



QUALIFICATION FILE

Assistant Technician Electrical and Electronics

- ☐ Short Term Training (STT) ☒ Long Term Training (LTT) ☐ Apprenticeship
☐ Upskilling ☐ Dual/Flexi Qualification ☐ For ToT ☐ For ToA
☒ General ☐ Multi-skill (MS) ☐ Cross Sectoral (CS) ☐ Future Skills ☐ OEM

NCrF/NSQF Level: 3.5

Submitted By:

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

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Section 1: Basic Details

1.	Qualification Name	Assistant Technician Electrical and Electronics								
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: Assistant Technician - Electrical and Electronics						
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-3.5-CG-01032-2023-V1-NTTF	6. NCrF/NSQF Level: 3.5							
7.	Award (Certificate/Diploma/Advance Diploma/ Any Other <i>(Wherever applicable specify multiple entry/exits also & provide details in annexure)</i>	Certificate								
8.	Brief Description of the Qualification	Technician Electrical and Electronics integrates Mechanical, Electrical and Electronics. The candidates will able to perform Assembling and Soldering of Electronic Components, read the drawings and simulate Electronics Circuits. Candidates with Technician skills are highly required for the Recent Technological developments in Industries. The subjects covered in this program are –, Electronics, CAD - Fusion 360, Simulation of Electronic Circuits, Metrology, Manufacturing Engineering, Mechanical Design, Circuits and Systems, Applied Science, Computer and Employability Skills.								
9.	Eligibility Criteria for Entry for Student/Trainee/Learner/Employee	a. Entry Qualification & Relevant Experience: <table border="1"> <thead> <tr> <th>S. No.</th> <th>Academic/Skill Qualification (With Specialization - if applicable)</th> <th>Required Experience (With Specialization - if applicable)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Minimum 10th Pass</td> <td>NA</td> </tr> </tbody> </table>			S. No.	Academic/Skill Qualification (With Specialization - if applicable)	Required Experience (With Specialization - if applicable)	1	Minimum 10 th Pass	NA
S. No.	Academic/Skill Qualification (With Specialization - if applicable)	Required Experience (With Specialization - if applicable)								
1	Minimum 10 th Pass	NA								
10.	Credits Assigned to this Qualification, Subject to Assessment <i>(as per National Credit Framework (NCrF))</i>	Total Credits: 40		11. Common Cost Norm Category (I/II/III) <i>(Wherever applicable):</i> 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 Mandatory (Hours)</th> <th>OJT Recommended (Hours)</th> <th>Total (Hours)</th> </tr> </thead> <tbody> <tr> <td>Classroom (offline)</td> <td>480</td> <td>510</td> <td>90</td> <td></td> <td>1080</td> </tr> <tr> <td>Online</td> <td>60</td> <td>60</td> <td></td> <td></td> <td>120</td> </tr> </tbody> </table> <i>(Refer Blended Learning Annexure for details)</i>						Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)	Classroom (offline)	480	510	90		1080	Online	60	60			120
Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)																				
Classroom (offline)	480	510	90		1080																				
Online	60	60			120																				
14.	Aligned to NCO/ISCO Code/s (<i>if no code is available mention the same</i>)	NCO Code – 2015.3114.0100																							
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 Technician Electrical and Electronics After Completion of 3 years of Full Time Programme and after 5 years of Industry Experience the Job Holder can work as R&D Engineer, Service Engineer, Maintenance Engineer, Automation Engineer and Robotic Engineer. Academic Progression: Advance Certificate - Industrial Control and Instrumentation Technician, Diploma - in Mechatronics Engineering & Smart Factory, Post Diploma, B. VoC and B.Tech Degree Course in Relevant field.																							
16.	Other Indian languages in which the Qualification & Model Curriculums are being submitted	Hindi																							
17.	Is similar Qualification(s) available on NQR-if yes, justification? for this qualification	☐ Yes ☒ No URLs of similar Qualifications: NA																							
18.	Is the Job Role Amenable to Persons with Disability	☐ Yes ☒ No If “Yes”, specify applicable type of Disability:																							
19.	How Participation of Women will be Encouraged	Yes - Admission open to women candidates (30% seats 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 <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 Tel number: 080 – 28390215 Mobile Number: 9844013448 Email: rg@nttf.co.in Website: nttfrg.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**Modules/ NOS/s of Qualifications:** *(In exceptional cases these could be described as components)***Mandatory Modules/ NOS/s:** Specify the training duration and assessment criteria at NOS/ Module level. For further details refer curriculum document - In Annexure**Th.-Theory Pr.-Practical OJT-On the Job Man.-Mandatory Training Rec.-Recommended Proj. -Project**

Sl. No.	NOS/Module Name	NOS/ Module Code & Version	Core/ Non-Core	NCrF/ NSQF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT- Man.	OJT- Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) (if applicable)
Semester – 1																
1	English – 1	CP15101T	Core	3.5	20	60	-	-	-	60	62.5	-	-	37.5	100	
2	Mathematics – 1	CP15102T	Core	3.5		60	-	-	-	60	100	-	-	-	100	
3	Applied Science	CP15103T	Core	3.5		40	-	-	-	40	100	-	-	-	100	
4	Electronics – 1	CP15104T	Core	3.5		40	-	-	-	40	100	-	-	-	100	
5	Electrical Engineering - 1	CP15105T	Core	3.5		40	-	-	-	40	100	-	-	-	100	
6	Applied Science Lab	CP15106P	Core	3.5		-	40	-	-	40	-	80	-	20	100	
7	Electronics - 1 LAB	CP15107P	Core	3.5		-	60	-	-	60	-	80	-	20	100	
8	Electrical Engineering - 1 LAB	CP15108P	Core	3.5		-	60	-	-	60	-	80	-	20	100	
9	Engineering Drawing/ Fusion 360	CP15109P	Core	3.5		-	60	-	-	60	-	80	-	20	100	
10	Workshop Practical	CP15110P	Core	3.5		-	80	-	-	80	-	80	-	20	100	
11	Basics of Computer LAB	CP15111P	Core	3.5		-	30	-	-	30	-	80	-	20	100	
12	Employability Skills	CP15112T	Core	3.5		30				30	75	-	-	25	100	
Duration (in Hours) / Total Marks					20	270	330			600	537.5	480		182.5	1200	
Semester – 2																
13	English – 2	CP15201T	Core	3.5		40	-	-	-	40	62.5	-	-	37.5	100	
14	Mathematics – 2	CP15202T	Core	3.5		40	-	-	-	40	100	-	-	-	100	
15	Manufacturing Engineering	CP15203T	Core	3.5		40	-	-	-	40	100	-	-	-	100	
16	Electronics – 2	CP15204T	Core	3.5		40	-	-	-	40	100	-	-	-	100	

<Approved in 32nd NSQC Meeting & Dated: 29th Sept 2023>

<Qualification File-LTT>

<NCVET-QG-3.5-CG-01032-2023-V1-NTTF>

17	Electrical Engineering - 2	CP15205T	Core	3.5	20	40	-	-	-	40	100	-	-	-	100	
18	Metrology	CP15206T	Core	3.5		40	-	-	-	40	100	-	-	-	100	
19	Wiring Practice and Simulation	CP15207P	Core	3.5		-	30	-	-	30	-	80	-	20	100	
20	Electronics - 2 LAB	CP15208P	Core	3.5		-	60	-	-	60	-	80	-	20	100	
21	Electrical Engineering - 2 LAB	CP15209P	Core	3.5		-	60	-	-	60	-	80	-	20	100	
22	CAD - Fusion 360	CP15210P	Core	3.5		-	30	-	-	30	-	80	-	20	100	
23	Workshop Practical	CP15211P	Core	3.5		-	60	-	-	60	-	80	-	20	100	
24	Employability Skills	CP15212T	Core	3.5		30	-	-	-	30	75	-	-	25	100	
25	OJT	CP15213P	Core	3.5		-	-	90	-	90	-	75	-	25	100	
Duration (in Hours) / Total Marks					20	270	240	90	-	600	637.5	475	-	187.5	1300	
Total for 1-Year Programme					40	540	570	90	-	1200	1225	955	-	370	2500	

Elective Modules/ NOS/s: NA

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

Optional Modules/ NOS/s: NA

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

Assessment - Minimum Qualifying Percentage

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

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

To pass the Qualification, the trainee should score minimum of 40% in each Theory, 50% in Practical and 60% in Project work / Internship and Viva-voce.

Assistant Technician - Electrical and Electronics

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 as 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 as trainer or industry experience
3.	Tools and Equipment Required for Training	☒ Yes ☐ No <i>(If "Yes", details to be provided in Annexure)</i>
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>	Blended theory (online and offline in the center) and practical
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 Resource requirement for skill encompassed in Mechatronics Engineering for the Manufacturing, Capital Goods and Automotive Industries. a. MSDE Annual Report 2021- 22 predict very high growth on Auto sector, Food processing, Electronics and IT Hardware, Pharmaceuticals, Health care, Communication in India. b. MSDE/ NSDC Human Resources and Skill Requirements in the Auto and Auto Components Sector report (2013- 2017 2017 – 2022) The Report Forecast a Higher growth in Automotive Manufacturing, Automotive Components Manufacture Sector c. Annual reports 2021 – 22 of Ministry of Heavy Industries Government of India The above Studies has found Higher growth in Manufacturing, Capital Goods and Automotive Industries which will require Qualified Technicians in Mechatronics Engineering and Smart Factory.
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, Pharma and Health care sector. 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. National Policy for skill Development and Entrepreneurship 2015 by MSDE has predicted skilled manpower requirement across key sectors by 2022. c. The Study has found Mechatronics Engineer, Embedded System Developers, 3D Printing Technician has new job roles emerging in Engineering and Manufacturing sectors.
4.	Number of Industry validation provided: 74
5.	Estimated nos. of persons to be trained and employed: 1400/ year
6.	Evidence of Concurrence/Consultation with Line Ministry/State Departments: If “No”, why: (Letter to be sent to the concerned ministry and copy attached) – 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.	Annexure - 13: Multiple Entry-Exit Details (Mandatory, in case qualification has multiple Entry-Exit)	No
9.	Annexure: Acronym and Glossary (Optional)	No
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	Explain Electrical safety. Practice Basic Engineering Mathematics. Explain of operating procedures of different Electronics and Electrical measuring tools and equipments. Describe functioning of basic Electronics components. Explain Circuit protection devices. Explain DC sources, Single phase and three phase AC Sources. State and explain laws governing Electrical and Electronics Circuits. Explain the working of different Electrical machines.	Identify the Electrical safety and protective devices. Perform Mathematical calculations related to Electronics & Electrical. Use of right equipments, modes and ranges for measuring Electrical parameters. Identify the Electronic components. Read Data Sheets of Electrical & Electronic components. Application of Laws to analyse Electrical & Electronics circuits. Identify and troubleshoot simple electrical circuits.	3.5
Professional and Technical Skills/ Expertise/ Professional Knowledge	Able to read the circuit diagrams, identify the Electrical and Electronic components and their values. Interpret & draw mechanical drawings using software applications. Interpret & Draw Electrical drawings using software applications. Use Mechanical and Electrical Hand tools. Operate conventional machine tools.	Perform different types of Electrical wirings. Assembling of Electronics components for product manufacturing. Perform simple machining operations.	3.5
Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	Describe good behaviour & work ethics. Explain constitutional values.	Demonstrate responsible behaviour, good work culture, valued citizens of the country.	3.5

	Read, write and comprehend English Language. Communicate and expressive.	Perform day to day activities effectively, report day to day happenings from time to time and write official / personal communication to the superiors.	
Broad Learning Outcomes/Core Skill	Describe Electrical and Electronics components and equipments. List out the measuring tools, explain the operating procedure, Specify the safety and best practices followed in the work area. Explain the assembling, mounting, soldering techniques in an assembly line. Describe the functioning of basic mechanical tools, equipments and measuring devices. Interpret Mechanical and Electrical drawings. Specify the types and gauges of wires. List and explain different protective devices, wiring practices.	Application of skills in the Electrical/ Electronic assembly for manufacturing. Basic troubleshooting of simple electrical & Electronics circuits and domestic wiring appliances.	3.5
Responsibility	Aware of Personal/Industrial goals Adapt to changes in the work area.	Work with caution and with due diligence to safety. Advocate safety to peers. Can work with minimum supervision.	3.5

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

Electronics Lab			
Sl. No.	Equipment	Specification	Quantity
1	Digital Oscilloscope	No of Channels - 2, Bandwidth: DC - 50 MHz	10
2	Variable Regulated Power supply	0-30V/1A	10
3	Fixed Power Supply with variable tapping	15-0-15 V/1A	10
4	Soldering Station - Temperature Controllable	Power- 60W, Temperature range - 180 to 400° C	1
5	Function Generator	Frequency Range: 0.3 Hz to 3 MHz, Functions: Sine, Square, Triangle, DC Sweep	10
6	LCR - Q Bridge		1
7	Digital Multimeter for instructor use	3 ³ / ₄ digit, counts 4000, Ac range - 400mV to 1000V, DC voltage Range 0 400mV to 1000V, AC Current range - 40mA to 10A, DC Current range - 40mA to 10A	1
8	Tool Kit for Instructor Use	As provided in the list	1
9	Electronics Work Bench	(L x B x H)1200mm x 1180mm x 800mm, saddle mount -1200mm x 520mm x 350mm	4

Electrical Lab			
Sl. No.	Equipment	Specification	Quantity
1	Three Phase Inductor motor	1hp/0.75kW	1
2	Three Phase Inductor motor	Star Delta Type/1kW	1
3	DC Motor and DC Generator Set, Including Speed Controller	0.75kW/220V	1
4	DC Source Variable	0-300V/10A	2

5	Single Phase Transformer	500VA/5A/230V/115V, with Terminal Point	1
6	Three Phase Transformer	440V/1.0kVA/15A with Terminal Box	1
7	Watt meter (LPF & UPF)	(AC/DC) 1250W/300V/5A UPF & LPF	1
8	Autotransformer	1 Phase,0-270 V,2A, with case and Main chord	1
9	Autotransformer	3 Phase/440V/1kVA	1
10	Relays, Switches, Fuse, MCB, ELCB and other protective devices	DC 5V/1A, Push button ON/OFF Switch -5A, with NO/NC elements, HRC 16A with Holders	2 each
11	Energy Meter	Single Phase and 3 phase	01 each
12	Decade Resistance box - 6 Dials	0.1 to 1 M Ω	2
13	Decade Capacitive box - 5 Dials	0.1 to 10 μ f/63V	2
14	Decade inductive box - 5 Dials	0.1m to 10mH/1A	2
15	Rheostat	0-500 Ω /10W	2
16	Portable Drilling machine	10 mm	1
17	PPE		2
18	Line Tester		5
19	Ring Spanner Set		1
20	Straight Cutter		2
21	Round File	200mm Second Cut	1
22	Megger	Digit 0-2000 M Ω 1000 V DC	1
23	Clamp meter	72-AUTO, 400A AC	1
24	Box Type Spanner		2
25	Adjustable Wrench		2
26	Mini Hacksaw	150mm	2
27	PVC Pipe Cutter	25mm	1

28	Crimping tool		2
29	Telescopic Gauge set	Total Range:8-150mm	1
30	Small hole Gauge set	Measuring Range 3 to 5 mm, Gages Per Set 4	1
31	Electrical Work Bench	(L x B x H) 1200mm x 580mm x 840mm	2
32	Electrical Workstation	To be Fabricated	3

Applied Science Lab			
Sl. No.	Equipment	Specification	Quantity
1	Force table	Force Table Circular with diameter 40cm with slotted weights 5x50g - 4 sets with marking.	2
2	Spring balance 5N & 10N	5N	2 each
3	Slotted Weights	Slotted weights 10x100g (9 slotted Weight + 1 Hanger) Total 1000g	2
4	Simple pendulum Set	(Bob Pendulum) with stand	1
5	Balance stand	Wooden Wedge on Pillar	2
6	Stopwatch	Digital	1
7	Spring Constant Apparatus with weights		2
8	Retort Stand	With Boss Head & Clamp	2
9	Flow Cup Viscometer stand	Material SS, MS, Type Viscometer	2
10	Measuring Jar – 500ml	Material: Glass, Thickness: 2-10mm, Capacity: 500ml	2
11	Measuring Jar – 1000ml	Material: Glass, Thickness: 2-10mm, Capacity: 1 Litre	2
12	Digital Balance	500g cap LC 0.01g	1

Mechanical Workshop			
Sl. No.	Equipment	Specification	Quantity
1	Workbench with Lockers - 4 Vices/Bench	1.5m x 0.8m x 0.7m	4
2	Bench Vice	125mm	16
3	Set of files		16 each
4	Steel Rule	150mm & 300mm	16 each
5	Scriber	150mm	5
6	Center Punch	60° & 90°	5
7	Try Square	150mm	5
8	Hacksaw with Blade	300mm	5
9	Hammer	200g	5
10	Hammer	500g	2
11	Caste Iron Surface Plate	1000mm x 630mm with stand	1
12	Angle Plate	225mm x 150mm x 150mm	1
13	V-Blocks	125mm x 90mm x 70mm	1 Pair
14	Vernier Height Gauge	450mm L.C 0.02	1
15	Magnetic V Block	100mm x 70mm x 95mm	1 Pair
16	Vernier caliper	150mm, LC0.02	6
17	Digital Vernier caliper	150mm, LC 0.01	1
18	Micrometer (External)	0-25 0. 01L.C	3
19	Micrometer (External)	25-50 0. 01L.C	1
20	Radius & Fillet Gauge	1mm – 7mm	2
		7.5mm – 15mm	
21	Standard Wire Gauge	S.W.G – Round wire gauge	2
22	Feeler Gauge	0.025mm to 0.63mm	2

23	Screw Pitch Gauge	0.25mm to 6mm	2
24	Double Ended Spanner Set	6 mmx 7mm, 8mm x 9mm, 8mm x 10mm, 9mm x 11mm, 10mm x 11mm, 10mm x 12mm, 12mm x 13mm, 13 mmx 16mm, 14mm x 15mm, 14 mmx 17mm, 16mm x 17mm, 18mm x 19mm, 18mm x 21mm, 19 mmx 22mm, 20mm x 22mm	1set
25	Ring Spanner set	6 mmx 7mm, 8mm x 9mm, 10mm x 11mm, 12mm x 13mm, 14mm x 15mm, 16mm x 17mm, 18mm x 19mm, 20mm x 22mm	1set
26	Socket Spanner Set	SOCKETS SETS - 6.3mm Sockets - 4,4.5,5,5.5,6,7,8,10,11,12,13, 14,1/4, T20, T25, T30, T40 Accessories - A733, A743, A753, A773, A703, A715	1set
27	Allen key set	1.5, 2, 2.5, 3, 4, 5, 6, 8,10	1
28	Nose plier	Long Nose – 170mm	1
29	Circlip Plier – Internal & External	Internal – 19mm – 60mm	2
30		External – 19mm – 60mm	
31	Screwdriver Set	6.0 x 0.8, 3.5 x 0.5	1
32	Torque Wrench	25mm, 25 to 200Nm	1
33	Pipe Wrench	450mm	1
34	Pipe Vice	15-155mm	1
35	Soft Hammer	25mm, 50mm	3each
36	Tap & Tap Wrench	M4-M12, 200mm	1
		M6-M20, 375mm	
37	Die & Die Stock	M4-M6, 200mm	1
		M6-M8, 200mm	
		M8-M12, 315mm	
38	Vernier Bevel Protector	Blade Length – 150mm, LC 5'	1
39	Dial Indicator Lever Type	LC 0.01, 0.8mm	1
40	Dial Indicator Plunger Type	0.01, 0-10mm	1
41	Magnetic Stand	70mmX48mmX64mm	1
42	Parallel Block Set	150mm x 10mm x 6mm	1

		150mm x 20mm x 10mm	
		150mm x 30mm x 15mm	
43	Tool Storage Cabinets		1
44	Miscellaneous tools		
45	Gear Puller		1
46	Tin Cutter	250mm	3
Machine Shop			
Sl. No.	Equipment	Specification	Quantity
1	Centre Lathe with Accessories	Swing over bed, 350mm, Admit between centre 800mm,	1
2	Vertical Milling Machine with Accessories	XYZ Movement – 550x250x350mm	1
3	Surface Grinding Machine with Accessories	XYZ – 1000x250x300mm	1
4	Bench Drilling Machine with Accessories	Maximum Dia. On steel – Ø10m	1
5	Bench Grinder	Wheel Dia: 200mm x thickness 20mm	1
6	Fly Press	No 10	1
7	Power hacksaw	350mm	1
8	Sheet Folding Machine	Bending width 1200mm, bending plate thickness 2mm	1
9	Metal Cupboard for Machines	Lockable – 400mmx 750mmx 750mm with 3 racks	2

List of Accessories for Machines			
Sl. No	Machine	Accessories	Quantity
1	Centre Lathe	1. 3 jaw chuck self-centering chuck - 150mm	1
		2. 4 jaw independent chuck - 200mm	1
		3. Faceplate - 200mm Φ	1
		4. Driving Plate - 100mm Φ	1
		5. Head Stock centre with sleeve to suit machine spindle	1
		5. Tailstock centre to suit tail stock	1
		6. Reduction sleeve MT1-2, MT2-3	1
		7. Keyless drill chuck with 10mm Φ with MT1 adapter	1
		8. 4-way tool post	1

		9. set of cutting tools (Consumables)	1
2	Vertical Milling Machine	1. Swivel vice 130mm width - 1 no	1
		2. T-bolts & nuts for vice - 2 no	1
		3. Stub arbor (to suit machine spindle)	1
		16 Φ (to suit machine spindle)	1
		22 Φ (to suit machine spindle)	1
		27 Φ (to suit machine spindle)	1
		4. Collet holder (to suit machine spindle)	1
		5. Clamping kit (Thread size to suit machine) - 70 pieces	1
		6. ER 25 collets for end mills	1
		Φ 4, Φ 5, Φ 6, Φ 8, Φ 10, Φ 12, Φ 16	1
		7. Holder for drills to suit machine spindle MT2, MT1	1
		8. Reduction Sleeves MT1-2.	1
3	Surface Grinding Machine	1. Magnetic Chuck 450mm x 150mm	1
		2. Diamond dresser 0.75 C with holder	1
		3. Grinding vice 70 jaw width	1
4	Bench Drilling Machine	1. Drill Press vice 150mm jaw width uni grip type	1
		2. Keyless drill chuck Φ 10mm with taper to suit machine	1

Note:

- The Tools and Equipments and other lab facilities are shared between Qualifications and batches.
- During the admission the trainees are supplied with toolkit containing DMM, soldering iron, Breadboard, and other tools for conducting experiments in different labs.
- Trainees are provided with Laptop.

Classroom Aids

The aids required to conduct sessions in the classroom are:

<Approved in 32nd NSQC Meeting & Dated: 29th Sept 2023>

<Qualification File-LTT>

<NCVET-QG-3.5-CG-01032-2023-V1-NTTF>

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

Annexure -3: Industry Validations Summary

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

SL. NO.	Organization Name	Contact Address	LOCATION	Representative Name	Contact Phone No	E-mail ID
1	Pari Robotics	Gat No. 463a, 463b & 464, Village Dhangarwadi	Satara	Sharad Agrawal	+91 2169 246 714	sharadpa@parirobotics.com
2	Mogora Cosmic (P) Ltd	El 31/16 Electronic Zone, Pimpri Industrial Area, MIDC Bhosari	Pune	Aravind	9820907828	aravindn@mogora.com
3	Yanfeng India Automotive Interior Systems Pvt. Ltd.	Plot No. G-1, Chakan MIDC Phase -III, Village: Nighoje	Pune	Subodh Deshmukh	+91 9822721116	subodh.deshmukh@yfai.com
4	Tata Hitachi Construction Machinery Co. Pvt. Ltd. (Thcm)	Jubilee Building, 45 Museum Road	Bangalore	Monikut Sharma	080669 53301	monikut.sharma@tatahitachi.co.in
5	Johnson Controls (India) Private Limited	Johnson Controls (India) Private Limited #507, Delphina Building, 2nd Floor, CmH Road, Indiranagar 1st Stage	Bangalore	Joel D' Silva	+91-80-6773 6784	Joel.1.Dsilva@jci.com
6	Signode India Limited	Rudraram Village, Patancheru Mandal,	Hyderabad	Mrs. Haritha D	+91 8455674821	haritha@signodeindia.com
7	Cotmac Electronics Pvt. Ltd.	No 70/5, Suvarna Tower, 21st Cross, Vijayanagar, Chbs Layout, Near Bda Complex,	Bangalore	Vishal Surve	80-23147172	vishal.surve@cotmac.io
8	Zf Steering Gear (India) Ltd.	No 70/5, Suvarna Tower, 21st Cross, Vijayanagar, Chbs Layout, Near Bda Complex,	Pune	Rahul Tayade	02137 305 100	rahul.tayade@zf india.com
9	Hytek Marketing	503, Mariegold, Neco Gardens Vimannagar	Pune	Clara F. Caldeira	+912040036057	sales1@hytekmarketing.biz
10	Achintyo Engineering Llp	#2331/B, 1st Floor, Rohan Plaza, 17th Cross, 1st Sector, Hsr Layout	Bangalore	Mr Manjunath Kalburgi	+91 (0)80 2258 2821	manjunath.k@achintyo.com
11	Bector Automation Rml India Pvt. Ltd.	Plot No. 24, Gat No 613/1, Kuruli	Pune	Amol Chougule	+91 7506506098	cgu5@bectorrml.com
12	S.P Engineers	Gate No: 73(1), Plot No: 17,	Pune	Santosh Shindhe	9890990234	santosh.shinde@spengine

		Behind Poona Forge Pvt. Ltd, Near Sonawane Wasti, Village- Talawade Gaon				erspune.com
13	Aisin Automotive Karnataka Pvt Ltd	Kiadb Industrial Area, Narasapura.	Kolar	Vijay S	9900087705	vijay.s@aisin-akl.co.in
14	Smp Engineers & Electricals Pvt. Ltd.	A-44, MIDC Malegaon Sinnar	Nasik	Swati Gangurde	7030917846	hr@divineindia.co.in
15	Kspg Automotive India Private Limited	Gat No. 380, Village Takwe Budruk, Tal Maval	Pune	Shrikant Bongale	+91 9552667100	shrikant.bongale@in.kspg.com
16	Beckhoff Automation Pvt. Ltd	No.15, Shraddhanand Bhavan, I Floor, New Market Road, V V Puram	Bangalore	Krishnamurthy Kulkarni	+91 80 40824800	K.Kulkarni@Beckhoff.com
17	Dearadhpro Automation	1879, 3 Main 7 Cross Judicial Layout, Yelhanka, New Town	Bangalore	Murali	+91- 8310646216	murali@designproautomation.in
18	Purshotam Company Private Limited	8 Lyons Range, 1st Floor	Kolkata	Monujesh Borooh	+91.33.2243494 1/22315344/329 50386	consultant@purshotam.com
19	Tm Automotive Seating Systems Private Limited	Survey No. 296,297,303,304,305, Plot No. 173, Kiadb, Belur Industrial Area	Dharwad	Praveen Hegde	+91- 7022868626	Praveen.Hegde@tmseating.com
20	Whirlpool Of India Ltd	Plot # A4, Ranjangaon Midc	Pune	Mahendra D Jadhav	9028031731	mahendra_d_jadhav@whirlpool.com
21	Magna Automotive India Pvt. Ltd	Plot # A 12 Talegaon Midc, Navlakh Umbare, Tal.- Maval	Pune	Suyog Chhatre	9145286093	suyog.chhatre@magna.com
22	KBD Sugars And Distilleries Ltd	No 787, 10th KM, Pune Bangalore Road, Noolvi Cross,	Dharwad	Shanmukhappa Alle	9743883777	hkrkdbhubli@gmail.com
23	Wipro Automation	Bangalore	Bangalore	Girish	8904021754	info@wintech.com
24	Minda Industries Ltd	B-6, M.I.D.C. Chakan, Village- Mahalunge, Tal.-Khed	Pune	Amar thakur	-21356683240	athakur@mindagroup.com
25	Velankani Electronics Pvt Ltd	Velankani Tech Park, 43 Electronic City, Phase -I	Bangalore	Jyothsna Rao	+91 80- 66145852	jyothsnarao@velankanigroup.com
26	Micropack Pvt Ltd	Plot # 16, Jigani Industrial Area, Anekal Taluk,	Bangalore	Lakshmi	7760976713	hr@micropack.in

27	Toyota Industries Engine India	Plot No. 9, Jigani Industrial Area Phase II,	Bangalore	Brijendra Shah	9538997508	brijendra_shah@tiei.toyota-industries.com
28	Kirloskar Toyota Textile Machinery Pvt Ltd	Plot 10/13, Phase II Jigani Industrial Area,	Bangalore	Kiran Kumar Deshpande	7026998585 / 9449991396	kiran.deshpande@kttm.toyota-industries.com
29	Tata Advanced Materials Limited	10, Jigani Industrial Area, Jigani	Bangalore	Mahesh	8747844393	procurement@tamilindia.com
30	Ace Designers	Plot No 7&8 li Phase Peenya Industrial Area	Bangalore	Sunil Ashok Sathe	8892464180	sunilashok_sathe@acedesigners.co.in
31	Araymond Fasteners India Pvt Ltd	Gat No. 259, 276/8B, Nighoje-Chakan, Taluka-Khed,	Pune	Vilas Kasulkar	9730004714	Vilas.Kasulkar@araymond.com
32	Biesse Manufacturing Company Private Limited	Survey No.28/1 & 28/2, Nagarur Village, Huskur Road, Dasanapura	Bangalore	Raghvendra M V	9880800999	raghavendra.mv@biesse.mnfg.com
33	Esautomotion Controls	Plot No: 488b, Kiadb M.S.Complex, Unit No:2b-07, Ground Floor, 2nd Block, 14th Cross, 4th Phase, Peenya Industrials Area	Bangalore	S.M.Chandra	9686654400	esautomotioncontrols@gmail.com
34	Insight Technologies	2nd C Main, 2nd Stage, Peenya Industrial Estat	Bangalore	Ajay V	7975232396	ajay.v@insight-technologies.in
35	Skh Sheet Metals Components Pvt. Ltd	Gat No. 542-545, Village-Dhoksangavi, Behind Bombay Dyeing Factory, ,	Pune	Mani Awasthi	9607034533	maniawasthi@skhsmc.com
36	Ming Xu Stamping Solutions Pvt Ltd.	706, 3rd A Cross Rd, HRBR Layout 1st Block, HRBR Layout, Kalyan Nagar, Bengaluru, Karnataka 560043	Bangalore	Balakrishna Nair	9890015302	bala.nair@mxsspl.com
37	Difacto Robotics & Automation Pvt Ltd	Peenya Industrial Area, Bangalore	Bangalore	Mrs.Bina Nathan	7406022719	bina.nathan@difacto.com
38	Phillips Machine Tools India Pvt. Ltd.	Sub Plot No. 3, Ramtekdi Industrial Estate, Hadapsar,	Pune	Deepika Mahapatra	9193716411	dmahapatra@phillipscorp.com
39	Gestamp	E1 (Part), Midc Industrial Area Phase3, Village Nigoje Mhalunge, Kharabwadi, Taluka Khed,	Pune	Shweta K	9673330972	skarekar@in.gestamp.com

40	Vandhana International Pvt. Ltd.	36, Dakshineshwar Building, 9th Floor, 10, Hailey Road,	New Delhi	Bhavna Chhatwani	+91 9311552111	careers@vandhana.com
41	Lohia Corp, Noida	B-2/15, Safdarjung Enclave, B5 Block, B4 Block, Safdarjung Enclave, New Delhi, Delhi 110029	Noida	Mahima	6390014838	mahima.singh@lohiagroup.com
42	Metlok	Qmv7+F4v, Jigani, Karnataka 560099	Bangalore	Uday	9704241821	hr2@metlok.com
43	Cadmax	#2095, 2nd Floor, 9th Cross, 5th Main Rd, Rpc Layout, Vijayanagar, Bengaluru, Karnataka 560040	Bangalore	Ankur	6363880528	hr@cadmax.com
44	Trelleborg	Plot 285, Rajdhani Industrial Park, Kengalkempohalli, Karnataka	Bangalore	Anitha	7349282915	anitha.karan@trelleborg.com
45	Arcus Automation	Velappanchavadi, Poonamallee, Chennai, Tamil Nadu 600077	Chennai	Ramesh	9884032017	ramesh@arcusautomation.com
46	Venson Electric	Venson Electric Pvt Ltd, #331, 9th Cross Rd, 4th Phase, Ganapathy Nagar, Phase 3, Peenya, Bengaluru, Karnataka 560058	Bangalore	Arya	9448288863	arya@vensonelectric.com
47	Difacto	Unit -3, S.No 103, 113, 114, 7th Main, 3rd Cross Rd, 3rd Phase, Peenya, Bengaluru, Karnataka 560058	Bangalore	Bina	9900487722	hr@difacto.com
48	Armax Automation	Chetan Circle, No.51-54, 2nd Cross, Vinayaka Layout, Andrahalli Main Rd, Peenya 2nd Stage, Shushruti Nagar, Byraveshwara Industrial Estate, Bengaluru, Karnataka 560091	Bangalore	Papia	9600952502	PAPIA@ARMAXINDIA.COM

49	Sansontech Technologies	A-108 Block li Kssidc Complex, Phase 1 Electronic City, Bengaluru, Karnataka 560100	Bangalore	Hari Prasad	9620204044	sonyt@sansontechs.com
50	Cardiac Design	#184, 2, Whitefield Main Rd, Palm Meadows, Mahadevapura, Bengaluru, Karnataka 560066	Bangalore	Praveen	9008655091	
51	Interplex	89a, Hosur Rd, Electronics City Phase 1, Electronic City, Bengaluru, Karnataka 560100	Bangalore	Preethi	906644327	manohara.n@in.interplex.com
52	Nash Inustries	Survey No 38/1, 39/2 B, Nagaruru Village, Dasanapura Hobli, Nagaruru North Taluk, Bengaluru, 562123	Bangalore	Jayashree	8660531921	
53	Rossell Techsys	Plot 58c(Aerospace Sector) At Hitech Defence And Aerospace Park, Devanahalli, Bengaluru, Karnataka 562110	Bangalore	Jennifer	7829378144	rossell@rossellindia.com
54	Sigma Forging & Forming Pvt. Ltd	Vwx5+7c7, Vadagal Rd, Vadagal, Tamil Nadu 631604	Vadagal, Tamil Nadu	Kamaraj	8939396971	Mayurbatra_ca@mayurbatra.com
55	Protocol Automation	59/1, Langford Road, Richmond Town, Bengaluru, Karnataka 560025	Bangalore	Mihir	9341235828	
56	Steel Strips Wheels Limited	Plot No. A-10, Sipcot Industrial Growth Centre, Singaperumal Koil - Sriperumbudur Rd, Oragadam Industrial Corridor, Oragaram, Tamil Nadu 602105	Oragaram, Tamil Nadu	Muhammad	7550009491	
57	Greenvision	45, 4th Cross Rd, 2nd Block, Malleswaram, Bengaluru, Karnataka 560003	Bangalore	Muralaesh	9655945444	

58	Rising Star Mobile India Pvt Ltd	Rising Star Mobile India Pvt Ltd, Pallavaram-Thuraipakkam Rd, Sunguvarchatram, Tamil Nadu	Chennai	Chandrakumar	4426170442	prasadpaldmk@gmail.com
59	Omax	Plot No. 6, 4th Phase, Bommasandra Jigani Link Rd, Kiadb Industrial Area, Bengaluru, Karnataka 562106	Bangalore	Sunaina	9582519058	sunaina.vashist@omaxauto.com
60	Control Print	No-4, 3rd Floor, Kolet Court, 995a, 11th Main Road, 2nd Ave, Anna Nagar, Chennai, Tamil Nadu 600040	Chennai	Rashtrapal Bhosale	9892330112	rashtrapal@controlprint.com
61	Taegu Tech	Plot No. 120, Bommsandra Jigani Link Road, Bommasandra Industrial Area, Phase 4, Bengaluru, Karnataka 560099	Bangalore	Primila	8049013303	primila@taegutechindia.com
62	Zf Steering	Icc Towers, A-Wing, 6th Floor, Senapati Bapat Rd, Model Colony, Shivajinagar, Pune, Maharashtra 411016	Pune	Asoka	9373693053	ashoka.d@zfindia.com
63	Dr.Fritsch Machines & Powders Pvt Ltd.,	4th Phase, Ind. Area, 453/A, 12th Cross Rd, Shivapura, Peenya, Bengaluru, Karnataka 560058	Bangalore	Makhbul Ahmmed	7022037333	makhbul.ahmed@dr-fritsch.com
64	Niehoff Of India Private Limited	PLOT Nos. 186 TO 194, Pashamylaram, Telangana 502307	Bangalore	M H Nageswara Rao	8184922671	m.nageswararao@niehoff.in
65	Tyche Diecast Pvt. Ltd.	Plot # 9 & 10B, Phase IV Extension, IDA Jeedimetla, Chinthal, Jeedimetla, Hyderabad, Telangana 522259	Hyderabad	H Sandhu	9241323402	sandhu.egic@gmail.com
66	Dubas Engineering Pvt Ltd	# 43 (P), Electronics City, Phase II, Hosur Main Road, Bengaluru, Karnataka 560100	Bangalore	V Keshava Murthy	0806683463/6683464/6683911	dubas@vsnl.com

67	M/S. Micropack	Plot # 16, Jigani Industrial Area, Anekal Taluk, Bengaluru, Karnataka 560105	Bangalore	Mr Lakshmi	7760976713	hr@micropack.in
68	e-Mug Engineering Services Ltd	IIInd floor, 21, Ceon Road, Jayabheri Pine Valley, Gachibowli, Telangana 500032	Bangalore	Y V Rajeswara reddy	9989145042	yvr.reddy@emugtech.com
69	Hemaadri Elex Systems Private Limited	Plot No.809, 17th D Cross, 37th A Main, JP Nagar 6th Phase, Bengaluru, Karnataka 560078	Bangalore	Padmanabhan Venkata Krishna Subramanian	-9449084977	pvksubramanian@hemadri.com
70	Ostritch Mobility	#235-J/1, 3rd Phase, Bommasandra Industrial Area Hosur Road, Bangalore 560099, Bengaluru, Karnataka 560099	Bangalore	Jayan	9845841155	jayan@ostritchmobility.com
71	Zentron labs pvt ltd	#16, PSS Plaza Gr. Floor, New Thippasandra Main Rd, HAL 3rd Stage, Bengaluru, Karnataka	Bangalore	Ravi Subramanian	9845172632	ravis@zentronlab.com
72	TAFE pvt ltd	7H35+HF5, Doddaballapura, Karnataka 561203	Bangalore	Keshav	9538895168	keshava@tafe.com
73	Electrohms pvt ltd	67/6-1 Ullas Theatre Road, Yeshwanthpur Industrial Suburb, Yeswanthpur, Bengaluru, Karnataka 560022	Bangalore	G N Kotresh	+91 (80) 43492200	hr@electrohms.com
74	S R Automation	#91, Ground floor, Gowri Tanaya, Mookambika layout Mylasandra, Kengeri, Bengaluru, Karnataka 560059	Bangalore	Ullas U	9739716463	ullas.u@srautomations.com

Annexure - 4: Training & Employment Details**Training and Employment Projections:**

Year	Total Candidates		Women		People with Disability	
	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities
2023	1200	More than 10000	480	More than 3000	-	
2024	1400	More than 10000	560	More than 3000	-	
2025	1600	More than 10000	640	More than 3000	-	

Data to be provided year-wise for next 3 years.

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 / Higher Studies	Trained	Assessed	Certified	Placed / Higher Studies	Trained	Assessed	Certified	Placed
	2017- 2020	1065	968	961	961	58	55	52	52	NIL			
	2018 - 2021	868	835	831	831	81	74	69	69				
	2019 - 2022	856	799	764	764	72	67	64	64				

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:

1st year of 3 years Full Time diploma Programme

Content availability for previous versions of qualifications:

☐ Participant Handbook ☐ Facilitator Guide ☒ Digital Content ☐ Qualification Handbook ☒ Any Other: In NTTF LMS and Edusquares ERP

Languages in which Content is available: English.

Annexure -5: Blended Learning**Blended Learning Estimated Ratio & Recommended Tools:**

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>

S. 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, Augmented reality, Web based	90:10
2	Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners	Physical classroom, Workshops, Mock sessions, Case study, Role play, Group Discussions, LMS	90:10
3	Showing Practical Demonstrations to the learners	Workshop / Lab, Augmented reality, Video recording	80:20
4	Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training	Workshop machines, Lab equipment, Simulators, Mini projects, Project	80:20
5	Tutorials/ Assignments/ Drill/ Practice	Class assignments, LMS assignments, Simulators	60:40
6	Proctored Monitoring/ Assessment/ Evaluation/ Examinations	Physical classroom, Labs, Workshop, Online tests, Project	75:25
7	On the Job Training (OJT)/ Project Work Internship/ Apprenticeship Training	Industry	100:00

Annexure -6: Detailed Assessment Criteria

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

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Semester -1					
English -1	Parts of Speech-Form meaningful Sentences	12.5			
	Verb Tenses-Use of right verb and tenses	10			5
	Language and Skill Development Exercises –Exercises on writing sentences	10			
	Writing Skills-Writing letters & reports	15			
	Sentences-Forming right sentences	15			10
	Language Skill Development-Oral communication skills				22.5
	Total Marks	100			
Mathematics – 1	Fundamentals of Mathematics-Solving arithmetical problems	20			
	Matrices and Determinants-Solving Problems	20			
	Complex Numbers -Understanding Complex Numbers	10			
	Trigonometry-Application in Engineering	20			
	Differential Calculus-Fundamentals	15			
	Statistics-Application in Engineering	15			
	Total Marks	100			
Applied Science	Physical World-Physical quantities & units	10		-	-
	Force, Motion and Energy –Definition & units	10		-	-
	Composition and Resolution of Forces-Resolving Forces	8		-	-
	Friction-Definition, Application in Engineering	8			
	Equilibrium of Forces-Determining equilibrium of forces	8			
	Centre of Gravity and Moment of Inertia-Determining for different objects	12			
	Properties of Solids and Fluids- Properties of Solids and Fluids-	12			
	Heat-Definition, Unit	12			
	Industrial Chemistry-Introduction to pollution, Corrosion	12			

	Renewable Energy-Introduction to wind and solar energy	8			
	Total Marks	100			
Electronics – 1	Introduction to Electronics – Explain the atomic structure, bonds, electric charge, electron movement and current flow, conductors, insulators.	10			
	Basic Components of Electronics – Explain, Analyse -construction, properties of Resistors, Capacitors, Inductors, switches, connection and applications.	15			
	Laws & Rules of Electronic Circuits – state and explain Ohms law, VI characteristics, Linear and Non – linear components & Characteristics, Voltage & Current divider	15			
	Introduction to Semiconductors – Classification of matter, Energy bands, Temperature coefficients, Classification of semiconductors, Intrinsic semiconductors, Doping, Extrinsic semiconductors, majority & Minority carriers	15			
	PN Junction Diode & its applications – VI Characteristics, rectifiers and applications	15			
	Special Purpose Diodes – VI Characteristics, & applications	15			
	PCB Assembly & Soldering – components forming, soldering techniques, safety, defects in soldering, Types of PCB	15			
	Total Marks	100			
Electrical Engineering - 1	Fundamentals of Electric Circuit – Charge & current, Potential Difference & Electromotive force, Power & Energy, Classification of power resources, distinguish between Electrical & Electronics devices.	8			
	DC Sources – types of cells, Batteries, Applications, grouping of cells, applications & Precautions	10			
	Laws of Electricity – analyse Nodes, branches & Loops, Ohms law, Kirchoff laws, superposition theorem	10			
	AC Fundamentals – AC waveforms, Distinguish between AC & DC, parameters of Alternating quantity, instantaneous value, waveform, cycle, Time period, Frequency, Amplitude angular frequency, RMS value, Form factor, Peak value	12			
	Single Phase AC – Power factor, Active, reactive & apparent power, RLC circuits, Power factor correction	12			
	Three Phase AC - 3 ϕ circuit, comparison of 1- ϕ & 3- ϕ supply, advantages of 3- ϕ over 1- ϕ , phase sequence, phase difference, 3 ϕ supply connections, Δ & Y connection & Applications.	18			
	Protective Devices –Types and applications, Fault conditions.	10			
	Earthing – Need, components of earthing, types and specifications	12			
	Types of Power Generation – Types and power generation methods.	8			
	Total Marks	100			
	Employability skills-Importance & applicability	20	-	-	5

Employability Skill	Behavior skills-Positive Attitude and Good Teamwork	20	-	-	5
	Constitutional Values & Citizenship-Awareness of our constitutional values	35	-	-	15
	Total Marks	100			
Applied Science LAB	Verification of Newton's third law of motion		10		5
	Parallelogram law: Find weight of a given body		10		
	Triangle law of forces: Find the weight of a given body		10		5
	Verify Polygon law of forces using force table		10		
	To measure torques on a rigid body		10		
	Determination of acceleration due to gravity by using simple pendulum		5		
	Determination of spring constant of the given helical spring		5		
	Compare viscosity of two fluids using flow cup viscometer		10		5
	Experiments to understand surface tension		10		5
	Total Marks	100			
Electronics - 1 LAB	Determination of resistance using colour codes, equivalent resistance for series and parallel resistances		5		5
	Determining Capacitance, series and parallel connections,		5		3
	Current and voltage divider using Ohm's Law		10		5
	Characteristics of Diodes - P-N Junction diode, LED, Zener diode		20		
	Rectifier circuits, wave forms and verifying the parameters		20		5
	Voltage regulation using Zener diode, applications.		10		2
	Soldering practice – identification defects		10		
	Total Marks	100			
Electrical Engineering - 1 LAB	Electrical lab safety and Indian electrical rules		5		5
	Identification of Electrical components, wire gauge, current rating specifications, different switches – current and Voltage ratings and applications, Plugs & sockets - ratings and applications		10		3
	Wiring experiments and practices – series and parallel looping, switch & load controls, Staircase and go-down wiring		10		
	Battery connections – series and parallel.		5		
	Verification of voltage laws and theorems		10		5

	Loading effect of power supply.		5		
	Measurement of electrical parameters under different load conditions,		10		
	Switching using relays		5		
	Use of different electrical measuring instruments – Clamp meter, Megger		5		5
	Checking the proper earth using different techniques		5		2
	Domestic house wiring - practice		10		
	Total Marks		100		
Engineering Drawing/ Fusion 360	Introduction about Engineering drawing – Application of Engineering Drawing		5		
	Basics of Engineering Drawing- Fundamental aspects of Engineering Drawing		10		5
	Geometric Construction – Construction of Geometric shapes		5		
	Projection- First and Third angle projection		25		5
	Dimensioning – Dimensioning of drawings		15		5
	Design procedures – Sketching and modelling - Drawing using Fusion 360 applications		20		5
	Total Marks		100		
Workshop Practical	Filing, Hacksawing, Number and letter punching		45		10
	Drilling – reaming – tapping, measuring and inspection		35		10
	Total Marks		100		
Basics of Computer LAB	Computer architecture, parts & application.		5		2
	Data representation and Computer specifications		5		2
	Software – operating systems and configuration		10		2
	PC tools – Internet concepts and IP configurations – diagnostic tools		10		4
	Use of MSOffice applications & Email configuration.		50		10
	Total Marks		100		
Semester -2					
English – 2	Internal correspondence-preparing Memo, Notices & Circulars	10			
	Technical writing -Preparing Technical Reports	8			7.5
	Organizational correspondence-Preparing Minutes of Meeting & Agenda	10			
	Writing skill (activity based)-Writing Simple Essays	12			

	Communication and Public speaking skills-Preparing Simple Speech	12.5			15
	Interview skills-Interview Techniques	15			15
	Total Marks	100			
Mathematics – 2	Percentage, Ratios and Proportions-Application in Engineering	10			
	Permutation and Combination- Application in Engineering	15			
	Analytical Geometry-Introduction & Application in Engineering	25			
	3D Shapes-Introduction to 3D Shapes	15			
	Integral Calculus-Basics of calculus	20			
	Statistics- Statistics for analysing Data	15			
	Total Marks	100			
Manufacturing Engineering	Engineering Material – Steel and Alloys and applications	10			
	Subtractive manufacturing – Conventional machining, non-conventional machining, SPMS, super surface finishing processes	50			
	Formative manufacturing – Casting – powder metallurgy, plastic moulding, metal forming process and applications	15			
	Joining processes – permanent and temporary fasteners and applications	15			
	Surface protection processes – Electroplating, chrome plating, zinc plating, Nickel plating	10			
	Total Marks	100			
Electronics – 2	Transistor configurations and biasing – Transistor construction, characteristics, circuits and applications	30			
	Small signal BJT amplifiers – constructions, characteristics, circuits and applications	20			
	Differential amplifier- Circuits and applications	5			
	Operational amplifier – advantage, circuits and applications	25			
	Junction field effect transistor- construction, characteristics, circuits and applications	8			
	Filters and oscillators- circuit analysis, and applications	12			
	Total Marks	100			
Electrical Engineering - 2	Magnetic Circuits – Magnets, types, magnetic flux, flux density, MMF, reluctance	7			
	Electromagnetism and Induction – magnetism & electricity relation, Faraday's law, induced EMF	7			
	Transformer- Types, transformation ratio, construction, losses, efficiency, tests, autotransformer, instrument transformer, applications	16			

	D.C Generator- construction, working principle, types & applications.	14			
	D.C Motor – construction, working principle, rated speed, speed regulation and control, characteristics	14			
	A.C Generator – construction, working principle, speed – frequency relation, difference between DC & AC generators	8			
	A.C Motor (Induction motor) – construction, working principle, self-starting and reversal of 1-Ø induction motor. applications	10			
	Three Phase Induction Motor – construction & working, reversal, efficiency, synchronous speed, torque slip characteristics, starting methods.	14			
	Special Purpose Motor- permanent magnet DC motor, stepper motor, BLDC, Universal servo motor	10			
	Total Marks	100			
Metrology	Introduction to Metrology – Application of Metrology in Industry	10			
	Linear Measurements – Measuring Instruments used for linear Measurements	25			
	Dial Indicators – Types and Application	15			
	Bore measuring Instruments – Types and Applications	15			
	Gauges - Types and Applications	20			
	Slip Gauges - Types and Applications	15			
	Total Marks	100			
Employability Skill	Effective learning skills	20	-	-	5
	English skills-Writing Skills	20	-	-	5
	Communication skills-Effective Oral & Written Communication	35	-	-	15
	Total Marks	100			
Wiring Practice and Simulation	Autodesk eagle software – Library, simple electrical wiring, domestic wiring. - simulation		20		4
	Transformer, 1-Ø, 3-Ø connection, DOL starter and reverse connection- 3-Ø induction motor, - simulation		30		8
	Basic electronic circuits- diodes characteristics, rectifiers, shaping circuits, transistor amplifier circuits, Op- Amp circuits simulation using LT spice software		30		8
	Total Marks	100			
Electronics - 2 LAB	Transistor- CE characteristics, CE amplifier DC, AC analysis, switch, Darlington amplifier, current mirror circuit.		20		5
	Op- Amp – familiarization, amplifier, differentiator, integrator, comparator and other circuits and applications.		20		5
	FET Characteristics		10		

	MOSFET characteristics		10		
	Passive and active filters using Op- Amps		10		5
	Fixed and variable regulator IC familiarization and application		10		5
	Total Marks	100			
Electrical Engineering - 2 LAB	Transformer – Step up and down operation, ratio and polarity test, losses and load test, three phase transformer connection		20		5
	DC Motor- Starting, speed control of DC shunt motor.		20		5
	AC Machines – Internal resistance measurement, DOL starter and reversal, ON delay timer control of 3Ø induction motor,		20		5
	Autotransformer starting of 3Ø induction motor, automatic STAR DELTA switching of 3Ø induction motor.		15		5
	Familiarisation on DG		5		
	Total Marks	100			
CAD - Fusion 360	Drafting – drafting tools, dimensioning, export to PDF		20		4
	Assembly – Assembly tools, joints and motion components		30		8
	Animation – Animation tools and Publishing animations		30		8
	Total Marks	100			
Workshop Practical	Grinding – Pedestal grinder- tool grinding		15		
	Turning – spindle turning		20		5
	Assembly fit		25		10
	Sheet metal work		20		5
	Total Marks	100			
OJT	Presentation	-	75	-	25
	Total Marks	100			

Annexure -7: Assessment Strategy

1 ASSESSMENT STRATEGY

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

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

Regarding Theory – Sessional is based on Intermediate Tests, File / Assignments & 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 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 & one Lab Test and semester end examination. Semester end examination is outcome-based experiments/ exercises of the course will be given to trainees to perform and based on the performance the mark will be awarded. The passing criteria is based on practical's performance, viva or oral exam, Test and final semester end examination.

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

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

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

Assessment comprises the following components:

- Job carried out in Labs / workshops
- Record book
- ONLINE Examination
- Answer sheet of assessment
- Viva-voce
- Semester end examination
- ON-THE-JOB training

- Tech Talk / Shop Talk
- Extracurricular and Co-curricular Activities
- Projects
- Attendance and punctuality

2. ASSESSORS

Evaluation of Theory & 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 conduct of assessments, teaching methodology etc.

3 ELIGIBILITY TO APPEAR FOR THE EXAM:

- The candidates should have an attendance of a minimum 90% in a semester.
- The candidates should have secured minimum Sessional Marks in Theory & 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 customer needs & requirements and perform Soft Skills effectively:
 - Videos/photos of Trainees during OJT

- Suggestions / Kaizens from trainees
- Rewards and appreciation to trainees as applicable

3. Assessment will ensure the following:

- Effective engagement with the customers
- Understand the working of various tools and equipment.

7 SYSTEM OF GRADING:

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

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

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

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

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

Awarding of class:

a) Awarding of class for semester:

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

b) Awarding of class for Programme:

First class with Distinction	Should have scored CGPA 8.5 and above and should have cleared all Semesters in the first attempt.
First class	Should have scored CGPA 7.5 to 8.4

Second class	Should have scored CGPA 6.0 to 7.4
Pass class	5.5 to 5.9

8. ASSESSMENT TOOLS

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

- EDUSQUARE : NTTF ERP/CRM used for academic purpose EDUSQUARE erp.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 & Multi secure Exam browser as and when the need arises.

List of ICT Tools :

Desktop and laptops

Interactive White Board

CCTV Camera

Pen Drive

Video Conferencing

Biometric

Edusquares: NTTF ERP/CRM used for academic purpose Edusquares 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 -1		Module Name: English-1	Module code: CP15101T
Sl. No	Module Details		Theory Hours 60
1	Parts of Speech		20h
2	Verb Tenses		8h
3	Language and Skill Development Exercises		15h
4	Writing Skills		4h
5	Sentences		4h
6	Language Skill Development		9h

Semester -1		Module Name: Mathematics-1	Module code: CP15102T
Sl. No	Module Details		Theory Hours 60
1	Fundamentals Of Mathematics		6h
2	Matrices & Determinants		11h
3	Complex Numbers		9h
4	Trigonometry		14h
5	Differential Calculus		12h
6	Statistics		8h

Semester -1		Module Name: Applied Science	Module code: CP15103T
Sl. No	Module Details		Theory Hours 40
1	Physical World		2h
2	Force, Motion and Energy		6h
3	Composition and Resolution of Forces		3h
4	Friction		3h
5	Equilibrium of Forces		5h
6	Centre of gravity and moment of inertia		5h

7	Properties of Solids and Fluids	4h
8	Heat	4h
9	Industrial chemistry	4h
10	Renewable Energy	4h

Semester - 1		Module Name: Electronics - 1	Module code: CP15104T
Sl. No	Module Details		Theory Hours 40
1	Introduction to Electronics		5h
2	Basic Components of Electronics		8h
3	Laws & Rules of Electronic Circuits		3h
4	Introduction to Semiconductors		6h
5	PN Junction Diode & its applications		7h
6	Special Purpose Diodes		6h
7	PCB Assembly & Soldering		5h

Semester - 1		Module Name: Electrical Engineering - 1	Module code: CP15105T
Sl. No	Module Details		Theory Hours 40
1	Fundamentals of Electric Circuit		3h
2	DC Sources		5h
3	Laws of Electricity		3h
4	AC Fundamentals		5h
5	Single Phase AC		5h
6	Three Phase AC		6h
7	Protective Devices		6h
8	Earthing		5h
9	Types of Power Generation		2h

Semester – 1		Module Name: Employability Skills	Module Code: CP15112T
Sl. No	Module Details		Practical Hours 30
1	Employability skills-Importance & applicability		10h

2	Behavior skills-Positive Attitude and Good Team work	10h
3	Constitutional Values & Citizenship-Awareness of our constitutional values	10h

Semester - 1		Module Name: Applied Science Lab	Module code: CP15106P
Sl. No	Module Details	Practical Hours 40	
1	Vernier Calipers: Measure of volume of a solid cylinder.	2h	
2	Vernier Calipers: Measure of slant angle of a cone.	2h	
3	Vernier Calipers: Measure depth of a hollow cylinder.	2h	
4	Screw Gauge: Measure diameter of a thin wire. Find its SWG number.	2h	
5	Screw Gauge: Measure thickness of a metal sheet. Find its SWG number.	2h	
6	Measure diameter of a bore using a telescopic gauge	2h	
7	Measure diameter of a small hole using small-hole gauge.	2h	
8	Determination of acceleration due to gravity by using Simple pendulum	2h	
9	Verification of Newton's third law of motion	2h	
10	Determination of spring constant of the given helical spring	2h	
11	To measure torques on a rigid body	2h	
12	Parallelogram law: Find weight of a given body.	2h	
13	Triangle law of forces: Find weight of a given body	2h	
14	Verify polygon law of forces using force table	2h	
15	Compare viscosity of two fluids using flow cup viscometer	2h	
16	Experiments to understand surface tension	2h	
17	Experiment to show working of fiber optic cable	2h	
18	Generate electricity using wind energy	2h	
19	Generate electricity using solar energy	2h	
20	PV Panel Characteristics	2h	

Semester - 1		Module Name: Electronics - 1 Lab	Module code: CP15107P
Sl. No	Module Details	Practical Hours 60	
1	Electronics Lab Safety and Instructions	2h	
2	Familiarization of Multi-meter	2h	

3	Familiarization of Power Supply	2h
4	Familiarization of Function Generator and Cathode Ray Oscilloscope	4h
5	Familiarization of Tool Kit – Tools, Bread Board and its connections	2h
6	Symbols of Electrical and Electronic components	1h
7	Identification of Electronic Components and Equipment's	1h
8	Exercises based on Resistors – color code, series, parallel	4h
9	Exercises based on Capacitors – Value, series, parallel	4h
10	Ohms Law	4h
11	Voltage and Current divider rule	4h
12	Exercises based on PN Junction Diode	4h
13	Exercises based on Light Emitting Diode	4h
14	Familiarization of Transformer	2h
15	Exercises based on Half Wave rectifier	4h
16	Exercises based on Center Tapped Full Wave rectifier	4h
17	Exercises based on Bridge Full Wave rectifier	4h
18	Exercises based on Zener Diode	4h
19	Soldering Exercises on PCB	4h

Semester - 1		Module Name: Electrical Engineering - 1 Lab	Module code: CP15108P
Sl. No	Module Details	Practical Hours 60	
1	Electrical Lab Safety and Instructions	4h	
2	Explanation of Indian Electrical Rules		
3	Safety labels for Electrical equipment & facilities management		
4	Familiarization of electrical components.	4h	
4.1	Identify and specify different types of Wires used for different current and voltage ratings.		
4.2	Identify and specify different types of Switches used for different applications as per current and voltage ratings.		
4.3	Identify and specify different types of Sockets and Plugs used for different current and voltage ratings.		

5	Parallel and Series wiring 3 loop/ 3 components	4h
6	One lamp by one switch	4h
7	2 Lamps by 1 switch	
8	Extension box	4h
9	Staircase wiring	4h
10	Go down wiring	
11	Familiarize the Battery and Battery in Series and parallel connection to make a battery bank.	4h
12	To verify the Kirchhoff's current and voltage laws	4h
13	To verify the Super Position Theorem	4h
14	Loading effect on Power Supply	4h
15	Measurement of Electrical quantities in Resistive Load and Inductive Load	4h
16	Switching operation using Relay	4h
17	Familiarization of testing instruments: 1: Clamp-on meter. 2: Megger.	2h
18	Checking whether Earthing is Proper by bulb method and DMM method.	2h
19	Domestic House wiring	8h

Semester - 1 Module Name: Engineering Drawing/ Fusion 360 Module code: CP15109P		
Sl. No	Module Details	Practical Hours 60
1	Introduction to Engineering Drawing - Drawing instruments, Types of lines	2h
2	Engineering Script - Lettering and numbering, Scale-full scale, reduced scale and enlarged scale, Drawing Sheet size, layout, and title block	2h
3	Geometrical Constructions - Geometric forms, bisecting a line and dividing the line	1h
4	Projections - Isometric Drawing, Orthographic projections, Difference between 1 st angle and 3 rd angle projection	4h
5	Dimensioning - Basics Definitions and Dimensions	1h
6	Sectional View - Introduction to sectional view, Half-Sectional Views, Sectioning Objects with Holes, Ribs, etc.	2h
7	Draw the given Isometric Diagrams into Orthographic views (2D Views) using First Angle Projection.	10h

	Draw the given Isometric Diagrams as per dimensions in the sketch book.	
8	Introduction to Fusion 360 - download the software, access your fusion 360 account, fusion 360 user interface, sharing the designs	3h
9	Designing Procedure (Sketching & Modelling) Creating Sketches Sketch Dimensioning Dynamic viewing function Display modes Modelling Modifying	10h
10	Draw the Two-dimensional (2D) diagrams as per given dimensions using Fusion 360 Draw the given Isometric Diagrams as per given dimensions using Fusion 360.	25h

Semester - 1 Module Name: Workshop Practical Module code: CP15110P		
Sl. No	Module Details	Practical Hours 80
1	General safety rules for conduction of Workshop	4h
2	U – Channel	15h
3	Steel Angle	9h
4	Marking & Dot Punching	5h
5	Number & Letter Punching	5h
6	Chain drilling exercise	9h
7	Drill Plate	17h
8	Pen stand	8h
9	Application based exercises	8h

Semester - 1 Module Name: Basics of Computer Lab Module code: CP15111P		
Sl. No	Module Details	Practical Hours 30
1	Parts of Computer	

	Computer architecture, CPU, types of memory, Disk drive, Input devices, Keys of keyboard and mouse, Output devices, monitor, various connectors and cables of computer	1h
2	Data Representation Using Bit and Byte - Binary to decimal and decimal to binary conversion, Binary coded decimal, Hexadecimal, KB, MB, GB, TB, ASCII codes, Computer specifications	2h
3	Software - Operating system, GUI tools, directory, files, create, delete, recycle bin Display resolution setting, personalization setting, Install and uninstall applications, Task bar setting	2h
4	Typing Tutorial - Familiarize typing in standard QWERTY keyboards. Touch Typing Course: Learn positions of all keys, keys for each finger. Achieve speed of 20 words per minute. Use all keys of keyboard.	2h
5	PC Tools - Internet concepts, IP address settings, Remote desktop, task manager, system date & time	2h
6	Creating Document (Word File) A text of about 100 words to be typed. Practice: Tab setting, font, font colour, text highlight, bold, italics, underline, superscript, subscript, set case Practice: Bullet, Numbering, indenting, alignment, line spacing, heading styles, find and replace, cut, copy and paste Layout: Margin, orientation, page size, columns. Insert: Pictures (text wrapping, format picture), shapes, 3D models, chart, table, comment, header, footer, page number, page break Create: Envelops, Labels, Mail merge Macro, Insert symbols and equations, Hyperlink Create table of contents, page colour, page border, water mark	7h
7	Email Handling Setting layout, CC, and BCC, create address book, email filter Create folders, set rules, auto reply, create signature and create groups Setting calendar, email recall, sorting emails, attachments	2h
8	Power Point Presentation – Adding new slide, layout, Indenting and text direction, slide show Insert shapes, icons, 3D models, chart, video and audio	5h

	Insert table, screen shots, symbols, equations Add comments, hyperlink and action, header and footer Transition, animation and recording slide show, slide hide Format shape, slide master, best practices	
9	EXCEL – Concept of cells, Rows and columns, fonts Format cells: Category, border, fill, protection, Insert and delete, Conditional formatting, create new rules Insert functions: sum, average, if, countif, counta, countifs, max, min, value, text, date, datevalue, round, roundup, rounddown, sort, filter Iferror, AND, OR, Day, Days, Datevalue, GCD, LCM, ABS Chart, pivot table, group, subtotal, filter Freeze panes, hide, macro, page layout Copy-paste options, VLOOKUP function	7h

Semester - 2		Module Name: English - 2	Module code: CP15201T
Sl. No	Module Details	Theory Hours 40	
1	Internal correspondence	4h	
2	Technical Writing	4h	
3	Organizational correspondence	3h	
4	Writing skill (activity based)	8h	
5	Public Speaking	9h	
6	Interview skills	12h	

Semester - 2		Module Name: Mathematics - 2	Module code: CP15202T
Sl. No	Module Details	Theory Hours 40	
1	Percentage, Ratios and Proportions	3h	
2	Analytical Geometry	7h	
3	Integral Calculus	8h	

4	Laplace Transform	5h
5	Statistics	6h
6	Correlation & Regression	6h
7	Sequence and series	5h

Semester - 2 Module Name: Manufacturing Engineering Module code: CP15203T		
Sl. No	Module Details	Theory Hours 40
1	Introduction to Manufacturing Engineering	2h
2	Engineering Material	3h
3	Subtractive Manufacturing	23h
4	Formative Manufacturing	5h
5	Joining Processes	5h
6	Surface Protective processes	2h

Semester - 2 Module Name: Electronics -2 Module code: CP15204T		
Sl. No	Module Details	Theory Hours 40
1	Transistor configurations and biasing	11h
2	Small signal BJT amplifiers	9h
3	Differential amplifier	3h
4	Operational amplifier	10h
5	Junction field effect transistor	3h
6	Filters and oscillators	4h

Semester - 2 Module Name: Electrical Engineering -2 Module code: CP15205T		
Sl. No	Module Details	Theory Hours 40
1	Magnetic Circuits	2h
2	Electromagnetism and Induction	2h
3	Transformer	7h
4	D.C Generator	6h

5	D.C Motor	6h
6	A.C Generator	2h
7	A.C Motor (Induction motor)	5h
8	Three Phase Induction Motor	7h
9	Special Purpose Motor	3h

Semester - 2		Module Name: Metrology	Module code: CP15206T
Sl. No	Module Details		Theory Hours 40
1	Introduction to metrology		2h
2	Linear measurements		6h
3	Gauges		8h
4	Angular measurement		6h
5	Comparators		5h
6	Measuring machines		3h
7	Limits, fits and tolerance		6h
8	Geometric dimensioning and tolerance (GD&T)		4h

Semester – 2		Module Name: Employability Skills	Module Code: CP15212T
Sl. No	Module Details		Theory Hours 30
1	Effective learning skills		10h
2	English skills-Writing Skills		10h
3	Communication skills-Effective Oral & Written Communication		10h

Semester - 2		Module Name: Wiring Practice and Simulation	Module code: CP15207P
Sl. No	Module Details		Practical Hours 30
1	Introduction and familiarization of Autodesk Eagle software.		1h
2	Addition of components into library of eagle software.		1h
3	One Lamp One Switch and two lamp one switch.		1h
4	Series & Parallel Wiring and staircase Wiring.		1h
5	Go-down wiring and Tube light wiring.		2h

6	Domestic house wiring (Tube Light, Fan, Lamp, and Plug Point)	2h
7	Design a Domestic wiring for a Computer Laboratory.	1h
8	Three phase transformer connection.	1h
9	Direct online starting of a 3-phase induction motor.	2h
10	Direct online starting of a 3-phase induction motor with reversal.	2h
11	Introduction and familiarization of LT spice Software.	1h
12	Diode characteristics.	1h
13	Clippers – Positive and Negative clipper.	2h
14	Clampers - Positive and Negative clipper.	2h
15	Half wave rectifier.	4h
16	Center tapped full rectifier.	
17	Bridge Full wave rectifier.	
18	Analysis of Transistor amplifier.	2h
19	Inverting Amplifier using Op-amp.	2h
20	Non – Inverting using Op-amp.	
21	Active low pass filter.	1h
22	Active High pass filter.	
23	Op-amp waveform generators - Sine wave generator, square wave generator.	1h

Semester - 2		Module Name: Electronics -2 Lab	Module code: CP15208P
Sl. No	Module Details	Practical Hours 60	
1	Switching ON LED with different voltages	3h	
2	Transistor characteristics in CE configuration	3h	
3	Common Emitter Amplifier- DC & AC analysis	3h	
4	Transistor as switch	3h	
5	Emitter follower	3h	
6	Darlington amplifier	3h	
7	NPN Current mirror and square wave testing	3h	
8	Familiarization of op-amp IC 741	3h	
9	Inverting & Non-inverting amplifier Design using op-amp	3h	

10	Op –amp as Voltage follower and Summing amplifier	3h
11	Integrator& Differentiator	3h
12	Comparator, Schmitt trigger	3h
13	Instrumentation amplifier	3h
14	Wave form generators – Square, Triangular & Saw tooth	3h
15	FET characteristics	3h
16	MOSFET characteristics	3h
17	Filters - Passive (RC Filter) and Active (LPF and HPF) Using op-amp	3h
18	Fixed regulator (7805,7905) - Variable Regulator (LM317)	3h
19	Series pass regulator using Transistor	3h
20	Construct a Bridge Rectifier as Power-Supply having following Specifications: DC Output Voltage, $V_{DC} = 12\text{ V}$. DC Output, Current, $I_{DC} = 100\text{mA}$, $V_{r(p-p)} = 1\text{V}$	3h

Semester - 2		Module Name: Electrical Engineering -2 Lab	Module code: CP15209P
Sl. No	Module Details	Practical Hours 60	
1	Electrical Lab Safety and Instructions	3h	
2	Experiment to understand the electromagnetic induction.	3h	
3	Experiment to find step up and step down of the transformer.	3h	
4	Experiment to find the transformer ratio and polarity test.	3h	
5	Experiment to find the losses of the transformer.	3h	
6	Load test on single phase transformer.	3h	
7	Three phase transformer connection.	3h	
8	Experiment to build a simple D.C motor.	3h	
9	Study of main Parts of a DC machine.	3h	
10	Study of D.C Motor Starters.	3h	
11	Experiment to learn the Speed Control of a D.C Shunt Motor.	3h	
12	Identification of parts & terminals of AC Machines and measurement of internal resistance.	3h	
13	Familiarization of motor control accessories.	3h	
14	Direct online starting of a 3-phase induction motor.	3h	
15	Direct online starting of a 3-phase induction motor with reversal.	3h	

16	DOL Starting of 3 phase induction motor with ON delay timer.	3h
17	Auto transformer Starting of 3 phase Induction motor.	3h
18	Automatic star delta switching of 3 phase induction motor.	3h
19	Automatic operation of two three phase induction motor.	3h
20	Familiarization of Diesel Generator (DG).	3h

Semester - 2		Module Name: CAD-Fusion 360 Lab	Module code: CP15210P
Sl. No	Module Details	Practical Hours 30	
1	DRAFTING		
1.1	Introduction to drafting and drafting tools.	1h	
1.2	Dimensioning	1h	
1.3	Export of drafting into PDF.	1h	
2	ASSEMBLY		
2.1	Introduction to assembly tools.	1h	
2.2	Joints and Motions of components.	2h	
3	ANIMATIONS		
3.1	Introduction to Animation tools.	2h	
3.2	Publishing of Animation Video.	2h	
4	FUSION 360 EXERCISES		
	6 Exercises	20h	

Semester - 2		Module Name: Workshop Practical	Module code: CP15211P
Sl. No	Module Details	Practical Hours 60	
1	Right Hand Knife Tool Grinding	6h	
2	Spindle Stage 1 & Stage 2	18h	
3	Assembly Fit	30h	
4	Sheet Metal Box	6h	

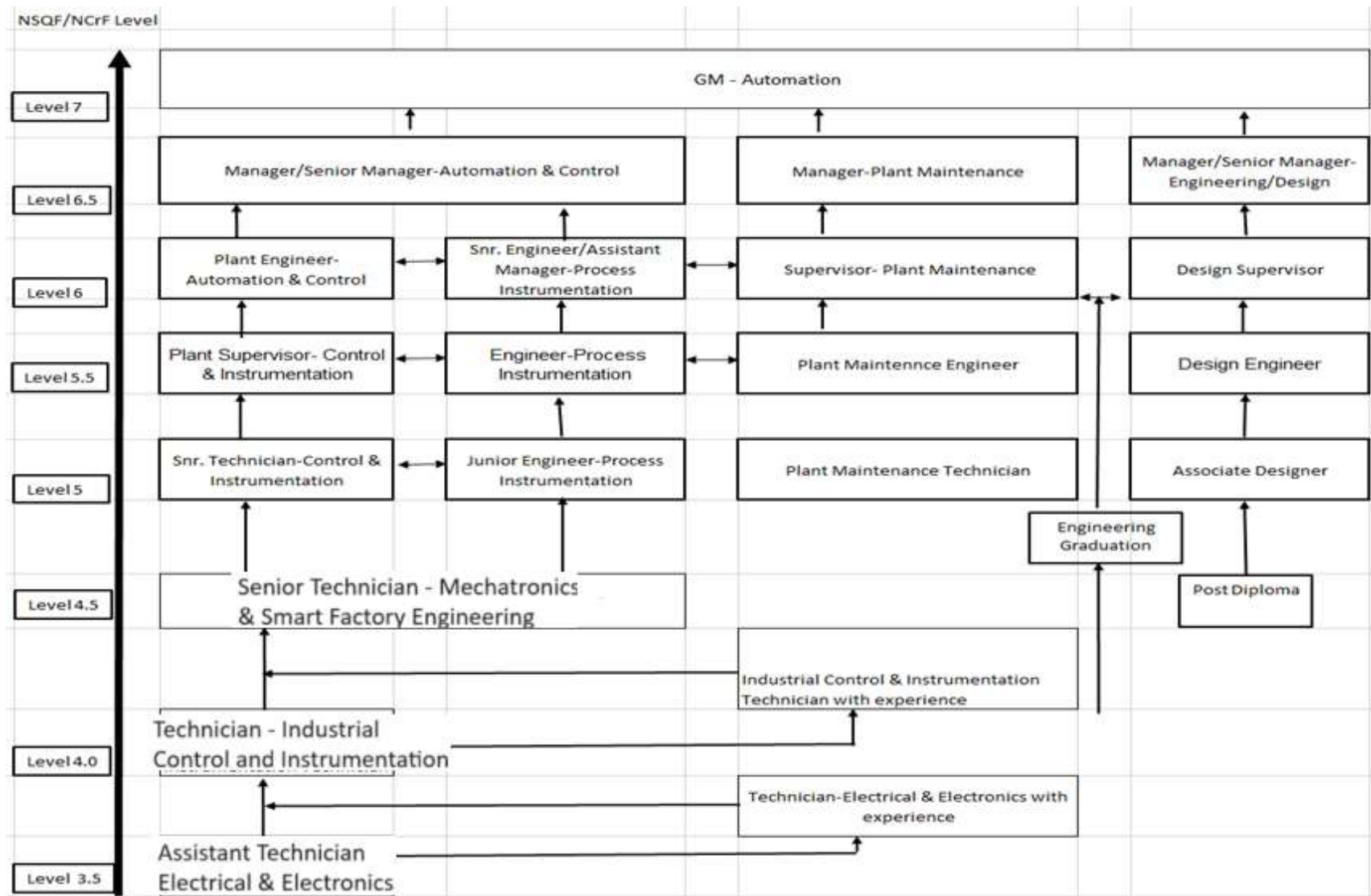
Semester - 2	Module Name: OJT	Module code: CP15212P
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Sl. No	Module Details	Practical Hours 90
1	OJT- On the Job Training in the Industry	90h

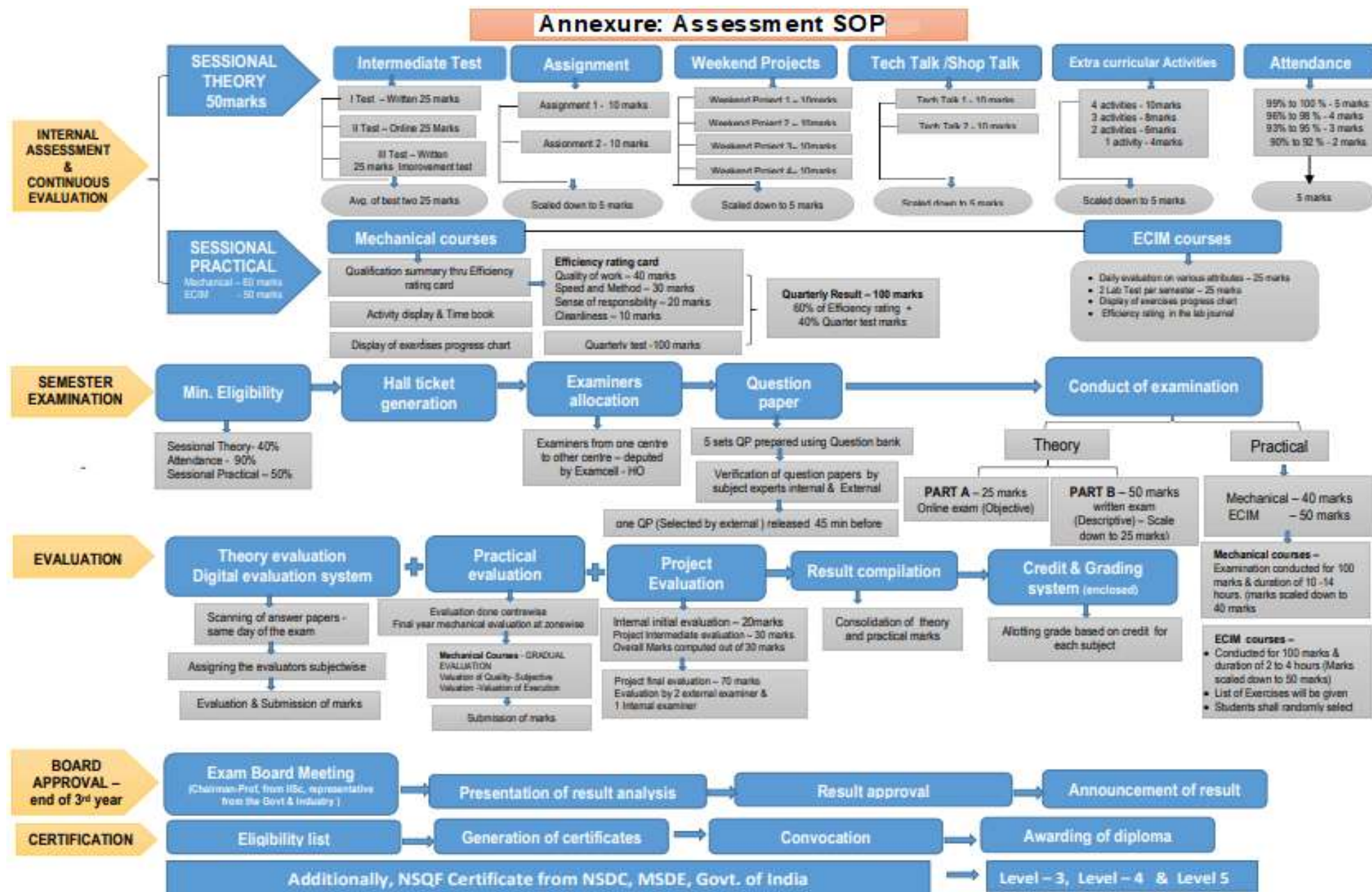
Annexure 9 Career Progression

Job Roles Progression Path

Sector: Capital Goods and Manufacturing



Annexure – 10 Assessment SOP



Annexure -11: Occupational Map**Sector Name: Capital Goods Manufacturing**

As per NCrf		As per NCO-2015	Sub-Sector 1/Automotive, Aerospace, Home appliances, Textile, Construction machinery	
NCrf Level (1-8)	Level Descriptors	NCO-15 -- Family (First 4 digits code/s for the given level cross cutting the OM Sub-Sectors/Occupations)	Occupation 1/Process control and instrumentation, maintenance, embedded system developer.	Occupation 2/ Industrial Automation planning and implementation. Product design and development.
Level 8	1. Professional Theoretical Knowledge: Mastery of knowledge / Innovation driven/ Comprehensive knowledge 2. Professional and Technical Skills/ Expertise: Most advanced Technical and Managerial skills 3. Employment Readiness & Entrepreneurship Skills & Mind-set: Significant authority, transformational leadership, Social intelligence 4. Broad Learning Outcomes: Lead large transformational projects 5. Responsibility: Business Vision Chairperson/ Board Member / CMD			
Level 7	1. Professional Theoretical Knowledge: Advanced knowledge with critical understanding of emerging developments 2. Professional and Technical Skills/ Expertise: Highly specialized skills, transdisciplinary skills, leadership skills 3. Employment Readiness & Entrepreneurship Skills & Mind-set: Cross cultural competency, transformational leadership 4. Broad Learning Outcomes: Apply acquired advanced technical skills, technical appraisal and reviews 5. Responsibility: Business Management (like GM/ CEO / CXO ,etc.)	1223, 1321, 3155.	GM - Instrumentation & Control, Power Electronics & Systems, Process Automation, Industrial Automation Engineering, Industrial Maintenance Engineering, Consumer Electronics. Embedded Developer Project Head.	GM - Engineering/Design 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	1321, 3114, 3155	Manager/ Sr. Manager - Instrumentation & Control, Power Electronics & Systems, Process Automation, Industrial Automation Engineering,	Manager/Senior Manager-Engineering Process planning/ Product development, Industrial Automation.
		2144, 1223, 2151,		

	& Mind-set: Leadership, effective resource management 4. Broad Learning Outcomes: Judgement in complex problems 5. Responsibility: Vertical/ Business unit management –Manager or Senior Manager		Industrial Maintenance Engineering, Consumer Electronics. Embedded Developer Product designer.	
Level 6	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 – Assistant technical supervisor, technical supervisor or Assistant/ deputy manager	2152, 2151, 3114 2144, 1223, 2512, 3155.	Plant Engineer - Instrumentation & Control, Power Electronics & Systems, Process Automation, Industrial Automation Engineering, Industrial Maintenance Engineering, Consumer Electronics. Embedded Developer Senior Team Lead	Design Supervisor - Process planning/ Product development, Industrial Automation.
Level 5.5	1. Professional Theoretical Knowledge: Specialized knowledge 2. Professional and Technical Skills/ Expertise: Specialized skills 3. Employment Readiness & Entrepreneurship Skills & Mind-set: Team readiness, self-entrepreneurship readiness 4. Broad Learning Outcomes: Specialized/ complex jobs/tasks 5. Responsibility: Self and team responsibility – Sr. Technician or Master Technician	2152, 2151, 3114 2512, 3155, 7412.	Plant Supervisor - Instrumentation & Control, Power Electronics & Systems, Process Automation, Industrial Automation Engineering, Industrial Maintenance Engineering, Consumer Electronics. Embedded Developer Team Leader	Design Engineer - Process planning/ Product development, Industrial Automation.
Level 5		2152, 2512, 3114, 3122, 3139, 3155, 7412.	Senior Technician - Instrumentation & Control, Power Electronics & Systems, Process Automation, Industrial Automation Engineering, Industrial Maintenance Engineering, Consumer Electronics. Senior Embedded Developer	Associate Designer - Process planning/ product development, Industrial Automation.
Level 4.5	1. Professional Theoretical Knowledge: Range of knowledge 2. Professional and Technical Skills/ Expertise: Range of technical skills	2152, 2512, 3114, 3122, 3139, 3155, 7412.	Technician - Instrumentation & Control, Power Electronics & Systems, Process Automation,	Study Post Diploma

	3. Employment Readiness & Entrepreneurship Skills & Mind-set: Team readiness & Enterpreurial readiness 4. Broad Learning Outcomes: Carry out Range of tasks and may provide range of solutions 5. Responsibility: Accountable/ responsible - Technician		Industrial Automation Engineering, Industrial Maintenance Engineering, Consumer Electronics. Embedded Developer	
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 Memembr-Follow instructions 4. Broad Learning Outcomes: Carry out Range of tasks and may provide range of solutions 5. Responsibility: Accountable/ responsible - Technician/Jr. technician	7311	Industrial Control and Instrumentation Technician	
Level 3.5	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 Memembr-Follow instructions 4. Broad Learning Outcomes: Carry out Range of tasks and may provide range of solutions 5. Responsibility: Accountable/ responsible - Technician/Jr. technician	2153 3113 3114	Technician-Electrical & Electronics	

Annexure-12: Key Learning Outcome

SL. NO.	MODULE NAME	KNOWLEDGE AND UNDERSTANDING	TECHNICAL & PROFESSIONAL SKILLS	APPLICATION OF KNOWLEDGE AND SKILLS
1st Year				
1	English -1 (CP15101T) English -2 (CP15201T) Ability to communicate effectively	Understand, comprehend grammar. Formation of simple sentences.	Communicate with peers. Writing skills - Internal & Organizational correspondence, technical writing. Public Speaking.	Write Business Letters Reports as necessary in Profession. Interact, communicate during Interviews, debates, and Group Discussion for Career Development. Develop Presentation Skills.
2	Mathematics -1 (CP15102T) Mathematics -2 (CP15202T) Ability to solve various mathematical problems	Basic Algebra. Linear and quadratic equations. Understanding Analytical geometry, Correlation and regressions, sequences, and series. Laplace Transform	Use of Trigonometry, Matrices and determinants, differential, and Integral calculus for solving Technical and Engineering problems.	Apply Statistics in Interpreting Data. Graphical representation of Data. Use appropriate units and measurements during interactions and discussions in the work area. Determine Percentage, Proportions and Ratios in day-to-day life.
3	Applied Science (CP15103T) Applied Science Lab - (CP15106P) Understanding various physical quantities, Conservation, and transfer of different forms of energy.	Interpret Different systems of Units and convert from one unit to another. Industrial Chemistry.	Describe Physical Law governing Translatory and Rotational Motions. Evaluating Work, Power, and Energy.	Application of Physical laws, Fluid Dynamics, concepts of Heat, and measurement, in the work area. Various energy sources, conversion, and conservation of energy. Renewable energy sources.

4	Electronics -1 - (CP15104T), Electronics -1 Lab - (CP15107P) Electronics -2 - (CP15204T), Electronics -2 Lab- (CP15208P) Understanding basic Electronics components, their construction, Specifications and Characteristics	Atomic Structure, Electron flow and charge, potential difference. Identifying active passive components. Introduction to Semiconductors, doping, Majority and Minority Carriers. Understand Construction, Types, Parameter, Characteristics, Configuration of Diodes and Transistors Construction, working and applications of Differential amplifier (inverting & non-inverting), NPN & PNP current mirror. Explain the Characteristics of Op-amp, symbol, and applications. Construction, classification and working of JFET & MOSFET Distinguish between BJT and JFET To understand the Working, Connection and applications of Opto-electronics Devices	Reading the specification and measuring values of different components using measuring equipment. Use different laws and rules governing electronic devices and circuits to derive various parameters of circuits (Current, Voltage, Impedance) etc. Design Different Types of Rectifier Circuits - wave shaping circuits- Clipper, clamper, Peak detector etc. Able to identify and explain different special purpose diodes and their characteristics and applications. Identify the components & read and comprehend the datasheet Soldering and de-soldering techniques, Safety procedure to be followed and best practices.	Troubleshoot different rectifiers and filters used in a product. Assembly and soldering of PCBs. Safety Practices.
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5	Electrical Engineering -1 - (CP15105T) Electrical Engineering-1 Lab - (CP15108P) Electrical Engineering -2 - (CP15205T) Electrical Engineering-2 Lab - (CP15209P) Ability to analyse different AC and DC Circuits, understanding functioning and controlling Electrical Machines.	Distinguish between Charge and Current, Potential Difference and EMF, Electric and Electronics Devices. Understanding on Power and Energy, Classification of Power resources, Knowledge on DC sources and their types. Understanding on various DC and AC parameters. Reduction of single-phase AC circuits. (Power factor, active reactive, Apparent Power, R-L-C Circuits) Power Generation and Distribution. Explain Three Phase AC Circuits, comparison, and advantages of Three phase AC Circuits, Phase difference, Delta and Star Configurations and applications. Construction and Functioning of AC and DC Machines. Explain Working Principle of Brushless D.C Motor, Stepper Motor, Servo Motor and PMSM Motor	State Specification and Applications of Electrical hand tools and identify Electrical safety symbols. Reduce circuits using different laws and theorems of electricity. Distinguish between single phase and 3 phase connections and their applications. Explain Types, Construction, Functioning and Applications of Single and Three Phase and Auto-Transformers, determine losses and efficiency. Specification and Applications of AC and DC Machines.	Will be Aware of Electrical fault conditions and Safety Procedures of Electrical Devices (Transformers, Motors etc) Use appropriate protective devices (fuse and their types, circuit breakers and their types, Relay and their types) Use Electrical hand tools and measuring equipments, Components, Safety and protection devices for development of Electrical circuits. Earthing and conditions. Rig up Single Phase AC Circuit wiring for lights and other appliances. Starting, Controlling and testing of AC and DC Machines.
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6	Engineering Drawing/CAD Fusion 360 Lab (CP15109P) CAD - Fusion 360 Lab - (CP15210P) Ability to create Engineering drawings through CAD software Application	Explain the different methods of geometric construction. Explain the types, uses and application of scale, lines, drawing sheet, layout, title block.	Describe the difference between first and third angle projection method. Explain the difference between orthographic and isometric projection. Dimensioning, Drafting, Assembly tools, Joints motion components, Animations and Animation tools.	Draw Orthographic projection, Isometric drawing, different types of sectioning and draw sectional views Draw the Two-dimensional (2D) and three dimensional (3D) diagrams as per given dimensions using Fusion 360. Perform CAD application in 2D modelling. Create and plot assembly and detail views of geometrical in 3D Modelling
7	Basics of Computer Lab (CP15111P) Ability to work with MS Office	Knowledge on Data representation and conversion.	Identify different parts of a computer and their functions. Installation of OS, Personalisation of PC, and other maintenance tools.	Perform different computer operation (Different computer operations: setting of computer, MS Office, and internet operation)
8	Workshop Practical – 1 (CP15110P) Workshop Practical – 2 (CP15211P) Understanding the safety and ability to operate the conventional machines.	Read Engineering Drawings	Identify the appropriate processes to be performed from the Engineering Drawings.	Perform different operations on the assigned job to achieve defined Specifications and dimensions.

9	Manufacturing Engineering (CP15203T) Understanding the manufacturing processes of various ferrous and non-ferrous materials and different Machining processes to achieve desired specifications.	Understanding basic concepts of Manufacturing Engineering Knowledge on Classification, Specification and Application of Steels and Alloys. Knowledge on Manufacturing Methods and Applications – Casting, Moulding and Forming Surface Protection Process - Electroplating, Chrome plating, Zinc, Nickel plating etc.	Subtractive Manufacturing: Conventional machining operations, work holding devices, tool holding devices, cutting fluids, Non-conventional Machining, Finishing. Formative Manufacturing: Casting, Powder metallurgy, plastic Moulding, Metal Forming. Joining Process - Fasteners.	Subtractive Manufacturing: Conventional machining operations, work holding devices, tool holding devices, cutting fluids, Non-conventional Machining, Finishing.
10	Metrology (CP15206T) Ability to apply the appropriate measuring instruments and gauges to measure different objects.	Knowledge on precision and Accuracy Interchangeability, Limits and Fits, Tolerance, Allowance, and Fits. Geometric dimensions and Tolerances,	Linear Measurements, Angular measurements Gauges, Comparators - different types of comparators. Measuring machines - Profile projector and CMM.	Linear Measurements- Using different measuring devices and options. Use of different gauges to measure different parameters of engineering,
11	Wiring Practices & Simulation Lab (CP15207P) Ability to apply, Digital circuits in simple applications	Knowledge on use of Autodesk eagle software	Draw the Symbols Used in Electrical Circuits	Draw the Electrical Wiring Diagram of Distribution Board, Power & Control Circuit, Assemble and test Electronic Circuit on simulation software, Measure voltage/ current at different test points, Detect fault observing diagnostic procedure and rectify using simulation software Rectification of errors using simulation software

12	Employability Skills (CP15112T) (CP15212T) Ability to behave appropriately. Understand Constitutional Values/ role of citizen. Ability to communicate appropriately. Understand Diversity and Inclusion.	Knowledge and understanding of all Human relation Principles. Knowledge and understanding of the constitution of Indian state and the preamble of the constitution. Fundamental Duties of the citizen of India. Knowledge and understanding of types of communication. Good understanding about Diversity and Inclusion in the workplace.	Able to practice HRP with peer groups to maintain healthy relationships. Practice the constitutional values in society. Being ethical and moral in society following all the fundamental duties in the society. Practice effective communication with peers, superiors and subordinates with empathy and care. Practice a sense of belonging in the society leaving behind all differences due to race, ethnicity, gender, age, identity etc.	Follow all the skills in the workplace and society to have peace and harmony with superiors and subordinates.
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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