with 2-years of relevant experience OR Previous relevant Qualification of NSQF level 3 with 1-year of relevant experience	NA
S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)								
1	10 th Grade Pass OR 8 th Grade pass with 2-year relevant experience OR Previous relevant Qualification of NSQF level 2.5 with 2-years of relevant experience OR Previous relevant Qualification of NSQF level 3 with 1-year of relevant experience	NA								
10.	Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))	Total Credits: 40		11. Common Cost Norm Category (I/II/III) (wherever applicable): NA						
12.	Any Licensing requirements for Undertaking Training on This Qualification (wherever applicable)	NA								

13. Training Duration by Modes of Training Delivery <i>(Specify Total Duration as per selected training delivery modes and as per requirement of the qualification)</i>	☒ Offline ☐ Online ☐ Blended <table border="1" data-bbox="905 245 1934 464"> <thead> <tr> <th>Training Delivery Modes</th> <th>Theory (Hours)</th> <th>Practical (Hours)</th> <th>OJT / Project Mandatory (Hours)</th> <th>OJT Recommended (Hours)</th> <th>Total (Hours)</th> </tr> </thead> <tbody> <tr> <td>Classroom (offline)</td> <td>360</td> <td>720</td> <td>120</td> <td>-</td> <td>1200</td> </tr> <tr> <td>Online</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT / Project Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)	Classroom (offline)	360	720	120	-	1200	Online					
Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT / Project Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)															
Classroom (offline)	360	720	120	-	1200															
Online																				
14. Aligned to NCO/ISCO Code/s <i>(if no code is available mention the same)</i>	2015/7223.5002 - CNC Operator – Machining Technician																			
15. Progression path after attaining the qualification <i>(Please show Professional and Academic progression)</i>	Professional Progression: CNC Machine shop supervisor, Conventional/CNC Machinist, CNC Programmer, Machine shop supervisor, Machine Shop Manager in Die & Mould,																			
16. Other Indian languages in which the Qualification & Model Curriculum are being submitted	Hindi																			
17. Is similar Qualification(s) available on NQR-if yes, justification for this qualification	☐ Yes ☒ No URLs of similar Qualifications: NA																			
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 - Admission open to women candidates (30% seats are reserved)																			
20. Are Greening/ Environment Sustainability Aspects Covered <i>(Specify the NOS/Module which covers it)</i>	☒ Yes ☐ No Industrial Education CPPCM204T																			
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 <i>(In case of CS or MS, provide details of both Lead AB & Supporting ABs)</i>	Name: Mr. R Rajagopalan Position in the Organization: Joint Managing Director Email: rg@nttf.co.in Tel number: 080 – 28390215 Contact No.: 9844013448 Website: nttftrg.com																			
23. Final Approval Date by NSQC: 31 Aug 2023	24. Validity Duration: 3 years	25. Next Review Date: 31 Aug 2026																		

Section 2: Module Summary**NOS/s of Qualifications** (In exceptional cases these could be described as components)**Mandatory Module / 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**

Sl. No.	NOS/Module Name	NOS/Module Code & Version	Core/ Non-Core	NCrF/ NSQF Level	Credits as per NCrF	Assessing Duration (Hours)					Assessment Marks					Weightage (%) (if applicable)
						Th.	Pr.	OJT- Man.	OJT- Rec.	Total	Th.	Pr.	Proj.	Viva	Total	
Semester – 1																
1	Communication English	CPPCM101T Version -1	Core	3.5	19	30	-	-	-	30	75	-	-	25	100	
2	Workshop Calculations	CPPCM102T Version -1	Core	3.5		30	-	-	-	30	100	-	-	-	100	
3	Basics of Computer	CPPCM103T Version -1	Core	3.5		20	-	-	-	20	50	-	-	-	50	
4	Metrology	CPPCM104T Version -1	Core	3.5		20	-	-	-	20	50	-	-	-	50	
5	Manufacturing Technology	CPPCM105T Version -1	Core	3.5		40	-	-	-	40	100	-	-	-	100	
6	CNC Technology I	CPPCM106T Version -1	Core	3.5		40	-	-	-	40	100	-	-	-	100	
7	Engineering drawing & CAD Fusion 360 - I	CPPCM107P Version -1	Core	3.5		-	40	-	-	40	-	75	-	25	100	
8	Workshop Practical – I	CPPCM108P Version -1	Core	3.5		-	320	-	-	320	-	250	-	50	300	
9	Employability Skills	CPPCM109T Version -1	Core	3.5		30	-	-	-	30	100	-	-	-	100	
Duration (in Hours)/ Total Marks					19	210	360	-	-	570	575	325	-	100	1000	
Semester – 2																
11	Material Technology	CPPCM201T, Version -1	Core	3.5	21	20	-	-	-	20	50	-	-	-	50	
12	CNC Technology II	CPPCM202T, Version -1	Core	3.5		40	-	-	-	40	100	-	-	-	100	
13	Electrical Technology	CPPCM203T, Version -1	Core	3.5		20	-	-	-	20	50	-	-	-	50	
14	Industrial Education	CPPCM204T, Version -1	Core	3.5		20	-	-	-	20	50	-	-	-	50	
15	Modern Shop Floor Practices	CPPCM205T, Version -1	Core	3.5		20	-	-	-	20	50	-	-	-	50	
16	Engineering drawing & CAD Fusion 360 - II	CPPCM206P, Version -1	Core	3.5		-	40	-	-	40	-	75	-	25	100	
17	Workshop Practical – II	CPPCM207P, Version -1	Core	3.5		-	320	-	-	320	-	250	-	50	300	
18	Project / OJT	CPPCM208P, Version -1	Core	3.5		-	-	120	-	120	-	75	-	25	100	
19	Employability Skills	CPPCM209T, Version -1	Core	3.5		30	-	-	-	30	100	-	-	-	100	
Duration (in Hours)/ Total Marks					21	150	360	120	-	630	400	400	-	100	900	
Total for 1-year Programme					40	360	720	120	-	1200	975	725	-	200	1900	

Elective Modules/ NOS/s: NA

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/ Non-Core	NCrF/NSQF 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 Modules/ NOS/s: NA

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/ Non-Core	NCrF/NSQF 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																

Assessment - Minimum Qualifying Percentage

Please specify **any one** of the following:

Minimum Pass Percentage – Aggregate at qualification level: (Every Trainee should score specified minimum aggregate passing percentage at qualification level to successfully clear the assessment.)

Minimum 40% in each Theory module, 50% in each Practical module and 60% in Project/OJT

Section 3: Training Related

1.	Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)	Diploma in relevant field with 2 years as trainer or industry experience B. Tech or BE with 1 year of trainer or industry experience
2.	Master Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)	Diploma in relevant field with 3 years as trainer or industry experience B. Tech or BE with 3 years of trainer + industry experience
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

1.	Assessor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	Diploma with 3 years as trainer or industry experience B. Tech or BE with 2 years as trainer or industry experience
2.	Proctor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	Diploma or B. Tech or BE with 1 year of experience
3.	Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	Diploma with 3 years as trainer or industry experience B. Tech or BE with 2 years as trainer or industry experience
4.	Assessment Mode (Specify the assessment mode)	Offline in the center
5.	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): Research Reports: The following reports establish the Skilled Resource requirement for the Manufacturing, Capital Goods and Automotive Industries. a. MSDE Annual Report 2021- 2022 predict very high growth on automobile and capital goods sector in India. b. MSDE/ NSDC Human Resources and Skill Requirements in the Auto and Auto Components Sector report (2013- 2017 2017 – 2022) The Report Forecast a Higher growth in Automotive Manufacturing, Automotive Components Manufacture Sector c. Human Resources and Skill Requirements in the Capital Goods Sector report (2012 – 2017 2017 – 2022) The Report Envisages Higher Growth in Capital Goods Sector –Electronic Components, Electrical Components, and Auto Components etc. The above two will lead to Higher requirement in Press tool, Moulds and Jigs and Fixtures d. Annual reports 2021 – 22 of Ministry of Heavy Industries Government of India The above Studies has found Higher growth in Manufacturing, Capital Goods and Automotive Industries which will require Qualified and skilled CNC Machine Operators
2.	Latest Market Research Reports or any other source (not older than 2 years) (Yes/No): The following reports establish the Skilled Resource requirement for the Manufacturing, Capital Goods and Automotive Industries. a. Indian Skills Report 2021-22 by Wheebox - partnered CII predicts skill requirement in Engineering and Manufacturing sectors. b. NASSCOM, FICCI and EY report on Future of Jobs in India – 2022 - Perspective predicts higher growth in Component Manufacturing and Automotive sector.
3.	Government /Industry initiatives/ requirement (Yes/No): a. Study on Job Role of the Future by Indian Institute of Skills. b. The Study has found Digital Manufacturing Engineer, Tool Room Technician, 3D Printing Technician has new job roles emerging in the Manufacturing Sector. These areas require skilled CNC Technicians
4.	Number of Industry validation provided: 22
5.	Estimated nos. of persons to be trained and employed: 300 / Year
6.	Evidence of Concurrence/Consultation with Line Ministry/State Departments : (Letter to be sent to the concerned ministry and copy attached) If “No”, why: Under Process

Section 6: Annexure & Supporting Documents Check List

Specify Annexure Name / Supporting document file name

1.	Annexure 1: NCrf/NSQF level justification based on NCrf level/NSQF descriptors <i>(Mandatory)</i>	Yes
2.	Annexure 2: List of tools and equipment relevant for qualification <i>(Mandatory, except in case of online course)</i>	Yes
3.	Annexure 3: Industry Validations Summary	Yes
4.	Annexure 4: Training & Employment Details	Yes
5.	Annexure 5: Blended Learning <i>(Mandatory, in case selected Mode of delivery is “Blended Learning”)</i>	No
6.	Annexure 6: Detailed Assessment Criteria <i>(Mandatory)</i>	Yes
7.	Annexure 7: Assessment Strategy <i>(Mandatory)</i>	Yes
8.	Annexure: Multiple Entry-Exit Details <i>(Mandatory, in case qualification has multiple Entry-Exit)</i>	No
9.	Annexure: Acronym and Glossary <i>(Optional)</i>	No
10.	Supporting Document: Model Curriculum <i>(Mandatory – Public view)</i>	Given in separate file
11.	Supporting Document: Career Progression <i>(Mandatory - Public view)</i>	Yes (Annexure 8)
12.	Supporting Document: Occupational Map <i>(Mandatory)</i>	Yes (Annexure 9)
13.	Supporting Document: Assessment SOP <i>(Mandatory)</i>	Included in Annexure 7
14.	Supporting Document: Key Learning Outcome	Yes (Annexure 10)
15.	Any other document you wish to submit:	No

Annexure 1: 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	Knowledge on Safety rules, PPE. Will have knowledge of Conventional and CNC Machine Tools. Will have knowledge on Materials. Will have capability to perform work assigned to him. Basic knowledge on CAD. Basic knowledge on Electrical.	Job Holder Understands Safety and Health aspects. Compliance with Health and Safety Regulations. Can select Cutting Tools, Machine Tools and Accessories needed for an operation. Use CAD for preparing simple drawings. Awareness of Electrical controls of machine.	3.5
Professional and Technical Skills / Expertise / Professional Knowledge	Can interpret technical drawings. Can operate Conventional machine tools. Can operate CNC Turning and Milling machines. Can Perform Measuring / Checking operations. Knowledge on selection of Cutting tools. Knowledge on selection of Cutting Parameters.	Set Conventional and CNC Machines. Select appropriate Cutting Tools. Produce components using Conventional and CNC Machines. Perform Quality check on Machined products. Can prepare simple programs for CNC Turning and Milling.	3.5
Employment Readiness & Entrepreneurship Skills & Mind-set / Professional Skill	Ability to communicate with Peers and Superiors. Able to work Effectively in a Team. Proficiency in Machining. Knowledge in 5S and Kaizen.	Good Communication Skills. Solve simple work-related problems. Involve in 5S and KAIZEN activities. Use Digital mode for Report / Data entry.	3.5

	Analyse situations and take decisions. Knowledge on Computer - MS Office.		
Broad Learning Outcomes / Core Skill	Will have good Interpersonal skills. Will have positive Attitude. Will follow good personal hygiene. Will manage time effectively. Produce components using Conventional and CNC Machines.	Can work effectively in a team. Will contribute to a good working environment. Will be able to produce industrially acceptable components.	3.5
Responsibility	Aware of personal Industrial goals. Adapt to changes in work area. Understanding of Standing instructions and SOP relevant to assigned work.	Follow safety rules. Report Nonconformity on safety. Follow SOP and get clarification when in doubt.	3.5

Annexure 2: Tools and Equipment (Lab Set-Up)**Batch size - 30 trainees**

Sl. No.	Tool / Equipment Name	Specification	Quantity
1	Work Bench with Lockers – 4 vices / Bench	1500 W X 900 D X 800 H	4
2	Bench Vice	125 mm	16
3	Flat Rough File	250 mm	16
4	Flat Second Cut File	200 mm	16
5	Rough File Δ	200 mm	16
6	Steel Rule	150 mm	16
7	Steel Rule	300 mm	10
8	Scriber		16
9	DOT Punch & Centre Punch	60° and 90°	16
10	Try Square	100 mm x 75 mm	16
11	Hack Saw frame with Blade	300 mm	16
12	Hammer	200 g	10
13	Vernier Caliper 0 – 150 mm	0.02 least count	16
14	Micrometer	0 - 25, 0.01 least count	8
15	Micrometer	0 - 25, 0.01 least count	3
16	Dial Indicator Lever type	0.01, range 0 – 0.8 mm	1
17	Dial Indicator Plunger type	0.01, range 0 – 10 mm	1
18	Magnetic Stand		2
19	Bevel Protractor	least count 5'	5
20	Slip Gauge	87 pieces (Inspection grade)	1
21	Radius Gauge	up to 7.5mm	5
22	Pitch Gauge	Metric (Angle: 60 °)	5
23	Feeler Gauge	13 leaves 150mm long	5
24	Spirit Level (0.5mm accuracy, without magnet)	30 x 300	1
25	Cast Iron Surface Plate	600mm X 450mm with Stand	1
26	Angle Plate	250mm X 150mm X 175mm	1
27	V – Blocks	150mm X 100mm X 60mm	1
28	Vernier Height Gauge	Least count 0.02, 0 - 600 mm	1
29	Digital Height gauge	Least count 0.01, 0 - 300 mm	1
30	Magnetic V block	75L x 56W x 75H, DIA 5 - 40mm	1
31	Double Ended Spanner Set	6 to 22mm	1
32	Ring Spanner Set	6 to 22mm	1

33	Adjustable Spanners	70/ 30	1
34	Screwdriver set		1
35	Allen Key Set (mm sizes)	1.5 to 12 mm	1
36	Allen Key Set (inch Sizes)	1/16 to 3/8	1
37	C-Clamp	150 mm	2
Machines			
Sl. No.	Machine	Recommended Specification	Quantity
1	Centre Lathe with accessories	Machining Dia: 100mm x 650mm long	1
2	Vertical Milling Machine with accessories	Machining size: 250mm x 150mm x 100mm H	1
3	Surface Grinding Machine with accessories	Machining size: 450mm x 150mm x 100mm H	1
4	Cylindrical Grinding Machine with accessories	Machining Dia: 60mm x 250mm long	1
5	Bench Drilling Machine with accessories	Maximum Ø10mm	2
6	Bench Grinder	Wheel Dia: 200mm x 20mm thick - 2 sided	1
7	Power Hacksaw	350 mm	1
8	CNC Lathe with servo stabilizer and accessories	Machining Dia: 60mm x 150mm long	1
9	CNC Milling Machine with servo stabilizer and accessories	Machining size: 250mm x 150mm x 100mm H	1
10	Compressor	Compressor - Reciprocating Air Compressor 5kw 3 phase motor, Air delivery 650 l/min Air receiver Size- 220 l	1
11	CNC Simulation Software	10 User License	1
12	Master CAM	10 License	1
13	Fusion 360	Free Educational Software	
14	Networked Computers with UPS		15

Classroom Aids

The aids required to conduct sessions in the classroom are:

1. White board
2. Projector with screen / Smart TV
3. Laptop / computer

Annexure 3: Industry Validations Summary

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

Sl. No.	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID	LinkedIn Profile
1	VVDN Technologies Pvt Ltd	Ruchi Gaur		Manesar, Delhi	9289713233	ruchi.gaur@vvdntech.in	
2	Edscha Aditya Automotive Systems Pvt. Ltd.	Sadanand Pujari	Assist. Manager - HR	Chakan, Pune	8600013903	sadanand@adityaauto.com	
3	Raghu Vamsi Machine Tools Pvt. Ltd.	K Rajitha	HR Dept,	Hyderabad, Telangana	70933 23350	rajitha.k@raghuvamsiaerospace.com	https://www.linkedin.com/in/raghu-vamsi-aerospace
4	High Tech Precision Manufacturing Llp	Priya	HR & Business Development Manager	DIP 2, DUBAI - UAE	+971 50 629 7698	info@highprecisionmanufacturing.com	
5	Seinumero Nirman Pvt. Ltd.	Siddharth Shetty		Pune	9325347440	siddharthshetty711@gmail.com	
6	I-TECH Plast India Pvt Ltd	Daksh Dave	HR	Bhavanagar, Gujrath	9879580074	daksh@industrialtechnologies.net	
7	Innovative Microtechnologies LLP_Gujarath	Daksh Dave	HR	Bhavanagar, Gujrath	9879580074	daksh@industrialtechnologies.net	
8	Raghav Aerospace	Raju Mukkera	Deputy Manager HR & Operations	IDA-Cherlapally, Hyderabad	8977916646	hr@raghavaerospace.com	
9	Amritha Tool Crafts Pvt Ltd	Sridhar Reddy	Cherlapally, Hyderabad	Cherlapally, Hyderabad	9963976174	sridharreddy@prathiraj.com	
10	Prathiraj Metal Masters Pvt Ltd	Sridhar Reddy	Cherlapally, Hyderabad	Cherlapally, Hyderabad	9963976174	sridharreddy@prathiraj.com	
11	Pitek Dies & Molds LLP	PVS Rao		Bhosari Pune	9765402095	pvsubarao@ydm.co.in	
12	Nexteer Automotive Pvt Ltd	Shivakumar Hiremath	Human Resources - India	Anekal Taluk, Bangaluru	9986414304	shivakumar.hiremath@nexteer.com	
13	Sachitanand Stenciles Pvt. Ltd.	Tosha Kulkarni		Bengaluru / Pune / Chennai	7798305266	admin1@smtstencils.in	
14	Saptagiri Aerospace & Defence Pvt. Ltd.	Sathya	MD	Magadi Road Bangalore	7022732878	director@sapaero.in	
15	Richcam Tooling	Abhijeet Kholam	-	MIDC, Moshi, Pimpri-Chinchwad, Maharashtra 412105	9766624925	planning@richcamtooling.com	

16	Jaychamunda Maa Enterprises	Ramesh Panchal	Owner	11, Lane Number 2, Koldongri, Andheri East, Mumbai, Maharashtra 400053	8459178360	jaychamunda_999@yahoo.com	
17	JJ Precision	Biju	Owner	T BLOCK 165/1/18 MIDC BHOSARI., NEAR MIDC POST OFFICE, 9850643135, Pune, Maharashtra 411026	9850643135	precisionjj@gmail.com	
18	Technosoft	Vikas Mali	HR	Number 1, MIDC Colony, Wagle Industrial Estate, Thane West, Thane, Maharashtra 400604	9322998200	vmali@technosofteng.com	
19	Associated Manufacturing	Siril Vaidya	HR	Gat No. 307,, Nanekarwadi, Maharashtra 410501	8308816695	ashvin.shah@associated.com	
20	PET Tools	Mathew	Owner	R-899 T.T.C Midc Area Thane, Belapur Road, Navi Mumbai - 400701, Maharashtra (India)	9833374591	pettools@gmail.com	
21	Raghuvamshi Aerospace	Bhavani Shankar	HR	Plot No. 60/A, IDA Gandhi Nagar, Hyderabad 500037, AP, INDIA.	9299002869	bhavanishanker@raghuvamsiaerospace.com	
22	Mould Smith	Rajni Prabhu	Owner	Gate No. 106, near Zunka, Kadolkar Colony, Jyotiba Nagar, Talwade, Pune, Maharashtra 411062	9922030764	rajini@moldesmith.com	

Annexure 4: 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
2023	300	More than 10000	60	More than 2000	-	-
2024	300	More than 10000	60	More than 2000	-	-
2025	300	More than 10000	60	More than 2000	-	-

Data to be provided year-wise for the 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
Version-1	2020 - 2021	44	44	44	39	06	06	06	06	-	-	-	-
	2021 - 2022	58	58	58	58	4	4	4	4	-	-	-	-
	2022 - 2023	86	86	86	84	6	6	6	4	-	-	-	-

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:

One-year Full Time Programme

Content availability for previous versions of qualifications:

☐ Participant Handbook ☐ Facilitator Guide ☒ Digital Content ☐ Qualification Handbook ☒ Any Other: In NTTF LMS and Edusquares ERP
Languages in which Content is available: English

Annexure 5: Blended Learning**Blended Learning Estimated Ratio & Recommended Tools: NOT APPLICABLE****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>

Sl. No.	Select the Components of the Qualification	List Recommended Tools – for all Selected Components	Offline : Online Ratio
1	Theory/ Lectures - Imparting theoretical and conceptual knowledge		100% offline
2	Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners		
3	Showing Practical Demonstrations to the learners		
4	Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training		
5	Tutorials/ Assignments/ Drill/ Practice		
6	Proctored Monitoring/ Assessment/ Evaluation/ Examinations		
7	On the Job Training (OJT)/ Project Work Internship/ Apprenticeship Training		

Annexure 6: Detailed Assessment Criteria

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

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Semester - 1					
Communication English	Reading comprehension – Exercises	10	-	-	5
	Listening comprehension – Exercises	10	-	-	5
	Construction of sentences – Exercises	15	-	-	-
	Dictionary learning – Practice in using Dictionary	5	-	-	5
	Group Discussion	5	-	-	10
	Technical Report Writing	15	-	-	-
	Presentation Skills – Preparing Presentations	15	-	-	-
	Total Marks	100			
Workshop Calculations	Units and Conversion of Units – SI, MKS, FPS Units. Conversion of units	5	-	-	-
	Mensuration – Calculation of Area, Volume	10	-	-	-
	Percentage, Ratio and Proportion – Application in Engineering	5	-	-	-
	Basics of Algebra	5	-	-	-
	Trigonometry – Application in Engineering	15	-	-	-
	Polar and Rectangular coordinates and its Conversions	5	-	-	-
	Drilling- Calculations – Determination of RPM	5	-	-	-
	Calculations for Turning – RPM Calculation, Taper Turning Calculation	15	-	-	-
	Milling – Calculations – Feed, Speed Calculations	15	-	-	-
	Grinding – Calculations – RPM Calculations	5	-	-	-
	Indexing – Calculations for Indexing Jobs	15	-	-	-
	Total Marks	100			
Basics of Computer	Computer and its peripherals – Hardware Software	8	-	-	-
	Basics of MS Word	10	-	-	-
	Basics of MS Excel	12	-	-	-
	Basics of MS PowerPoint	10	-	-	-
	Internet – Email, Browsing Do's and Don'ts	10	-	-	-
	Total Marks	50			
Metrology	Introduction to metrology – Metrology in Manufacturing	3	-	-	-
	Linear measurements – Instruments used for Linear Measurement	5	-	-	-
	Marking and Marking tool – Types and Application	5	-	-	-
	Bore measuring Instruments – Instruments used for Bore measuring	5	-	-	-
	Gauges/Comparators – Types of Gauges and Comparators, Application	5	-	-	-

	Introduction to limits and fits, Determination of Maximum, Minimum Clearance	7	-	-	-
	Angular measurement – Instruments used for Angular Measurement	5	-	-	-
	Errors in measurement and calibration of instrument	5	-	-	-
	Hardness Testing Devices – Types of Hardness and their Measurement	5	-	-	-
	Measuring Machines – CMM – Working, Application	5	-	-	-
	Total Marks	50			
Manufacturing Technology	Safety – Personal Safety, Workshop Safety	5	-	-	-
	Hand Tools – Types, Specification, Application	15	-	-	-
	Drilling – Drilling Machine, Drilling, Counter boring, Counter sinking, Reaming, Die passing	15	-	-	-
	Turning – Types of Lathes, Turning operations, Work holding and Tool holding methods	20	-	-	-
	Milling – Types of Milling machine, Milling operations, Cutters, Work holding and Tool holding methods	25	-	-	-
	Grinding – Types of Grinding Machine, Grinding operations, Specification of Grinding wheel, Mounting grinding wheel	20	-	-	-
	Total Marks	100			
CNC Technology - I	Familiarize with the technology of NC/CNC/DNC systems	5	-	-	-
	Features of CNC system – Introduction to CNC System	10	-	-	-
	Safety – CNC Machine Safety	5	-	-	-
	Different elements of CNC machine tool – Parts and Functions of CNC Lathe, Milling	20	-	-	-
	Introduction to CNC turning – Controls in CNC Machines, Operating Procedure	10	-	-	-
	Part programming in CNC turning – Programming for Turning operations	20	-	-	-
	Introduction to CNC milling – Controls in CNC Milling Machines, Operating Procedure	10	-	-	-
	Part programming in CNC milling – Programming for Milling operations	20	-	-	-
	Total Marks	100			
Engineering Drawing & CAD Fusion 360 - I	Engineering Drawing	-	-	-	-
	Introduction – Scale, Paper size, Importance of Engineering Drawing	-	3	-	3
	Types of Lines	-	2	-	-
	Isometric views and Orthographic projection	-	20	-	5
	Dimensioning and providing Tolerances	-	10	-	2
	CAD - FUSION 360	-	-	-	-
	Introduction to Autodesk Fusion 360 software	-	10	-	10

	Sketch and Dimensioning	-	10	-	-
	Introduction to Solid Modelling	-	10	-	5
	Introduction to Orthographic views – Drawing Orthographic View Using CAD	-	10	-	-
	Total Marks	100			
Workshop Practical - I	Manual Metal working skills - Filing, Hacksawing, Drilling, Reaming, Counter Boring, Counter Sinking, Tapping	-	35	-	10
	Conventional Machines – Turning Plain turning, Step turning, Grooving, Taper turning	-	35	-	5
	Conventional Machines – Milling Plain milling, Step milling, Slot milling	-	55	-	5
	Conventional Machines - Surface Grinding Step grinding, Slot grinding	-	35	-	5
	Conventional Machines - Cylindrical Grinding External grinding	-	20	-	5
	CNC – Lathe	-	35	-	10
	CNC – Milling	-	35	-	10
	Total Marks	300			
	Employability Skills	Behavioural skills	20	-	-
Constitutional Values - Citizenship.		10	-	-	-
Communication skills		20	-	-	-
Diversity and Inclusion.		10	-	-	-
Financial and Legal Literacy		20	-	-	-
Occupation safety, Health, and Environment education.		20	-	-	-
Total Marks		100			
Semester - 2					
Material Technology	Properties of Materials – Physical, Mechanical, and Electrical properties	7	-	-	-
	Ferrous Metals – Types, Specification, Application	13	-	-	-
	Non- Ferrous Metals and Alloys – Types, Specification, Application	10	-	-	-
	Plastics – Types, Specification, Application	7	-	-	-
	Hard materials – PMKNSH – Selection of cutting tool material for machining different grades of materials	13	-	-	-
	Total Marks	50			
CNC Technology - II	Tools for CNC Machines – Types of tools used in CNC machining	10	-	-	-
	Classification of Carbide Tools - Solid Tools - Inserts – Types, Selection, Application	10	-	-	-
	Carbide Inserts and Insert Holder – Types, Specification, Application	10	-	-	-

	Coolant - – Types, Specification, Application, Preparation of coolant	5	-	-	-
	CNC Work holding Devices – Types, Specification, Application	15	-	-	-
	Part programming in CNC turning	15	-	-	-
	Part programming in CNC milling	15	-	-	-
	Understanding Machine Alarms and Warnings	10	-	-	-
	Maintenance of CNC Machines – Routine and Preventive maintenance	10	-	-	-
	Total Marks	100			
Electrical Technology	Electrical Safety	3	-	-	-
	Hand Tools – Hand tools used in Electrical Engineering	5			
	DC and AC circuits – Parallel and Series, Single phase and 3 phase	12			
	Electrical Protective Devices – Fuses, MCB, ELCB, RCCB	10			
	AC Machines – Types of AC motors, Specification, Application	13			
	Wires and Cables – Types, Specification, Application	5	-	-	-
	Display Devices	2	-	-	-
	Total Marks	50			
Industrial Education	Entrepreneurship Skills	15	-	-	-
	Occupational Safety, Health, and Environment Education	15	-	-	-
	Quality Tools – Introduction to ISO systems	20	-	-	-
	Total Marks	50			
Modern Shop Floor Practices	5S – Application in workplace	13	-	-	-
	Gemba – Application	5	-	-	-
	Kaizen – Application in workplace	12	-	-	-
	Poka Yoke – Concept, Application	5	-	-	-
	Just in Time – Concept, Application	7	-	-	-
	Muda, Mura, Muri – Application to improve productivity	8	-	-	-
	Total Marks	50			
Engineering Drawing & CAD Fusion 360 - II	Sectional Views – Preparation Sectional views	-	15	-	5
	Introduction to Form and Position Tolerance – Indicating and Interpreting	-	15	-	5
	Surface Texture – Indicating and Interpreting	-	5	-	5
	Creating Sectional views in Autodesk Fusion 360	-	15	-	5
	Indicating Surface Texture in Drawings using Autodesk Fusion 360	-	10	-	-
	Creating, Editing and Saving CAD drawings	-	15	-	5
	Total Marks	100			
Workshop Practical - II	Lathe – Turning operations	-	20	-	5
	Milling Machine – Milling operations	-	20	-	5
	Surface Grinder – Operations	-	10	-	-

	Cylindrical Grinder - Operations	-	10	-	-
	Practice on CNC Lathe including Simulation – Simulation exercises, Loading programmes, Operating CNC Lathe machine and Production of parts	-	90	-	20
	Practice on CNC Milling including Simulation – Simulation exercises, Loading programmes, Operating CNC Milling machine and Production of parts	-	100	-	20
	Total Marks	300			
Project / OJT	Project: – Manufacturing	-	75	-	25
	Total Marks	100			
Employability Skills	Entrepreneurship skills	20	-	-	-
	Essential skills for success	15	-	-	-
	Labour Welfare and Legislation	15	-	-	-
	Quality Management	15	-	-	-
	Getting ready for Employment/ Entrepreneurship	25	-	-	-
	Customer Interaction/ Service	10	-	-	-
	Total Marks	100			

NSQC Approved

Annexure 7: Assessment Strategy

1. ASSESSMENT STRATEGY

The Criterion for assessment is based on Modules and will be assigned marks proportional to its importance.

The assessment for the semester-based qualification is carried out by conducting Formative and Summative Assessments.

Regarding Theory – Sessional is based on Intermediate Tests, File / Assignments and Viva –voce: Semester end examination wherein for each Individual batch, Assessment & Evaluation department, at corporate office, Bangalore creates unique question paper for theory part as well as for practical – Theory comprises MCQ and descriptive questions drawn randomly from the Question Bank.

Regarding the practical part, the experiments/ exercises are performed by the trainees during the LAB Hours and the trainees are allowed to record the learning of it which will be carried as their Record Marks & one Lab Test and semester end examination. Semester end examination is outcome-based experiments/ exercises of the course will be given to trainees to perform and based on the performance the mark will be awarded.

The passing criteria is based on practical's performance, viva or oral exam, Test, and final semester end examination.

Theory and practical Examinations are carried out by Examiners under the overall supervision of the Assessment and Evaluation Dept.

Evaluation of Theory and Practical examination is carried out by the Trained Assessors (NTTF faculty members) under the supervision of Shopfloor Manager / senior faculty in a fair manner as per the assessment criteria set by A&E dept. of NTTF.

The Tabulation and processing of results shall be carried out under EDUSQUARE campus Software.

Assessment comprises the following components:

- Job carried out in Labs / workshops.
- Record book
- Online Examination
- Answer sheet of assessment
- Viva-voce.
- Semester end examination
- On-the-Job training
- Tech Talk / Shop Talk
- Extracurricular and Co-curricular Activities
- Projects

- Attendance and punctuality

2. ASSESSORS

Evaluation of Theory and Practical examination is carried out by the Trained Assessors (NTTF faculty members) in a fair manner as per the assessment criteria set by Assessment & Evaluation department.

Assessors / Faculties are trained from time to time to upgrade their skills on various aspects such as conduct of assessments, teaching methodology etc.

3. ELIGIBILITY TO APPEAR FOR THE EXAM

- The candidates should have an attendance of a minimum 90% in a semester.
- The candidates should have secured minimum Sessional Marks in Theory and Practical

4. PASS CRITERIA

To pass the Qualification, every trainee should score a minimum of 40% in each Theory and 50% in each Practical and 60% in OJT / Projects.

5. RESULTS AND CERTIFICATION

The assessment results are backed by evidence collected by assessors. Successful trainees are awarded the Diploma certificate by NTTF Corporate Office.

6. ON THE JOB TRAINING

1. The candidate must score 60% to successfully complete the OJT.
2. Tools of Assessment that will be used for assessing whether the candidate is having desired skills and etiquette of dealing with customer needs and requirements and perform Soft Skills effectively:
 - Videos/photos of Trainees during OJT
 - Suggestions / Kaizens from trainees
 - Rewards and appreciation to trainees as applicable
3. Assessment will ensure the following:
 - Effective engagement with the customers
 - Understand the working of various tools and equipment.

7. SYSTEM OF GRADING

An alphabetical letter grade will be assigned for each subject based on the total marks scored in the sessional and end semester examination.

Equivalent Grade Points are used: A = 9.5, B = 8.5, C = 7.5, D = 6.5, E = 5.5, F = 0 (FAIL), I = Incomplete (MP/AB/SP) Supplementary cleared = E

The student will be issued Semester Grade Report calculating SGPA / CGPA as follows:

$$\text{Semester Grade Point Average (SGPA)} = \frac{\sum (\text{No. of Credits} \times \text{Grade Point})}{\sum (\text{No. of Credits for the Program})}$$

$$\text{Cumulative Grade Point Average (CGPA)} = \frac{\sum (\text{SGPA} \times \text{total Credits of each semester})}{\text{Total credits Acquired.}}$$

Awarding of class:**a) Awarding of class for semester:**

SGPA	Classification
8.5 and above	First class with distinction
7.5 to 8.4	First class
6.0 to 7.4	Second class
5.5 to 5.9	Pass class

b) Awarding of class for Programme:

First class with Distinction	Should have scored CGPA 8.5 and above and should have cleared all Semesters in the first attempt.
First class	Should have scored CGPA 7.5 to 8.4
Second class	Should have scored CGPA 6.0 to 7.4
Pass class	5.5 to 5.9

8. **ASSESSMENT TOOLS**

All assessment and evaluation activities are carried out under EDUSQUARE campus software which includes Formative assessment & Summative assessment.

- EDUSQUARE : NTTF ERP/CRM used for academic purpose EDUSQUARE erp.nttftg.com used as SaaS (software as a service) mode
- Digital Valuation System: Digital Valuation system is an innovative software solution which automates manual evaluation and help institutions to minimize the time, effort and human errors in the entire valuation process.
- Remote proctoring which includes AI based Auto Proctoring, Student authentication and Multi secure Exam browser as and when the need arises.

List of ICT Tools:

Desktop and laptops

Interactive White Board

CCTV Camera

Pen Drive

Video Conferencing

Biometric

Edusquares: NTTF ERP/CRM used for academic purpose Edusquare erp.nttftg.com used as SaaS (Software as a Service) mode

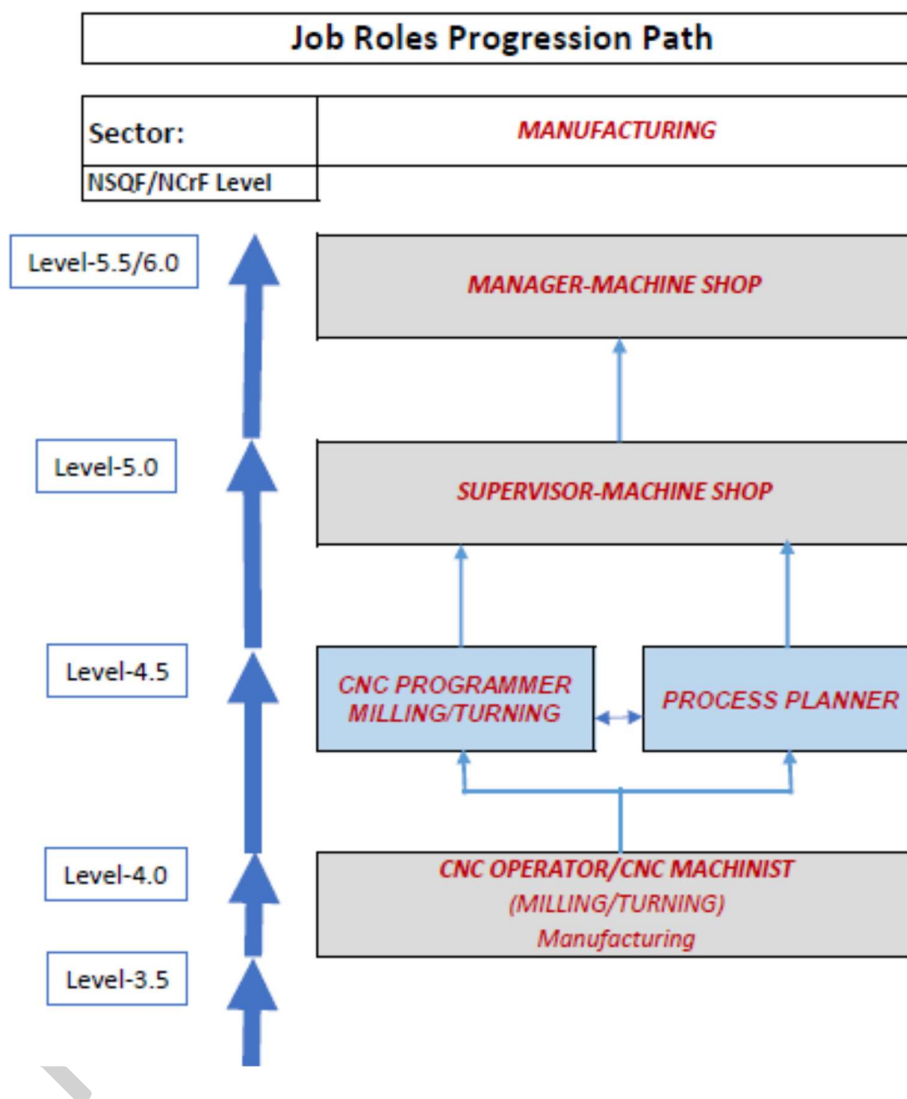
Networking: Includes Wireless access Points, Switches, Routers, Controllers across all NTTF

AWS Cloud: AWS Cloud computing platform to host NTTF website www.nttftg.com and used as backup storage.

Firewall: Network security device protecting our network by filtering traffic and blocking outsiders.

Microsoft (O365/M-365) – Email/office (Word, Excel, PPT, One Drive for all staff/students are provided using Microsoft O365 MDM (BYOD) policies implemented through M365 used as SaaS

Annexure 8: Career Progression



Annexure 9: Occupational Map

Sector Name: Capital Goods and Manufacturing

As per NCrF		As per NCO-2015	<i>Sub-Sectors/Die and Mould, Machine Tools, Aerospace, Automotive, Textile, Earth moving equipment</i>
NCrF Level (1-8)	Level Descriptors	NCO-15 -- Family (First 4 digits code/s for the given level cross cutting the OM Sub-Sectors/Occupations)	Occupation / <u>PARTS MACHINING</u>
Level 8	1. Professional Theoretical Knowledge: Mastery of knowledge / Innovation driven/ Comprehensive knowledge 2. Professional and Technical Skills/ Expertise: Most advanced Technical and Managerial skills 3. Employment Readiness & Entrepreneurship Skills & Mind-set: Significant authority, transformational leadership, Social intelligence 4. Broad Learning Outcomes: Lead large transformational projects 5. Responsibility: Business Vision Chairperson/ Board Member / CMD		
Level 7	1. Professional Theoretical Knowledge: Advanced knowledge with critical understanding of emerging developments 2. Professional and Technical Skills/ Expertise: Highly specialized skills, transdisciplinary skills, leadership skills 3. Employment Readiness & Entrepreneurship Skills & Mind-set: Cross cultural competency, transformational leadership		
Level 6.5	4. Broad Learning Outcomes: Apply acquired advanced technical skills, technical appraisal and reviews 5. Responsibility: Business Management (like CEO / CXO, etc.)		

Level 6	1. Professional Theoretical Knowledge: Advanced multidisciplinary and specialized knowledge 2. Professional and Technical Skills/ Expertise: Advanced Technical and Managerial Skills 3. Employment Readiness & Entrepreneurship Skills & Mind-set: Leadership, effective resource management 4. Broad Learning Outcomes: Judgement in complex problems 5. Responsibility: Vertical/ Business unit management – Manager or Senior Manager	2015/1321.0600	<u>Manager-Machine Shop</u> <i>Decision making, Cost control, Time management, Training, Safety, Advanced machining Technologies, Human relation skills, Data Management.</i> <u>Options:</u> <i>Metal stamping, Injection moulding, Home appliances, Aerospace, Assembly line, Academic institution.</i>
Level 5.5			
Level 5	1. Professional Theoretical Knowledge: Multidisciplinary and specialized knowledge 2. Professional and Technical Skills/ Expertise: Range of skills along with specialized domain skills 3. Employment Readiness & Entrepreneurship Skills & Mind-set: Entrepreneurial mind set, self-management 4. Broad Learning Outcomes: Judgement / decision making – specialized 5. Responsibility: Team leader – Junior technical supervisor, Technical supervisor or junior/ deputy manager	2015/7223.0502 2015/3122.6503	<u>Supervisor Machine Shop</u> <i>Planning, Training, Safety, Costing, Decision making. Advanced technology in machine tool and cutting tools. Inspection.</i> <u>Options:</u> <i>Metal stamping, Injection moulding, Home appliances, Aerospace, Assembly line, Academic institution.</i>
Level 4.5	1. Professional Theoretical Knowledge: Specialized knowledge 2. Professional and Technical Skills/ Expertise: Specialized skills 3. Employment Readiness & Entrepreneurship Skills & Mind-set: Team readiness, self-entrepreneurship readiness 4. Broad Learning Outcomes: Specialized/ complex jobs/tasks 5. Responsibility: Self and team responsibility – Sr. Technician or Master Technician	2015/7223.6003 2015/2141.0500	<u>CNC Programmer- MILLING/TURNING.</u> <i>Prepare milling/turning program. CAM software. Cutting tool selection. Estimation. Training.</i> <u>Process Planner</u> - <i>Process planning. Cutting tools. Programming.</i> <u>Options:</u> <i>Metal stamping, Injection moulding, Home appliances, Aerospace, Assembly line, Academic institution.</i>

Level 4	1. Professional Theoretical Knowledge: Range of knowledge 2. Professional and Technical Skills/ Expertise: Range of technical skills 3. Employment Readiness & Entrepreneurship Skills & Mind-set: Team readiness & Entrepreneurial readiness 4. Broad Learning Outcomes: Carry out Range of tasks and may provide range of solutions 5. Responsibility: Accountable/ responsible - Jr. Technician & Technician	2015/7223.5003 2015/7223.5004 2015/7223.5005 2015/7223.6001 2015/7223.5001	<u>CNC Operator/CNC machinist CNC Milling/Turning-</u> <i>CNC setter cum operator. Inspection. Machine maintenance. Simple CNC programming.</i> <u>Options:</u> <i>Metal stamping, Injection moulding, Home appliances, Aerospace, Assembly line, Academic institution.</i>
Level 3.5	1. Professional Theoretical Knowledge: Fundamental knowledge 2. Professional and Technical Skills/ Expertise: Limited finite skills 3. Employment Readiness & Entrepreneurship Skills & Mind-set: Employment readiness 4. Broad Learning Outcomes: Carry out the Predefined tasks 5. Responsibility: Assistant		
Level 3			
Level 2	1. Professional Theoretical Knowledge: Elementary Knowledge 2. Professional and Technical Skills/ Expertise: Role confined Skills 3. Employment Readiness & Entrepreneurship Skills & Mind-set: Basic employment readiness 4. Broad Learning Outcomes: Routine/Repetitive Tasks 5. Responsibility: Helper		
Level 1			

Annexure 10: Key Learning Outcome

SL. NO.	MODULE NAME	KNOWLEDGE AND UNDERSTANDING	TECHNICAL AND PROFESSIONAL SKILLS	APPLICATION OF KNOWLEDGE AND SKILLS
1ST YEAR				
1	Communication English (CPPCM101T) Ability to communicate effectively	Understand, Comprehend and Communicate in English Form simple sentences.	Writing skills Public Speaking. Read and comprehend. Make meaningful sentences. Use dictionary.	Write Business Letters Reports as necessary in Profession. Interact, Communicate during Interviews, debates, and Group Discussion for Career Development. Develop Presentation Skills.
2	Workshop Calculations (CPPCM102T) Ability to solve various mathematical problems and calculate technical measures	Interpret Different systems of Units and also convert from one unit to another. Perform Area and Volume Calculations Perform Arithmetic operations. Understand various Trigonometric terms, theorems and equations and their utility. Interpret rectangular and polar coordinates and convert from one to another. Calculate feed and depth of cut in milling operations	Use Trigonometry for Engineering Calculations. Ability to solve various mathematical problems. Determine Ratio, proportions, and percentages. Can provide a solid foundation of technical knowledge that can be applied to many different industries and fields.	Use appropriate units and measurements during interactions and discussions in the work area. Determine dimensions, perimeter, Area, and Volume using associated formulas for engineering needs. Calculate RPM of tool/job for the given cutting speed
3	Basics of Computer (CPPCM103T) Creation of various documents and reports using MS Office	Perform different computer operation. (Different computer operations: setting of computer, MS Office and internet operation)	Identify different parts of a computer and their functions. Installation of OS, Personalisation of PC, and other maintenance tools.	Proficiency in using Microsoft Office applications, such as Word, Excel, and PowerPoint, to create and edit documents, spreadsheets, presentations, and emails.

4	Metrology (CPPCM104T)	Explain the Importance of Metrology in Industry Select right type of measurement for Linear measurement, angular measurement, Bore Measuring Instrument Classify gauges according to type, purpose and design. Explain Limits, Fits and Tolerances as per BIS Explain hardness testing devices	Perform precision Linear measurements, Angular measurements, Bore measurements. Use gauges for measuring internal and external dimension, taper, thread, thread pitch, radius, clearance, and profiles. Define Clearance, Interference and Transition as per BIS Identify and specify Measuring machines – Height Master, CMM	Linear Measurements- Using different measuring devices and options. Use of different gauges to measure different parameters of engineering. Use Sine bar for accurate angular measurement. Use appropriate Measuring / Inspection Equipment in Industry
5	Manufacturing Technology (CPPCM105T) Understanding the operations of various Conventional machines. Perform tasks associated with the job-role specific to the industry.	Explain the Importance of Health and Safety Follow Safe Working Practices to Prevent accidents. Explain Drilling Operation Identify and Specify Reamers, Taps, Dies Describe different Turning Operation Explain Different Types of Cutting Tool material and their Characteristics, Specifications and Applications Explain different milling processes. Explain feed and depth of cut in milling operations.	Understand Safety and Health aspects and Ensures Compliance with Health and Safety Regulations. Identify and select Work holding and Tool holding devices for Turning Operations Identify and select work holding and tool holding devices for Milling Operations Identify and specify milling cutters. Identify and Specify grinding wheels. Select grinding wheels as per operations.	Knowledge of health and safety regulations and practices relevant to manufacturing and protective measures. Work Effectively with others. Do Basic First Aid when required in Emergencies. Follow good housekeeping Practices. Perform marking operation on Jobs. Perform drilling, counter boring, counter sinking, Reaming and Tapping Operations

		Explain Grinding Operations Explain different Surface grinding operations and cylindrical grinding operations		Knowledge on different milling processes
6	CNC Technology – I (CPPCM106T) CNC Technology – II (CPPCM202T) Programming and operating and basic Maintenance of CNC machines	Differentiate between NC, CNC and DNC Explain the elements and Functions of CNC Turning Center and VMC Explain materials for CNC Cutting Tools and their applications. Do Part Programming for Turning and Milling Understand alarms and Warning. Use Fusion 360 to create simple CAM Programmes Awareness on maintenance of CNC Machines	Identify and Select Tools for CNC Lathe and CNC Milling Study and Familiarise tool catalogue. Identify CNC machine controls. Load and Edit Programs in CNC Machine Set and Operate CNC Turning Set and Operate CNC VMC Interpret Machine alarms and warnings. Create simple CAM Programmes using Fusion 360. Perform routine maintenance of CNC Machine	Execution of Programs on CNC Milling and CNC Lathe Machines. Take remedial action on warnings and alarms. Run the Machine using CAM Programme Maintain CNC Machines in optimum working condition
7	Engineering Drawing & CAD FUSION 360 - I (CPPCM107P) Engineering Drawing & CAD FUSION 360 – II (CPPCM206P)	State Importance of engineering drawing Indicate Dimensional Tolerances as per BIS Indicate Geometrical Tolerances as per BIS	Explain the difference between orthographic and isometric projection. Able to draw Orthographic Projection in 1st angle and 3rd angle	Draw the Two-dimensional (2D) and three dimensional (3D) diagrams as per given dimensions using Fusion 360.

	Understanding the need of engineering drawing. Ability to create Engineering drawings through CAD software	Draw Sectional Views Draw Isometric Projection Able to draw Orthographic Projection in 1st angle and 3rd angle. Draw assembly and detailed drawings. Use Autodesk Fusion 360 Create and Save files in Fusion 360 Create Drawings using Fusion 360	Dimension Drawings as per BIS Interpreting Surface Texture symbols given in Drawing.	
8	Workshop Practical - I (CPPCM108P) Workshop Practical - II (CPPCM207P) Use of mechanical measuring instruments and perform basic operations in the workshop.	Describe and explain the classification, selection and use of hand tools. Follow all safety precautions prescribed for workshop operations. Read and interpret the Workshop drawings. Drilling, Reaming, Tapping Plain turning, Step turning, Taper turning Identify different measuring instruments and their purposes.	Identify the appropriate processes to be performed from the Drawings. Filing, Hack sawing, Drilling, Counter boring, Counter sinking, Tapping and Reaming. Bench work, Milling, Turning, Surface Grinding Determine least count, measure physical variable quantities. SOP for use of different hand tools and Gauges.	Perform different operations on the assigned job to achieve defined Specifications and dimensions. Knowledge on manual metal working methods and equipment Marking practice Use appropriate measuring instruments to measure variables in the job role. Filing, Drilling, Turning, Milling and Grinding process.
9	Material Technology (CPPCM201T) Awareness on structure of Engineering Materials	Classify Engineering Materials Explain Properties of Materials Describe Various Types of Ferrous Metals	Understand the properties, characteristics, and behaviour of various materials and their applications. Select Standard Steel Sections	Knowledge of the physical, mechanical, and chemical properties of materials and how they relate to their performance in different applications.

		Explain Types, Properties and Application of Cast Iron, Steel, Non - Ferrous metals and Alloys. Differentiate between Thermoplastics and Thermoset Plastics Explain Types, Properties and Application of Non - Ferrous metals and Alloys	and Sheets State Types, Properties and Application of Thermoplastics State the Properties and application of hard materials (PMKNSH)	Knowledge on Properties, Specification and Application of Materials used in Industry.
10	Electrical Technology (CPPCM203T)	Aware of Electrical Safety Procedures. Identify and Specify Wires and Cables Identify, Specify and Use measuring instruments – Ammeter, Voltmeter, Multimeter and CRO Differentiate between Potential Difference and EMF Differentiate types of fuses and their applications Describe construction, Working, specifications and Applications of single phase and three phase Induction motors. Describe Working principle of Stepper and Servo motors. Describe Display Devices	Identify and State Specification and Applications of Electrical hand tools. Identify the specify Electrical Protective Devices Able to select the cables and wires as per the applications. Identification and specification of Electrical Components Like Wires, Switches, Sockets, Fuse, MCB, ELCB	Knowledge of electrical machines, such as transformers, motors, and their operating principles. Knowledge of electrical safety standards and regulations. Identify and select appropriate protective devices (fuse and their types, circuit breakers and their types, Relays, and their types)
11	Industrial Education (CPPCM204T)	Identify and analyse the traits/quality required for an entrepreneur.	Understand safety regulations and standards in the auto sector, including workplace safety	Apply the importance of Industrial safety.

		Aware of Basic hazard, Chemical hazard, and Mechanical hazards Follow Personal, Shop floor, Electrical and Fire Safety Explain Environment Pollution and Controlling Methods Explain Energy Saving Methods Explain methods of disposal of wastes Understand Global warming - Ozone Layer Depletion Explain the Importance of Quality in Production Explain QC Tools	regulations, vehicle safety regulations, and environmental regulations. Understand Health Hazards and Controlling Methods Understand the need of recording and investigating Accidents. Understand the principles of environmental sustainability and regulations related to waste disposal, emissions, and energy consumption. Skill to identify potential quality issues before they occur and to implement preventive measures to avoid them. Skill to identify opportunities for improvement, optimize quality processes, and increase organizational efficiency.	Ability to operate machinery and equipment safely and follow workplace safety regulations and guidelines. Use Appropriate PPE Help in Preventing and Controlling Accidents Follow safety regulations and standards. Proficiency in the use of safety equipment and emergency response protocols.
12	Modern Shop Floor Practices (CPPCM205T) Practice the modern shop floor practices in their work area.	Explain the Concept of 5S and participate in 5S Activities. Explain Gemba Explain and Understand Poka-yoke. Describe concepts of Kaizen Explain MUDA, MURA, MURI Explain JIT	Participate in Gemba Kaizen Participate in 5S Activities.	Apply 5s and KAIZEN in Workplace Poka-yoke - Six mistake proofing techniques
13	Project (CPPCM208P)	Select and Plan Project / Case Study Execute Project / Case Study		Case study under the work area under the guidance of faculty or executive in the work area.

		Prepare Project / Case Study Report		
		Present Project / Case Study Report		
14	Employability Skills (CPPCM109T) Employability Skills (CPPCM209T) Ability to behave appropriately. Understand Constitutional Values/ role of citizen. Ability to communicate appropriately. Understand Diversity and Inclusion. Understand Entrepreneurship skills Ability to understand financial and legal aspects Understand Occupation safety, Health, and Environment related issues. Ability to use Essential skills.	Knowledge and understanding of all Human relation Principles. Knowledge and understanding of Indian constitution. Awareness about duties of the citizen of India. Knowledge and understanding of types of communication. Good understanding about Diversity and Inclusion in the workplace. Knowledge on various schemes and institutions promoting Entrepreneurs. Knowledge and understanding on personal finance management, investments, returns, basics of taxes, awareness on financial frauds and prevention. Knowledge on Occupation safety and health, at workplace, Occupation Hazards, Accident prevention and PPEs, Environment, Pollution and protection of environment, Energy conservation, Global warming, Conservation of natural resources, waste management and disposal, Disaster Management.	Able to practice HRP with peer groups to maintain healthy relationships. Practice the constitutional values in society. Practice effective communication with peers, superiors and subordinates with empathy and care. Practice a sense of belonging in the society leaving behind all differences due to race, ethnicity, gender, age, identity etc. Explain the schemes promoted by various support institutions. Budgeting and evaluations. Explain the Occupations hazards and process of mitigation of such hazards. PPEs. Explain environment conservation, and other factors affecting them. Explain various Acts enacted for labour welfare by various Governments.	Follow all the skills in the workplace and society to have peace and harmony with superiors and subordinates. Apply and impart details to other people in society. Decide, plan and implement various financial management ideas, taxations and benefits and legal compliance in the workplace. Enforce caution against financial frauds and addressal of frauds. Follow all safety norms laid by the industry to develop a safe workplace. Practice stress management techniques to ensure high productivity in the work area. Use of various QC tools and Kaizen for problem solving and Quality improvement themes. Customer handling from greeting, grievance handling.

Understand Labour Welfare and Legislation.	Understanding balancing Life and Career, Value based decision making, Types of stress and stress management.	Attend mock interviews, create Resume documents.	
Understand the concept of Quality Management Getting ready for Employment/ Entrepreneurship.	Knowledge on benefits guaranteed under various Acts, legislations, Factories act, Apprenticeship Act, ESI, EPF Acts, Payment of wages act, women's compensation Act, POSH, and other industrial laws.	Body language, relationship building, probing techniques.	
Learn to interact with customers/ provide service.	Understanding the pathway and progression. Creating resume and apply for Jobs.		

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