



QUALIFICATION FILE

Technician - Manufacturing and Assembly

- ☐ 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: 4.0

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	Technician - Manufacturing and Assembly	
2.	Sector/s	Capital Goods and Manufacturing	
3.	Type of Qualification: ☒ New ☐ Revised ☐ Has Electives/Options ☐ OEM	NQR Code & version of existing/previous qualification: <i>(change to previous, once approved)</i>	Qualification Name of existing/previous version: Technician - Manufacturing and Assembly
4.	a. OEM Name b. Qualification Name <i>(Wherever applicable)</i>	NA	
5.	National Qualification Register (NQR) Code & Version <i>(Will be issued after NSQC approval)</i>	QG-04-CG-01036-2023-V1-NTTF	6. NCrf/NSQF Level: 4.0
7.	Award (Certificate/Diploma/Advance Diploma/ Any Other) <i>(Wherever applicable specify multiple entry/exits also & provide details in annexure)</i>	Advanced Certificate	
8.	Brief Description of the Qualification	The Candidate will be able to Manufacture and Assemble Mechanical products / Automobile / Precision assembly The subjects covered in this Programme are – Employability skills, CNC Technology, Electrical and Electronics, Automation-I, Mechanical Drive, Material Handling (Elective -Auto), Automobile Engineering – I (Elective -Auto), Manufacturing Technology - III (Elective -Auto), Manufacturing Technology - III (Elective -Mfg), Industrial Electronics (Elective -Mfg), Welding (Elective -Mfg), Eye Glass Frame Manufacturing (Elective -Mfg), Foundry Technology - I (Elective -Mfg), Jewellery Making Process - I (Elective -Jewellery), Gold Refining Process (Elective -Jewellery), Automobile Engineering - II (Elective -Auto), Parts and Functions of Two Wheelers (Elective -Auto), Assembly Techniques (Elective -Auto), Advanced CNC (Elective -Mfg), Glass Manufacturing Technology (Elective -Mfg), Material Recycling and Logistics(Elective -Mfg), Heat Treatment(Elective -Mfg), Gems Stones and Diamonds(Elective -Jewellery), Jewellery Making Process - II(Elective -Jewellery), Electrical and Electronics Lab, CNC Lab, Automobile Engineering Lab-I (Elective -Auto), Industrial Electronics Lab (Elective -Mfg), Observation of Gold Refining process (Elective -Jewellery), Automation Lab-I, Automobile Engineering Lab - II (Elective -Auto), Advanced CNC Lab (Elective -Mfg), Familiarisation / Observation of Glass Manufacturing (Elective -Mfg), Observation of Jewellery making processes (Elective -Jewellery), OJT	

9.	Eligibility Criteria for Entry for Student/Trainee/Learner/Employee	Entry Qualification & Relevant Experience: <table border="1" data-bbox="884 196 2056 576"> <tr> <th data-bbox="884 196 981 264">Sl. No.</th> <th data-bbox="981 196 1760 264">Academic/Skill Qualification (With Specialization - if applicable)</th> <th data-bbox="1760 196 2056 264">Required Experience (with Specialization)</th> </tr> <tr> <td data-bbox="884 264 981 576">1</td> <td data-bbox="981 264 1760 576"> 12th Pass with Mathematics OR After 10th Pass 2 years ITI Candidates of the following trades: Fitter, Turner, Machinist Grinder, Machinist, Mechanic Machine Tool Maintenance, Tool & Die Maker (Dies & Moulds), Tool & Die Maker (Press Tools, Jigs & Fixtures) OR After 10th Pass completed 2 years diploma in relevant trade OR Certificate: Mechanical assembler (Level 3.5) from NTTF </td> <td data-bbox="1760 264 2056 576">NA</td> </tr> </table>						Sl. No.	Academic/Skill Qualification (With Specialization - if applicable)	Required Experience (with Specialization)	1	12th Pass with Mathematics OR After 10th Pass 2 years ITI Candidates of the following trades: Fitter, Turner, Machinist Grinder, Machinist, Mechanic Machine Tool Maintenance, Tool & Die Maker (Dies & Moulds), Tool & Die Maker (Press Tools, Jigs & Fixtures) OR After 10th Pass completed 2 years diploma in relevant trade OR Certificate: Mechanical assembler (Level 3.5) from NTTF	NA												
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10.	Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))	Total Credits – 44			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 (Specify Total Duration as per selected training delivery modes and as per requirement of the qualification)	☐ Offline ☐ Online ☒ Blended <table border="1" data-bbox="949 794 2040 1046"> <thead> <tr> <th data-bbox="949 794 1218 919">Training Delivery Modes</th> <th data-bbox="1218 794 1368 919">Theory (Hours)</th> <th data-bbox="1368 794 1525 919">Practical (Hours)</th> <th data-bbox="1525 794 1688 919">OJT / Project Mandatory (Hours)</th> <th data-bbox="1688 794 1906 919">OJT Recommended (Hours)</th> <th data-bbox="1906 794 2040 919">Total (Hours)</th> </tr> </thead> <tbody> <tr> <td data-bbox="949 919 1218 983">Classroom (offline)</td> <td data-bbox="1218 919 1368 983">310</td> <td data-bbox="1368 919 1525 983">180</td> <td data-bbox="1525 919 1688 983">690</td> <td data-bbox="1688 919 1906 983">-</td> <td data-bbox="1906 919 2040 983">1180</td> </tr> <tr> <td data-bbox="949 983 1218 1046">Online</td> <td data-bbox="1218 983 1368 1046">140</td> <td data-bbox="1368 983 1525 1046"></td> <td data-bbox="1525 983 1688 1046"></td> <td data-bbox="1688 983 1906 1046"></td> <td data-bbox="1906 983 2040 1046">140</td> </tr> </tbody> </table> (Refer Blended Learning Annexure for details)						Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT / Project Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)	Classroom (offline)	310	180	690	-	1180	Online	140				140
Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT / Project Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)																				
Classroom (offline)	310	180	690	-	1180																				
Online	140				140																				
14.	Aligned to NCO/ISCO Code/s (if no code is available mention the same)	NCO Code - 2015.8211.0101																							
15.	Progression path after attaining the qualification. (Please show Professional and Academic progression)	Professional Progression: After Completion of 1 year of Full Time Programme can work as integrating and assembling of machine parts, maintain & service the equipment. After Completion of 3 years of Full Time Programme and after 5 years of Industry Experience the Job Holder can work as Maintenance Engineer, Customer service Academic Progression: Diploma in Manufacturing Engineering																							

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 (10% seats are reserved)	
20.	Are Greening/ Environment Sustainability Aspects Covered (Specify the NOS/Module which covers it)	☐ Yes ☒ No	
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: Mr. R Rajagopalan Position in the Organization: Joint Managing Director Email: rg@nttf.co.in Tel. number: 080 – 28390215 Contact Number: 9844013448 Website: nttftrg.com	
23.	Final Approval Date by NSQC: 29 Sep 2023	24. Validity Duration: 3 years	25. Next Review Date: 29 Sep 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 (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)
SEMESTER – III																
1	CNC Technology	CP33301T	Core	4.0	23	45	-	-	-	45	100	-	-	-	100	
2	CNC Lab	CP33302P	Core	4.0		-	60	-	-	60	-	75	-	25	100	
3	Electrical and Electronics	CP33303T	Core	4.0		60	-	-	-	60	100	-	-	-	100	
4	Electrical and Electronics Lab	CP33304P	Core	4.0		-	40	-	-	40	-	75	-	25	100	
5	Elective Theory 7/8/9 (Choose One)	CP333XX*T	Core	4.0		105				105	100	-	-	-	100	
6	Elective Practical 10/11/12 (Choose One)	CP333XX*P	Core	4.0			20			20	-	75	-	25	100	
7	OJT	CP33317P	Core	4		-	-	330	-	330	-	75	-	25	100	
8	Employability Skills	CP33318T	Core	4		30	-	-	-	30	75	-	-	25	100	
Duration (in Hours)/ Total Marks					23	240	120	330		690	375	300	-	125	800	
SEMESTER – IV																
9	Automation-I	CP33401T	Core	4	21	45	-	-	-	45	100	-	-	-	100	
10	Mechanical Drive	CP33402T	Core	4		45	-	-	-	45	100	-	-	-	100	
11	Automation Lab-I	CP33403P	Core	4		-	30	-	-	30	100	-	-	-	100	
12	Elective Theory 13/14/15 (Choose One)	CP334XX*T	Core	4		90				90	100	-	-	-	100	
13	Elective Practical 16/17/18 (Choose One)	CP334XX*P	Core	4		-	30			30	-	75	-	25	100	
14	OJT	CP33417P	Core	4		-	-	360	-	360	-	75	-	25	100	
15	Employability Skills	CP33418T	Core	4		30	-	-	-	30	75	-	-	25	100	
Duration (in Hours)/ Total Marks						21	210	60	360	-	630	475	150	-	75	700
Total for 1-year Programme					44	450	180	690	-	1320	850	450	-	200	1500	

Elective Modules/ NOS/s:

Sl. 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
SEMESTER – III																
7	7.1 Material Handling	CP33305T	Core	4.0		30	-	-	-	30	100	-	-	-	100	
	7.2 Automobile Engineering – I	CP33306T	Core	4.0		45	-	-	-	45	100	-	-	-	100	
	7.3 Manufacturing Technology - III	CP33307T	Core	4.0		30	-	-	-	30	100	-	-	-	100	
8	8.1 Manufacturing Technology - III	CP33308T	Core	4.0		30	-	-	-	30	100	-	-	-	100	
	8.2 Industrial Electronics	CP33309T	Core	4.0		30	-	-	-	30	100	-	-	-	100	
	8.3 Welding	CP33310T	Core	4.0		45	-	-	-	45	100	-	-	-	100	
	8.3 Eye Glass Frame Manufacturing	CP33311T														
	8.3 Foundry Technology - I	CP33312T														
9	9.1 Jewellery Making Process - I	CP33313T	Core	4.0		45	-	-	-	45	100	-	-	-	100	
	9.2 Gold Refining Process	CP33314T	Core	4.0		60	-	-	-	60	100	-	-	-	100	
10	Automobile Engineering Lab – I	CP33315P	Core	4.0			20			20	-	75	-	25	100	
11	Industrial Electronics Lab	CP33316P	Core	4.0			20			20	-	75	-	25	100	
12	Observation of Gold Refining Process	CP33317P	Core	4.0			20	-	-	20	-	75	-	25	100	
SEMESTER – IV																
13	13.1 Automobile Engineering - II	CP33404T	Core	4.0		45	-	-	-	45	100	-	-	-	100	
	13.1 Parts and Functions of Two Wheelers	CP33405T														
	13.2 Assembly Techniques	CP33406T	Core	4.0		45	-	-	-	45	100	-	-	-	100	
14	14.1 Advanced CNC	CP33407T	Core	4.0		60	-	-	-	60	100	-	-	-	100	
	14.1 Glass Manufacturing Technology	CP33408T														
	14.1 Material Recycling and Logistics	CP33409T														
	14.2 Heat Treatment	CP33410T	Core	4.0		30	-	-	-	30	100	-	-	-	100	
15	15.1 Gems Stones and Diamonds	CP33411T	Core	4.0		45	-	-	-	45	100	-	-	-	100	
	15.2 Jewellery Making Process – II	CP33412T	Core	4.0		45		-	-	45	100	-	-	-	100	

16	16.1 Automobile Engineering Lab – II	CP33413P	Core	4.0		-	30	-	-	30	-	75	-	25	100	
17	17.1 Advanced CNC Lab	CP33414P	Core	4.0		-	30	-	-	30	-	75	-	25	100	
	17.1 Familiarisation / Observation of Glass Manufacturing	CP33415P														
18	18.1 Observation of Jewellery Making Processes	CP33416P	Core	4.0		-	30	-	-	30	-	75	-	25	100	

Optional Modules/ NOS/s: NA

Sl. 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

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

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.

Section 3: Training Related

1.	Trainer's Qualification and experience in the relevant sector (in years) <i>(as per NCVET guidelines)</i>	Diploma in relevant field with 3 years as trainer or industry experience B. Tech or BE with 2 years of trainer or industry experience
2.	Master Trainer's Qualification and experience in the relevant sector (in years) <i>(as per NCVET guidelines)</i>	Diploma in relevant field with 5 years as trainer or industry experience B. Tech or BE with 5 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) <i>(as per NCVET guidelines)</i>	Diploma with 4 years as trainer or industry experience B. Tech or BE with 3 years as trainer or industry experience
2.	Proctor's Qualification and experience in relevant sector (in years) <i>(as per NCVET guidelines)</i>	Diploma or B. Tech or BE with 2 years of experience
3.	Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years) <i>(as per NCVET guidelines)</i>	Diploma with 4 years as trainer or industry experience B. Tech or BE with 3 years as trainer or industry experience
4.	Assessment Mode <i>(Specify the assessment mode)</i>	Theory and practical (offline)
5.	Tools and Equipment Required for Assessment	Same as for training ☒ Yes ☐ No <i>(details to be provided in Annexure-if it is different for Assessment)</i>

Section 5: Evidence of the need for the Qualification*Provide Annexure/Supporting documents name.*

1.	Research Reports: The following reports establish the Skilled Resource requirement for the Manufacturing, Capital Goods and Automotive Industries. a. MSDE Annual Report 2021- 2022 predicts very high growth on Manufacturing Sector. 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 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
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): YES a. Study on Job Role of the Future by Indian Institute of Skills. b. The Study has found High Demand in Manufacturing Sector for Persons with Skills/Knowledge on Emerging Technologies.
4.	Number of Industry validation provided: 92
5.	Estimated nos. of persons to be trained and employed: 4000 / 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 (Mandatory)	Yes
2.	Annexure 2: List of tools and equipment relevant for qualification (Mandatory, except in case of online course)	Yes
3.	Annexure 3: Industry Validations Summary	Yes
4.	Annexure 4: Training & Employment Details	Yes
5.	Annexure 5: Blended Learning (Mandatory, in case selected Mode of delivery is “Blended Learning”)	Yes
6.	Annexure 6: Detailed Assessment Criteria (Mandatory)	Yes
7.	Annexure 7: Assessment Strategy (Mandatory)	Yes
8.	Annexure13: Multiple Entry-Exit Details (Mandatory, in case qualification has multiple Entry-Exit)	No
9.	Annexure: Acronym and Glossary (Optional)	Yes
10.	Supporting Document: Model Curriculum (Mandatory – Public view)	Digital content available to trainees through Edusquares ERP (Will be made public after the qualification is approved) (Annexure 8)
11.	Supporting Document: Career Progression (Mandatory - Public view)	Yes (Annexure 9)
12.	Supporting Document: Occupational Map (Mandatory)	Yes (Annexure 11)
13.	Supporting Document: Assessment SOP (Mandatory)	Yes (Annexure 10)
14.	Supporting Document: Key Learning Outcome	Yes (Annexure 12)
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	• Describe the operations of various Conventional, Non-conventional and Special purpose machines. • Explain the steels used and their heat treatment. • Programming and operating and basic Maintenance of CNC machines. • Describe the elements of Hydraulics and Pneumatics and function. • Explain basic electrical & electronics safety, tools used, identification & use of parts like motors, sensors etc. • Explain parts and different systems of automobile and government norms. • Describe different manufacturing processes like foundry, glass manufacturing, eye glass frame manufacturing. • Describe assembly/joining processes. • Explain identification of gems, stones, diamond & jewellery making process. • Describe entrepreneurship skills, financial and legal aspects, occupational safety.	• Application of the knowledge and skills gained from learning Conventional, Non-conventional and Special purpose machines in a wide range of industries. • Provide Specification and Application of suitable Materials and their Heat Treatment. • Generate CAM programs using CAM. Execution of Programs on CNC Milling and Lathe Machines. • Perform simulation of basic hydraulics and pneumatics circuits. • Demonstrate basic electrical & electronics safety, tools used, identification & use of parts like motors, sensors etc. • Demonstrate parts and different systems of automobile and government norms. • Demonstrate the basics of different manufacturing processes like foundry, glass manufacturing, eye glass frame manufacturing. • Demonstrate joining process like welding. • Demonstrate identification of gems, stones, diamond & jewellery making process. • Demonstrate financial management ideas, taxations and benefits and legal compliance in the workplace.	4.0
Professional and Technical Skills/ Expertise/ Professional Knowledge	• Perform machining operations using various Conventional, Non-conventional and Special purpose machines and check quality. • Perform machining operations using CNC milling and turning. • Prepare CNC programming and tool selection.	• Machining of elements using conventional milling, turning, grinding machines and Wire, Spark EDM machines. • Prepare and execute CNC programming using CAM software. Operate CNC machines to machine the elements.	4.0

	• Perform verification of hydraulics and pneumatics circuits. • Explain parts and different systems of automobile. • Explain jewellery making process. • Describe personal finance management, investments, returns, basics of taxes.	• Prepare basic hydraulics and pneumatics circuits and verify with simulation. • Identify parts and different systems of automobile, their functions and assembly. • Demonstration of jewellery making process. • Demonstrate various financial management ideas, taxations and benefits and legal compliance in the workplace.	
Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	• Communicate Effectively with Peers and Supervisors in the work area. • Describe Knowledge on Organization, ethical & moral values, and Practice Time Management • Exhibit and maintain a safe working environment and good housekeeping practices. • Able to Analyze solutions Critically and Logically for fine decision making. • Proficiency in Manual metal working Processes • Proficiency in CAM Software • Proficiency in using Conventional Machine, Nonconventional Machine and CNC Machine • Proficiency in manufacturing and assembly process used in manufacturing, automobile, jewellery making.	• Demonstrate good Communication with Peers, superiors both verbal and written, good on Presentation Skills, QC, and 5S. • Follow safe working practices to prevent accidents. • Analyze situations Critically and Logically. • Perform Manual metal working Operations. • Machine Components using Conventional and CNC Machines • Programming in CAD/CAM for CNC machine and Nonconventional machine • Demonstrate manufacturing and assembly process used in manufacturing, automobile, jewellery making.	4.0
Broad Learning Outcomes/Core Skill	• Proficiency in manufacturing and inspection of elements using conventional, non-conventional and CNC machines. • Proficiency in manufacturing and assembly process used in manufacturing, automobile, jewellery making.	• Machine and inspect the elements using conventional, non-conventional, CNC machines. • Demonstration of manufacturing and assembly process used in manufacturing, automobile, jewellery making.	4.0

	• Proficiency in using hydraulics and pneumatics circuits. • Prepare Technical Reports and Presentations using MS Office. • Describe Safety and standard operating Procedures and Practices in the work area. • Communicate with Peers and Superiors. • Describe effective 5S.	• Prepare technical reports and Presentation using MS Office. • Demonstrate the preparation of basic hydraulics and pneumatics circuits and verify with simulation. • Follow all safety norms and standard operating Procedures in the work area. • Demonstrate verbal and written communication, Maintain Good Relationship with Peers and Superiors.	
Responsibility	• Be Aware of Personal/Industrial goals. • Adapt to changes in the work area. • Describe safety Procedures and SOPs in the relevant work area.	• Carry out Manufacture and assembly of simple elements used in manufacturing, automobile, jewellery making. • Guide fitters in Fulfilling Tasks Assigned to them.	4.0

Annexure 2: Tools and Equipment (Lab Set-Up)**List of Tools and Equipment for a batch of 30 trainees**

SL. NO.	NAME OF THE TOOL AND EQUIPMENT	SPECIFICATION	QUANTITY
1	Work Bench with Lockers - 4 vices / Bench		5
2	Bench Vice	125 mm	10
3	Set of Files		10
4	Steel Rule	150mm	10
5	Steel Rule	300mm	5
6	Vernier caliper	0.02 least count	10
7	Scriber		10
8	Centre Punch	60° & 90°	10
9	Try Square	100 mm x 75 mm	10
10	Hack Saw with Blade	300 mm	10
11	Hammer	200g and 500g	5
12	Cast Iron Surface Plate	600mm X 450mm with Stand	1
13	Angle Plate	250mm X 150mm X 175mm	1
14	V - Blocks	150mm X 100mm X 60mm	1
15	Vernier Height Gauge	600mm	1
16	V block	80mm sq 1 pair	1
17	Ring Spanners set	6 mm to 22 mm	1
18	Double Ended Spanner Set	6 mm to 22 mm	1
19	Adjustable Spanners	70/ 30	1
20	Philips Screw Driver set		1
21	Flat Screw Drivers Set		1

22	Circlip Pliers – Set		1
23	Torque Wrench Ratchet type	70 to 340 Nm	2
24	Pneumatic Screw Driver		2
25	Pneumatic Nut Runner		2
26	Allen Key Set (mm sizes)		1
27	Bearing puller	100 mm	1
28	Drill Machine Portable	ø6mm	1
29	Portable Angle Grinder	100mm	1
30	Socket set - 24 pieces	10 to 32	1
31	200A Inverter based Arc Welding Machine with all Accessories		1
32	MIG Welding Machine 400A with all Accessories		1
33	Electrode drying Oven	Capacity: 25kg	1
34	Welding Table with Fixture		2
35	Centre Lathe	Machining Dia: 100mm x 650mm long	1
36	Vertical Milling Machine	Machining size: 250mm x150mm x100mm H	1
37	Surface Grinding Machine	Machining size: 450mm x150mm x100mm H	1
38	Bench Drilling Machine	Maximum Dia. On steel – Ø10m	1
39	Bench Grinder	Wheel Dia: 200mm x 20mm thick - 2 sided	1
40	Power hacksaw	350 mm	1
41	CNC Lathe machine with Accessories and Servo Stabiliser		1
42	CNC Milling machine with Accessories and Servo Stabiliser		1

43	CNC Simulation Software - 10 user license.		1
44	Compressor	Compressor- Reciprocating Air Compressor - 2 stage/2 Cylinder with 3 phase motor capacity 8CFM, Air Receiver Size- 160l	1
45	Pneumatic Trainer Kit		1
46	Hydraulic Trainer Kit		1
47	PLC Trainer Kit		1
48	Sensor Trainer Kit with Assorted Sensors		1
49	Pneumatic Simulation Software -10 User		1
50	Hydraulic Simulation Software - 10 User		1
51	PLC Simulation Software - 10 User		1
52	Robot Simulation Software -10 User		1
53	Automobile Drive Train		1
54	Computer		10
Equipment / Machineries available where OJT is being conducted			

Classroom Aids

The aids required to conduct sessions in the classroom are:

1. Black / White board
2. Projector with screen / Display 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	M/s. ACE Designers Limited	Mr. Veeresha K K		Plot No. 7 & 8, 80 Feet Rd, II Phase, Peenya, Bengaluru, Karnataka 560058	+91 9611622522	veeresha_kk@acedesigners.co.in	
2	M/s. Alpha Elsec Defence and Aerospace Systems Pvt Ltd	Mr. Lalithkumar M		4th Cross Rd, Peenya 1st Stage, Peenya, Bengaluru, Karnataka 560058	+91 8618115045	lalithkumar.m@alpha-elsec.com	
3	M/s. Ace Multi Axes Systems Limited	Mr. RL Patil		No. 17, Plot No. 467-9, Peenya Industrial Area Phase IV, Peenya Industrial, Area, Bengaluru, Karnataka 560058	+91 9945503052	patil@acemulti.net	
4	M/s. Auto CNC Machining Private Limited	Ms. Rohini		4th Phase, 282, 4th Main, Near, Tvs Cross, Peenya, Bengaluru, Karnataka 560058	+91 9591305181	hr@autocnc.co.in	
5	M/s. Acwa Automatics LLP	Mr. Madhu		No, 204, 12th Main Rd, 3rd Stage, Peenya, Bengaluru, Karnataka 560058	+91 9844007796	madhu@acwaautomatics.com	
6	M/s. sartorius stedim india private limited	Mr. Sudheer		No.-69/2 & 69/3, Jakkasandra, Kunigal Road, Nelamangala Taluk, Bangalore - 562123	+91 9845287865	sudheer.adithya@sartorius.com	
7	M/s. Sphoorti Machine Tools Pvt. Ltd.	Mr. Nandakumar		Plot No. 467, #18, 469, 12th Cross Rd, Peenya Industrial Area Phase IV, Peenya, Bengaluru, Karnataka 560058	+91 80 41272768	hr@spoorthi.com	
8	M/s. DC Auto Parts Private Limited	Mr. Santosh		No. A-267, 6th Main, 2nd Stage, Peenya Industrial Estate, Bengaluru-560058	+91 80 28364423	-	
9	M/s. COMPRESSOR CARE	Mr. SANJEEV KUMAR		68, Shakti Vihar Rd, Awasth Vikas, Rudrapur, Uttarakhand 263153	+91 9917328888	info@compressorcare.co.in	
10	M/s. KRISTEEL SHINWA INDUSTRIES SILVASSA	MR. JALAPUR		47 Govt industrial estate , Masat, Silvassa, 396230	+91 9558876587	mbjalapur@kristeel.com	

11	M/s. GATE INDIA PRIVATE LIMITED PUNE	MR SAHIL KOLHE		Plot No. K-8, Near Hyundai Company-Khalumbre, Pune, Maharashtra 410501	+91 9975564970	sahil.kohle@teamlease.com	
12	M/s. HOLISTER MEDICAL INDIA PRIVATE LIMITED	MS. SARIKA		Plot No. 27, Sector 5 Phase II, HSIIDC Growth Center, Bawal, Haryana 123501	+91 9050750090	panacea.anilsandilya@gmail.com	
13	M/s. ABI Showatech India Pvt Ltd	Mr. S. Ganesan		Pulivalam Village & Post Via Banavaram, Vellore Dist 632505, Tamil Nadu, India.	9790977674	Ganesan.SR@abishowatech.co.in	
14	M/s. Amara Raja batteries ltd	Mr. P Lakshmi Narayana		Karakambadi Rd, Mangalam, Tirupati, Andhra Pradesh 517507		pln@amararaja.co.in	
15	M/s. Bellsonica Auto Components India Pvt Ltd	Mr. Dharmendra		Plot No. 1, Phase3A, Sector 8, Imt Manesar, Gurugram, Haryana 122051	9810722584	dharmender.kumar@bellsonicaindia.com	
16	M/s. Brakes India (Foundry Division)	Mr. Senthilnathan		New No.5, 4th Main Raod, Gandhi Nagar, Adyar, Chennai – 600 020	7867041722	fdypersonnel@brakesindia.co.in	
17	M/s. Brakes India Private Limited	Mr. Arun kumar		Plot No 55, , Block C, Menakuru Village, Naidupeta, Andhra Pradesh - 524421	7094440721	Arunkumar.S@brakesindia.co.in	
18	M/s. Caterpillar India private limited	Mr. Devendran Thiruganasambandam		Melnallathur Post, Thiruvallur, Tamil Nadu 602004	9940435287	thiruganasambandam_devendran@cat.com	
19	M/s. Fritzmeier Motherson Cabin Engg Ltd	Mr.Sivakumar		Post 631561, NH4 - Athivakkam Road/112 - Singadivakkam/Attuputhur, Kanchipuram, Tamil Nadu 631561	8056000347		
20	M/s. Hitachi Astemo Chennai Private Limited	Ms.G.Preetha		Plot No:17, One Hub Chennai,Panchanthiruthi Village, Manamathy PO, Thiruporur Tk, Kanchipuram District,Pincode – 603 105	8428206671	preetha.ganesan.fo@hitachiastemo.com	
21	M/s. India Pistons Limited	Mr. Ramesh		Huzur Gardens, Sembiam, Chennai - 600011	7904524074	ird.sembiam@indiapistons.com	

22	M/s. PRECISION MACHINE & AUTO COMPONENTS PVT LTD	Mr.Udhayakumar S		B70/2,Sipcot industrial Park, Irrungattukottai,Sriperumbudur - 602105	9841688468	udhaya@pmacindia.com	
23	M/s. Real Talent Engineering Private Limited	Mr. Duraisamy		SIDCO Estate, RK Pet, Near Police Station, Rk Pet, Vellore-631304, Tamil Nadu	9843051234	doraiswamy.s@rte.org.in	
24	M/s. Saint-Gobain India Pvt. Ltd	Mr. Pugalenth		Plot No-36, GIDC Mega Estate, Jhagadia, Jhagadia, Bharuch, Gujarat - 393110	9994069222	pugalenth.m@saint-gobain.com	
25	M/s. Saint-Gobain India Pvt. Ltd ,Bhiwadi	Mr. Shivasakar		Plot No. SP1, Kaharani, Bhiwadi Extension, RIICO Industrial Area, Bhiwadi, Rajasthan 301019	8003194214	shivsagar.sharma@saint-gobain.com	
26	M/s. Saint-Gobain India Pvt. Ltd,Chennai	Mr. Pugalenth		Plot NO. A-1 Sipcot Industrial Park, Mambakkam, Sriperumbudur, Tamil Nadu 602105	9994069222	pugalenth.m@saint-gobain.com	
27	M/s. Samsung India Electronics Pvt Ltd	Mr. Ramesh		SH 120, Sriperumbudur, Kanchipuram, Tamil Nadu 602106	9994393455	shikha.s11@samsung.com	
28	M/s. THE ACETECH MACHINERY COMPONENTS INDIA PVT LTD	Ms.Narmadha T		Acetech Heavyfab Private Limited,S.F 62/2C, Padurmedu, Poonamallee, Chennai - 602 107.	7358736726	planthr2@acotechindia.in	
29	M/s. Tube Product of India	Mr.Deepak		Post Box No. 18, Mth Road, Avadi, Chennai, Tamil Nadu 600054	9840996496	DeepakAPJ@tii.murugappa.com	
30	M/s. Turbo Energy Private Limited	Mr. Baranidharan		Turbo Energy Private Limited, Pulivalam, Banavaram, Vellore, Tamil Nadu, 632505	9787714955	baranidharan.tv@turboenergy.co.in	
31	M/s. Turbo Energy Pvt Ltd	Mr. Baranidharan		Survey Block No. 859, Por Industrial Park Village, Vadodara, Gujarat, 391243	9787714955	baranidharan.tv@turboenergy.co.in	
32	M/s. Turbo Energy Pvt Ltd, Payanoor	Mr. Baranidharan		100, Old Mahabalipuram Road, Paiyanur, Kanchipuram, Tamil Nadu, 603104	9787714955	baranidharan.tv@turboenergy.co.in	
33	M/s. Wheels India Limited	Mr.Jayanth		453V+Q8W, Madras Thiruvallur High Rd, TVS Industries, Padi, Chennai, Tamil Nadu 600040	9841003176	jayanth_t@wheelsindia.com	

34	M/s. Wipro Infrastructure Engineering	Mr. Balamurali		Sipcot Industrial Park, Irungattukottai, Sriperumbudur, C 1, Mevalurkuppam, Tamil Nadu 602105	9940535558	balamurali.n96@wipro.com	
35	M/s. Indo-mim Pvt Ltd	Mr. Vishal Argekar		#45[p], KIADB Industrial Area, Doddaballapur, Bangalore 561 203	7892754941	vishal.a@indo-mim.com	
36	M/s. Spacenex Aero Private Limited	Mr. Tippleswamy		# 13, Hi-tech Aerospace & Defence Park, KIADB Industrial Area, Bhatramarenahalli Devanahalli (taluk), Bangalore - 562110, Karnataka, India	8073161212	thippeswamy.s@spacenet.com	
37	M/s. Krupa Technologies	Mr. Shambulingana Gowda		#5, 5th Cross, 8th Main, Slv Industrial Area, Peenya, Bangalore - 560058	--	shambu@krupatechnologies.in	
38	M/s. Ajax Engineering Pvt Ltd	Mr. Abhishek		Plot Nos: 3, 16 & 17, KIADB Industrial Area, Bashettyhally Doddaballapur Taluk, Bengaluru Rural, karnataka - 561203.	9606921030	abhishek.r@ajax-engg.com	
39	M/s. Wadpack Pvt Ltd	Mr. Gopal		Sw-20, 2nd Phase, Apparel Park, KIADB Industrial Area, Doddaballapura, Karnataka 561203	9945245419	gopal@wadpack.co.in	
40	M/s. Mach Aero Pvt Ltd	Mrs. Chaithra		Plot No. 27-b Doddaballapura Industrial Area 98-99 Veerapura Village, Kassba-hobli Bangalore 561203, India	8027630565	chaithra@machaero.co.in	
41	M/s. YG Cutting Tools	Mr. Vishwanath Shetty		Plot No 2c- Obadenahalli Industrial Area Doddaballapura 3rd Phase, National Highway 207, Nagandenahalli, Karnataka 561205	--	vishwanath.shetty@yg1india.com	
42	M/s. Omni Matrix Pvt. Ltd	Mr. Manjunath		Plot No.48k1 & 48k2, KIADB Industrial Area, Yellupura, Doddaballapura Indl. Area, Bengaluru-561203, Karnataka, India	8105886323	manjunath@omnimatrixindia.com	
43	M/s. Wipro Enterprises Pvt Limited	Mrs. Komala N		Plot no 21, Bengaluru aerospace SEZ Devanahalli, Bangalore north, 562129	9880224840	komala.n96@wipro.com	

44	M/s. Micromatic Grinding Technologies Ltd	Mrs. Urmila Balaram		5/a #74, 103, 106, 107 Kiadb Industrial Area, Dobaspet, nelamangala, Bangalore-562111	8027735383	urmilab@microtech.co.in	
45	M/s. Tractor And Farm Equipment Ltd	Mr. Abhijit Guharoy		Plot No. 1, KIADB Industrial Area, Doddaballapur, Bengaluru - 561 203.	9538895092	abhijitg@tafe.com	
46	M/s. Micro Plastics Private Limited	Mr. G. Anbarasan		Khatha No. 170/1, SY. No. 330/3, Subharam Industrial Estate, Marsur Gate, Anekal Road, Bengaluru-562106, Karnataka, India	8068979801	anbarasan@mplastindia.com	
47	M/s. Ankit Fasteners	Mr. indrajith		297,Haragadde village Road No 4, Jigani industrial Estate ,Banglore	8197691426		
48	M/s. Avasarala Technologies Limited	Mr. krishna		No.47, 36th Main Rd, Dollar Layout, 1st Stage, BTM 1st Stage, Bengaluru,	99006801529		
49	M/s. Guhring India Pvt. Ltd.	Ms. Roopa Rao		Plot No.129,Bommasandra Indl Area,Phase 4 Anekal Taluk 2638,Hosur rd,banglore	8497865140	rooparao@gururing.com	
50	M/s. Apex luminaries pvt ltd	Mr. Dharani Babu V		Apex luminaries pvt ltd plot #26C KIADB industrial Area malur kolara distic Karnataka-56310	9845480226	dharani@apexgroups.in	
51	M/s. Sahara label	Ms. Shoba		#10 1st Cross, 1st main , Sri Lakshmi Industrial Estate, Thigalarapalya Main Rd, Karihobanahalli, Peenya 2nd Stage.	6366801529		
52	M/s. INDO MIM TEC PVT. LTD. DODDABALLAPUR	Mr. praveen		# 45(P) KIADB Industrial Area Doddaballapur, Bengaluru	9880697717		
53	M/s. TAEGUTEC INDIA LTD.	Ms. Vinodini A		Plot 119 & 120, Bommsandra, Koppa, Bommasandra Jigani Link Rd, Bommasandra Industrial Area, Bengaluru	9980596686	vinodini@taegutec-india.com	
54	M/s. Riddhi Machine Tools Ltd.	Ms. Suchitra		#471 sadguru tapovana royal park residency Alahalli, JP nagar 9th phase banglore	9945909155		
55	M/s. Middleby India Engineering Private Limited	Mr. Yogesh		No. 45, Jigani Rd, Bommasandra Industrial Area, Bengaluru, Karnataka 560099	7411690717		

56	M/s. Ashok Leyland Pvt. Ltd	Ms. Vidya Tiwari		Plot No.1 Sector 12, lie, Pantnagar, Uttarakhand 263153	+91 8941002580	vidya.tewari@ashokleyland.com	
57	M/s. Tata Motors Ltd	Mr. Tarak Chakraborty		Telco-Tata Motors , Jamshedpur-831004	7360022714	tarak.chakraborty@tataamotors.com	
58	M/s. Maruti Suzuki	Mr. Dinesh Kumar Nimesh		Nelson Mandela Road, Vasant Kunj, Delhi	8860199905	Dineshkumar.nimesh@maruti.co.in	
59	M/s. Tata Motors Randstand	Mr. Manish Tiwary		Bhadani Trade Centre,Bistupur, Jamshedpur-831001	8252707491	manish.tiwary@randstand.in	
60	M/S. Ashok Leyland Ltd	Mr. Aneesh		No.1, Sardar Patel Road, Guindy, Chennai – 600 032.	9985654949	Anees.SK@ashokleyland.com	
61	M/S. India Yamaha Motors Pvt Ltd	Mr. Sreenoop		VV1, Sipcot Industrial Park, Vallam Vadagal, Taluk, Sriperumbudur, Tamil Nadu 602105	7824833120	sreenoopkp@yamaha-motor-india.com	
62	M/S. Daimler India Commercial Vehicles Pvt Ltd	Mr. Kuldeep		SIPCOT Industrial Growth Centre, Oragadam, Mathur Post, Kundrathur Taluk, Kancheepuram District - 602105 Tamil Nadu, India	9940036730	kuldeep.g@daimler.com	
63	M/s. Brakes india pvt. Ltd.	Mr. Promod Kumar		Kolaibera, Seraikela Jharkhand-831016	8877160600	pramodkumar@brakesindia.co.in	
64	M/s. Mahalaxmi Enterprises	Mr. Amit Kumar		Telco-Tata Motors , Jamshedpur-831004	9122770810	office@mahalaxmienterprises	
65	M/s Welspun Corp	Ms. Harleen Kaur		Welspun city,village versamedi, tal. Anjar,district kutch	6357315540	harleen_kaur@welspun.com	
66	M/s. Ramakrishna Forgings	Mr. Subham Mishra		Industrial Area, Gamharia, Jamshedpur, Jharkhand 832109	8210551498	cnc-division@ramkrishnaforgings.com	
67	M/s. GS Auto International Ltd.	Mr. Subodh Kumar		Industrial Area, Gamharia, Jamshedpur, Jharkhand 832109	9234255995	hr@gsgroupindia.com	
68	M/s. Tata Steel Rural Development	Mr. Avinash Ekka		E-Road, Northern Town, Bistupur, Jamshedpur, Jharkhand	7903529560	avinash.ekka@tatasteel.foundation.org	
69	M/s. Kross Limited	Mr. R K Giri		Phase Vi, Adityapur Industrial Area, Jamshedpur - 832 108	9204859823	giri@krossindia.com	
70	M/s. Pebco Motors	Mr. Niranjana Kumar		Industrial Area, Adityapur, Jamshedpur-832109	9308433352	pebco.jam.srv1@marutidealers.com	

71	M/S Jamshedpur Utility Services Company Limited	Ms. Megna Gogna		Bistupur, Jamshedpur-831001	6576646000	corpcomm.jusco@tatasteel.com	
72	M/s. It Scient	Mr. Sumant Kumar		Autocluster, Adityapur	7903126248	hr.jsr@itscient.com	
73	M/s. IDFC	Mr. Ajit Singh		Bistupur, Jamshedpur-831001	7277544681	ajit.singh3@idfcfirstbank.com	
74	M/s. Tata Auto Comp.Pks	Mr. Suraj Kumar		Telco-Tata Motors , Jamshedpur-831004	7061032140	suraj6205339714@gmail.com	
75	M/s. Accrypoly	Mr. Ravi Shankar		M-10 ,Phase -Iv, Adityapur Industrial Area , Jamshedpur	0657 2387335	hr@accropolygroup.com	
76	M/s. JMT Auto Ltd.	Mr. Jaimant		7th Phase, Industrial Area, Adityapur, Jamshedpur-832109,	6576626331	jmt.auto@jmtauto.com	
77	M/s. RSB International	Mr. Manish Prakash		Ward NO.9, Gamharia, Jamshedpur - 832108	7677870351	manish.prakash@rsbglobal.com	
78	M/s. Reliance	Mr. Rajan Dey		Court House Lokmanya Tilak Marg, Mumbai	022-67673800	ranjan.dey@reliance.co.in	
79	M/s. Q Connect	Ms. Bharti Singh		Aegis Building, Dimna Chowk, Jamshedpur	9073303053	bharti.singh@qconnect.com	
80	M/s. Tata advance System Ltd.- Vendor Quess	Mr. G.Bala Subramanyam		Telco-Tata Motors , Jamshedpur-831004	9031080050	gonigunta.subramanyam@tataadvancedsystems.com	
81	M/s. Alchor	Ms. Laxmi Samanta Das		Bistupur, Jamshedpur-831001	9102982672	hr@alchorhotel.com	
82	M/s. M Pallonji & co.pvt	Mr. M Pallonji		Inside Tata Steel, Jamshedpur	6200295125	mpallonjitlj@gmail.com	
83	M/s. Trimurty & Sons	Mr. Trimurty		Inside Tata Steel, Jamshedpur	9204099688	trimurty_murty@yahoo.com	
84	M/s. PMS	Mr. Nihal Sharma		Inside Tata Steel, Jamshedpur	9065513121	hr.tsj@pmsindia.in	
85	M/s. SGB Scaffolding And Industrial Services Pvt Ltd	Mr. Gaddahar Das		Inside Tata Steel, Jamshedpur	9262792520	gdas@brandsafway.com	
86	M/s. Vaaman engg.	Mr. Biswajit Chateerjee		Inside Tata Steel, Jamshedpur	9939700904	vaamanjsr@gmail.com	
87	M/s. Nassuridin & Sons	Mr. Nassiruddin		Inside Tata Steel, Jamshedpur	9234459541	Nasiruddin.tsl@gmail.com	

88	M/s. Titan Company Limited, Jewellery Division, Hosur	Mr. Karthik raja		No 29 Sipcot Industrial Complex, Hosur Industrial Complex, Hosur	9940976333	karthikrajam@titan.co.in	
89	M/s. Vaibhav Global Limited Jaipur	Mr. Paneer Selvam		E-68, EPIP, Sitapura, Jaipur, Rajasthan 302022	+91 9358900563	paneer.selvam@vaibhavglobal.com	
90	M/s. ICON Enterprises Hosur	Dr. T. Hariprasad		304-A/5 3rd Floor, TNHB, Phase- VII, Brindhavan, Maruthi Nagar Rd, Hosur, Tamil Nadu 635109	+91 9994106619	iconenterpriseshr@gmail.com	
91	M/s. Zulu Design Studio	Mr. Nishanth		4/1, Kambar Street Krishna Nagar, Vellore Tamil Nadu- 632001	+91 9600888929	animationnishanth@gmail.com	
92	M/s. Devanshi Enterprises	Mr. Hitesh		First Floor Yes Bank Avas Vikas Rudrapur 263153	+91 9819211519	devanshienterprises06@gmail.com	

Annexure 4: Training & Employment Details

Training and Employment Projections: *Data to be provided year-wise for next 3 years*

Year	Total Candidates		Women		People with Disability	
	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities
2023	2400	More than 10000	240	More than 1000	-	-
2024	2500	More than 10000	250	More than 1000	-	-
2025	2500	More than 10000	250	More than 1000	-	-

Training, Assessment, Certification, and Placement Data for previous versions of qualifications: (Previous years)

Qualification Version	Year	Total Candidates				Women				People with Disability			
		Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed
New Qualification	2017 - 2020	829	740	727	556	77	69	68	24	-	-	-	-
	2018 - 2021	1416	1264	1245	1175	154	136	135	59	-	-	-	-
	2019 - 2022	652	583	574	500	107	98	94	61	-	-	-	-

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: **NA**

Content availability for the 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	Physical classroom, LMS, Web based, Online sessions	75:25
2	Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners	Workshops, Mock sessions, Case study, Role play, Group Discussions, Sensitivity training, Transactional analysis.	95:05
3	Showing Practical Demonstrations to the learners	Using industry equipment and machinery, Workshop / Lab, Simulators	100:0
4	Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training	Work on real time industry job, job rotation, job/process instructions, Workshop machines, Lab equipment, Simulators.	90:10
5	Tutorials/ Assignments/ Drill/ Practice	Class assignments, LMS assignments, Simulators	60:40
6	Proctored Monitoring/ Assessment/ Evaluation/ Examinations	Physical classroom, Labs, Workshop, Quiz tests, Project	100:0
7	On the Job Training (OJT)/ Project Work Internship/ Apprenticeship Training	In the Industry	100:0

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 – 3					
CNC Technology	Introduction to CNC	10			
	CNC Hardware Basics	10			
	Safety – Workshop safety and Machine Safety	10			
	Basics of Part Programming in CNC Lathe	30			
	Basics of Part Programming in CNC Milling	40			
	Total Marks	100			
CNC Lab	Familiarization of CNC lathe and CNC milling machine		10		5
	Practice on CNC Simulation Software		25		10
	Try out of CNC program: Turning		15		5
	Try out of CNC program: Milling		20		5
	Practice on CNC Lathe		5		
	Total Marks	-	100		
Electrical and Electronics	Electrical Safety	05			
	Hand Tools and their usage in electrical and electronics	05			
	Basics of Electricity - AC Phase Relationship	05			
	Wires, Cables and Connectors – Types, Specification and Application	05			
	Power Sources – Types, Specification and Application	05			
	Measurements and Monitoring Devices – Types, Specification and Application	05			

	Electronic Components - Active and Passive components	10			
	DC and AC circuits – Series and Parallel DC Circuits, Single and 3 phase AC Circuits	10			
	Electrical Protective Devices – Fuses, MCB, ELCB	05			
	DC motor – Types, Specification and Application	10			
	AC Machines – Types, Specification and Application	15			
	Sensors and Transducers – Types, Specification and Application	05			
	Microcontrollers – Types, Specification and Application	10			
	Display Devices – Types, Specification and Application	05			
	Total Marks	100			
Electrical and Electronics Lab	Electrical protective devices – Identification, Selection 1. Fuse 2. MCB 3. ELCB 4. RCCB		10		5
	Wires and Wire Harness – Identification		10		2.5
	Industrial Switches – Identification, Selection		10		5
	Measuring Equipments – Identification, Selection		10		5
	Transformers – Identification, Selection		10		
	AC and DC Motors – Identification, Selection		10		
	Sensors – Identification, Selection		7.5		5
	Display devices – Identification, Selection		7.5		2.5
	Total Marks	-	100		
Elective 7 – 7.1 Material handling	Conveyors – Types, Application	15			
	Industrial Vehicles – Types, Application	10			
	Automated Vehicles – Types, Application	10			

	Positioning Equipment's – Types, Application	10			
	Rack– Types, Application	10			
	Hoist and Cranes – Types, Application	15			
	Automatic Identification and Communication Equipment	10			
	Criteria for selection of Material handling equipment	10			
	Study of Material handling equipment's at Industry	10			
	Total Marks	100			
Elective 7 – 7.2 Automobile Engineering - I	Internal Combustion Engine	10			
	Construction details of I.C Engine	15			
	Valve Timing Diagrams - Four Stroke Petrol and Diesel Engines	10			
	Understanding the following Systems Fuel System, Ignition System, Governing of I.C Engine, Cooling System, Lubrication System, Air Intake System	25			
	Introduction to Engines used at Industry	05			
	Familiarisation of Commercial Vehicles	10			
	Familiarisation and Classification of Passenger Cars	10			
	Basic Understanding of the following Tyres, Rim, Suspension, Frame, Axles, Front Axel Assembly, Steering System, Power Transmission, Brakes, Engine, Electrical System	15			
	Total Marks	100			
ELECTIVE 7 – 7.3 Manufacturing Technology – III Auto	Plastic Processing – Processes	25			
	Rubber Moulding – Processes	25			
	Other Processes – Forging, Rolling, Extrusion	25			
	Introduction to Presses – Types, Specification and Application	25			
	Total Marks	100			

ELECTIVE 8 – 8.1 Manufacturing Technology - III Mfg	Electric Discharge Machining – Wire EDM and Spark EDM	10			
	Powder Metallurgy	10			
	Metal Injection Moulding	15			
	Plastic Processing Methods – Injection Moulding, Compression Moulding and Transfer Moulding	25			
	Press Tools – Types of Press tools	30			
	Metal Joining Processes – Welding, Riveting	10			
	Total Marks	100			
ELECTIVE 8 – 8.2 Industrial Electronics	Sensor and Transducer - Types, Specification and Application	20			
	Power Semiconductor Devices - Types, Specification and Application	20			
	Inverters - Types, Specification and Application	20			
	Motor Drive Circuits	20			
	Power Supply Devices - Types, Specification and Application	20			
	Total Marks	100			
ELECTIVE 8 – 8.3 Welding	Welding Safety	05			
	Welding Process	05			
	MMAW / SMAW – Equipment Process parameters	15			
	MIG / MAG Welding- GMAW – Equipment Process parameters	15			
	Pipe Welding – Pipe Welding Techniques	10			
	TIG Welding – Equipment process parameters	15			
	Oxy fuel Cutting – Equipment process parameters	10			
	Plasma Cutting – Equipment process parameters	10			
	Test / Inspection of Welds as ASME / ISO Code	15			
	Total Marks	100			

ELECTIVE 8 – 8.3 Eye Glass Frame Manufacturing	Introduction to Eyewear Industry	05			
	Introduction to Indian Eyewear Industry	05			
	Parts and Functions of Eye Glass Frame	15			
	Materials used for Frames	15			
	Manufacturing Process of Non-metal Frames	15			
	Manufacturing Process of Metal Frames	15			
	Process of Manufacturing Moulded Frames	15			
	Handling and Packing Process for Finished Frames	15			
	Total Marks	100			
ELECTIVE 8 – 8.3 Foundry Technology - I	Introduction to Foundry Process	10			
	Furnaces – Induction furnace, Specification	10			
	Introduction to Sand Moulding	15			
	Core – Manufacturing Core, Core Shooting machine	15			
	Moulding Processes	10			
	Moulding Machines – Types, Application	15			
	Inspection of Casting	15			
	Casting Defects	10			
	Total Marks	100			
ELECTIVE 9 – 9.1 Jewellery Making Process - I	Introduction to Jewellery Making Process	05			
	Process for Jewellery Making	10			
	Investment Process	10			
	Burnout Process	10			
	Alloying of Gold	15			

	Devesting and Quenching	10			
	Fettling (Sprue Cutting, De-Sprucing)	10			
	Procedure at Jewellery Making Plant	15			
	Study of above Processes at Jewellery Manufacturing Industry	15			
	Total Marks	100			
ELECTIVE 9 – 9.2 Gold Refining Process	Gold Standards	15			
	Gold Refining – An Introduction	10			
	Refining Process	20			
	Refining Furnaces	10			
	Grain Refining Process	10			
	Standard forms of Refined Gold	10			
	Refining Process followed in Jewellery Manufacturing Industry	25			
	Total Marks	100			
ELECTIVE 10 – Automobile Engineering Lab - I	Power Train and Valve train		7.5		2.5
	Air inlet System and Exhaust System		7.5		2.5
	Fuel System		7.5		2.5
	Lubrication System		7.5		2.5
	Cooling System		7.5		2.5
	Electrical		7.5		2.5
	Synchromesh Gear Box		7.5		2.5
	Front and Rear Axle Assembly		7.5		2.5
	Mechanical and Hydraulic Clutch		7.5		2.5
	Manual and Power Steering System		7.5		2.5

	Total Marks	100			
ELECTIVE 11 – Industrial Electronics Lab	Familiarisation of Temperature Sensor		10		3
	Familiarisation of Proximity Sensor		10		4
	Familiarisation of Pressure Sensor		10		3
	Familiarisation of Power Supply System		15		5
	Familiarisation of Power Semiconductor Devices		15		5
	Familiarisation of Electrical drive System		15		5
	Total Marks	100			
ELECTIVE 12 – Observation of Gold Refining Process	Evaluation of Observation Format		75		25
	Total Marks	100			
OJT	On the Job Training in the relevant sector		75		25
	Total Marks	100			
Employability Skills	Diversity and Inclusion, Gender sensitivity PwD etc.	20			5
	Career development and Goal setting	20			5
	Entrepreneurship	15			10
	Analytical thinking and Adaptive Thinking	20			5
	Total Marks	100			
Semester – 4					
Automation - I	Introduction to Automation – Advantages and Disadvantages	5			
	Pneumatic Power and Hydraulic Power – Application, Advantages and Disadvantages	5			
	Compressed air – Types of Compressors, Specification, Application, Terms used	5			
	Industrial Pneumatics – Treatment of Compressed Air, Role of Pneumatics in Industry	5			

	Pneumatic Cylinders - Types, Specification and Application	7.5			
	Pneumatic Valves - Types, Specification and Application	7.5			
	Basic Pneumatic Circuits – Designing Basic Pneumatic Circuits	15			
	Industrial Hydraulics – Role of Hydraulics in Industry	5			
	Hydraulic Cylinders - Types, Specification and Application	7.5			
	Hydraulic Valves - Types, Specification and Application	7.5			
	Basic Hydraulic Circuits – Designing basic Hydraulic Circuits	15			
	Care and Maintenance of Pneumatic and Hydraulic System	10			
	Mobile Hydraulics Hydraulic Systems in Earth moving and Allied Equipments	5			
	Total Marks	100			
Mechanical Drives	Lubrication - Types, Specification and Application	10			
	Belt and Chain Drives - Types, Specification and Application	10			
	Gears and Gear Drives - Types, Specification and Application	15			
	Cams - Types and Application	10			
	Bearings - Types, Specification and Application	15			
	Keys - Types, Specification and Application	10			
	Couplings - Types, Specification and Application	15			
	Familiarization of Drive elements used in Industry	15			
	Total Marks	100			
Automation Lab - I	Pneumatics				
	Familiarization of Compressor and its parts, Air driers, FRL unit Single acting and double acting cylinder, Direction control valve Flow control valve, Pressure control valve		10		5

	Stimulation of basic Pneumatic circuits		18		
	Rigging of basic Pneumatic circuits		10		7.5
	Hydraulics				
	Familiarization of Hydraulic Power pack, Single acting and double acting cylinder Direction control valve, Flow control valve, Pressure control valve		10		5
	Stimulation of basic Hydraulic circuits		18		
	Rigging of basic Hydraulic circuits		9		7.5
	Total Marks	-	100		
ELECTIVE 13 – 13.1 Automobile Engineering - II	Introduction to Emission and Emission Norms	25			
	Transmission and Power Train – Parts and Function	40			
	Introduction to Electric Vehicles – Electrical and Mechanical Components and Control System	35			
	Total Marks	100			
ELECTIVE 13 – 13.1 Parts and Functions of Two Wheelers	Air Intake System	5			
	Braking System	5			
	Frame	5			
	Suspension System	5			
	Lighting System	5			
	Cooling System	5			
	Lubrication System	5			
	Wheels and Types	5			
	Electrical System	5			
	Instrument Cluster	5			
	Transmission System of Two Wheelers	5			

	Construction of Two-Wheeler Engine	10			
	Technical Terms used in Two-Wheeler Engine	5			
	Fuel System of Two Wheelers	5			
	Exhaust System of Two Wheelers	5			
	Emission Standards	10			
	Introduction to Electric Two Wheelers	10			
	Total Marks	100			
ELECTIVE 13 – 13.2 Assembly Techniques	Introduction to Assembly Techniques	10			
	Tightening Methods and Process	20			
	Assembly - Understanding Solving	20			
	Organizational Knowledge	10			
	Accessories used in Assembly	20			
	Gauges and Measuring Instruments	15			
	Documentation	5			
	Total Marks	100			
ELECTIVE 14 – 14.1 Advanced CNC	CNC Tooling	20			
	CNC Work Holding Devices	15			
	Advanced Part Programming – Lathe	25			
	Advanced Part Programming – Milling	40			
	Total Marks	100			
ELECTIVE 14 – 14.1 Glass Manufacturing Technology	Introduction to Glass	7.5			
	Types of Glasses	7.5			
	Glass Manufacturing Processes	7.5			

	Batch Preparation	7.5			
	Melting and Refining	7.5			
	Glass Forming	7.5			
	Post Forming	7.5			
	Cold End Process	7.5			
	ACGP	7.5			
	Cutting and Edge deletion	7.5			
	Grinding	7.5			
	Tempering	7.5			
	Integrated Glass Unit / Double Glazed Unit	10			
	Total Marks	100			
ELECTIVE 14 – 14.1 Material Recycling and Logistics	Material Recycling				
	Waste Management	5			
	Classification of Wastes	5			
	Recycling	5			
	Benefits of Recycling	5			
	Methods of collecting Recyclable material	5			
	Classification of Steel Scrap	5			
	Steel scrap Sorting and Preparation	5			
	Material handling methods in Steel scrap recycling plants	5			
	Compacting, Packing and Labelling methods in Steel scrap recycling plants	5			
	Study of Recycling Process	5			
	Logistics				
	Fundamentals of Supply Chain Management	5			
	Basics of Logistics Management	5			
	Packaging	5			
	Warehouse	5			
	Material Handling	7.5			
	Documentation and Clearance processes	5			
	Basics of Transportation	7.5			
	Risk and Insurance Management	5			

	Recent developments in Logistics	5			
	Total Marks	100			
ELECTIVE 14 – 14.2 Heat Treatment	Purpose of Heat Treatment	10			
	Introduction to Iron Carbon Equilibrium Diagram	10			
	Microstructure of Steel	10			
	Heat Treatment Process – Annealing, Normalising, Hardening, Tempering, Case Hardening, Surface Hardening	40			
	Introduction to Heat Treatment Furnace	15			
	Heat Treatment Defects and Remedies	15			
	Total Marks	100			
ELECTIVE 15 – 15.1 Gem Stones and Diamonds	Gem Stones – Introduction	5			
	Major Gem Stones	15			
	Properties of Gem Stones	15			
	Diamonds	20			
	Uses of Gem Stones	10			
	Certification	20			
	Synthetic Diamonds	15			
	Total Marks	100			
ELECTIVE 15 – 15.2 Jewellery Making Process -II	Stone Setting	15			
	Embossing	15			
	Joining Processes	15			
	Finishing Processes	15			
	Enameling	10			
	Plating and Coating	15			
	Jewellery Quality	15			

	Total Marks	100			
ELECTIVE 16 – 16.1 Automobile Engineering Lab - II	Starting System		25		10
	Charging System		25		5
	Lighting System		25		10
	Total Marks	100			
ELECTIVE 17 – 17.1 Advanced CNC Lab	Advanced Programming - CNC Turning		20		5
	Advanced Programming - CNC Milling		25		5
	Try out on Machine - CNC Turning		10		5
	Try out on Machine - CNC Milling		10		5
	Maintenance Practice		10		5
	Total Marks	100			
ELECTIVE 17 – 17.1 Familiarisation/Observation of Glass Manufacturing	Evaluation of Observation Format		75		25
	Total Marks	100			
ELECTIVE 18 – 18.1 Observation of Jewellery Making Processes	Jewellery Making Processes		25		10
	Stone Setting		20		5
	Polishing and Finishing		10		5
	Quality / Inspection Processes		10		5
	Total Marks	100			
OJT	On the Job Training in the relevant sector		75		25
	Total Marks		100		
Employability skills	Financial and Legal Literacy	20			5
	Occupation safety, Health, and Environment education	20			5
	Digital Literacy Skills	20			5
	Essential skills for success	15			10
	Total Marks	100			

Annexure 7: Assessment Strategy

1. ASSESSMENT STRATEGY:

The Criteria for assessment based on Modules, 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, A&E dept. at Corporate office, Bangalore creates unique question papers for theory part as well as practical – Theory comprises of MCQ and descriptive questions drawn randomly from 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 and 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 with Examiners under the overall supervision of the Assessment & Evaluation Dept.

Evaluation of Theory and Practical examination is carried out by the Trained Assessors (NTTF faculty members) under the supervision of Shopfloor Manager / Principal 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.

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

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
- 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 A&E dept. of NTTF.

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

3. ELIGIBILITY TO APPEAR FOR THE EXAM:

- The candidates should have an attendance of a minimum 80% 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:

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 customers, understanding needs and requirements, assessing the customer and perform Soft Skills effectively:
 - Videos of Trainees during OJT
3. Assessment will ensure that the candidate is able to:
 - 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 and 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

List of ICT Tools:

Desktop and laptops

Interactive White Board

CCTV Camera

Pen Drive

Video Conferencing

Biometric

Edusquare: 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: Model Curriculum

Semester - 3		Module Name: CNC Technology	Module Code: CP35301T
Sl. No.	Module Details	Theory Hours 45	
1	Introduction	4h	
2	CNC Hardware Basics	10h	
3	Safety	4h	
4	Basics of Part Programming in CNC Lathe	12h	
5	Basics of Part Programming in CNC Milling	15h	
	Total Hour	45 h	

Semester - 3		Module Name: CNC Lab	Module Code: CP33302P
Sl. No.	Module Details	Practical Hours 60	
1	Familiarization of CNC lathe and CNC milling machine	60 h	
2	Practice on CNC Simulation Software		
3	Try out of CNC program: Turning		
4	Try out of CNC program: Milling		
5	Practice on CNC Lathe		
	Total Hour	60 h	

Semester - 3		Module Name: Electrical and Electronics	Module Code: CP33303T
Sl. No.	Module Details	Theory Hours 60	
1	Electrical Safety	3h	
2	Hand Tools and their usage	3h	
3	Basics of Electricity - AC Phase Relationship	3h	
4	Wires, and Connectors	3h	
5	Power Sources	3h	

6	Measurements and Monitoring Devices	3h
7	Electronic Components	8h
8	DC and AC circuits	8h
9	Electrical Protective Devices	5h
15	DC motor	5h
11	AC Machines	5h
12	Sensors and Transducers	5h
13	Microcontrollers	3h
14	Display Devices	3h
Total Hour		60 h

Semester - 3		Module Name: Electrical and Electronics Lab	Module Code: CP33304P
Sl. No.	Module Details	Practical Hours 40	
1	Electrical protective devices 1. Fuse 2. MCB 3. ELCB 4. RCCB	4h	
2	Wires and Wire Harness	2h	
3	Industrial Switches	4h	
4	Measuring Equipments	4h	
5	Transformers	2h	
6	AC and DC Motors	8h	
7	Sensors	8h	
8	Display devices	8h	
Total Hour		40 h	

Semester - 3		Module Name: ELECTIVE 7 – 7.1 Material Handling	Module Code: CP33305T
Sl. No.	Module Details	Theory Hours 30	
1	Conveyors	6h	
2	Industrial Vehicles	4h	

3	Automated Vehicles	2h
4	Positioning Equipment's	4h
5	Rack	4h
6	Hoist and Cranes	3h
7	Automatic Identification and Communication Equipment	3h
8	Criteria for selection of Material handling equipment	2h
9	Study of Material handling equipment's at Industry	2h
Total Hour		30h

Semester - 3 Module Name: ELECTIVE 7 – 7.2 Automobile Engineering - I Module Code: CP33306T		
Sl. No.	Module Details	Theory Hours 45
1	Internal Combustion Engine	6h
2	Construction details of I.C Engine	4h
3	Valve Timing Diagrams - Four Stroke Petrol and Diesel Engines	4h
4	Understanding the following Systems Fuel System, Ignition System, Governing of I.C Engine, Cooling System, Lubrication System, Air Intake System	12h
5	Introduction to Engines used at Industry	2h
6	Familiarisation of Commercial Vehicles	3h
7	Familiarisation and Classification of Passenger Cars	4h
8	Basic Understanding of the following Tyres, Rim, Suspension, Frame, Axles, Front Axel Assembly, Steering System, Power Transmission, Brakes, Engine, Electrical System	10h
Total Hour		45h

Semester - 3 Module Name: ELECTIVE 7 – 7.3 Manufacturing Technology - III Auto Module Code: CP33307T		
Sl. No.	Module Details	Theory Hours 30

1	Plastic Processing	8h
2	Rubber Moulding	6h
3	Other Processes	8h
4	Introduction to Presses	8h
	Total Hour	30h

Semester - 3		Module Name: ELECTIVE 8 – 8.1 Manufacturing Technology - III Mfg.	Module Code: CP33308T
Sl. No.	Module Details	Theory Hours 30	
1	Electric Discharge Machining	3h	
2	Powder Metallurgy	3h	
3	Metal Injection Moulding	4h	
4	Plastic Processing Methods	6h	
5	Press Tools	8h	
6	Metal Joining Processes	6h	
	Total Hour	30 h	

Semester - 3		Module Name: ELECTIVE 8 – 8.2 Industrial Electronics	Module Code: CP33309T
Sl. No.	Module Details	Theory Hours 30	
1	Sensor and Transducer	6h	
2	Power Semiconductor Devices	6h	
3	Inverters	6h	
4	Motor Drive Circuits	6h	
5	Power Supply	6h	
	Total Hour	30 h	

Semester - 3		Module Name: ELECTIVE 8 – 8.3 Welding	Module Code: CP33310T
Sl. No.	Module Details	Theory Hours 45	
1	Welding Safety	2h	

2	Welding Process	4h
3	MMAW / SMAW	8h
4	MIG / MAG Welding- GMAW	6h
5	Pipe Welding	4h
6	TIG Welding	8h
7	Oxy fuel Cutting	4h
8	Plasma Cutting	3h
9	Test / Inspection of Welds as ASME / ISO Code	6h
	Total Hour	45 h

Semester - 3 Module Name: ELECTIVE 8 – 8.3 Eye Glass Frame Manufacturing Module Code: CP33311T		
Sl. No.	Module Details	Theory Hours 45
1	Introduction to Eyewear Industry	3h
2	Introduction to Indian Eyewear Industry	2h
3	Parts and Functions of Eye Glass Frame	6h
4	Materials used for Frames	6h
5	Manufacturing Process of Non-metal Frames	10h
6	Manufacturing Process of Metal Frames	10h
7	Process of Manufacturing Moulded Frames	4h
8	Handling and Packing Process for Finished Frames	4h
	Total Hour	45 h

Semester - 3 Module Name: ELECTIVE 8 – 8.3 Foundry Technology - I Module Code: CP33312T		
Sl. No.	Module Details	Theory Hours 45

1	Introduction	4h
2	Furnaces	6h
3	Introduction to Sand Moulding	4h
4	Core	5h
5	Moulding Processes	8h
6	Moulding Machines	6h
7	Inspection of Casting	6h
8	Casting Defects	6h
Total Hour		45 h

Semester - 3 Module Name: ELECTIVE 9 – 9.1 Jewellery Making Process - I Module Code: CP33313T		
Sl. No.	Module Details	Theory Hours 45
1	Introduction to Jewellery Making Process	4h
2	Process for Jewellery Making	6h
3	Investment Process	6h
4	Burnout Process	6h
5	Alloying of Gold	6h
6	Devesting and Quenching	6h
7	Fettling (Sprue Cutting, De-Sprueing)	6h
8	Procedure at Jewellery Making Plant	2h
9	Study of above Processes at Jewellery Manufacturing Industry	3h
Total Hour		45 h

Semester - 3 Module Name: ELECTIVE 9 – 9.2 Gold Refining Process Module Code: CP33314T		
Sl. No.	Module Details	Theory Hours 60

1	Gold Standards	2h
2	Gold Refining – An Introduction	4h
3	Refining Process	18h
4	Refining Furnaces	8h
5	Grain Refining Process	8h
6	Standard forms of Refined Gold	8h
7	Refining Process followed in Jewellery Manufacturing Industry	12h
	Total Hour	60 h

Semester - 3 Module Name: ELECTIVE 10 – Automobile Engineering Lab - I Module Code: CP33315P		
Sl. No.	Module Details	Practical Hours 20
1	Power Train and Valve train	20h
2	Air inlet System and Exhaust System	
3	Fuel System	
4	Lubrication System	
5	Cooling System	
6	Electrical	
7	Synchromesh Gear Box	
8	Front and Rear Axle Assembly	
9	Mechanical and Hydraulic Clutch	
10	Manual and Power Steering System	
	Total Hour	20h

Semester - 3	Module Name: ELECTIVE 11 – Industrial Electronics Lab	Module Code: CP33316P
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Sl. No.	Module Details	Practical Hours 20
1	Familiarisation of Temperature Sensor	20 h
2	Familiarisation of Proximity Sensor	
3	Familiarisation of Pressure Sensor	
4	Familiarisation of Power Supply System	
5	Familiarisation of Power Semiconductor Devices	
6	Familiarisation of Electrical drive System	
	Total Hours	20 h

Semester - 3 Module Name: ELECTIVE 12 – Observation of Gold Refining Process Module Code: CP33317P		
Sl. No.	Module Details	Practical Hours 20
1	Observation and Familiarisation of Gold Refining Process at Jewellery	20 h
	Total Hour	20 h

Semester - 3 Module Name: OJT Module Code: CP33317P		
Sl. No.	Module Details	Practice Hours 330
1	On the Job Training in the relevant sector	330 h
	Total Hours	330 h

Semester - 3 Module Name: Employability Skills Module Code: CP33318T		
Sl. No.	Module Details	Theory Hours 30
1	Diversity and Inclusion, Gender sensitivity PwD etc.	8h
2	Career development and Goal setting	7h
3	Entrepreneurship	7h
4	Analytical thinking and Adaptive Thinking	8h
	Total Hours	30 h

Semester - 4 Module Name: Automation - I Module Code: CP33401T		
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Sl. No.	Module Details	Theory Hours 45
1	Introduction to Automation	2h
2	Pneumatic Power and Hydraulic Power	3h
3	Compressed air	4h
4	Industrial Pneumatics	4h
5	Pneumatic Cylinders	2h
6	Pneumatic Valves	2h
7	Basic Pneumatic Circuits	6h
8	Industrial Hydraulics	4h
9	Hydraulic Cylinders	2h
10	Hydraulic Valves	2h
11	Basic Hydraulic Circuits	6h
12	Care and Maintenance of Pneumatic and Hydraulic System	4h
13	Mobile Hydraulics	4h
	Total Hour	45 h

Semester - 4		Module Name: Mechanical Drives	Module Code: CP33402T
Sl. No.	Module Details	Theory Hours 45	
1	Lubrication	4h	
2	Belt and Chain Drives	6h	
3	Gears and Gear Drives	6h	
4	Cams	4h	

5	Bearings	9h
6	Keys	2h
7	Couplings	6h
8	Familiarization of Drive elements used in Industry	8h
	Total Hour	45 h

Semester - 4		Module Name: Automation Lab - I	Module Code: CP33403P
Sl. No.	Module Details	Practical Hours 30	
Pneumatics			
1	Familiarization of Compressor and its parts Air driers FRL unit Single acting and double acting cylinder Direction control valve Flow control valve Pressure control valve	4h	
2	Stimulation of basic Pneumatic circuits	6h	
3	Rigging of basic Pneumatic circuits	5h	
Hydraulics			
4	Familiarization of Hydraulic Power pack Single acting and double acting cylinder	5h	

	Direction control valve Flow control valve Pressure control valve	
5	Stimulation of basic Hydraulic circuits	5h
6	Rigging of basic Hydraulic circuits	5h
	Total Hour	30 h

Semester - 4 Module Name: ELECTIVE 13 – 13.1 Automobile Engineering - II Module Code: CP33404T		
Sl. No.	Module Details	Theory Hours 45
1	Introduction to Emission and Emission Norms	10h
2	Transmission and Power Train	20h
3	Introduction to Electric Vehicles	15h
	Total Hour	45h

Semester - 4 Module Name: ELECTIVE 13 – 13.1 Parts and Functions of Two Wheelers Module Code: CP33405T		
Sl. No.	Module Details	Theory Hours 45
1	Air Intake System	2h
2	Braking System	2h
3	Frame	2h
4	Suspension System	2h
5	Lighting System	2h
6	Cooling System	2h
7	Lubrication System	2h

8	Wheels and Types	2h
9	Electrical System	2h
10	Instrument Cluster	2h
11	Transmission System of Two Wheelers	3h
12	Construction of Two-Wheeler Engine	3h
13	Technical Terms used in Two-Wheeler Engine	3h
14	Fuel System of Two Wheelers	4h
15	Exhaust System of Two Wheelers	2h
16	Emission Standards	5h
17	Introduction to Electric Two Wheelers	5h
	Total Hour	45h

Semester - 4		Module Name: ELECTIVE 13 – 13.2 Assembly Techniques	Module Code: CP33406T
Sl. No.	Module Details	Theory Hours 45	
1	Introduction	3h	
2	Tightening Methods and Process	8h	
3	Assembly - Understanding Solving	8h	
4	Organizational Knowledge	6h	
5	Accessories used in Assembly	8h	
6	Gauges and Measuring Instruments	6h	
7	Documentation – Industry	6h	
	Total Hour	45h	

Semester - 4		Module Name: ELECTIVE 14 – 14.1 Advanced CNC	Module Code: CP33407T
Sl. No.	Module Details	Theory Hours 60	

1	CNC Tooling	12h
2	CNC Work Holding Devices	10h
3	Advanced Part Programming – Lathe	18h
4	Advanced Part Programming – Milling	20h
	Total Hour	60h

Semester - 4 Module Name: ELECTIVE 14 – 14.1 Glass Manufacturing Technology		Module Code: CP33408T
Sl. No.	Module Details	Theory Hours 60
1	Introduction to Glass	2h
2	Types of Glasses	3h
3	Glass Manufacturing Processes	3h
4	Batch Preparation	5h
5	Melting and Refining	6h
6	Glass Forming	3h
7	Post Forming	3h
8	Cold End Process	5h
9	ACGP	3h
10	Cutting and Edge deletion	8h
11	Grinding	3h
12	Tempering	6h
13	Integrated Glass Unit / Double Glazed Unit	10h
	Total Hour	60h

Semester - 4 Module Name: ELECTIVE 14 – 14.1 Material Recycling and Logistics		Module Code: CP33409T
Sl. No.	Module Details	Theory Hours 60
	PART A - Material Recycling	
1	Waste Management	3h
2	Classification of Wastes	4h
3	Recycling	2h
4	Benefits of Recycling	2h

5	Methods of collecting Recyclable material	2h
6	Classification of Steel Scrap	4h
7	Steel scrap Sorting and Preparation	4h
8	Material handling methods in Steel scrap recycling plants	3h
9	Compacting, Packing and Labelling methods in Steel scrap recycling plants	3h
10	Study of Recycling Process	3h
	Total Hour	30h
PART B – Logistics		
1	Fundamentals of Supply Chain Management	3h
2	Basics of Logistics Management	4h
3	Packaging	3h
4	Warehouse	3h
5	Material Handling	3h
6	Documentation and Clearance processes	3h
7	Basics of Transportation	3h
8	Risk and Insurance Management	4h
9	Recent developments in Logistics	4h
	Total Hour	30h

Semester - 4		Module Name: ELECTIVE 14 – 14.2 Heat Treatment	Module Code: CP33410T
Sl. No.	Module Details	Theory Hours 30	
1	Purpose of Heat Treatment	2h	
2	Introduction to Iron Carbon Equilibrium Diagram	3h	
3	Microstructure of Steel	3h	
4	Heat Treatment Process	10h	
5	Introduction to Heat Treatment Furnace	4h	
6	Heat Treatment Defects	8h	
	Total Hour	30h	

Semester - 4		Module Name: ELECTIVE 15 – 15.1 Gem Stones and Diamonds	Module Code: CP33411T
Sl. No.	Module Details	Theory Hours 45	
1	Gem Stones – Introduction	5h	
2	Major Gem Stones	10h	
3	Properties of Gem Stones	6h	
4	Diamonds	12h	

5	Uses of Gem Stones	3h
6	Certification	5h
7	Synthetic Diamonds	4h
Total Hour		45h

Semester - 4 Module Name: ELECTIVE 15 – 15.2 Jewellery Making Process -II Module Code: CP33412T		
Sl. No.	Module Details	Theory Hours 45
1	Stone Setting	6h
2	Embossing	4h
3	Joining Processes	6h
4	Finishing Processes	10h
5	Enameling	5h
6	Plating and Coating	6h
7	Jewellery Quality	8h
Total Hour		45h

Semester - 4 Module Name: ELECTIVE 16 – 16.1 Automobile Engineering Lab - II Module Code: CP33413P		
Sl. No	Module Details	Practical Hours 30
1	Starting System	10h
2	Charging System	10h
3	Lighting System	10h
Total Hour		30h

Semester - 4 Module Name: ELECTIVE 17 – 17.1 Advanced CNC Lab Module Code: CP33414P		
Sl. No.	Module Details	Practical Hours 30
1	Advanced Programming - CNC Turning	8h
2	Advanced Programming - CNC Milling	10h
3	Try out on Machine - CNC Turning	4h
4	Try out on Machine - CNC Milling	6h
5	Maintenance Practice	2h
Total Hour		30h

Semester - 4 Module Name: ELECTIVE 17 – 17.1 Familiarisation/Observation of Glass Manufacturing Module Code: CP33415P		
Sl. No.	Module Details	Practical Hours 30

1	Familiarisation / Observation of Glass Manufacturing at Industry	30h
	Total Hour	30 h

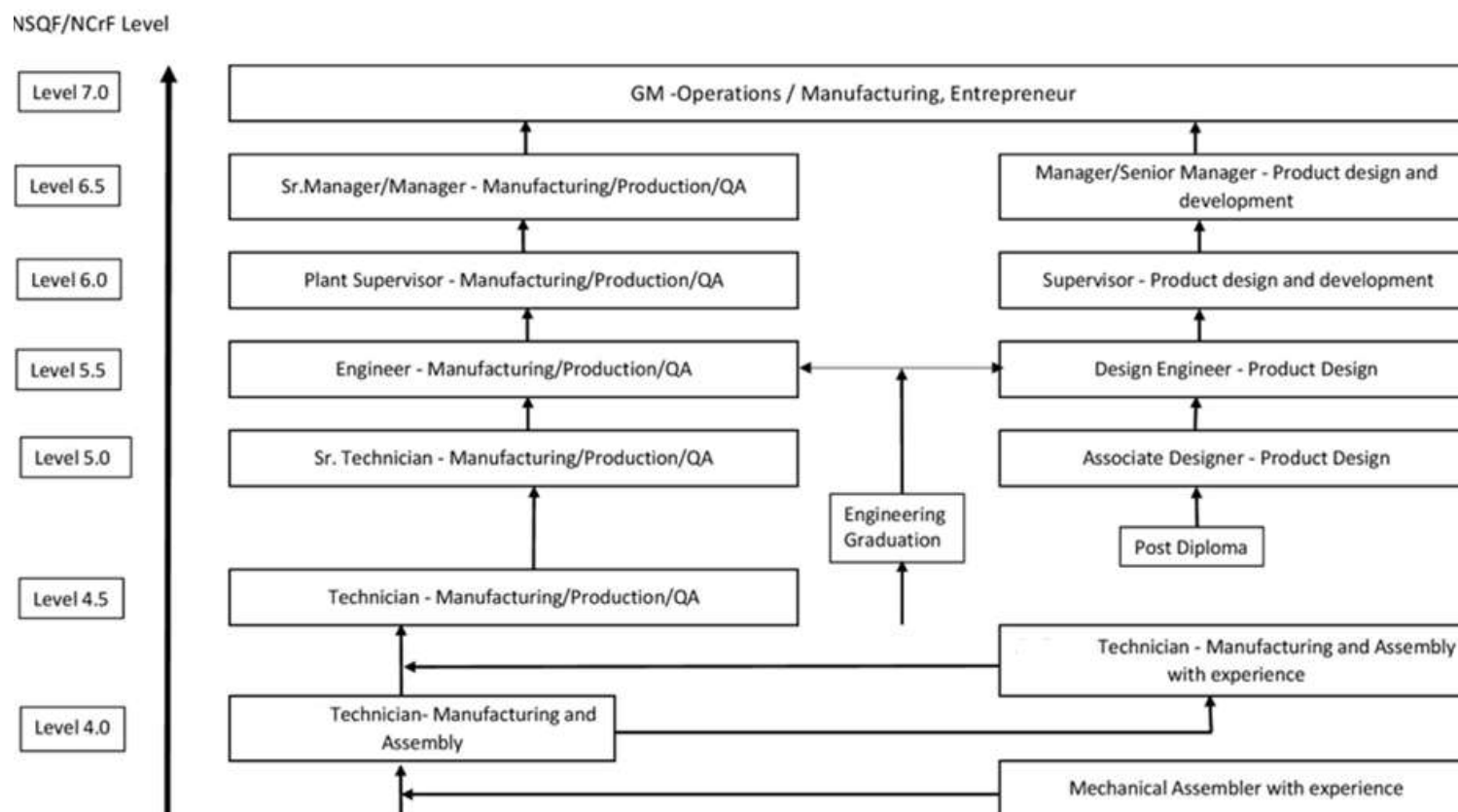
Semester - 4 Module Name: ELECTIVE 18 – 18.1 Observation of Jewellery Making Processes Module Code: CP33416P		
Sl. No.	Module Details	Practical Hours 30
1	Jewellery Making Processes	30h
2	Stone Setting	
3	Polishing and Finishing	
4	Quality / Inspection Processes	
	Total Hour	30 h

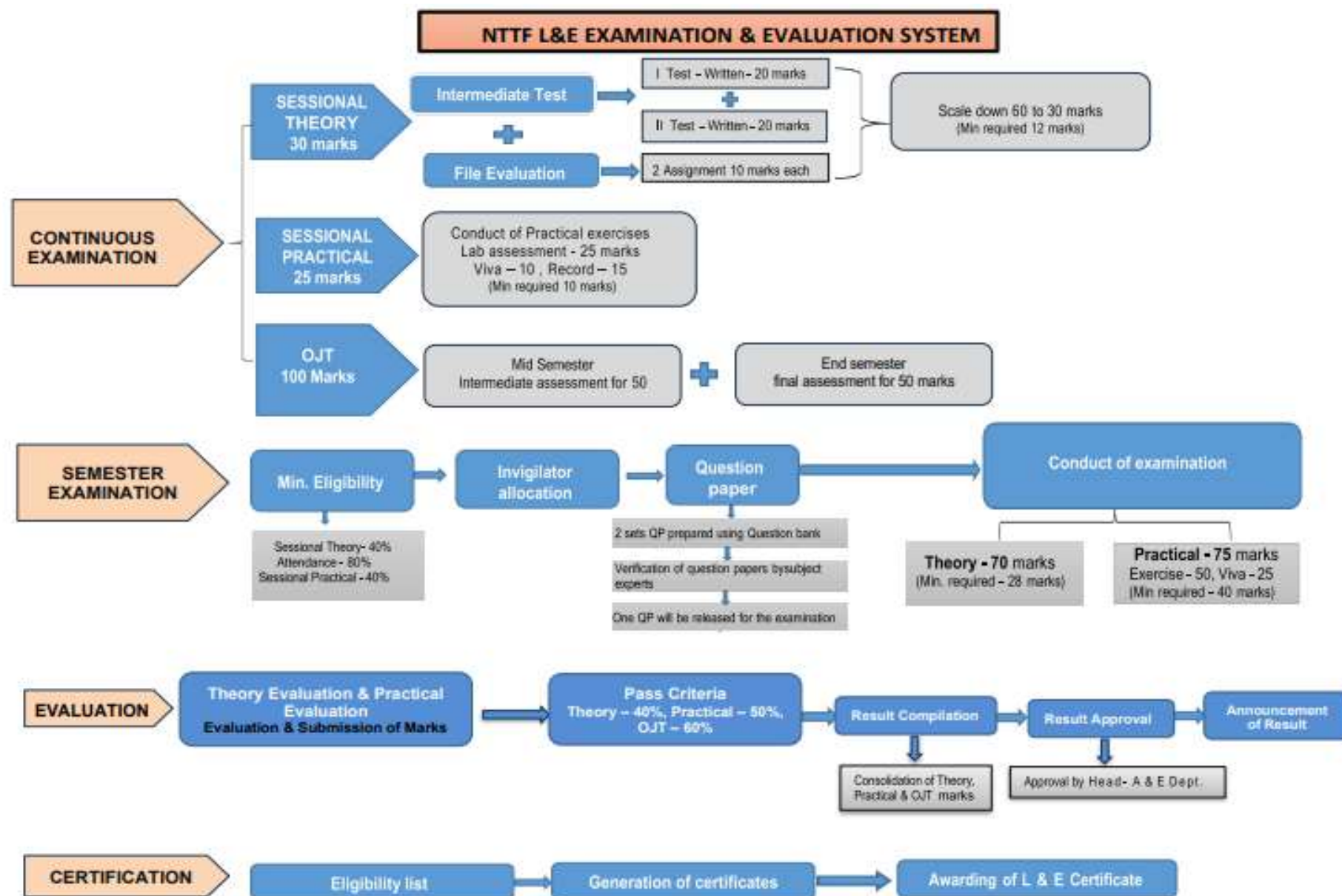
Semester – 4 Module Name: OJT Module Code: CP33417P		
Sl. No.	Module Details	Practice Hours 360
1	On the Job Training in the relevant sector	360h
	Total Hours	360 h

Semester - 4 Module Name: Employability Skills Module Code: CP33418T		
Sl. No.	Module Details	Theory Hours 30
1	Financial and Legal Literacy	10
2	Occupation Safety, Health, and Environment Education	5
3	Digital Literacy Skills	7
4	Essential skills for Success	8
	Total Hours	30

Annexure 9: Career Progression

Sector: Capital Goods and Manufacturing



Annexure 10: Assessment SOP

Annexure 11: Occupational Map
Occupational Map - Sector Name: Manufacturing

As per NCrf		As per NCO-2015	Sub-Sector 1/Automotive, Manufacturing, Gems & Jewellery	
NCrf Level (1-7)	Level Descriptors	NCO-15 -- Family (First 4 digits code/s for the given level cross cutting the OM Sub-Sectors/Occupations)	Occupation 1/Process control , Manufacturing, Production	Occupation 2/ Product design and development.
Level 7.0	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 4. Broad Learning Outcomes: Apply acquired advanced technical skills, technical appraisal and reviews 5. Responsibility: Business Management (like GM/ CEO / CXO, etc.)	1321	GM - Operations/ Manufacturing, Entrepreneur	
Level 6.5	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	1321, 1213, 2144	Sr. manager/Manager - Manufacturing/Production/QA Automobile, Manufacturing, Jewellery	Manager/Senior Manager- Product Design & development Automobile, Manufacturing, Jewellery
Level 6.0	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 mindset, self-management 4. Broad Learning Outcomes: Judgement / decision making – specialized 5. Responsibility: Team leader – Technical supervisor, technical supervisor or Assistant/ deputy manager	3115, 3122, 2144	Plant Supervisor - Manufacturing/Production/QA Automobile, Manufacturing, Jewellery	Supervisor - Product Design & Development Automobile, Manufacturing, Jewellery
Level 5.5	1. Professional Theoretical Knowledge: Specialized knowledge	2141, 2144		

	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		Engineer - Manufacturing/Production/QA Automobile, Manufacturing, Jewellery	Design Engineer - Product Design Automobile, Manufacturing, Jewellery
Level 5.0		2144, 3115, 7231	Sr.Technician - Manufacturing/Production/QA Automobile, Manufacturing, Jewellery	Associate Designer - Product Design Automobile, Manufacturing, Jewellery
Level 4.5	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 & Enterpreurial readiness-with guidance. 4. Broad Learning Outcomes: Carry out Range of tasks with minimum supervision 5. Responsibility: Accountable/ responsible - Technician	2144, 3115, 7231	Technician - Manufacturing/Production/QA Automobile, Manufacturing, Jewellery	Study Post Diploma
Level 4.0	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 Member-Follow instructions 4. Broad Learning Outcomes: Carry out Range of tasks with supervision 5. Responsibility: Accountable/ responsible - technician	7231, 3115, 7313	Technician- Manufacturing and Assembly- Automobile, Manufacturing, Jewellery	

Annexure 12: Key Learning Outcome

SL. NO.	SUBJECT NAME	KNOWLEDGE AND UNDERSTANDING	TECHNICAL & PROFESSIONAL SKILLS	APPLICATION OF KNOWLEDGE AND SKILLS
SECOND YEAR				
20	CNC Technology (CP33301T) CNC Lab (CP33302P)	Differentiate between NC, CNC and DNC Explain the elements and Functions of CNC Turning Center Explain the elements and Functions of VMC Explain materials for CNC Cutting Tools and their applications Do Part Programming for Turning and Milling	Identify and Select Tools for CNC Lathe and CNC Milling Study and Familiarise tool catalogue Perform the Part Programming for Turning, Milling Load and Edit Programs in CNC Machine Interpret alarms in CNC machine Operates CNC Turning Center Perform Basic Maintenance of CNC Machines	Execution of Programs on CNC Milling and CNC Lathe Machines. Identify and Select Tools for CNC Lathe, CNC Milling Operate CNC VMC Use CNC machine controls
21	Electrical and Electronics (CP33303T) Electrical and Electronics Lab (CP33304P)	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 Explain different types of Earthing and Purpose State Types and Applications of Sensors and Transducers	Identify and State Specification and Applications of Electrical hand tools Identify the specify Electrical Protective Devices Understand electronic components, such as resistors, capacitors, and transistors, and their applications in electronic circuits. Describe construction, Working, specifications, Applications and Speed Control of Induction	Knowledge of electrical machines, such as transformers, motors, and their operating principles. Knowledge of electrical safety standards and regulations. Describe DC Servo Drives, Variable Frequency Drives Describe Power Supplies Knowledge of sensors and transducers, including types, operating principles, and applications.

		Explain construction and working principle of Transformers Describe construction, Working, specifications, Applications and Speed Control of Induction motors, DC Motors Describe Working principle of Stepper and Servo motors Describe Display Devices Differentiate between Potential Difference and EMF Explain different types of Earthing and Purpose State Types and Applications of sensors Explain construction and working principle of Transformers. Explain PMSM Motor	motors. Describe Working principle of Stepper and Servo motors. Describe Construction, Working principle and applications of DC Motors Specification and Applications of AC and DC Machines. Explain Types, Construction, Functioning and Applications of Single and Three Phase and Auto-Transformers, determine losses and efficiency. Testing transformer polarity, earth resistance.	Identify and State Specification and Applications of Electrical hand tools Identify and Specify Wires and Cables
22	Automation-I (CP33401T)	Differentiate between pneumatic and hydraulic power State application, advantages and disadvantages of Pneumatics State application, advantages and disadvantages of Hydraulics Explain types of Compressors Explain types and applications of Pneumatic actuators	Familiarity with the components and subsystems of pneumatic and hydraulic systems. Understand the basic principles of automotive pneumatic and hydraulic circuits. Design and Rig Pneumatic Circuits Design and Rig Hydraulic Circuits	Knowledge of the components and sub systems of pneumatic and hydraulic power transmission systems. Stimulation of basic Pneumatic circuits Stimulation of basic Hydraulic circuits

		Explain Pneumatic Directional Control, Flow Control and Pressure Control Valves State types and Specification and applications of Hydraulic Oils State types and Specification and applications of Hydraulic Hoses State types and Specification and applications of Hydraulic Filters Explain types and applications of Hydraulic actuators Explain Hydraulic Directional Control, Flow Control and Pressure Control Valves		
23	Mechanical Drive (CP33402T)	Describe Types, Specification and Application of Lubricants Describe Types, Specification and Application of Gears and Gear Drives Explain Types, Specification and Application of Keys	Explain Types, Specification and Application of Belt Drives, Chain Drives Types and Application of Cams	Describe Types, Specification and Application of Couplings Explain Types, Specification and Application of Bearings
24	Automation Lab - I (CP33403P)	Differentiate between pneumatic and hydraulic power State application, advantages and disadvantages of Pneumatics State application, advantages and disadvantages of Hydraulics Explain types of Compressors	Familiarity with the components and subsystems of pneumatic and hydraulic systems. Understand the basic principles of automotive pneumatic and hydraulic circuits. Design and Rig Pneumatic Circuits Design and Rig Hydraulic Circuits	Knowledge of the components and sub systems of pneumatic and hydraulic power transmission systems. Stimulation of basic Pneumatic circuits Stimulation of basic Hydraulic circuits

		Explain types and applications of Pneumatic actuators Explain Pneumatic Directional Control, Flow Control and Pressure Control Valves State types and Specification and applications of Hydraulic Oils State types and Specification and applications of Hydraulic Hoses State types and Specification and applications of Hydraulic Filters Explain types and applications of Hydraulic actuators Explain Hydraulic Directional Control, Flow Control and Pressure Control Valves		
25	Material Handling (CP33305T) - Elective	Explain Types and Application of Conveyors Describe Types and Application of Industrial Vehicles Explain Types and Application of Automated Guided Vehicles Describe Types and Application of Positioning Equipments Explain Types and Application of Rack Explain Types and Application of Hoists and Cranes	Understand the principles of conveyor systems. Describe Automated Identification and Communication Equipment. Understand the principles of lifting and moving heavy materials within a facility, including different types of cranes such as bridge cranes and jib cranes.	State Criteria for Selection of Material Handling Equipment. Identify different types of vehicles used to transport materials within a facility. Explain various storage and retrieval systems.

26	Automobile Engineering-I (CP33306T) - Elective	Explain Working Principle of I.C Engine Explain Working Principle, Advantage and Disadvantage of Two Stroke and Four Stroke Engines Explain Working of Petrol and Diesel Engines Explain Construction Details and Parts of an I.C Engine Explain the following systems of an I.C Engine Fuel System, Ignition System, Governing System, Cooling System, Lubrication System and Air Intake System Interpret Valve Timing Diagram Explain the factors influencing the design of Commercial Vehicles Explain Automotive Homologation Explain Emission and Emission Norms Explain BS6 Emission Norms Explain Fuel suitable for BS6. Explain Power Transmission System	Understand the differences between two-stroke and four-stroke engines. Understand the emissions characteristics of different engines and the importance of reducing emissions. Understand the principles of power transmission. Classify Commercial Vehicles Classify Types of Passenger Cars	Knowledge of engine components. Knowledge of transmission components. Familiarity with different types of passenger cars and commercial vehicles, including their features, functions, and capabilities. Knowledge of the various components of a vehicle, including the engine, fuel System, power transmission, brakes, cooling systems
27	Manufacturing Technology-III - Auto (CP33307T) - Elective	Explain processing of Plastics Explain Rubber Moulding Process Describe Metal Injection Moulding	Understand plastic, rubber, and metal materials. Understand CNC programming.	Knowledge of manufacturing processes including injection Moulding, extrusion, and casting.

		Describe Additive Manufacturing Describe CNC Machines and Hardware Do basic programming for CNC Lathe DO basic programming for CNC Milling Explain Machine Control	Understanding and Solving Alarm Signals	Knowledge of G-code and M-code programming languages used in CNC programming
28	Manufacturing Technology-III – Mfg (CP33308T) Elective	Explain Process and Application of Spark EDM and Wire EDM Explain the Process of Powder Metallurgy and Metal Injection Moulding Explain Injection Moulding, Compression Moulding, Rotational Moulding, Blow Moulding, Thermo Forming, Extrusion Explain working and Construction Details of Press Tools Explain ARC Welding, MIG Welding and TIG Welding Process Explain Riveting, Brazing Process	Describe different types and materials for electrode Describe and specify different types and materials for Wire Identify and State the Process of Powder Metallurgy, Metal Injection Moulding, ARC Welding, MIG Welding and TIG Welding	Understanding of different manufacturing processes, including their advantages, disadvantages, and limitations, and their applications in various industries.
29	Industrial Electronics-(CP33309T) - Elective	Understanding of construction and working of various motors. Power semiconductor devices. Knowledge on Electromechanical devices.	Construction and working of Inverters, power supplies, UPS. Handling Electronic components.	Identifying and selecting protective devices.
30	Welding- (CP33310T)-Elective	Describe AC/ DC ARC Welding Specify and Select DC ARC Welding	Identify Polarity in DC Arc Welding and their Applications	Set up DC ARC Welding Machine Prepare Work for MMAW/SMAW

		Machine Describe Types and Application of ARC Welding Accessories State the effect of Long Arc, Short Arc and Normal Arc Explain effect of Angle of Electrode Explain Types of Weld Joints Explain Welding Positions Describe Storage and Drying of Electrodes Explain GMAW Welding Equipment and their Accessories State Process Parameters for GMAW Explain Metal transfer - Spray Transfer, Globular transfer and Dip Transfer Explain Procedure for Pipe Welding Explain TIG Welding Equipment and their Accessories State Process Parameters for TIG Welding Explain the Equipment, Process for Manual Gas Cutting , Machine Cutting, Plasma Cutting Explain Ultrasonic Test, Gamma Rays Test and X-ray Test	Identify Welding Defects and Remedial Measures Identify Types of Electrodes, Specify and Select Electrodes Identify Defects and Remedial Measures in GMAW Do Destructive Testing of Welded Joints Do Die Penetration Test, Magnetic Particle Test	Set up GMAW Welding Machines Select Electrodes and Filler rods for TIG Welding Select Shielding Gases
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31	Eye Glass Frame Manufacturing- (CP33311T) - Elective	Explain Parts and Functions of Eye Glass Frame Explain Materials used for Frames Explain Manufacturing Process for Non Metal Frames Explain Manufacturing Process for Metal Frames Explain Manufacturing Process for Moulded Frames	Handling and Packing Process for Finished Frames	Manufacturing Process for Non Metal Frames, Metal Frames, Moulded frames
32	Foundry Technology-I (CP33312T) - Elective	Explain Advantages and Limitations of Casting Process Describe different types of Furnaces used in Foundry Explain Sand Moulding Process Describe Cores used in Sand Moulding Describe working of different types of Moulding Machines	Different Types of Moulding Processes in Casting Destructive and Non Destructive Testing of Castings	Identify Defects in Castings and Suggest Remedial Measures to minimise / prevent defects
33	Jewellery Making Process-I (CP33313T) - Elective	Explain Wax Tree Making Process Describe Investment Casting Process and Burn out process Explain Principles of Alloying Explain Principle, Equipment and Applications of Devesting and Quenching Explain Process and Equipment for De-Sprueing	Understand Elements of D-Block for Jewellery Able to understand the process involved in Jewellery making	Able to follow safety measures during the Jewellery making process

34	Gold Refining Process- (CP33314T) - Elective	Explain Process, Equipment and Application of Cupellation Process Explain Process, Equipment and Application of Liquartation and Parting Process Explain Process, Equipment and Application of Electrolytic Process Explain Process, Equipment and Application of Aquaregia Process Explain Process, Equipment and Application of Pyro metallurgical Process	Perform Clean-up Process and Full Refining Able to apply the knowledge in Steps involved in refining process Explain Grain Refining Process Follow Standard forms of Refined Gold	Maintain the records for Gold Refining Maintenance of the Process control Equipments in refining furnace
35	Auomobile Engineering Lab-I- (CP33315P) - Elective	Explain Working Principle of I.C Engine Explain Working Principle, Advantage and Disadvantage of Two Stroke and Four Stroke Engines Explain Working of Petrol and Diesel Engines Explain Construction Details and Parts of an I.C Engine Explain the following systems of an I.C Engine Fuel System, Ignition System, Governing System, Cooling System, Lubrication System and Air Intake System Interpret Valve Timing Diagram Explain the factors influencing the design of Commercial Vehicles	Understand the differences between two-stroke and four-stroke engines. Understand the emissions characteristics of different engines and the importance of reducing emissions. Understand the principles of power transmission. Classify Commercial Vehicles Classify Types of Passenger Cars	Knowledge of engine components. Knowledge of transmission components. Familiarity with different types of passenger cars and commercial vehicles, including their features, functions, and capabilities. Knowledge of the various components of a vehicle, including the engine, fuel System, power transmission, brakes, cooling systems

		Explain Automotive Homologation Explain Emission and Emission Norms Explain BS6 Emission Norms Explain Fuel suitable for BS6. Explain Power Transmission System		
36	Industrial Electronics Lab - (CP33316P) - Elective	Understanding of construction and working of various motors. Power semiconductor devices. Knowledge on Electromechanical devices.	Construction and working of Inverters, power supplies, UPS. Handling Electronic components.	Identifying and selecting protective devices.
37	Observation of Gold Refining Process- (CP33317P) - Elective			Observation of the Jewellery making process in the Manufacturing Industry Observation and Familiarization of Gold Refining Process at Jewellery
38	Automobile Engineering-II (CP33404T) - Elective	Explain Working Principle of I.C Engine Explain Working Principle, Advantage and Disadvantage of Two Stroke and Four Stroke Engines Explain Working of Petrol and Diesel Engines Explain Construction Details and Parts of an I.C Engine Explain the following systems of an I.C Engine	Understand the differences between two-stroke and four-stroke engines. Understand the emissions characteristics of different engines and the importance of reducing emissions. Understand the principles of power transmission. Classify Commercial Vehicles	Knowledge of engine components. Knowledge of transmission components. Familiarity with different types of passenger cars and commercial vehicles, including their features, functions, and capabilities. Knowledge of the various components of a vehicle, including the engine, fuel System,

		Fuel System, Ignition System, Governing System, Cooling System, Lubrication System and Air Intake System Interpret Valve Timing Diagram Explain the factors influencing the design of Commercial Vehicles Explain Automotive Homologation Explain Emission and Emission Norms Explain BS6 Emission Norms Explain Fuel suitable for BS6. Explain Power Transmission System	Classify Types of Passenger Cars	power transmission, brakes, cooling systems
39	Parts and functions of two wheelers - CP33405T	Identify Parts and Functions of the following systems with respect to Two Wheelers - Air Intake Systems, Braking Systems, Frame, Suspension System, Lighting System, Fuel System, Engine, Cooling System, Exhaust System, Lubrication System, Wheels and Tyres, Electrical System, Power Transmission, Instrument Cluster Explain Construction and Parts of Two-Wheeler Engine Explain Emission Standards for Two Wheelers Describe Battery, Battery Management System and Drive System for Electric Two Wheelers	Understand the basic components of a two-wheeler, such as the frame, wheels, tires, brakes, suspension, engine, transmission, exhaust system, electrical system. State Terms used in Two-Wheeler Engines Understand the testing procedures used to measure emissions from two-wheelers	Knowledge of the different types of electric driving systems used in two-wheelers. Knowledge of the different types of emission standards that exist for two-wheelers.

40	Assembly Techniques- (CP33406T) - Electives	Follow Safety Practices while Assembling. Follow Safety Practices while using electrically operated and Pneumatic operated Hand Tools Follow Standard Tightening procedures and Torque requirements. Handle gauges and measuring instruments used in Assembly	Identify and Specify Fasteners, Washers and other Fastening Devices Knowledge on Assembly methods and Equipments	Use Accessories used in Assembly – Wires and Connectors, Adhesive and Sealants, Gaskets and Seals Perform Assembly using Hand Tools and Power Tools
41	Advanced CNC (CP33407T) - Elective	Identify CNC machine controls Explain Work Holding Devices for CNC Lathe / CNC Milling Machine Perform Basic Maintenance of CNC Machines	Load and Edit Programs in CNC Machine Interpret alarms in CNC machine	Operate CNC Turning Center Operate CNC VMC
42	Glass manufacturing Technology (CP33408T) - Elective	Explain Types, Specification and Application of Different types of glasses Explain Furnaces for Melting and Refining Explain Construction and Function of Lehr Oven Explain Cold Process Explain Tempering Procedures and Furnaces for Glasses	Advanced Coated Glass Processing (ACGP) Describe Batch Process and Equipments Describe Float Glass Production Process Describe Cutting and Edge Preparation of Glasses Describe Edge Grinding of Glasses	Knowledge on Steps followed in manufacture of Integrated Glass and Double Glazed Glass
43	Material Recycling and Logistics (CP33409T) - Elective	Describe Waste Management Explain Methods adopted in disposing wastes	Classify Household, Industrial, Bio Medical and E – Wastes Classify Steel Scraps	Methods of collecting Recyclable material Material handling methods in Steel scrap recycling plants

		Explain Benefits of Recycling –Generates Industries, Create Jobs, Impact on Environment Explain Major Waste Generating Activities in Metal Industry Describe Steel Scrap Sorting and Preparation Explain Compacting, Packing and Labelling methods in recycling plants Explain Recycling Process Describe Basics of Logistics Management Describe Various Packing Methods Describe Documentation and Clearance process for Inland Export and Import Activities Describe Transportation Methods for Road, Rail, Sea and Air Explain Green Logistics, Cold Chain Logistics Explain role of I.T in Logistics	Study of Recycling Process Describe the basics of 3D Printing and Wearable Devices in Logistics Material Handling Equipments used in Warehouses Basics of Risk and Insurance Management	Fundamentals of Supply Chain Management Functions, Types, Storage Methods and Operation of Warehouses
44	Heat Treatment (CP33410T) - Elective	Explain the Purpose of Heat Treatment Interpret Iron Carbon and TTT Describe Heat treatment Processes – Procedure, Structural change, Change in Properties and Application	Give an awareness on heat treatment process of engineering materials	Have a basic knowledge on structure of Materials and heat treatment process. Basic knowledge on defects and remedies in heat treatment

		Select Heat treatment Process for Different Material State Defects in Heat treatment and Explain Remedial Measures Explain Types and Applications of Heat treatment Equipment Explain Post Heat treatment processes Describe Different Surface Treatment processes and process Applications		Knowledge on Properties, Specification and Application of Materials and their Heat Treatment
45	Gems Stones and Diamonds (CP33411T) - Elective	Explain Name, Characteristics and Properties of Semi-Precious Gem Stones Explain Name, Characteristics and Properties of Precious Gem Stones Explain Properties of Gem Stones Explain the effect of light on Diamonds Explain Cut Nomenclature of Diamonds Describe Shapes of Diamonds Explain Faceting, Cut-Types of Diamonds Describe Diamond Size Chart (CARAT) Describe Production Process, Grading and Uses of Synthetic Diamonds	Explain Diamond Inspection Methods Describe Grading of Diamonds Able to understand the effect of Light on a Diamond, Reflection, Refraction, Dispersion Awareness of Diamond Certification adopted in Jewellery Manufacturing Industry	Name Diamond Certifying Bodies Specify Diamond in Jewellery

46	Jewellery Making process-II (CP33412T) - Elective	Explain Wax Tree Making Process Describe Investment Casting Process and Burn out process Explain Principles of Alloying Explain Principle, Equipment and Applications of Devesting and Quenching Explain Process and Equipment for De-Sprueing	Understand Elements of D-Block for Jewellery Able to understand the process involved in Jewellery making	Able to follow safety measures during the Jewellery making process
47	Automobile engineering lab-II- (CP33413P)-Elective	Explain Working Principle of I.C Engine Explain Working Principle, Advantage and Disadvantage of Two Stroke and Four Stroke Engines Explain Working of Petrol and Diesel Engines Explain Construction Details and Parts of an I.C Engine Explain the following systems of an I.C Engine Fuel System, Ignition System, Governing System, Cooling System, Lubrication System and Air Intake System Interpret Valve Timing Diagram Explain the factors influencing the design of Commercial Vehicles Explain Automotive Homologation	Understand the differences between two-stroke and four-stroke engines. Understand the emissions characteristics of different engines and the importance of reducing emissions. Understand the principles of power transmission. Classify Commercial Vehicles Classify Types of Passenger Cars	Knowledge of engine components. Knowledge of transmission components. Familiarity with different types of passenger cars and commercial vehicles, including their features, functions, and capabilities. Knowledge of the various components of a vehicle, including the engine, fuel System, power transmission, brakes, cooling systems

		Explain Emission and Emission Norms Explain BS6 Emission Norms Explain Fuel suitable for BS6. Explain Power Transmission System		
48	Advanced CNC Lab (CP33414P) - Elective	Identify CNC machine controls Explain Work Holding Devices for CNC Lathe / CNC Milling Machine Perform Basic Maintenance of CNC Machines	Load and Edit Programs in CNC Machine Interpret alarms in CNC machine	Operate CNC Turning Center Operate CNC VMC
49	Familiarisation/Observation of Glass Manufacturing- (CP33415P) - Elective	Explain Types, Specification and Application of Different types of glasses Explain Furnaces for Melting and Refining Explain Construction and Function of Lehr Oven Explain Cold Process Explain Tempering Procedures and Furnaces for Glasses	Advanced Coated Glass Processing (ACGP) Describe Batch Process and Equipments Describe Float Glass Production Process Describe Cutting and Edge Preparation of Glasses Describe Edge Grinding of Glasses	Knowledge on Steps followed in manufacture of Integrated Glass and Double Glazed Glass
50	Observation of Jewellery Making processes- (CP33416P) - Elective			Observation of the Jewellery making process in the Manufacturing Industry Observation and Familiarization of Gold Refining Process at Jewellery
51	OJT- (CP33317P) OJT- (CP33417P)			On the Job Training in the relevant sector

52	Employability Skills- (CP33318T) Employability skills- (CP33418T) Understand Entrepreneurship skills Ability to understand financial and legal aspects Understand Occupation safety, Health, and Environment related issues. Ability to use Essential skills.	Knowledge on various schemes and institutions promoting Entrepreneurs. Ways of setting enterprise, legal compliances, marketing, and budgeting etc. Knowledge and understanding on personal finance management, investments, returns, basics of taxes, awareness on financial frauds and prevention. Awareness on fundamental rights under the constitution and facilities available for recourse in the event of breach. 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. Understanding balancing Life and Career, Value based decision making, Types of stress and stress management.	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.	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.
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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