



QUALIFICATION FILE

Senior Technician - Manufacturing

☐ 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: 4.5

Submitted By:

NETTUR TECHNICAL TRAINING FOUNDATION
23/24, II PHASE, PEENYA INDUSTRIAL AREA,
BENGALURU – 560058, KARNATAKA

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Section 1: Basic Details

1.	Qualification Name	Senior Technician - Manufacturing								
2.	Sector/s	Capital Goods and Manufacturing								
3.	Type of Qualification: ☒ New ☐ Revised ☐ Has Electives/Options ☐ OEM	NQR Code & version of existing/previous qualification: (change to previous, once approved)		Qualification Name of existing/previous version: Senior Technician – Manufacturing						
4.	a. OEM Name b. Qualification Name (Wherever applicable)	NA								
5.	National Qualification Register (NQR) Code & Version (Will be issued after NSQC approval)	QG-4.5-CG-01037-2023-V1-NTTF	6. NCrF/NSQF Level: 4.5							
7.	Award (Certificate/Diploma/Advance Diploma/ Any Other) (Wherever applicable specify multiple entry/exits also & provide details in annexure)	Certificate								
8.	Brief Description of the Qualification	The Candidate will be able to Process Plan, Manufacture, Assemble and Inspect Components and Assemblies in Manufacturing Industries, Assembling auto components for automobile The subjects covered in this Programme are - Employability Skill, Safety, Health and Environment, Industrial Management, Automation-II, Jigs and Fixtures, Automobile Engineering - III (Elective- Auto), Sheet Metal Processing Technology (Elective- Mfg), Metal Injection Moulding (Elective- Mfg), Machine Tool Maintenance and Performance Testing (Elective- Mfg), Quality check-Jewellery (Elective- Jewellery), Production Management, Introduction to IoT and Industry 4.0, Automobile engineering IV(Elective- Auto), Additive manufacturing (Elective- Auto), Foundry technology II (Elective- Mfg), Plastic material processing (Elective- Mfg), Fabrication of pressure vessels (Elective- Mfg), Estimation and costing (Elective- Mfg), Additive manufacturing (Elective- Mfg), Jewellery CAD (Elective- Jewellery), Jewellery Retailing (Elective- Jewellery), Automation Lab – II, Project /Case study, OJT								
9.	Eligibility Criteria for Entry for Student/Trainee/Learner/Employee	Entry Qualification & Relevant Experience: <table border="1"> <thead> <tr> <th>Sl. No.</th> <th>Academic/Skill Qualification (With Specialization - if applicable)</th> <th>Required Experience (with Specialization)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Advanced Certificate - Technician- Manufacturing and Assembly - Level 4.0 from NTTF</td> <td>NA</td> </tr> </tbody> </table>			Sl. No.	Academic/Skill Qualification (With Specialization - if applicable)	Required Experience (with Specialization)	1	Advanced Certificate - Technician- Manufacturing and Assembly - Level 4.0 from NTTF	NA
Sl. No.	Academic/Skill Qualification (With Specialization - if applicable)	Required Experience (with Specialization)								
1	Advanced Certificate - Technician- Manufacturing and Assembly - Level 4.0 from NTTF	NA								
10.	Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))	Total Credits – 42		11. Common Cost Norm Category (I/II/III) (wherever applicable): NA						

12.	Any Licensing requirements for Undertaking Training on This Qualification <i>(wherever applicable)</i>	NA																						
13.	Training Duration by Modes of Training Delivery <i>(Specify Total Duration as per selected training delivery modes and as per requirement of the qualification)</i>	☐ Offline ☐ Online ☒ Blended <table border="1"> <thead> <tr> <th>Training Delivery Modes</th> <th>Theory (Hours)</th> <th>Practical (Hours)</th> <th>OJT / Project Mandatory (Hours)</th> <th>OJT Recommended (Hours)</th> <th>Total (Hours)</th> </tr> </thead> <tbody> <tr> <td>Classroom (offline)</td> <td>290</td> <td>120</td> <td>720</td> <td>-</td> <td>1130</td> </tr> <tr> <td>Online</td> <td>130</td> <td></td> <td></td> <td></td> <td>130</td> </tr> </tbody> </table> <i>(Refer Blended Learning Annexure for details)</i>					Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT / Project Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)	Classroom (offline)	290	120	720	-	1130	Online	130				130
Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT / Project Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)																			
Classroom (offline)	290	120	720	-	1130																			
Online	130				130																			
14.	Aligned to NCO/ISCO Code/s <i>(if no code is available mention the same)</i>	NCO Code – 2015.3115.0101, 2015.3115.0102, 2015.3115.0201, 2015.7231.0100, 2015.7231.0400																						
15.	Progression path after attaining the qualification. <i>(Please show Professional and Academic progression)</i>	Professional Progression: After Completion of 3 years of Full Time Programme and after 3 years of Industry Experience the Job Holder can work as Production Engineer, Machine Shop Engineer, Quality Assurance Engineer Academic Progression: Post Diploma, B. VoC and B. Tech Degree Course in Relevant areas.																						
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 <i>(Specify the NOS/Module which covers it)</i>	☒ Yes ☐ No Industrial Management - CP33502T Safety, Health and Environment - CP33501T																						
21.	Is Qualification Suitable to be Offered in Schools/Colleges	Schools ☐ Yes ☒ No Colleges ☐ Yes ☒ No																						
22.	Name and Contact Details of Submitting / Awarding Body SPOC <i>(In case of CS or MS, provide details of both Lead AB & Supporting ABs)</i>	Name: Mr. R Rajagopalan Position in the Organization: Joint Managing Director Email: rg@nttf.co.in Tel. number: 080 – 28390215 Contact 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 – V																
1	Safety, Health and Environment	CP33501T	Core	4.5	21	20	-	-	-	20	100	-	-	-	100	
2	Industrial Management	CP33502T	Core	4.5		45	-	-	-	45	100	-	-	-	100	
3	Automation-II	CP33503T	Core	4.5		40	-	-	-	40	100	-	-	-	100	
4	Automation Lab- II	CP33504P	Core	4.5		-	60	-	-	60	-	75	-	25	100	
5	Jigs and Fixtures	CP33505T	Core	4.5		30	-	-	-	30	100	-	-	-	100	
6	Elective Theory 19/20/21 (Choose One)	CP335XX*T	Core	4.5		45	-	-	-	45	100	-	-	-	100	
7	OJT	CP33511P	Core	4.5		-	-	360	-	360	-	75	-	25	100	
8	Employability Skills	CP33512T	Core	4.5		30	-	-	-	30	75	-	-	25	100	
Duration (in Hours)/ Total Marks					21	210	60	360	-	630	575	150	-	75	800	
SEMESTER – VI																
9	Production Management	CP33601T	Core	4.5	21	45	-	-	-	45	100	-	-	-	100	
10	Introduction to IoT and Industry 4.0	CP33602T	Core	4.5		45	-	-	-	45	100	-	-	-	100	
11	Project work/Case study	CP33603P	Core	4.5		-	60	-	-	60	-	75	-	25	100	
12	Elective Theory 22/23/24 (Choose One)	CP336XX*T	Core	4.5		90	-	-	-	90	100	-	-	-	100	
13	OJT	CP33613P	Core	4.5		-	-	360	-	360	-	75	-	25	100	
14	Employability Skills	CP33614T	Core	4.5		30	-	-	-	30	100	-	-	-	100	
Duration (in Hours)/ Total Marks					21	210	60	360	-	630	400	150	-	50	600	
Total for 1-year Programme					42	420	120	720		1260	1000	300	-	100	1400	

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 – V																
19	19.1 Automobile Engineering – III	CP33506T	Core	4.5		45	-	-	-	45	100	-	-	-	100	
20	20.1 Sheet Metal Processing Technology	CP33507T	Core	4.5		45	-	-	-	45	100	-	-	-	100	
	20.1 Metal Injection Moulding	CP33508T														
	20.1 Machine Tool Maintenance and Performance Testing	CP33509T														
21	21.1 Quality check-Jewellery	CP33510T	Core	4.5		45	-	-	-	45	100	-	-	-	100	
SEMESTER – VI																
22	22.1 Automobile engineering – IV	CP33604T	Core	4.5		60	-	-	-	60	100	-	-	-	100	
	22.2 Additive manufacturing	CP33605T	Core	4.5		30	-	-	-	30	100	-	-	-	100	
23	23.1 Foundry technology II	CP33606T	Core	4.5		45	-	-	-	45	100	-	-	-	100	
	23.1 Plastic material processing	CP33607T														
	23.1 Fabrication of pressure vessels	CP33608T														
	23.2 Estimation and costing	CP33609T	Core	4.5		15	-	-	-	15	100	-	-	-	100	
	23.3 Additive manufacturing	CP33610T	Core	4.5		30	-	-	-	30	100	-	-	-	100	
24	24.1 Jewellery CAD	CP33611T	Core	4.5		45	-	-	-	45	100	-	-	-	100	
	24.2 Jewellery Retailing	CP33612T	Core	4.5		45	-	-	-	45	100	-	-	-	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 Materials used in Automobile, Manufacturing & Gem and Jewels industry and their properties. • Explain speed, feed for Conventional and CNC Machines • Describe Parts and Functions of Conventional and CNC Machines • Practice Engineering Drawing and CAD software • Describe Mechanical & Automobile assembly and sub assembly Process, • Describe Manufacturing procedure of Jewellery Components and Assemblies and inspection. • Describe the importance of Health and Safety.	• Demonstrate the Selection of Material for a Product • Perform manufacturing process using conventional and CNC machines & demonstrate Machine related Calculations. • Demonstrate Skill, knowledge on operating Conventional and CNC Machines • Interpret Technical Drawings, Prepare CAD drawings. • Demonstrate Mechanical & Automobile assembly and sub assembly Process, • Apply gained knowledge to Identify, Integrate and facilitate Jewellery manufacturing facilities available. • Demonstrate Safety and Health aspects and Ensures Compliance with Health and Safety Regulations.	4.5
Professional and Technical Skills/ Expertise/ Professional Knowledge	• Communicate Effectively with Peers and Supervisors in the work area. • Explain Different manual metal working processes. • Describe Measuring/Inspection Equipment, used in Manufacturing, Automobile and Precision metal industries. • Use Conventional and CNC Machine Tools • Lead a Team in a Manufacturing Facility • Describe Automation – Hydraulics Pneumatics, PLC, Robotics and IoT	• Demonstrate Good Communication Skills • Perform on manual metal working methods and equipment. • Perform Measurement/Inspection using measuring equipment and follow quality assurance procedure in Manufacturing Industry • Perform manufacturing process using conventional and CNC machines. • Demonstrate leadership in a Manufacturing Facility	4.5

	• Identify customer requirements. • Plan the production requirements. • Plan and process gold refining operation to get required grade of purity.	• Application of Industrial Hydraulics Pneumatics, PLC, Robotics and IoT • Demonstrate fulfilling of customer requirements from drawings and work instructions. • Prepare a list of materials, equipment and instruments needed for production and assuring Quality. • Ensure SOP is followed in refining process to achieve required purity.	
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 • Explain Analysis of solutions Critically and Logically for decision making. • Execute to work effectively in a Team and lead a Team. • Explain the latest Technologies and Industrial Trends. • Exhibit good Ingenuity and Creativity, leadership skills & entrepreneurship skills. • Describe Safety and standard operating Procedures and Practices in the work area.	• Demonstrate good Communication with Peers, superiors both verbal and written, Good on Presentation Skills, QC, 5S and KAIZEN. • Analyze situations Critically and Logically. • Demonstrate use of latest Technologies emerging in the Domain. • Demonstrate leadership quality to lead a group to work effectively. • Adapt to new Situations Creatively. • Follow all safety norms and standard operating Procedures in the work area.	4.5
Broad Learning Outcomes/Core Skill	• Proficiency in using CAD software for preparing technical drawing. • Can do calculations required for Manufacturing and Inspection • Prepare Technical Reports and Presentations using MS Office • Prepare emails for correspondence.	• Perform creation of Technical Drawings. • Demonstrate with calculations required for Manufacturing and Inspection. • Prepare technical reports and Presentation using MS Office. • Correspond through emails.	4.5

	• Safety and standard operating Procedures and Practices in the work area. • Communicate with Peers and Superiors. • Critical Thinking, Creativity and Logical thinking. • Data collection, analysis, decision making ability. • Solve problems using QC tools and contribute for Kaizen in the work areas. • Knowledge on effective 5S, TPM and TQM activities.	• Follow all safety norms and standard operating Procedures in the work area. • Demonstrate verbal and written communication, computer literacy. Maintain Demonstrate good Relationship with Peers and Superiors and will be able to win good will and Trust of Peers. • Perform analysis of Critical problems in work area and real life. • Demonstrate decision making ability.	
Responsibility	• Aware of Personal/Industrial goals • Adapt to changes in the work area. • Thorough understanding of safety Procedures and SOPs in the relevant work area • Supervise, evaluate and improve the activities of team in the shop floor	• Can assure the quantity and Quality of production output within the planned time frame. • Guide Freshers in Fulfilling Tasks Assigned to them. • Follow all safety norms and standard operating procedures in the work area.	4.5

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. Veerasha K K		Plot No. 7 & 8, 80 Feet Rd, II Phase, Peenya, Bengaluru, Karnataka 560058	+91 9611622522	veerasha_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 Road, 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@spacenex.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@brandsafeway.com	
86	M/s. Vaaman engg.	Mr. Biswajit Chateerjee		Inside Tata Steel, Jamshedpur	9939700904	vaamanjsr@gmail.com	
87	M/s. Nassurdin & 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 – 5					
Safety, Health and Environment	Safety – Personal Safety, Work Safety	25			
	Health	25			
	Environment	25			
	Introduction to ISO 14001 and ISO 45001	25			
	Total Marks	100			
Industrial Management	Selection of Plant Location / Site	15			
	Plant Layout	10			
	Production Methods	15			
	Types of Organization	15			
	Leadership - Styles of Leadership	15			
	Motivation - Motivational theories	15			
	Communication - Types of communication, Channels of communication	15			
	Total Marks	100			
Automation-II	PLC Basics	10			
	Basic Function	10			
	Specification of commonly used PLC and Applications	10			
	Introduction to Robots - Types of robots and Application	10			
	Anatomy of Robots - Parts and Functions of Robots	10			
	Applications of Robots - Industrial application of robots	10			
	Microcontroller - 8051, PLC microcontroller, Architecture and Programming	20			
	Transducers -Types, Specification and Application	10			
	Limit Switches -Types, Specification and Application	10			
	Total Marks	100			

Automation Lab-II	PLC Lab				
	Familiarization of PLC System		05		05
	Familiarisation of Basics Function		10		
	Basic Logic Function		05		
	Basics of Timer and Counter		05		
	Application of PLC using Timer and Counter		10		05
	Robotics Lab				
	Pick and Place – Familiarisation		10		05
	Sorting – Familiarisation		10		05
	Welding – Familiarisation		10		2.5
	Painting – Familiarisation		10		2.5
	Total Marks	100			
Jigs and Fixtures	Jigs and Fixtures - Definition, Advantages and Applications	15			
	Types of jigs and fixtures	20			
	Machine relation - Fixture, Jig	15			
	Elements of jig and fixture	20			
	Design steps to be followed	15			
	Effect of heat treatment on jig and fixture elements	15			
	Total Marks	100			
ELECTIVE 19 – 19.1 Automobile Engineering - III	Frames and Suspension – Parts, Functions	25			
	Brake System – Parts, Functions	25			
	Electrical System – Parts, Functions	25			
	Wheels and Tyres – Types, Applications	25			
	Total Marks	100			

ELECTIVE 20 – 20.1 Sheet Metal Processing Technology	Sheet metal Processing - Press tools	10			
	Shearing Theory – Stages of shearing	05			
	Determination of Cutting Clearance/ Angular Clearance	05			
	Determination of Cutting Force	05			
	Blanking and Piercing Process	05			
	Compound Tool and Progressive Tool – Elements, Function	10			
	Strip Layout	05			
	Bending - Process, Tool details	10			
	Deep Drawing - Process, Tool details	10			
	Coining and Embossing - Process, Tool details	03			
	Parting and Cut off - Process, Tool details	02			
	Identification of Defects in Sheet Metal Components and Remedial Measures	10			
	Main Parts of Power Press	05			
	Working Principle, Specification and Application of the types of Presses	05			
	Tool Handling methods	02			
	Strip feeding methods	03			
	Documentation in Press Shop	05			
	Total Marks	100			
ELECTIVE 20 – 20.1 Metal Injection Moulding	Introduction to Powder Metallurgy	10			
	Raw Materials used in MIM	15			
	Study of MIM Moulds	15			
	Metal Injection Moulding - Machine Parameters, Process	20			
	Mechanical properties of MIM Components	10			
	MIM Components - Types, Application, Advantages	10			
	Metal Injection Moulding - Defects and Remedies	10			
	Inspection Procedure for Metal Injection Moulded Components	10			
	Total Marks	100			

ELECTIVE 20 – 20.1 Machine Tool Maintenance and Performance Testing	Introduction to Maintenance, Practices	10			
	Maintenance of Mechanical Components of CNC Machine Tool	20			
	Maintenance Tools and Accessories for Performing Maintenance	10			
	Maintenance of Electrical / Electronic Components of CNC Machine Tool	20			
	Maintenance of Hydraulic Components of CNC Machine Tool	20			
	Machine Performance Deviations	10			
	Performance Testing	10			
	Total Marks		100		
ELECTIVE 21 – 21.1 Quality Check - Jewellery	Introduction to Inspection of jewellery	15			
	Checks for Finished Jewellery	25			
	Jewellery Inspection Checklist	35			
	Documentation	25			
	Total Marks		100		
OJT	On the Job Training in the relevant sector		75		25
	Total Marks			100	
Employability skills	Essential Skills for Success	20			5
	Quality Management	20			5
	Critical thinking and Problem solving	15			10
	Getting ready for Entrepreneurship	20			5
	Total Marks		100		
Semester – 6					
Production Management	Types of Manufacturing Industry	10			
	Layout of Plant	10			

	Production Planning and Control	45			
	Material, Purchase, Store and Inventory	35			
	Total Marks	100			
Introduction to IoT and Industry 4.0	Introduction to Industry 4.0	05			
	Building Blocks of Industry 4.0	10			
	Industrial Internet of Things (IIOT)	10			
	Future Trends in Industry 4.0 and IIOT	25			
	Case Study in IIOT	25			
	IIOT Application at Industry	25			
	Total Marks	100			
Project / Case Study	Project / Case Study A group of (3 to 4) students shall do Project / Case Study in their work area under the guidance of faculty and an executive from the work area. The Project / Case Study to bring out the application of learning's across semesters.				
	Project / Case Study Execution - Steps for Project / Case Study Execution Scope Data collection Analysis of data Cause identification Development of solutions Evaluation of solutions & selection of best solution Implementation of solution Evaluation of results Standardization & Documentation of solution		25		5

	Project / Case Study Report – Project / Case Study Report structured as under Selection of the Project / Case Study Data collection & Analysis Development of solution, trials and implementation Standardization Benefits of the Project / Case Study Presentation		25		15
	Project / Case Study Evaluation – Project / Case Study Evaluated on the following Results achieved Application of learning and knowledge acquired Quality of presentation - Data, visuals		25		5
	Total Marks	100			
ELECTIVE 22 – 22.1 Automobile Engineering - IV	Tipper Trucks - Types, Parts and Functions	15			
	Tractor and Trailer - Types, Parts and Functions	15			
	Vehicle Electronics	20			
	Automotive Heating and Air conditioning	15			
	Servicing of Vehicles	20			
	On-Board Diagnostics and Tools	15			
	Total Marks	100			
ELECTIVE 22 – 22.2/23.3 Additive Manufacturing	Introduction to AM Technologies	20			
	AM Technologies and Materials	20			
	CAD for AM	20			
	Post Processing	20			
	Applications of AM	20			
	Total Marks	100			

ELECTIVE 23 – 23.1 Foundry Technology - II	Moulding Sand - Types, Selection criteria	05			
	Binder - Types, Selection criteria	05			
	Moisture - Effects of moisture, Optimum level	05			
	Additives - Types, Selections	05			
	Types of Silica Moulding Sand - Types, Application	05			
	Properties of Moulding sand	10			
	Sand Testing	05			
	Heat Treatment of Cast Iron	20			
	Study of Automatic Moulding Machine	20			
	Study of Core Shooting Machine	20			
	Total Marks	100			
ELECTIVE 23 – 23.1 Plastic Material Processing	Introduction to Plastics - Types, Specification, Application	10			
	Injection Moulds - Types, Elements and Function	25			
	Injection Moulding Machine - Part, Functions, Operation	20			
	Injection Moulding - Defects and Remedies	15			
	Compression and Transfer Moulding - Mould construction	15			
	Blow Moulding, Features of Mould, Operation	15			
	Total Marks	100			
ELECTIVE 23 – 23.1 Fabrication of Pressure Vessels	Pressure Vessels - Types, Applications	10			
	Materials used in manufacturing pressure vessels	05			
	Tube and Pipes used in manufacturing pressure vessels	10			
	Fabrication of pressure vessels	20			

	Polishing Stainless Steel Sheets	10			
	Attachments and Accessories of pressure vessels	10			
	Agitators / Stirrers	10			
	Inspection and Testing	10			
	Material Handling	10			
	Packing and Dispatching	5			
	Total Marks	100			
ELECTIVE 23 – 23.2 Estimation and Costing	Importance of estimation	10			
	Importance of costing	10			
	Determination of Selling price of a Machined component	20			
	Determination of Basic machine hour rate	20			
	Cost of component - Pressed and moulded	25			
	Types of taxes	15			
	Total Marks	100			
ELECTIVE 24 – 24.1 Jewellery CAD	CAD Software - Familiarisation of commands	10			
	Introduction to CAD Software – Jewellery	10			
	Jewellery Design Software - Interface Elements	10			
	Modelling Modes	15			
	Creating Drawings	15			
	Modifying Drawings	15			
	3D Modelling	15			
	Jewellery Selection and Setting on CAD	10			

	Total Marks	100			
ELECTIVE 24 – 24.2 Jewellery Retailing	Overview of Jewellery Industry	05			
	Jewellery Stock Management	10			
	Jewellery Retailing	10			
	Hallmarking	10			
	Concept of GST	10			
	Basics of Accounting practices	15			
	Preparation of Financial Statements	15			
	Customer Relationship Management	15			
	Product Safety	10			
	Recall / Revision from Previous Semester				
	Total Marks	100			
OJT	On the Job Training in the relevant sector		75		25
	Total Marks	100			
Employability skills	Labour Welfare and Legislation	20			5
	Customer Interaction / Service	15			10
	Conflict resolution and Negotiation	20			5
	Job readiness and Exam Preparation	20			5
	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:

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

$$\Sigma (\text{No. of Credits for the Program})$$

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

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.nttftrg.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.nttftrg.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.nttftrg.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 - 5		Module Name: Safety, Health and Environment	Module Code: CP33501T
Sl. No.	Module Details		Theory Hours 20
1	Safety		5h
2	Health		5h
3	Environment		5h
4	Introduction to ISO 14001 and ISO 45001		5h
	Total Hour		20h

Semester - 5		Module Name: Industrial Management	Module Code: CP33502T
Sl. No.	Module Details		Theory Hours 45
1	Selection of Plant Location / Site		5h
2	Plant Layout		5h
3	Production Methods		5h
4	Types of Organization		5h
5	Leadership		8h
6	Motivation		8h
7	Communication		9h
	Total Hour		45h

Semester - 5		Module Name: Automation - II	Module Code: CP33503T
Sl. No.	Module Details		Theory Hours 40
1	PLC Basics		5h
2	Basic Function		4h
3	Specification of commonly used PLC and Applications		4h
4	Introduction to Robots		4h
5	Anatomy of Robots		4h
6	Applications of Robots		5h
7	Microcontroller		5h
8	Transducers		5h
9	Limit Switches		4h
	Total Hour		40h

Semester - 5		Module Name: Automation Lab - II	Module Code: CP33504P
Sl. No.	Module Details		Practical Hours 60
PLC LAB			
1	Familiarization of PLC System		24h
2	Familiarisation of Basics Function		
3	Basic Logic Function		
4	Basics of Timer and Counter		
5	Application of PLC using Timer and Counter		
	Total Hour		24 h
Robotics Lab			
1	Pick and Place		36h
2	Sorting		
3	Welding		
4	Painting		
	Total Hour		36 h

Semester - 5		Module Name: Jigs and Fixtures	Module Code: CP33505T
Sl. No.	Module Details		Theory Hours 30
1	Jigs and Fixtures		6h
2	Types of jigs and fixtures		8h
3	Machine relation		4h
4	Elements of jig and fixture		6h
5	Design steps to be followed		4h
6	Effect of heat treatment on jig and fixture elements		2h
	Total Hour		30h

Semester - 5		Module Name: ELECTIVE 19 – 19.1 Automobile Engineering - III	Module Code: CP33506T
Sl. No.	Module Details		Theory Hours 45
1	Frames and Suspension		12h
2	Brake System		8h
3	Electrical System		15h

4	Wheels and Tyres	10h
	Total Hour	45h

Semester - 5		Module Name: ELECTIVE 20 – 20.1 Sheet Metal Processing Technology
		Module Code: CP33507T
Sl. No.	Module Details	Theory Hours 45
1	Sheet metal Processing - Press tools	6h
2	Shearing Theory	3h
3	Cutting Clearance/ Angular Clearance	3h
4	Cutting Force	2h
5	Blanking and Piercing	3h
6	Compound Tool and Progressive Tool	3h
7	Strip Layout	2h
8	Bending	3h
9	Deep Drawing	3h
10	Coining and Embossing	2h
11	Parting and Cut off	1h
12	Identification of Defects in Sheet Metal Components and Remedial Measures	3h
12	Main Parts of Power Press	2h
13	Working Principle, Specification and Application of the types of Presses	3h
14	Tool Handling	2h
15	Strip feeding	2h
16	Documentation in Press Shop	2h
	Total Hour	45h

Semester - 5		Module Name: ELECTIVE 20 – 20.1 Metal Injection Moulding	Module Code: CP33508T
Sl. No.	Module Details	Theory Hours 45	
1	Introduction to Powder Metallurgy	8h	
2	Raw Materials used in MIM	4h	
3	Study of MIM Moulds	8h	
4	Metal Injection Moulding	10h	
5	Mechanical properties of MIM Components	4h	

6	MIM Components - Types, Application, Advantages	4h
7	Metal Injection Moulding - Defects and Remedies	4h
8	Inspection Procedure for Metal Injection Moulded Components	3h
Total Hour		45h

Semester - 5 Module Name: ELECTIVE 20 – 20.1 Machine Tool Maintenance and Performance Testing Module Code: CP33509T		
Sl. No.	Module Details	Theory Hours 45
1	Introduction to Maintenance	3h
2	Maintenance of Mechanical Components of CNC Machine Tool	6h
3	Maintenance Tools and Accessories for Performing Maintenance	6h
4	Maintenance of Electrical / Electronic Components of CNC Machine Tool	4h
5	Maintenance of Hydraulic Components of CNC Machine Tool	4h
6	Machine Performance Deviations	10h
7	Performance Testing	12h
Total Hour		45h

Semester - 5 Module Name: ELECTIVE 21 – 21.1 Quality Check - Jewellery Module Code: CP33510T		
Sl. No.	Module Details	Theory Hours 45
1	Introduction to Inspection	10h
2	Checks for Finished Jewellery	15h
3	Jewellery Inspection Checklist	12h
4	Documentation	8h
Total Hour		45h

Semester - 5		Module Name: OJT	Module Code: CP33511P
Sl. No.	Module Details		Practice Hours 360
1	On the Job Training in the relevant sector		360h
	Total Hours		360 h

Semester - 5		Module Name: Employability Skills	Module Code: CP33512T
Sl. No.	Module Details		Theory Hours 30
1	Essential Skills for Success		6h
2	Quality Management		9h
3	Critical thinking and Problem solving		8h
4	Getting ready for Entrepreneurship		7h
	Total Hours		30h

Semester - 6		Module Name: Production Management	Module Code: CP33601T
Sl. No.	Module Details		Theory Hours 45
1	Types of Manufacturing Industry		6h
2	Layout		10h
3	Production Planning and Control		16h
4	Material, Purchase, Store and Inventory		13h
	Total Hour		45 h

Semester - 6 Module Name: Introduction to IoT and Industry 4.0 Module Code: CP33602T		
Sl. No.	Module Details	Theory Hours 45
1	Introduction to Industry 4.0	4h
2	Building Blocks of Industry 4.0	10h
3	Industrial Internet of Things (IIOT)	10h
4	Future Trends in Industry 4.0 and IIOT	6h
5	Case Study in IIOT	7h
6	IIOT Application at Industry	8h
	Total Hour	45 h

Semester - 6 Module Name: Project Work / Case Study Module Code: CP33603P		
Sl. No.	Module Details	Practical Hours 60
1	Project Work A group of two students shall do Project work (QC project) in their work area under the guidance of faculty and an executive from the work area. The project to bring out the application of learning's across semesters.	60 h
2	Project Execution - Steps for Project Execution Scope Data collection Analysis of data Cause identification Development of solutions Evaluation of solutions and selection of best solution Implementation of solution Evaluation of results Standardization and Documentation of solution	
3	Project Report - Project Report structured as under Selection of the Project Data collection and Analysis	

	Development of solution, Trials and Implementation Standardization Benefits of the Project /Case Study Presentation	
4	Project Evaluation – Project Evaluated on the following Results achieved Application of learning and knowledge acquired Quality of presentation - Data, visuals	

Semester - 6		Module Name: ELECTIVE 22 – 22.1 Automobile Engineering - IV	Module Code: CP33604T
Sl. No.	Module Details	Theory Hours 60	
1	Tipper Trucks	12h	
2	Tractor and Trailer	10h	
3	Vehicle Electronics	16h	
4	Automotive Heating and Air conditioning	10h	
5	Servicing	6h	
6	On-Board Diagnostics and Tools	6h	
	Total Hour	60h	

Semester - 6			Module Name: ELECTIVE 22 – 22.2/23.3 Additive Manufacturing	Module Code: CP33605T/CP610T
Sl. No.	Module Details	Theory Hours 30		
1	Introduction to AM Technologies	4h		
2	AM Technologies and Materials	10h		
3	CAD for AM	6h		

4	Post Processing	6h
5	Applications of AM	4h
	Total Hour	30h

Semester - 6		Module Name: ELECTIVE 23 – 23.1 Foundry Technology - II	Module Code: CP33606T
Sl. No.	Module Details	Theory Hours 45	
1	Moulding Sand	4h	
2	Binder	4h	
3	Moisture	2h	
4	Additives	4h	
5	Types of Silica Moulding Sand	6h	
6	Properties of Moulding sand	6h	
7	Sand Testing	6h	
8	Heat Treatment of Cast Iron	5h	
9	Study of Automatic Moulding Machine	4h	
10	Study of Core Shooting Machine	4h	
	Total Hour	45 h	

Semester - 6		Module Name: ELECTIVE 23 – 23.1 Plastic Material Processing	Module Code: CP33607T
Sl. No.	Module Details	Theory Hours 45	
1	Introduction to Plastics	6h	
2	Injection Moulds	8h	
3	Injection Moulding Machine	13h	
4	Injection Moulding - Defects and Remedies	6h	

5	Compression and Transfer Moulding	6h
6	Blow Moulding	6h
	Total Hour	45 h

Semester - 6		Module Name: ELECTIVE 23 – 23.1 Fabrication of Pressure Vessels	Module Code: CP33608T
Sl. No.	Module Details	Theory Hours 45	
1	Pressure Vessels	4h	
2	Materials Used	2h	
3	Tube and Pipes	4h	
4	Fabrication	6h	
5	Polishing Stainless Steel Sheets	10h	
6	Attachments and Accessories	6h	
7	Agitators / Stirrers	3h	
8	Inspection and Testing	4h	
9	Material Handling	4h	
10	Packing and Dispatching	2h	
	Total Hour	45 h	

Semester - 6		Module Name: ELECTIVE 23 – 23.2 Estimation and Costing	Module Code: CP33509T
Sl. No.	Module Details	Theory Hours 15	
1	Importance of estimation	2h	
2	Importance of costing	2h	
3	Selling price of a component	3h	
4	Basic machine hour rate	3h	
5	Cost of component	3h	
6	Types of taxes	2h	
	Total Hour	15 h	

Semester - 6		Module Name: ELECTIVE 24 – 24.1 Jewellery CAD	Module Code: CP35611T
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Sl. No.	Module Details	Theory Hours 45
1	CAD Software	10h
2	Introduction to CAD Software – Jewellery	8h
3	Jewellery Design Software - Interface Elements	4h
4	Modelling Modes	4h
5	Creating Drawings	6h
6	Modifying Drawings	4h
7	3D Modelling	4h
8	Jewellery Selection and Setting	5h
	Total Hour	45 h

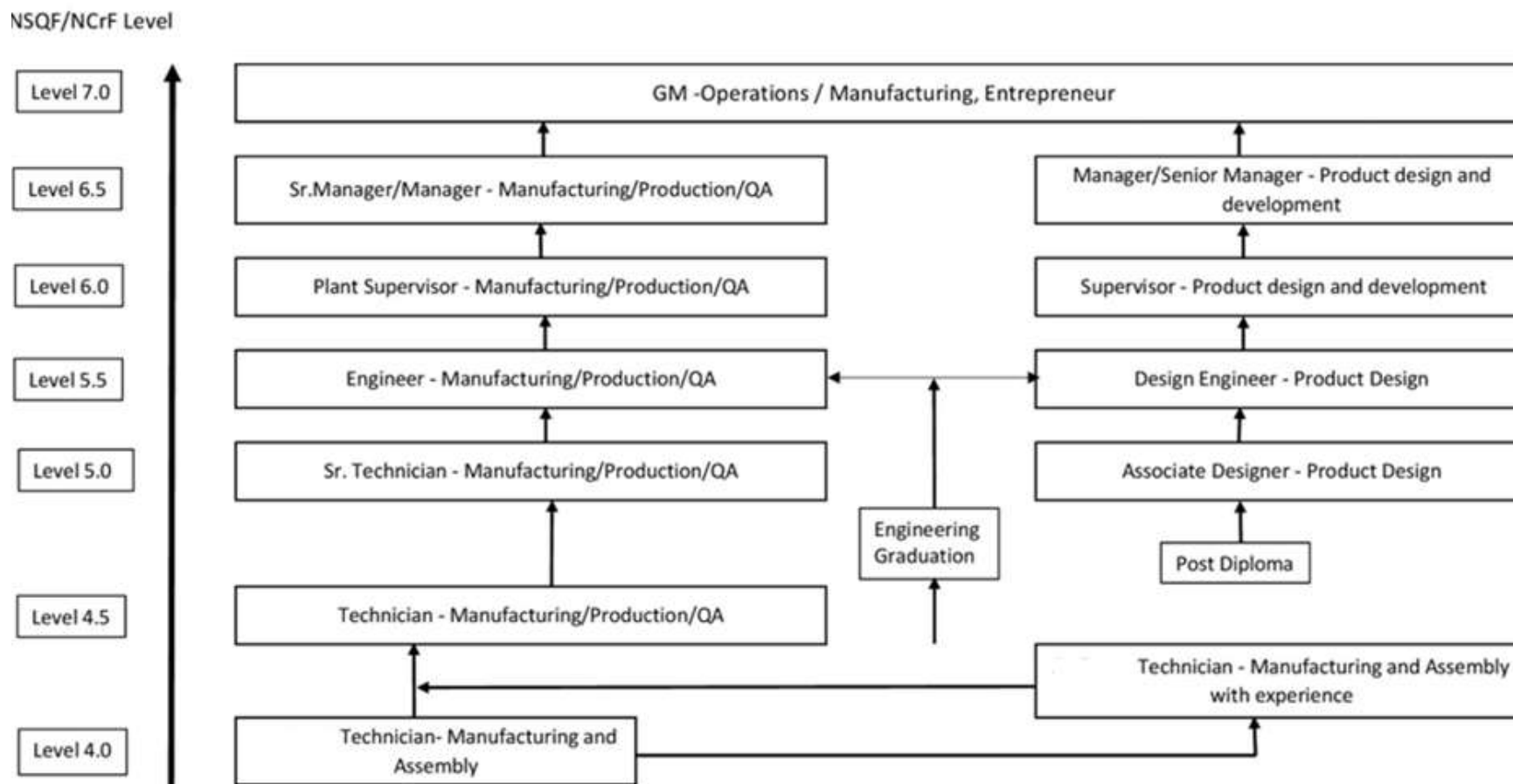
Semester - 6		Module Name: ELECTIVE 24 – 24.2 Jewellery Retailing	Module Code: CP35612T
Sl. No.	Module Details	Theory Hours 45	
1	Overview of Jewellery Industry	4h	
2	Jewellery Stock Management	4h	
3	Jewellery Retailing	4h	
4	Hallmarking	2h	
5	Concept of GST	4h	
6	Basics of Accounting	5h	
7	Financial Statements	6h	
8	Customer Relationship Management	6h	
9	Product Safety	4h	
10	Recall / Revision from Previous Semester	6h	
	Total Hour	45 h	

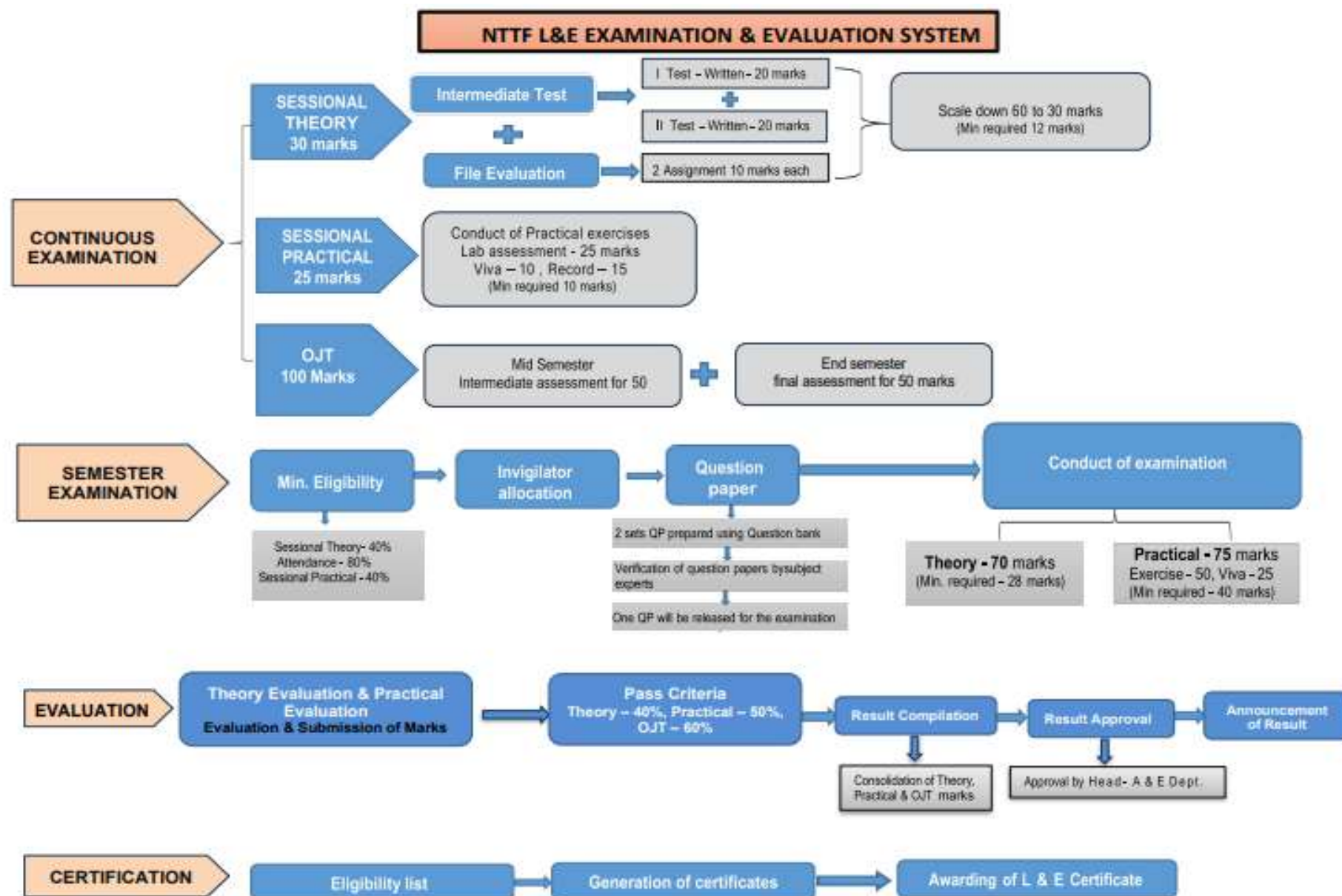
Semester - 6		Module Name: OJT	Module Code: CP33613P
Sl. No.	Module Details	Practice Hours 355	
1	On the Job Training in the relevant sector	355 h	
	Total Hours	355 h	

Semester - 6		Module Name: Employability Skills	Module Code: CP33614T
Sl. No.	Module Details	Theory Hours 30	
1	Labour Welfare and Legislation	8h	

2	Customer Interaction / Service	7h
3	Conflict resolution and Negotiation	8h
4	Job readiness and Exam Preparation	7h
	Total Hours	45 h

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 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

Annexure 12: Key Learning Outcome

SL. NO.	SUBJECT NAME	KNOWLEDGE AND UNDERSTANDING	TECHNICAL & PROFESSIONAL SKILLS	APPLICATION OF KNOWLEDGE AND SKILLS
THIRD YEAR				
53	Safety, Health and Environment (CP33501T)	Follow Personal, Shop floor, Electrical and Fire Safety Explain Air Pollution and Controlling Methods Explain Water Pollution and Controlling Methods Explain Noise Pollution and Controlling Methods Explain Energy Saving Methods Explain methods of disposal of wastes Explain contribution of wind and solar energy to environment	Understand safety regulations and standards in the auto sector, including workplace safety regulations, vehicle safety regulations, and environmental regulations. Understand Health Hazards and Controlling Methods Understand the need of recording and investigating Accidents Understand the principles of environmental sustainability and regulations related to waste disposal, emissions, and energy consumption. Understand ISO 14000 and OSHAS 18001	Ability to operate machinery and equipment safely and follow workplace safety regulations and guidelines. Use Appropriate PPE Help in Preventing and Controlling Accidents Familiar with safety regulations and standards. Proficiency in the use of safety equipment and emergency response protocols.
54	Industrial Management (CP33502T)	Describe factors influencing selection of Site. Explain advantages and disadvantages of Process Layout, Product Layout and Fixed Position Layout Explain Mass Production, Batch Production and Job Order Production Describe types of Organisations	Understand the production processes. Awareness of industrial acts.	Leadership and communication skills Qualities of Good Leader. Theories of Motivation,

55	Automation – II (CP35503T) Automation Lab – II (CP35504P) Ability to develop simple programs using Microcontroller, PLC and Program Robot to control the peripherals.	Understanding on Basic PLC, its configuration and components. Knowledge on Input/ Output ports, relationship with basic GATES, Knowledge and understanding on Basic Functions (Registers, Timers, Counters) Understanding types of Robots, knowledge on Robot Anatomy, Degree of Freedom, Understanding Robot motion analysis, Robot communication Methods. Knowledge on Robot programming, Application and Maintenance. Understanding Architecture and programming of 8051 Microcontroller. Understanding Architecture, features, of PIC 16F877A Microcontroller. Understand the various transducers, specifications and applications Explain the types of limit switches, specifications and applications	Creating ladder diagram using different functions (Basic functions, Intermediate functions, Data handling functions etc). Recognition of Robot components Safety precautions for Operator, Programmer, Maintenance etc. Jogging a robot, working limits of a Robot, Changing Speed, Homing a Robot. Control Instructions. Reading and interpreting the data sheet of different Microcontrollers. Simple Programming on Microcontrollers using various programming software. Creating Macros, Mastering, Backup and restore. Execution of Programs on CNC milling and Lathe Machines.	Creation, Testing, simulation of different Ladder diagrams, Function diagrams using Gates, Timers, counters in a PLC system. Programming a Robot, Modifying Program. Creating a Pick & Place Robot. Programming different Microcontroller - interfacing different Input/ Output devices to perform the desired tasks.
56	Jigs and Fixtures (CP33505T)	Explain the function Jigs and Fixtures Differentiate between Jigs and Fixture Describe Advantages of Jigs and Fixtures	To learn the difference between jig and fixture. To learn concepts of location and clamping and different elements used for locating and clamping the work piece in a jig, fixture.	Ability to understand various types of jigs & fixtures and their parts and functions.

		Describe the freedom of movement of object Explain locating methods and locators Provide fool proofing in Jigs and Fixtures Describe different types of clamps and stoppers Explain types and application of different types of Jigs and Fixtures Explain the Jigs and Machine Relation Explain the Fixture and Machine Relation Describe different of Clamps Explain different types of locating elements Explain different of drill bushes Explain different types of setting elements	Familiarize with different types of jig and fixtures	
57	Automobile Engineering – III (CP33506T) Elective Automobile Engineering – IV (CP33604T) Elective	Describe types of Frames and Suspension Explain Brake System Describe Electrical System Explain Wheels and Tyres Explain Types and Systems in Tipper Trucks	Understand the different types of frames and suspension systems used in automobiles, their functions, and their applications. Understand the basic principles of electrical systems. Understanding of the different types of wheels and Tyres used in automobiles.	Knowledge of the different types of brake systems used in automobiles, such as hydraulic, pneumatic, and mechanical brakes, and their applications. Knowledge of the various components of an electrical system, such as the battery, alternator, starter motor, wiring harnesses.

		Describe Tractor and Trailer Explain Vehicle Electronics Understand Electronic Engine Control System Understand working of Scan Tools for Diagnostics Describe Heating and Air Conditioning Knowledge on Procedures for Servicing Automobiles Knowledge on On-Board Diagnostic Tools Explain Parts and Functions of Electric Vehicle Explain Power and Drive System of Electric Vehicle Machine Automobile Components	Understand the principles of wheel balancing. Familiarity with different types of tipper trucks, tractors, and trailers, including their specific applications and features. Understand the principles of electronic systems, including circuits, sensors, Ability to perform routine maintenance tasks on vehicles, such as oil changes, tire rotations, and brake inspections. Assemble Auto Components Assemble and Integrate Automobile Systems Assemble Automobiles	Knowledge of the various tools and equipment used in wheel balancing. Knowledge of the various components of automotive heating and air conditioning systems, such as compressors, condensers, evaporators, Knowledge of relevant regulations and standards related to the maintenance and repair of vehicles.
58	Sheet Metal Processing Technology (CP33507T) - Elective	Explain different types of Press Tool Operations Explain Shearing Theory Explain Cutting Clearance and Angular Clearance Describe Effect of Clearance on Component / Tool	Familiarize with theory of shearing. Ability to determine cutting force and cutting clearance. Familiarization of different types of Punches and Die blocks. Working Principle, Specification and Application of different types of Power Presses	Knowledge on press tool operations. Knowledge on different elements of press tools, their types and functions in tool. Familiarisation of Documentation used in Press Shop Defects occurring in Sheet Metal

		Describe Relationship between Piece Part Size and Punch and Die Size Determine Cutting Force Differentiate between Blanking and Piercing Explain Parts, Functions and Materials used in Blanking / Piercing Tool Explain Parts, Functions and Materials used in Progressive Tool, and Compound Tool Explain Different Types of Strip Layout Explain Parts, Functions and Materials used in V-Bending / U Bending Tool Explain Parts, Functions and Materials used in Deep Drawing Tool Explain Coining and Embossing Operation Differentiate between Parting and Cutting off Describe Tool Handling Equipments, Strip Feeding Equipments	Parts and Function of Power Press	Components and Remedial Measure to minimise / avoid them
59	Metal Injection Moulding (CP33508T) - Elective	Explain in detail the process of Powder Metallurgy Describe Types and Characteristics of Metal Powders, Binders, Mixing Method and Feed Stock in MIM	Types, Applications and Advantages of Metal Injection Moulded Components	Defects occurring in Metal Injection Moulded Components and Remedial Measure to minimise / avoid them

		Describe Parts and Function of MIM Moulds Describe in detail the process of MIM Explain Mechanical Properties of MIM Components Explain Inspection Procedure for Metal Injection Moulded Components		
60	Machine Tool Maintenance and Performance Testing (CP33509T) - Elective	Explain Types of Maintenance Describe Tools and Accessories used for performing Maintenance Describe Maintenance Activities of Electrical/ Electronic components of CNC Machines Explain Maintenance Activities of Hydraulic components of CNC Machines	Maintenance Procedure for CNC Turning Centre, VMC Perform Geometric Test, Alignment Test and Rigidity Test of Machine Tools	Knowledge of Causes and Remedies for Machine Performance Deviations.
61	Quality Check – Jewellery (CP33510T) - Elective Understanding the importance of Quality check	State Roles and Responsibilities of Quality Inspector of Jewellery State Factors to be verified on receiving Jewellery Name Accessories required for Inspection of Jewellery Understand Basic Checks to be done on Finished Chains, Rings, Earrings, Pendants, Necklace, Bracelets and Bangles Explain the various details to be verified	Perform the roles and responsibilities of Quality inspector Interpret the check list for finished jewellery-Chain, Rings, Earrings, Necklace, Bracelet and Bangles	Follow the inspection procedures Observe and record the defects

		while QC passing of a Jewellery		
		Explain the documents to be maintained in Jewellery QC Department		
62	Additive Manufacturing (CP33605T) Elective Additive Manufacturing (CP33610T) Elective	Understand Difference, Advantages and Applications of Additive Manufacturing over Conventional Manufacturing Specify the Materials and relevant Properties used for Additive Manufacturing Technologies - Material Extrusion and Material Jetting Convert CAD File for AM Describe the process of Material Extrusion - FDM and Material Jetting - Polyjet Describe the Post Processing Tools and Procedure	Additive manufacturing Technology, and the materials used and their Properties.	Design the concept for Additive Manufacturing. Converting 3D model to - .stl format.
63	Foundry Technology – II (CP33606T) - Elective	Explain the Properties and Application of Moulding Sand Describe the effect of moisture on casting process Describe Types and Properties of Silica Moulding Sand Explain Methods of Testing Sand	Types, Properties and Application of Binders and Additives used Heat treatment Processes for Cast Iron	Parts, Functions and Working of Automatic Moulding Machine and Core Shooting Machine
64	Plastic Material Processing (CP33607T) - Elective	Explain Types, Properties and Application of Thermoplastics and Thermoset plastic Explain Construction details of Single Cavity Injection Mould, Multi Cavity	Perform Mould Mounting Procedure	Set Machine Parameters Identify Defects in Moulded Components and Suggest Remedial Measures to minimise / prevent defects

		Injection Mould Explain Types of Injection Moulding Machines Explain Parts and Functions of Injection Moulding Machine Explain Pneumatic, Hydraulic, Electrical and Electronic Control Systems of an Injection Moulding Machine Explain Compression and Transfer Moulding Explain Blow Moulding		
65	Fabrication of Pressure Vessels (CP33608T) - Elective	Explain Application of Pressure Vessels in Industries Explain Procedure for Manufacturing Pressure Vessels Describe Different Types of Pressure Vessels for Pharmaceutical and related Industries Describe the fixing procedure of Tubes, Pipes and Glands in Pressure Vessels Explain Welding procedure for pressure vessels and support elements Explain Measuring and Monitoring System attached with the Pressure Vessels Explain Motors and their Speed Control	Specify grades of Stainless Steel used in the manufacture of Pressure Vessel Specify properties of Tubes and Pipes used in the manufacture of Pressure Vessel Different methods of polishing metal sheets – Pre-Treatment, Polishing Process and Post Treatment	Knowledge on Packing and Dispatching Procedure for Pressure Vessels Inspection and Testing of Pressure vessels Material Handling equipment used in Pressure Vessel Manufacturing Plant

		Methods used for Stirrers and Agitators		
66	Estimation and Costing (CP33609T) Elective	Describe Importance of Estimation Describe Importance of Costing Determine selling price of component Determine basic machine hour rate Estimate the cost of a component Explain Types of Taxes	Skill to ensure that the project budget is realistic and that there are no unexpected cost overruns.	Can accurately estimate project costs, optimize resource utilization, and ensure that projects are completed within the allocated budget and to the required quality standards.
67	Jewellery CAD (CP33611T) Elective Ability to create drawings through Jewellery Design Software	Explain Solid Modelling of Drawings Describe Basic Features of Jewellery Design Software Explain Plug-ins for Jewellery Design Software Explain Interface Elements of Jewellery Design Software Describe Modelling Modes of Jewellery Design Software Explain Component Selection and Setting Procedure using Jewellery Design Software	Able to create sketch, dimensioning of drawings of project Create Drawings by basic commands using Jewellery Design Software Create 3D Shapes using Jewellery Design Software Able to Export various Models	Modify Solid Objects using Jewellery Design Software Modify Drawings by basic commands using Jewellery Design Software
68	Jewellery Retailing (CP33612T) Elective Understanding the Gold supply chain	Explain Gold Supply Chain in India Understand Price Components of Jewellery Understand Stock Management Explain BIS Hallmarking	Calculate Price of Jewellery Prepare Financial Statements Prepare Tax Invoices Interpret different types of Retailing methods in Jewellery Business	Aware of the rate of GST for Jewellery Products Aware of Exemptions of GST Follow various methods of recording Business Transactions

		Explain Terminologies used in Taxation Explain the process of Tax Payment Explain the process of E-filing of Tax Documents Explain Types of Accounts Understand factors to be considered for establishing / maintaining Customer Relationship Management Explain Steps and Methods regarding Product Safety	Interpret Types and Applicability of GST	
69	OJT (CP33511P) OJT (CP33613P)			On the Job Training in the relevant sector
70	Employability Skills (CP33512T) Employability Skills (CP33614T) Understand Labour Welfare and Legislation. Understand the concept of Quality Management Getting ready for Employment/ Entrepreneurship. Learn to interact with customers/ provide service.	Knowledge on benefits guaranteed under various Acts, legislations, Factories act, Apprenticeship Act, ESI, EPF Acts, Payment of wages act, women's compensation Act, POSH, and other industrial laws. Understanding of Quality concepts, QMS, PDCA QC Tools, 5S, Kaizen. ISO Process. Distinguishing between Job and Career, Awareness of different job roles in the related sector. Understanding the pathway and progression. Creating resume and apply for Jobs.	Explain various Acts enacted for labour welfare by various Governments. Attend mock interviews, create Resume documents. Body language, relationship building, probing techniques.	Use of various QC tools and Kaizen for problem solving and Quality improvement themes. Customer handling from greeting, grievance handling.

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