

QUALIFICATION FILE

Electronics Manufacturing Services (EMS) Technician

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

NCrF/NSQF Level: 4

Submitted By:

Electronics Sector Skills Council of India (ESSCI)

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Section 1: Basic Details

1.	Qualification Name	Electronics Manufacturing Services (EMS) Technician														
2.	Sector/s	Electronics														
3.	Type of Qualification: ☐ New ☒ Revised ☐ Has Electives/Options ☐ OEM	NQR Code & version of existing/previous qualification: (change to previous, once 2022/EHW/ESSC/05136 & V 3		Qualification Name of existing/previous version: Electronics Manufacturing Services Technician												
4.	a. OEM Name b. Qualification Name (Wherever applicable)	NA														
5.	National Qualification Register (NQR) Code & Version (Will be issued after NSQC approval)	QG-04-EH-044942025-V2-ESSCI	6. NCrF/NSQF Level: 4													
7.	Award (Certificate/Diploma/Advance Diploma/ Any Other (Wherever applicable specify multiple entry/exits also & provide details in annexure)	Certificate														
8.	Brief Description of the Qualification	Electronics Manufacturing Services (EMS) Technician in this job job works on SMT machines, circuit boards and soldering equipment. The individual is responsible for the maintenance and troubleshooting of SMT equipment and also assists in the assembly and programming of SMT equipment.														
9.	Eligibility Criteria for Entry for Student/Trainee/Learner/Employee	a. Entry Qualification & Relevant Experience: <table border="1"> <thead> <tr> <th>S. No.</th> <th>Academic/Skill Qualification (with Specialization - if applicable)</th> <th>Required Experience (with Specialization - if applicable)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12th grade or equivalent</td> <td>NA</td> </tr> <tr> <td>2</td> <td>10th grade or equivalent</td> <td>3 years relevant experience</td> </tr> <tr> <td>3</td> <td>Certificate-NSQF (Level-3 in relevant domain)</td> <td>3 years of relevant experience</td> </tr> </tbody> </table> # Relevant Experience in Electronics Manufacturing Services b. Age: NA			S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)	1	12th grade or equivalent	NA	2	10th grade or equivalent	3 years relevant experience	3	Certificate-NSQF (Level-3 in relevant domain)	3 years of relevant experience
S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)														
1	12th grade or equivalent	NA														
2	10th grade or equivalent	3 years relevant experience														
3	Certificate-NSQF (Level-3 in relevant domain)	3 years of relevant experience														

10. Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))	15	11. Common Cost Norm Category (I/II/III) (wherever applicable): I																	
12. Any Licensing requirements for Undertaking Training on This Qualification (wherever applicable)	NA																		
13. Training Duration by Modes of Training Delivery (Specify Total Duration as per selected training delivery modes and as per requirement of the qualification)	☐ Offline ☐ Online ☒ Blended <table border="1"> <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>00:00</td> <td>180:00</td> <td>120:00</td> <td>00:00</td> <td rowspan="2">450</td> </tr> <tr> <td>Online</td> <td>150:00</td> <td>00:00</td> <td>00:00</td> <td>00:00</td> </tr> </tbody> </table> (Refer Blended Learning Annexure for details)		Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)	Classroom (offline)	00:00	180:00	120:00	00:00	450	Online	150:00	00:00	00:00	00:00
Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)														
Classroom (offline)	00:00	180:00	120:00	00:00	450														
Online	150:00	00:00	00:00	00:00															
14. Aligned to NCO/ISCO Code/s (if no code is available mention the same)	NCO-2015/3114.9900																		
15. Progression path after attaining the qualification (Please show Professional and Academic progression)	EMS Supervisor																		
16. Other Indian languages in which the Qualification & Model Curriculum are being submitted	Hindi																		
17. Is similar Qualification(s) available on NQR-if yes, justification for this qualification	☐ Yes ☒ No URLs of similar Qualifications:																		
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	No gender sensitization																		
20. Are Greening/ Environment Sustainability Aspects Covered (Specify the NOS/Module which covers it)	☒ Yes ☐ No (Employability Skills (60 hours)																		
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	Name: Saleem Ahmed Email: ceo@essc-india.org Contact No.: 011 – 8447738501																		

	(In case of CS or MS, provide details of both Lead AB & Supporting ABs)	Website: https://www.essc-india.org/				
23.	Final Approval Date by NSQC: 07.10.2025	24. Validity Duration: 3 Years	25. Next Review Date: 07.10.2028			

Section 2: Module Summary

NOS/s of Qualifications

(In exceptional cases these could be described as components)

Mandatory NOS/s:

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

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

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core / Non-Core	NCrF/NSQ F Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Re.c.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) (if applicable)
1	Operate reflow-oven soldering machine	ELE/N5304 & V3.0	Core	4	4	30	60	30	0	120	40	50	0	10	100	30
2	Apply solder paste	ELE/N5201 & V3.0	Core	4	4	30	60	30	0	120	40	50	0	10	100	25
3	Operate pick-and-place machine for PCB assembly	ELE/N5104 & V1.0	Core	4	6	60	60	60	0	180	40	50	0	10	100	25
4	Employability Skills (30 hours)	DGT/VSQ/N010 1 & V1.0	Non-core	4	1	30	0	0	0	30	20	30	0	0	50	20
Duration (in Hours) / Total Marks					15	150	180	120	0	450	140	180	0	30	350	100

Elective NOS/s:

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 NOS/s:

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

Assessment - Minimum Qualifying Percentage

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

Minimum Pass Percentage – Aggregate at qualification level: 70 % (Every Trainee should score specified minimum aggregate passing percentage at qualification level to successfully clear the assessment.)

Minimum Pass Percentage – NOS/Module-wise: ____ % (Every Trainee should score specified minimum passing percentage in each mandatory and selected elective NOS/Module to successfully clear the assessment.)

Section 3: Training Related

1.	Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)	Diploma/ ITI (Electronics/Mechanical) with 1 years industrial and 1 year training experience in the field of EMS Technician. Or Certified in relevant CITS Trade
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2.	Master Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)	Diploma/ ITI (Electronics/Mechanical) with 2 years industrial and 1 year training experience in the field of EMS Technician. Or Certified in relevant CITS Trade
3.	Tools and Equipment Required for Training	☒ Yes ☐ No (If "Yes", details to be provided in Annexure)
4.	In Case of Revised Qualification, Details of Any Upskilling Required for Trainer	NA

Section 4: Assessment Related

1.	Assessor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	Diploma/ ITI (Electronics/Mechanical) with 2 years industrial and 1 year training experience in the field of EMS Technician. Or Certified in relevant CITS Trade
2.	Proctor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	Diploma/ ITI (Electronics/Mechanical) with 3 years industrial and 2 year training experience in the field of EMS Technician. Or Certified in relevant CITS Trade
3.	Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	Diploma/ ITI (Electronics/Mechanical) with 4 years industrial and 1 year training experience in the field of EMS Technician. Or Certified in relevant CITS Trade
4.	Assessment Mode (Specify the assessment mode)	Blended
5.	Tools and Equipment Required for Assessment	☒ Same as for training ☐ Yes ☐ No (details to be provided in Annexure-if it is different for Assessment)

Section 5: Evidence of the need for the Qualification

Provide Annexure/Supporting documents name.

1.	Latest Skill Gap Study (not older than 2 years) (Yes/No): Yes
2.	Latest Market Research Reports or any other source (not older than 2 years) (Yes/No): Yes
3.	Government /Industry initiatives/ requirement (Yes/No): Yes
4.	Number of Industry validation provided: 23
5.	Estimated nos. of persons to be trained and employed: 3500
6.	Evidence of Concurrence/Consultation with Line Ministry/State Departments: Yes If “No”, why:

Section 6: Annexure & Supporting Documents Check List

Specify Annexure Name / Supporting document file name

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

12.	Any other document you wish to submit:	
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Annexure: Evidence of Level

NCrF/NSQF Level Descriptors	Key requirements of the job role/ outcome of the qualification	How the job role/ outcomes relate to the NCrF/NSQF level descriptor	NCrF/NSQF Level
Professional Theoretical Knowledge/Process	Demands a wide range of specialized technical skill, clarity of knowledge and practice in broad range of activity involving standard and non-standard practices. · Works on SMT machines, circuit boards and soldering equipment · Maintaining and troubleshooting of SMT equipment · Assists in the assembly and programming of SMT equipment · Plan the work as per the job allocation · Prepare all necessary records and documentation	Electronics Manufacturing Services (EMS) Technician is responsible for working on SMT machines, circuit boards and soldering equipment. He/She also responsible for maintaining and troubleshooting of SMT equipment and also assists in the assembly and programming of SMT equipment. Hence Level 4	4
Professional and Technical Skills/ Expertise/ Professional Knowledge	Factual and theoretical knowledge in broad contexts within a field of work or study. ☐ Knowledge of various tools and equipment used in Electronics Manufacturing Services - Know the basic types of electronics and SMT components ☐ Understanding of various types of machines and programming ☐ Know how to read a printed circuit board (PCB)	Electronics Manufacturing Services (EMS) Technician should know the basics of electrical/electronic components along with their functioning. He/She should know about the various types of machinery and programs used, maintaining and troubleshooting SMT and relevant equipment. Hence Level 4	4
Employment Readiness & Entrepreneurship	A range of cognitive and practical skills required to generate solutions to		4

Skills & Mind-set/Professional Skill	specific problems in a field of work or study. · Identify the work requirement to schedule timely completion accordingly · Apply the knowledge for managing Surface Mount Technology (SMT) machines · Identify different components to be machines · Complete the documentation as per company standards	An Electronics Manufacturing Services (EMS) Technician should be able to use basic tools and equipment in correct way Surface Mount Technology (SMT) machines He works after getting work requirements from supervisor or work schedule. Hence Level 4	
Broad Learning Outcomes/Core Skill	Needs proficiency in: · Communicating in clear, crisp and respectful language · Understanding workplace related documentation, guidelines, policies and procedures · Complying with organizational and professional code of ethics and standards of practice	Accountable for own work and learning in the domain of operation and maintenance. Hence Level 4	4
Responsibility	Responsibility of completing the work assigned and reporting the same as per standards. · Understand the job role and follow the organizational policy · Record and report about the work status · Follow safety regulations at work place · Work along with colleagues and supervisors	An Electronics Manufacturing Services (EMS) Technician is responsible for working on SMT machines, circuit boards and soldering equipment. The operator is also responsible to understand and follow the work standards and policies. Hence Level 4	4

Annexure: Tools and Equipment (Lab Set-Up)

List of Tools and Equipment

Batch Size: 30

S. No.	Tool / Equipment Name	Quantity for specified	Specifications
1	Electronics SMD components	100	Cosmic devices
2	Solder paste	2	IPC-Standard/Rosin/Water Soluble
3	Bare PCBs	50	Standard
4	Assembled Boards	5	Standard
5	De-soldering Pump	5	ABS Desoldering pump
6	Hot Air Gun	2	Bosh
7	Tweezers	10	Standard
8	SMT line including Loader	1	ETA/Dimension(L*W*H) 1650x730x1250mm
9	Solder paste printer machine	1	Fuji
10	Pick & Place machine	1	Fuji
11	Reflow solder machine	1	Fuji
12	AOI machine	1	Vitrox
13	Un-loader	1	ETA/Dimension(L*W*H) 2450x730x1250mm
14	In-circuit Tester	1	Okano AT01
15	Functional Testing setup	2	Standard
16	X-ray machine for inspection of BGA assemblies	1	Unicomp X-ray machine
17	Wave Soldering Machine	1	JT/NSM450
18	ESD Accessories	30	Standard
19	Solder Paste Mixer	1	Standard
20	Stencil Cleaning Machine	1	SMT net/33KW
21	ESD Wrist bands	40	Standard
22	ESD monitoring equipments	1	Standard
23	ESD Safe Bins	30	EVA Foam/Polypropylene
24	PCB Cleaning machine	1	KED-600/ 220-240V
25	PCB routing Machine/ De-panelizing machine	1	EM-5700N/40000rpm
26	Auto Chip counter	1	HEDA-818
27	Feeder Trolley	10	Standard
28	Feeder Loading Machine	1	Fuji
29	Multimeter	5	Standard
30	LCR meter	5	Standard
31	Oscilloscope	1	DC Digital Storage -30 MHz, SDS 5032E

32	DC power Source	1	Input Voltage:230V +/-10% AC 50 Hz
33	AC power Supply	1	Zeal/250VA
34	Ultrasonic Cleaning Machine	1	LeelaSonic/18"*12"*6" Capacity Liters- 20
35	SMT Rework Station	1	AC Voltage- 220 V +/-10%, Frequency- 50Hz, Power-700W +/-10%

Classroom Aids

The aids required to conduct sessions in the classroom are:

1. Whiteboard and marker
2. Projector
3. Computer/Laptop
4. Chairs and Tables

Annexure: Industry Validations Summary

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

S. No	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID	LinkedIn Profile (if available)
1	Access Edutech Pvt. Ltd.	Sanjay Kumar Mishra	Director	96, Vrindavan Nagar Ayodhya Bypass Road Bhopal	7000650224	sanjaymishra@accessedutech.com	
2	Sri Rajaram Shikshan Sansthan	Rajendra Parsad	Principle		8808696968	rajendraitijnp@gmail.com	
3	Artificial Intelligence Technologies	Rohit Kumar Sharma	Manager Product Development	A-21, sector 4, Block A, Kailash Colony, Greater Kailash, New Delhi	9927564461	rohit.sharma@aituniversal.com	
4	Bergen Associates Pvt Ltd.	Soubam Sunil	Manager	305-306, Magnum House-I, Commercial Complex, Karampura, New Delhi – 110015	9311780832	s.soubam@bergengroupindia.com	

5	Conduent- https://www.conduent.com	Prince Jain	Senior Business Analyst	7 to 9th Floor & 6 to 9th Floor, Building No.5 & 6, Plot No 20&21, Candor Tech Space, IT/ITES SEZ., Noida, Uttar Pradesh 201304	8439385780	prince.jain@conduent.com	
6	Ephicacy Lifescience Analytics	Rahul Kumar Kaushik	Senior Software Engineer	2nd Main Rd, Sarvobhogam Nagar, Arekere, Bengaluru, Karnataka 560076	8859885973	Rahul.Kaushik@ephicacy.com	
7	Nagravision India Pvt. Ltd.	Avinash Yadav	Manager- System Administrator	RMZ Centennial, Tower C unit 301 and 302, Mahadevapura Post ITPL Road, Bangalore	9808326626	avinash.yadav@nagra.com	
8	Ramyash Pvt ITI	Ramyash	Principel	Jamalpur	9454738298	Yashvantyadav964@gmail.com	
9	Nexgen Exhibitions Pvt. Ltd.	Saurabh Purwar	Director	1201/1206 Pragati Tower, 26 Rajendra Place, New Delhi-110008, India	9457306691	fbvidgo@gmail.com	
10	Siemens Limited	Manoj Belgaonkar	Head – Regulations, Standards and QM	R&D Centre, Thane Belapur Road, Airoli, Navi Mumbai 400708	9820682825	manoj.belgaonkar@siemens.com	
11	Tata Consultancy Services	Sheepra Kaushik	Consultant – Product Development	Kensington B Wing, Hiranandani SEZ, Powai, Mumbai 400076	8433595090	sheepra.sharma@tcs.com	
12	Evergreen Education Trust	Faizanbazaz	Director	217, Pehari Colony Jammu 180005	7006341193	eetturst@gmail.com	
13	B M Upadhyay Shiksha Samiti	K K Upadhyay	SPOC	Agra	9149158684	Kk7500081234@gmail.com	
14	SHIV SHAKTI TECKNIKI EVAM SAMANAYA SHIKSHAN SANSTHAN	Jitendra Kumar Garg	President	B 32 MAHESH NAGAR JAIPUR RAJASTHAN-302015	9782912782	jitendra.garg303@gmail.com	

15	Shri Solasar Balaji Shikshan	Nand Kishor Gurjar	SPOC	Rajasthan	9358734466	shribalajiitisujangarh@gmail.com	
16	Shree Hari Shikshan Santhan Aaspura	Mukesh Kumar	SPOC	Rajasthan 341508	7877239952	Harikct2024@gmail.com	
17	YADUVANSHI PRIVATE ITI	YADVENDRA	PRINCIPAL	TC229199 - YADUVANSHI PVT ITI, HASAMPUR The- NEEMKATHANA DIST-SIKAR RAJASTHAN PIN CODE NO -332718	8432882688	yaduvanshicollege2008@gmail.com	
18	Nagdeo Education Welfare Society	Vijay Nagdeo	General Manager	Ward No. 11 Junnardeo Dist. Chhindwara M.P. 480551	9425461093	Vijaynagdeo02@gmail.com	
19	Shri Prasad Sharma Shikshan Sansthan Myana	Suresh		Gautam Budha Nagar UP	8433476571		
20	Sankalp Education and development society	Jafruddin Khan	SPOC		8104049522		
21	Sri Venkateswara College of Engineering	Dr C Chandrasekhar	Head R &D & Professor in ECE	Karakmbadi Road,Tirupati 517507	9177217190	dr.chandrasekhar.c@svcolleges.edu.in	
22	Rastriya Khushali Sansthan	Ramkaran Sinsinwar	President	VOP Tajsar Fatehpur Rajasthan	6350658040	Rkstajsar1998@gmail.com	
23	IIAE Educational Society	Barinder Singh	President		9829745313	ivyindiaprojects@gmail.com	

Annexure: Training Details

Training and Employment Projections:

Year	Total Candidates	Women	People with Disability
	Estimated Training # Total	Estimated Training # Women	Estimated Training # PwD
2025-26	1000	NA	NA
2026-27	1000	NA	NA
2027-28	1500	NA	NA

Data to be provided year-wise for next 3 years

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

Qualification Version	Year	Total Candidates				Women				People with Disability			
		Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed
3.0	2022-23	203	168	143	NA	NA	NA	NA	NA	NA	NA	NA	NA
3.0	2023-24	86	81	53	NA	NA	NA	NA	NA	NA	NA	NA	NA
3.0	2024-25	3289	3062	2810	NA	NA	NA	NA	NA	NA	NA	NA	NA

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

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

1. PMKVY
- 2.

Content availability for previous versions of qualifications:

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

Languages in which Content is available:

Annexure: Blended Learning

Blended Learning Estimated Ratio & Recommended Tools:

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

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

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	• Books/ e-books • Presentations • Reference Material • Audio / Video Modules	30:70
2	☒ Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners	• Self-Learning Videos • Broadcasts • Mobile Learning • Curated Digital content	30:70
3	☒ Showing Practical Demonstrations to the learners	• Video Content • E-Resource library • AR/ VR/ XR	30:70
4	☒ Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training	• Training tools (tools list attached) • Video Play • Presentations	30:70
5	☒ Tutorials/ Assignments/ Drill/ Practice	• Online Question Bank • Mobile Quick test app • MCQ based tests	30:70
6	☒ Proctored Monitoring/ Assessment/ Evaluation/ Examinations	• Assessment engine for Essays • Up-loadable file examinations • Mock test sessions	30:70
7	☒ On the Job Training (OJT)/ Project Work Internship/ Apprenticeship Training	• Online tests • Offline assessments	30:70

Annexure: 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
ELE/N5304:Operate reflow-oven soldering machine	Program and operate the reflow- oven machine	26	30	-	5
	PC1. Discuss about how to Operate, maintain, and troubleshoot SMT machines and equipment, and assist in the assembly and programming of SMT systems as per operational requirements.	2	2		0
	PC2.check the daily PCB loading list	3	2	-	1
	PC3.identify and load specified program for the type of PCB assembled	2	3	-	0
	PC4.set temperature and time profile of heaters and coolers	3	4	-	0
	PC5.inspect the assembled boards for no defects before loading	3	4	-	1
	PC6.ensure the conveyer is adjusted according to the size of PCB and start the oven for the soldering schedule	3	4	-	1
	PC7.monitor soldering process until boards come out of the machine after soldering	4	4	-	0
	PC8.examine soldered boards to ensure quality	3	4	-	1
	PC9.follow ESD precautions and contamination prevention handling practices	3	3	-	1
	Perform quality inspection	7	12	-	3
	PC10. ensure that components are soldered using programmable reflow ovens with real-time thermal profiling for precise soldering	2	4		1
	PC11.check placement and solder of components	2	4	-	1
	PC12.check for any loose or damaged components or board	3	4	-	1
	Perform preventive maintenance of the machine	7	8	-	2
	PC13.maintain reflow oven machine to avoid downtime	3	4	-	1
	PC14.perform regular cleaning as prescribed by machine manufacturer	4	4	-	1
	NOS Total	40	50	-	10
ELE/N5201:Apply solder paste	Perform pre-screen printing activities	18	21	-	6
	PC1.collate the right stencil from stores and verify the correct screens and design to print	2	2	-	1
	PC2.use a roller to clean off the dust particles from the PCBs	2	3	-	1
	PC3.examine PCBs under microscopes for defects and dust	2	3	-	1

	PC4.change the sheet in the roller for every 10 boards	2	3	-	-
	PC5.inspect overall cleanliness to avoid defects such as solder bridging and poor wetting	3	3	-	1
	PC6.ensure that PCB surface does not come in contact with hand	3	1	-	1
	PC7.set up printing machine and program it based on the performance flow chart	2	3	-	1
	PC8.measure and mark pallets to ensure proper placement	2	3	-	-
	Apply solder paste	17	25	-	4
	PC9.Identify and load specified programs on machine's computer	2	3	-	1
	PC10.develop program overlay as precision fixture for automated paste application	2	3	-	-
	PC11.use framed stencil for machine application and prototype stencil for hand application of solder paste	2	3	-	1
	PC12.attach the stencil and board to printing machine	2	3	-	1
	PC13.ensure that solder paste is applied as per specifications	2	3	-	1
	PC14.monitor print speed, print pressure, separation speed and distance and printer alignment for controlled application of solder paste	2	3	-	-
	PC15.ensure there are no solder opens or bridging to prevent leakage through stencil holes to areas other than those intended	2	3	-	-
	PC16.confirm even release of paste with electro polished finish	1	2	-	-
	PC17.confirm that PCBs are sent for mounting in less than five hours after stencil printing	2	2	-	-
	Perform preventive maintenance of the machine	5	4	-	-
	PC18.perform regular cleaning as prescribed by machine manufacturer	3	2		-
	PC19.follow checklist for preventive maintenance schedules	2	2	-	-
	NOS Total	40	50	-	10
ELE/N5104:Operate pick-and-place machine for PCB assembly	Program and load the pick-and-place machine	6	11	-	5
	PC1.inspect printed solder paste for accuracy	2	2	-	1
	PC2.install specified programs on machine's computer according to PCB assembly plan	1	2	-	1
	PC3.program the coordinates as per customer specified design chart or as per the design of the board	1	2	-	1

PC4.identify components accurately and decide where/how to place them on the reel	1	2	-	1
PC5.perform troubleshoot and optimize the program	1	3	-	1
Perform assembling on PCBs	22	26	-	5
PC6.warm up machine for prescribed time period and set up tools and parts to operate the machine	1	2	-	-
PC7.check and place all components to the feeders according to program	3	3	-	1
PC8.adjust PCB transport rails for all machines	2	2	-	-
PC9.ensure specified gap between two boards for secure placing of components on each PCB	2	2	-	1
PC10.check and update the daily PCB-loading list	2	3	-	1
PC11.observe proper ESD and contamination prevention handling practices	2	2	-	-
PC12.monitor the operation of equipment to ensure that assemblies are in compliance with standards	2	3	-	1
PC13.hand over the finished boards to reflow machine operator	2	2	-	-
PC14.reload the components as and when the reel or tray becomes empty	2	3	-	1
PC15.monitor the pick-and-place assembling and soldering process	2	2	-	-
PC16.clear the reel path if it gets stuck due to improper flow of components	2	2	-	-
Visually inspect after assembly cycle	6	6	-	-
PC17.cross check the PCB and components received from screen printing section prior to assembly	2	2	-	
PC18.use the design chart to visually check the assembled board for components missed out	2	2	-	
PC19.inspect solder paste to check if it is as per specifications before starting the pick-and-place operation	2	2	-	
Perform preventive maintenance of the machine	3	4	-	
PC20.maintain machine to avoid downtime	1	2	-	
PC21.perform regular cleaning as prescribed by machine manufacturer	1	2	-	
PC22.perform weekly greasing and cleaning of nozzles	1			
Maintain Safe and Efficient Work Practices	3	3		

	PC1: Maintain a clean, organized, and safe work area, and follow workplace discipline.	1	1		
	PC2: Use personal protective equipment (PPE) and follow ESD precautions while handling electronic components.	1	1		
	PC3: Identify and report safety hazards or emergencies to the appropriate authority.	1	1		
	NOS Total	40	50	-	10
DGT/VSQ/N0101 - Employability Skills (30 hours)	Introduction to Employability Skills	1	1	-	-
	PC1. understand the significance of employability skills in meeting the job requirements	-	-	-	-
	Constitutional values – Citizenship	1	1	-	-
	PC2. identify constitutional values, civic rights, duties, personal values and ethics and environmentally sustainable practices	-	-	-	-
	Becoming a Professional in the 21st Century	1	3	-	-
	PC3.explain 21st Century Skills such as Self Awareness, Behavior Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and cultural awareness, emotional awareness, continuous learning mindset etc.	-	-	-	-
	Basic English Skills	2	3	-	-
	PC4. speak with others using some basic English phrases or sentences	-	-	-	-
	Communication Skills	1	1	-	-
	PC5. follow good manners while communicating with others	-	-	-	-
	PC6. work with others in a team			-	
	Diversity & Inclusion	1	1	-	-
	PC7. communicate and behave appropriately with all genders and PwD	-	-	-	-
	PC8. report any issues related to sexual harassment	-	-	-	-
	Financial & Legal Literacy	3	4	-	-
	PC9. use various financial products and services safely and securely	-	-	-	-
	PC10. calculate income, expenses, savings etc.	-	-	-	-
	PC11. approach the concerned authorities for any exploitation as per legal rights and laws	-	-	-	-

Essential Digital Skills	4	6	-	-
PC12. operate digital devices and use its features and applications securely and safely	-	-	-	-
PC13. use internet and social media platforms securely and safely	-	-	-	-
Entrepreneurship	3	5	-	-
PC14. identify and assess opportunities for potential business	-	-	-	-
PC15. identify sources for arranging money and associated financial and legal challenges	-	-	-	-
Customer Service	2	2	-	-
PC16. identify different types of customers	-	-	-	-
PC17. identify customer needs and address them appropriately	-	-	-	-
PC18. follow appropriate hygiene and grooming standards	-	-	-	-
Getting ready for apprenticeship & jobs	1	3	-	-
PC19. create a basic biodata	-	-	-	-
PC20. search for suitable jobs and apply	-	-	-	-
PC21. identify and register apprenticeship opportunities as per requirement	-	-	-	-
NOS Total	20	30	-	-
Grand Total	140	180	-	30

Annexure: Assessment Strategy

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

Mention the detailed assessment strategy in the provided template.

1. Assessment System Overview:
 - Batches assigned to the assessment agencies for conducting the assessment on SDMS/SIP or email
 - Assessment agencies send the assessment confirmation to VTP/TC looping SSC
 - Assessment agency deploys the ToA certified Assessor for executing the assessment
 - SSC monitors the assessment process & records
2. Testing Environment:
 - Confirm that the centre is available at the same address as mentioned on SDMS or SIP
 - Check the duration of the training.
 - Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
 - If the batch size is more than 30, then there should be 2 Assessors.
 - Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
 - Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
 - Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
 - Check the availability of the Lab Equipment for the particular Job Role.
3. Assessment Quality Assurance levels / Framework:
 - Question papers created by the Subject Matter Experts (SME)
 - Question papers created by the SME verified by the other subject Matter Experts
 - Questions are mapped with NOS and PC
 - Question papers are prepared considering that level 1 to 3 are for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor & higher management
 - Assessor must be ToA certified & trainer must be ToT Certified
 - Assessment agency must follow the assessment guidelines to conduct the assessment
4. Types of evidence or evidence-gathering protocol:
 - Time-stamped & geotagged reporting of the assessor from assessment location
 - Centre photographs with signboards and scheme specific branding
 - Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period
 - Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos
5. Method of verification or validation:
 - Surprise visit to the assessment location

- Random audit of the batch
- Random audit of any candidate
- 6. Method for assessment documentation, archiving, and access
 - Hard copies of the documents are stored
 - Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage
 - Soft copies of the documents & photographs of the assessment are stored in the Hard Drives

On the Job:

Each module (which covers the job profile of Electronics Manufacturing Services (EMS) Technician) will be assessed separately.

1. The candidate must score 50% in each module to successfully complete the OJT.
2. Tools of Assessment that will be used for assessing whether the candidate is having desired skills and etiquette of dealing with customers, understanding needs & requirements, assessing the customer and perform Soft Skills effectively:
 - Videos of Trainees during OJT
 - Answer Sheets of Question Banks
 - Assessing the Log Book entries of Trainees at Employer location
 - Employer Performance Feedback.
3. Assessment of each Module will ensure that the candidate is able to:
 - Understand the basic principles of AC, DC and electronic circuits.
 - Work effectively at the workplace
 - Basic health and safety practice.

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