



QUALIFICATION FILE

Electronic Hardware Design Engineer

☒ 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: 5

Submitted By:

Electronics Sector Skills Council of India (ESSCI)

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Section 1: Basic Details

1.	Qualification Name	Electronic Hardware Design Engineer														
2.	Sector/s	Electronics														
3.	Type of Qualification: ☐ New ☒ Revised ☐ Has Electives/Options ☐ OEM	NQR Code & version of existing/previous qualification: 2022/EHW/ESSC/05119 & V3.0		Qualification Name of existing/previous version: Electronic Hardware Design Engineer												
4.	a. OEM Name b. Qualification Name (Wherever applicable)	N/A														
5.	National Qualification Register (NQR) Code &Version (Will be issued after NSQC approval)	QG-05-EH-03980-2025-V4-ESSCI	6. NCrF/NSQF Level: Level 5													
7.	Award (Certificate/Diploma/Advance Diploma/ Any Other (Wherever applicable specify multiple entry/exits also & provide details in annexure)	Certificate														
8.	Brief Description of the Qualification	The individual at work is responsible for undertaking research on new products, working with R&D on developing the schematics, converting them to PCB layout using CAD and other software and generating the Gerber file to pass on to PCB manufacturers.														
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>UG Diploma in the relevant field (Physics/ Electronics/ Electrical/Mechanical)</td> <td>1.5 years of relevant experience required</td> </tr> <tr> <td>2</td> <td>3 Years Diploma after 10th (Electronics / Electrical/ Mechanical)</td> <td>3 years of relevant experience</td> </tr> <tr> <td>3</td> <td>Previous relevant qualification of NSQF level 4.5</td> <td>1.5 years of relevant experience</td> </tr> </tbody> </table> # Relevant Experience in PCB design & Manufacturing.			S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)	1	UG Diploma in the relevant field (Physics/ Electronics/ Electrical/Mechanical)	1.5 years of relevant experience required	2	3 Years Diploma after 10th (Electronics / Electrical/ Mechanical)	3 years of relevant experience	3	Previous relevant qualification of NSQF level 4.5	1.5 years of relevant experience
S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)														
1	UG Diploma in the relevant field (Physics/ Electronics/ Electrical/Mechanical)	1.5 years of relevant experience required														
2	3 Years Diploma after 10th (Electronics / Electrical/ Mechanical)	3 years of relevant experience														
3	Previous relevant qualification of NSQF level 4.5	1.5 years of relevant experience														
		b. Age: NA														
10.	Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))	19	11. Common Cost Norm Category (I/II/III/IV) (wherever applicable): I													

12.	Any Licensing requirements for Undertaking Training on This Qualification <i>(wherever applicable)</i>	N/A																						
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>00:00</td> <td>210:00</td> <td>180:00</td> <td>00:00</td> <td>570:00</td> </tr> <tr> <td>Online</td> <td>180.00</td> <td>00:00</td> <td>00:00</td> <td>00:00</td> <td></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)	00:00	210:00	180:00	00:00	570:00	Online	180.00	00:00	00:00	00:00	
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Classroom (offline)	00:00	210:00	180:00	00:00	570:00																			
Online	180.00	00:00	00:00	00:00																				
14.	Aligned to NCO/ISCO Code/s <i>(if no code is available mention the same)</i>	NCO-2015/2152.0801																						
15.	Progression path after attaining the qualification <i>(Please show Professional and Academic progression)</i>	Electronic Hardware Design - Lead																						
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: N/A																						
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 <i>(Specify the NOS/Module which covers it)</i>	☒ Yes ☐ No Employability Skills (DGT/VSQ/N0102)																						
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. Saleem Ahmed Email: ceo@essc-india.org Contact No.: 011 – 8447738501 Website: https://www.essc-india.org/																						
23.	Final Approval Date by NSQC: 07.05.2025	24. Validity Duration: 3 Years			25. Next Review Date: 30.04.2028																			

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/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	Develop and testing of PCB prototype	ELE/N8707 & V1.0	Core	5	10	90	120	90	0	300	40	60	0	0	100	30
2	Ensuring Product Excellence and Collaboration	ELE/N8708 & V1.0	Core	5	7	66	54	90	0	210	40	60	0	0	100	50
3	Employability Skills (60 Hours)	DGT/VSQ/N0102 & V1.0	Non-Core	4	2	24	36	0	0	60	20	30	0	0	50	20
Duration (in Hours) / Total Marks					19	180	210	180	0	570	100	150	0	0	250	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/Degree in Mechanical/Electrical/Electronics with 2 years of experience in Electronic Designing and preferably 1 year as Trainer in PCB design & Manufacturing. Or Certified in relevant CITS Trade
2.	Master Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)	Diploma/ ITI/Degree in Mechanical/Electrical/Electronics with 3 years of experience in Electronic Designing and preferably 1 year as Trainer in PCB design & Manufacturing. 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/Degree in Mechanical/Electrical/Electronics with 3 years of experience in Electronic Designing and preferably 1 years as Trainer in PCB design & Manufacturing. Or Certified in relevant CITS Trade
2.	Proctor's Qualification and experience in relevant sector (in years) (as per NCVET guidelines)	Diploma/ITI/Degree in Mechanical/Electrical/Electronics with 4 years of experience in Electronic Designing and preferably 1 years as Trainer in PCB design & Manufacturing. 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/Degree in Mechanical/Electrical/Electronics with 4 years of experience in Electronic Designing and preferably 1 years as Trainer in PCB design & Manufacturing. 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: 18
5.	Estimated nos. of persons to be trained and employed: 500
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:	

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 specialised technical skill, clarity of knowledge and practice in a broad range of activity involving standard and non-standard practices. - Understanding new product specifications - Designing and creating layouts - Testing the prototype - Verifying and approving design	An Electronic Hardware Design Engineer is responsible for understanding a new product and then doing the forward process of designing and testing the product prototype	5

	- Achieving productivity, quality, and safety standards as per company's norms - Working effectively at the workplace. - Applying health and safety practices at the workplace.		
Professional and Technical Skills/ Expertise/ Professional Knowledge	Factual and theoretical knowledge in broad contexts within a field of work or study. - Understanding of new product specifications - Process of achieving productivity and quality - Knowledge of company's policy on turnaround time, working hours.	An Electronic Hardware Design Engineer should have a proper understanding about the new product specifications and going forward in the process by achieving productivity and quality. Hence Level 5	5
Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	A range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study. - Communicate with the team to understand the work requirement - Identify the errors in process - Achieve quality and productivity - Complete the documentation of the design	An Electronic Hardware Design Engineer should be able to communicate with the team to understand the requirements. Achieving quality and productivity is also important. Hence Level 5	5
Broad Learning Outcomes/Core Skill	Reasonably good in: - Understanding new product specifications - Designing and creating layouts - Testing of prototype and design modification - Verifying and approving the design	An Electronic Hardware Design Engineer should be able to understand new product specifications and move forward with designing and testing the product prototype. Hence Level 5	5
Responsibility	Responsibility of completing the work assigned and reporting the same as per standards. - Understand the job role and follow the organisational policy - Follow safety regulations at work place - Work along with colleagues	An Electronic Hardware Design Engineer should record the issues and also update the status of the work as per organisations policy. Hence Level 5	5

Annexure: Tools and Equipment (Lab Set-Up)

List of Tools and Equipment

Batch Size: 30

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1	Wire Stripper	2	Nos
2	Whiteboard	1	No
3	Warning Signs and Tapes	2	Pair
4	Universal Crimp Tool	5	Nos
5	Torque Wrench	4	Nos
6	Spot Welding Machine	2	Nos
7	Shear Cutters	2	Nos
8	Screw Driver Set	2	Nos
9	Safety Shoes	6	Pair
10	Safety Helmet	6	Nos
11	Safety Glasses	6	Pair
12	Rubber Gloves	2	Pair
13	Projector	1	No
14	Precision Screw Driver	2	Nos
15	Power Supply	2	Nos
16	Marker	5	Nos
17	Line Tester	2	Nos
18	Laptop	1	No
19	First Aid Kit	1	No
20	Fire Extinguisher	1	No
21	ESD Mat	6	Nos
22	ESD Gloves	6	Pair
23	Digital Multimeter	6	Nos
24	Connecting Wire	30	Nos
25	Functional Validation Test (FVT)	1	No
26	In-Circuit Testing (ICT)	1	No
27	Pick-and-Place machine	1	No
28	Digital ICs	2	Nos
29	Software (OrCAD/ Altium/KiCad)	1	No
30	Automated Optical Inspection (AOI)	1	No
31	Wave Soldering machine	1	No
32	Reflow Soldering machine	1	No
33	Soldering Machine	2	Nos
34	Stencils	5	Nos

Classroom Aids

The aids required to conduct sessions in the classroom are:

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

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	Nagdeo Education Welfare Society	Vijay Nagdeo	General Manager	Ward No. 11 Junnardeo Dist. Chhindwara M.P. 480551	9425461093	Vijaynagdeo02@gmail.com	
2	Access Edutech Pvt. Ltd.	Sanjay Kumar Mishra	Director	96, Vrindavan Nagar Ayodhya Bypass Road Bhopal	7000650224	sanjaymishra@accesseduotech.com	
3	SHIV SHAKTI TECKNIKI EVAM SAMANAYA SHIKSHAN SANSTHAN	Jitendra Kumar Garg	President	B 32 MAHESH NAGAR JAIPUR RAJASTHAN-302015	9782912782	jitendra.garg303@gmail.com	
4	YADUVANSHI PRIVATE ITI	YADVENDRA	PRINCIPAL	TC229199 - YADUVANSHI PVT ITI, HASAMPUR The-NEEMKATHANA DIST-SIKAR RAJASTHAN PIN CODE NO - 332718	8432882688	yaduvanshicollege2008@gmail.com	
5	Balaji Private ITI	Rakesh Kumar	PRINCIPAL	Moonpur Mundawar Alwar Rajasthan	9829745313	rakeshiti@gamil.com	

6	EdgeFX Technologies Pvt. Ltd	Tarun Agarwal	COO	105, Liberty Plaza, Himayatnagar Hedrabad Telangana 500029		info@edgefxkits.in	
7	KK TMCE			59 Seema Vihar Kammanhalli, Main road, Kalyan Nagar, Po. Bangalore 560043			
8	n- Gen Group		Trainer	Pune	8888839605	training@ngen.group.com	
9	Rastriya Khushali Sansthan	Ramkaran Sinsinwar	President	VOP Tajsar Fatehpur Rajasthan	6350658040	Rkstajsar1998@gmail.com	
10	Rita Pad P System Ltd	Rita	Director	Plot 44/45 Sector18 Gurgaon 122015	995809443		
11	Skills India Pvt. Ltd.	Sriram	Head Content		9845013638	sriram@skills.com	
12	Manav Shiksha			Vill+Post – OIE, Dis. Mathura	7500000637		
13	Annur Industrial Training Institute	Shridevikr	Director		9489675146	skill@gmail.com	
14	Involute Automation Pvt. Ltd	Vijaya Chandra	Operational Charge In	Plot No. 12 Tecgnocrats Industrial Estate Balanaga, Hyderabad, Telangna 500037 india		Vijaya.chandra@involutetraining.in	
15	Jnana Ganga Vidya Pith	Jagdish Parsad Yadav	Manager		9448467800	jagdishprasadyadav@gmail.com	
16	Varujh Infotech Pvt. Ltd	Gaurav Prakash	M.D.	Kanpur Uttar Pradesh	8886634504	Skill.akyone@gmail.com	
17	Vedh Narayan Singh Sheva Sansthan	Manoj Kumar	Director	Dholpur Rajasthan	9216692269	Msharmadholpur1@gmail.com	
18	Vedham Academy Madurai	Sundar Rajan	Admin	Tamilnadu	9787551862		

Annexure: Training & Employment Details

Training and Employment Projections:

Year	Total Candidates	Women	People with Disability
	Estimated Training # Total	Estimated Training # Women	Estimated Training # PwD
2025-26	150	NA	NA
2026-27	150	NA	NA
2027-28	200	NA	NA

Data to be provided year-wise for next 3 years

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

Qualifica tion Version	Year	Total Candidates				Women				People with Disability			
		Trained	Assesse d	Certifie d	Placed	Trained	Assessed	Certifie d	Placed	Trained	Assessed	Certified	Placed
3.0	2022-23	160	155	67	NA	NA	NA	NA	NA	NA	NA	NA	NA
3.0	2023-24	91	51	46	NA	NA	NA	NA	NA	NA	NA	NA	NA
3.0	2024-25	65	65	65	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.
- 2.

Content availability for previous versions of qualifications:

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

Languages in which Content is available: English

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 Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
ELE/N8707: Develop and testing of PCB prototype	<i>Understanding new product specifications</i>	12	16	-	-
	PC1. Interact with customers to understand hardware specifications and functional requirements.	3	4	-	-
	PC2. Analyze the technical feasibility of product requirements and provide feedback to stakeholders.	3	4	-	-
	PC3. Collaborate with cross-functional teams to define hardware specifications, interfaces, and performance metrics.	3	4	-	-
	PC4. Research and evaluate new technologies and components to meet product requirements.	3	4	-	-
	<i>Designing Electronic Circuits</i>	10	17	-	-
	PC5: Develop schematic diagrams using design software (e.g., Altium, KiCad, OrCAD).	2	5	-	-
	PC6: Select and evaluate electronic components for functionality, reliability, and cost-effectiveness.	2	3	-	-
	PC7: Design high-speed, low-power, or high-frequency circuits based on application requirements.	2	3	-	-
	PC8: Perform simulations to validate circuit performance under various conditions (e.g., thermal, EMI/EMC).	2	3	-	-
	PC9: Optimize designs for manufacturability, testability, and scalability.	2	3	-	-
	<i>Developing PCB Layouts</i>	10	15	-	-
	PC10: Create PCB layouts adhering to design rules and manufacturing constraints.	2	5	-	-
	PC11: Perform impedance control, differential pair routing, and high-speed signal routing for critical designs.	2	5	-	-

	PC12: Validate the PCB design through design rule checks (DRC) and electrical rule checks (ERC).	2	3	-	-
	PC13: Generate Gerber files and fabrication packages for manufacturing.	2	2	-	-
	PC14: Collaborate with PCB manufacturers to resolve design-related queries.	2	3	-	-
	<i>Prototyping and Testing</i>	8	12	-	-
	PC15: Assemble and test prototypes to validate design functionality and performance.	2	3	-	-
	PC16: Perform debugging and troubleshooting of hardware issues using test equipment (e.g., oscilloscopes, logic analyzers).	2	3	-	-
	PC17: Validate hardware against product specifications and performance criteria.	2	3	-	-
	PC18: Document test procedures, results, and deviations for future reference.	2	3	-	-
	NOS Total	40	60	-	-
ELE/N8708: Ensuring Product Excellence and Collaboration	<i>Ensuring Compliance and Standards</i>	<i>11</i>	<i>16</i>	-	-
	PC1: Ensure designs comply with relevant industry standards (e.g., IPC, RoHS, CE, FCC).	3	4	-	-
	PC2: Conduct EMI/EMC testing to ensure regulatory compliance.	3	4	-	-
	PC3: Incorporate safety and reliability features into the hardware design.	3	4	-	-
	PC4: Ensure thermal management and mechanical integrity of hardware designs.	2	4	-	-
	<i>Supporting Manufacturing and Production</i>	<i>9</i>	<i>12</i>	-	-

PC5: Work with production teams to ensure smooth transition from design to manufacturing.	3	4	-	-
PC6: Develop test jigs and fixtures for production testing.	3	4	-	-
PC7: Provide technical support for resolving manufacturing and assembly issues.	3	4	-	-
<i>Continuous Improvement and Innovation</i>	6	12	-	-
PC8: Identify opportunities for cost reduction and performance improvement in existing designs.	2	4	-	-
PC9: Stay updated with advancements in hardware design tools, components, and technologies.	2	4	-	-
PC10: Propose innovative solutions to improve product features and performance.	2	4	-	-
<i>Collaboration and Communication</i>	6	8	-	-
PC11: Collaborate with firmware, software, and mechanical teams to ensure seamless integration.	2	2	-	-
PC12: Communicate design progress and challenges to stakeholders through presentations and reports.	2	3	-	-
PC13: Participate in design reviews and provide constructive feedback to peers.	2	3	-	-
<i>Achieving Productivity and Quality Standards</i>	8	12	-	-
PC14: Meet project deadlines and deliverables as per the project plan.	2	3	-	-
PC15: Ensure hardware designs meet customer specifications and quality standards.	2	3	-	-
PC16: Work with the quality assurance team to identify and resolve defects.	2	3	-	-
PC17: Maintain proper documentation of designs, revisions, and test results.	2	3	-	-
NOS Total	40	60	-	-
<i>Introduction to Employability Skills</i>	1	1	-	-

DGT/VSQ/N0102: Employability Skills (60 Hours)	PC1. identify employability skills required for jobs in various industries	-	-	-	-
	PC2. identify and explore learning and employability portals	-	-	-	-
	<i>Constitutional values – Citizenship</i>	1	1	-	-
	PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
	PC4. follow environmentally sustainable practices	-	-	-	-
	<i>Becoming a Professional in the 21st Century</i>	2	4	-	-
	PC5. recognize the significance of 21st Century Skills for employment	-	-	-	-
	PC6. practice the 21st Century Skills such as Self- Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life	-	-	-	-
	<i>Basic English Skills</i>	2	3	-	-
	PC7. use basic English for everyday conversation in different contexts, in person and over the telephone	-	-	-	-
	PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
	PC9. write short messages, notes, letters, e-mails etc. in English	-	-	-	-
	<i>Career Development & Goal Setting</i>	1	2	-	-
	PC10. understand the difference between job and career	-	-	-	-

PC11. prepare a career development plan with short- and long-term goals, based on aptitude	-	-	-	-
<i>Communication Skills</i>	2	2	-	-
PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings	-	-	-	-
PC13. work collaboratively with others in a team	-	-	-	-
<i>Diversity & Inclusion</i>	1	2	-	-
PC14. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC15. escalate any issues related to sexual harassment at workplace according to POSH Act	-	-	-	-
<i>Financial and Legal Literacy</i>	2	3	-	-
PC16. select financial institutions, products and services as per requirement	-	-	-	-
PC17. carry out offline and online financial transactions, safely and securely	-	-	-	-
PC18. identify common components of salary and compute income, expenses, taxes, investments etc	-	-	-	-
PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation	-	-	-	-
<i>Essential Digital Skills</i>	3	4	-	-
PC20. operate digital devices and carry out basic internet operations securely and safely	-	-	-	-

PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively	-	-	-	-
PC22. use basic features of word processor, spreadsheets, and presentations	-	-	-	-
<i>Entrepreneurship</i>	2	3	-	-
PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research	-	-	-	-
PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-
PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity	-	-	-	-
<i>Customer Service</i>	1	2	-	-
PC26. identify different types of customers	-	-	-	-
PC27. identify and respond to customer requests and needs in a professional manner.	-	-	-	-
PC28. follow appropriate hygiene and grooming standards	-	-	-	-
<i>Getting ready for apprenticeship & Jobs</i>	2	3	-	-
PC29. create a professional Curriculum vitae (Résumé)	-	-	-	-
PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	-	-	-

	PC31. apply to identified job openings using offline /online methods as per requirement	-	-	-	-
	PC32. answer questions politely, with clarity and confidence, during recruitment and selection	-	-	-	-
	PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-
	NOS Total	20	30	-	-
Grand Total		100	150		0

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 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:

- Check the Assessment location, date and time
- 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.

3. Assessment Quality Assurance levels/Framework:

- Question bank is created by the Subject Matter Experts (SME) are verified by the other SME
- Questions are mapped to the specified assessment criteria
- Assessor must be ToA certified & trainer must be ToT Certified

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

5. Method of verification or validation:

- Surprise visit to the assessment location

6. Method for assessment documentation, archiving, and access

- Hard copies of the documents are stored

On the Job:

1. Each module (which covers the job profile of Electronic Hardware Design Engineer) will be assessed separately.
2. The candidate must score 60% in each module to successfully complete the OJT.
3. 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 performing 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
4. Assessment of each Module will ensure that the candidate is able to:

- Understand new product specification for PCB
- Designing and creating the PCB layout.
- Work Effectively at work place

NSQC Approved

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 defines 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