QUALIFICATION FILE

Printed Circuit Board 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:

NATIONAL INSTITUTE OF ELECTRONICS AND INFORMATION TECHNOLOGY

NIELIT Bhawan,
Plot No. 3, PSP Pocket, Sector-8,
Dwarka, New Delhi-110077

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<tr><td>2.</td><td>Sector/s</td><td colspan="2">Electronics</td></tr>
<tr><td>3.</td><td>Type of Qualification: ☐ New ☒ Revised ☐ Has Electives/Options
☐OEM</td><td>NQR Code & version of existing/previous qualification:
2020/ITES/NIELIT/03936</td><td>Qualification Name of existing/previous version:
Certificate Course on Printed Circuit Board Design, Analysis and Manufacturing Techniques</td></tr>
<tr><td>4.</td><td>a. OEM Name
b. Qualification Name
(Wherever applicable)</td><td colspan="2">NA</td></tr>
<tr><td>5.</td><td>National Qualification Register (NQR) Code &Version
(Will be issued after NSQC approval)</td><td>QG-04-EH-02854-2024-V2-NIELIT</td><td>6. NCrF/NSQF Level: 4</td></tr>
<tr><td>7.</td><td>Award (Certificate/Diploma/Advanced Diploma/ Any Other (Wherever applicable specify multiple entry/exits also & provide details in annexure)</td><td colspan="2">Certificate</td></tr>
<tr><td>8.</td><td>Brief Description of the Qualification</td><td colspan="2">This course provides an overview of Printed Circuit Board (PCB) technology, starting with an exploration of basic concepts such as electronic component packages, types of PCBs, and the history of PCB development. Participants gain insight into Electronic Design Automation (EDA) tools, with a focus on customizing Autodesk Eagle for in-depth analysis and design. The curriculum delves into component types, including through-hole packages, and emphasizes adherence to design rules. Participants learn the CAD workflow and the importance of manufacturing documentation. Additionally, they develop proficiency in creating PCB flowcharts, understanding layering and materials, and simulating electronic circuits to analyze waveform outputs. Furthermore, the course covers Film Master generation methods, material selection, and assembly techniques for both leaded and surface-mounted devices, along with familiarization with assembly tools. Through this comprehensive training, participants acquire fundamental knowledge crucial for PCB design and manufacturing processes.</td></tr>
<tr><td>9.</td><td>Eligibility Criteria for Entry for Student/Trainee/Learner/Employee</td><td colspan="2">a. Entry Qualification & Relevant Experience:
<table>
<tr><th>S. No.</th><th>Academic/Skill Qualification (with Specialization - if applicable)</th><th>Required Experience (with Specialization - if applicable)</th></tr>
<tr><td>1.</td><td>12th or equivalent</td><td>NA</td></tr>
</table>
</td></tr>
</table>

		2.	**OR** 2 Years of 3-years Diploma in relevant field* after 10th	NA
		3.	**OR** 10th grade pass	3 year relevant experience
		4.	**OR** Previous relevant Qualification of NSQF Level 3	1.5 year relevant experience

*Electrical/Electronics

b. Age: 18 years

10.	**Credits Assigned to this Qualification, Subject to Assessment** *(as per National Credit Framework (NCrF))*	16 Credits	**11. Common Cost Norm Category (I/II/III)** *(wherever applicable)***:** Category I (Electronics System Design)
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 the requirement of the qualification)*	☒**Offline** ☐ **Online** ☐ **Blended**	

Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	ES (Hours)	Total (Hours)
Classroom (offline)	180	180	60	60	480

**based on the project OJT can be done online/ offline/mixed mode.*

The mode of delivery shall be based on the regional demand and can be offered in any of the above modes mentioned.

14.	**Aligned to NCO/ISCO Code/s** *(if no code is available, mention the same)*	NCO-2015 / 8212.2701
15.	**Progression path after attaining the qualification** *(Please show Professional and Academic progression)*	*Academic:* *PCB Design Engineer-* ***ELE/Q8703****(Electronics Sector Skills Council of India)* *Professional:* *Lab Technician of PCB->PCB Design Engineer, PCB fabrication Engineer->Supervisor*

16.	**Other Indian languages in which the Qualification & Model Curriculum are being submitted**	Qualification files are available in English and Hindi language.	
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:** a. Locomotor Disability ● Leprosy Cured Person ● Dwarfism ● Muscular Dystrophy ● Acid Attack Victims b. Visual Impairment ● Low Vision	
19.	**How Participation of Women will be Encouraged**	Through funding from the Government under various schemes and projects.	
20.	**Are Greening/ Environment Sustainability Aspects Covered** *(Specify the NOS/Module which covers it)*	**☐ Yes ☒ No**	
21.	**Is Qualification Suitable to be Offered in Schools/Colleges**	**Schools ☐ Yes ☒ No Colleges ☒ Yes ☐ No**	
22.	**Name and Contact Details of Submitting / Awarding Body SPOC** *(In case of CS or MS, provide details of both Lead AB & Supporting ABs)*	**Name:** Surajit Paul **Email:** surajit@nielit.gov.in **Contact No.:** +91 8794822459 **Website:** https://nielit.gov.in/	
23.	**Final Approval Date by NSQC: 25.07.2024**	**24. Validity Duration: 3 Years**	**25. Next Review Date: 25.07.2027**

Section 2: Module Summary

Mandatory NOS/s of Qualifications

I. *NOS1: Fundamentals of PCB Design*
II. *NOS2: Printed Circuit Board Design and Analysis Techniques*
III. *NOS3: PCB Manufacturing and Assembly Techniques*
IV. *NOS4: Implementation of PCB Design Project/ OJT*
V. *NOS5: Employability Skills*

duration and assessment criteria at NOS/ Module level. For further details refer to the 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.	Total	Weightage (%) *(if applicable)*
1.	NOS1: Fundamentals of PCB Design	Code: NIE/ELE/N0914 Version: 1.0	Core	4	4	60	60	0	0	120	50	23	73	14.6
2.	NOS2: Printed Circuit Board Design and Analysis Techniques	Code: NIE/ELE/N0915 Version: 1.0	Core	4	4	60	60	0	0	120	50	22	72	14.4
3.	NOS3: PCB Manufacturing and Assembly Techniques	Code: NIE/ELE/N0916 Version: 1.0	Core	4	4	60	60	0	0	120	100	45	145	29
Subtotal						**180**	**180**	**0**	**0**	**360**	**200**	**90**	**290**	**58**
4.	NOS4: Implementation of PCB Design project/ OJT	Code: NIE/ELE/N0913 Version: 1.0	Core	4	2	0	0	60	0	60	0	0	60	12

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.	Total	Weightage (%) *(if applicable)*
5.	NOS5: Employability Skills	Code: DGT/VSQ/N0102 Version: 1.0	Non-Core	4	2	60	0	0	0	60	0	0	50	10
6.	Major Project/ Dissertation	NA	Core	4	-	-	-	-	-	-	-	-	100	20
7.	**Duration (in Hours) / Total Marks**	**-**	**-**	**4**	**16**	**480**					**500**			**100**

Assessment Components	NOS Included	Duration (in mins)	Marks
Theory Paper 1 – PCB Design Fundamentals and Analysis Techniques	1,2	90	100
Theory Paper 2 – PCB Manufacturing and Assembly Techniques	3	90	100
Practical Paper 1- Practical on PCB Design, Manufacturing and Assembly	1,2,3	180	90
Internal Assessment	5		60
OJT/Assignment	1,2,3		50
Major Project	1,2,3,4		100
		Total	**500**

*** Along with the report on OJT, an additional dissertation has to be submitted by the trainee.**

*****Assessment strategy shall be as per NIELIT Norms prevailing at times.**

Minimum Pass Percentage – The pass percentage is 50% in each assessment component (as mentioned in the above table) with the aggregate pass percentage be 50%

Section 3: Training Related

1.	**Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	B.E./B. Tech in Electronics/ Electronics & Communication/ Electrical/ Electrical and Electronics/Instrumentation/ Electronics & Instrumentation / Instrumentation & Control Minimum 2 year of experience in the field of Electronics System Design
2.	**Master Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	B.E./B. Tech in Electronics/ Electronics & Communication/ Electrical/ Electrical and Electronics/Instrumentation/ Electronics & Instrumentation / Instrumentation & Control Minimum 5 years of experience in the field of Electronics System Design
3.	**Tools and Equipment Required for Training**	☒Yes ☐No (*If "Yes", details to be provided in Annexure)* *Details available in Annexure II*
4.	**In Case of Revised Qualification, Details of Any Upskilling Required for Trainer**	Nil

Section 4: Assessment Related

1.	**Assessor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	B.Tech or Equivalent as per NCrF + 3 years relevant experience
2.	**Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	The assessor carries out theory online assessments through the remote proctoring methodology. Theory examination would be conducted online and the paper comprises MCQ. Conduct of assessment is through trained proctors. Once the test begins, remote proctors have full access to the candidate's video feeds and computer screens. Proctors authenticate the candidate based on registration details, pre-test image captured and I-card in possession of the candidate. Proctors can chat with candidates or give warnings to candidates. Proctors can also take screenshots, terminate a specific user's test session, or re-authenticate candidates based on video feeds.
3.	**Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	External Examiners/ Observers (Subject matter experts) are deployed including NIELIT scientific officers who are subject experts for evaluation of Practical examination/ internal assessment / Project/ Presentation/ assignment and Major Project (if applicable). Qualification is generally B.Tech
4.	**Assessment Mode** *(Specify the assessment mode)*	Online for Theory Online/ Offline/ Blended for other assessment components depending on the region where the assessment is conducted
5.	**Tools and Equipment Required for Assessment**	☒ Same as for training ☒ Yes ☐ No (D*etails to be provided in Annexure-II)*

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, Available in Annexure-A: Evidence of Need
2.	**Latest Market Research Reports or any other source (not older than 2 years) (Yes/No):** Yes, Available at Annexure-A: Evidence of Need
3.	**Government /Industry initiatives/ requirement (Yes/No):** Yes, Available at Annexure-A: Evidence of Need
4.	**Number of Industry validation provided:** 10
5.	**Estimated no. of persons to be trained and employed:** 500 persons per year shall be trained.
6.	**Evidence of Concurrence/Consultation with Line Ministry/State Departments:** NIELIT is recognized as AB and AA under Government Category. NIELIT is an HRD arm of MeitY, therefore, the Line Ministry Concurrence is not required.

Section 6: Annexure & Supporting Documents Checklist

1.	**Annexure:** NCrF/NSQF level justification based on NCrF level/NSQF descriptors *(Mandatory)*	Available at Annexure-I: Evidence of Level
2.	**Annexure:** List of tools and equipment relevant for qualification *(Mandatory, except in case of online course)*	*Available at Annexure-II: Tools and Equipment*
3.	**Annexure:** Detailed Assessment Criteria *(Mandatory)*	*Available at Annexure-VI: Detailed Assessment Criteria*
4.	**Annexure:** Assessment Strategy *(Mandatory)*	*Available at Annexure-VII: Detailed Assessment Strategy*
5.	**Annexure:** Blended Learning *(Mandatory, in case selected Mode of delivery is "Blended Learning")*	*Available at Annexure-V: Blended Learning*
6.	**Annexure:** Industry Validation Summary	*Available at Annexure-III: Industry Validation*
7.	**Annexure:** Multiple Entry-Exit Details *(Mandatory, in case qualification has multiple Entry-Exit)*	*NA*
8.	**Annexure:** Acronym and Glossary *(Optional)*	*Available at Annexure-VIII: Acronym and Glossary*
9.	**Supporting Document:** Model Curriculum *(Mandatory – Public view)*	*Available at Annexure-B_ Model Curriculum* *Syllabus is available at Annexure-D*
10.	**Any other document you wish to submit:**	*NA*

Annexure I: 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	Expected to work in PCB Industries in design and Manufacturing Sector. Expected to works in academic Area for conduction of Practical's /Project Development Phase. Expected to start setup for design and development of PCBs.	The job of PCB design & fabrication involves different predictable and routine activities such as use of CAD tools, CNC drilling, Through hole plating, developing, etching, stripping, solder masking etc ,which requires work in familiar situation of clear choice of processes.	**4**
Professional and Technical Skills/ Expertise/ Professional Knowledge	After completion of certification as per the curriculum on this course student will be able to design PCBs using different CAD tools. They can assist in PCB Design and manufacturing Industries. Students will be able to handle this work in academic environment also	The PCB design & fabrication involves execution of different processes in sequence. The students should have the factual knowledge of all the related processes to perform the job.	**4**
Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	Students can Design PCBs for given circuits; They can handle various PCB CAD packages. Students will be able to generate Manufacturing documents; can assist in Manufacturing Sector and in assembly area. Can assist in Project development in Academic field	The PCB design & fabrication involves execution of specific processes in sequence, operation of different machines & use of different tools in routine and repetitive manner which requires practical skills. The student should also be aware of quality aspects of the related activities as it is the key to the customer satisfaction.	**4**
Broad Learning Outcomes/Core Skill	They will be able to handle alone as well as in /with the team in the area as per the curriculum.	The job involves understanding of the customer's requirements & meeting of the same, which requires proper oral/written communication skills. The job holder also need to interact with customers of different areas/nature, which requires basic understanding of social, political &natural environment.	**4**
Responsibility	They will be able to work in team to assist the PCB design and Manufacturing Team. They can also work as a supervisor in assembly section as well as in manufacturing sections.	As the job role involves working with different processes, machines, materials & tools, the person concerned needs to take responsibility for own work so that production activity is not disturbed.	**4**

		In view of the frequent technological changes in the PCB industry, the person concerned needs to be in continuous learning mode for updating the knowledge.	

Annexure II: Tools and Equipment (Lab Set-Up)

LIST OF EQUIPMENT (For a batch of 20 students)

Description		Qty	Specifications
1	Classroom	1	30 Sq.mt
2	Student Chair	20	
3	Student Table	20	
4	LCD Projector	1	
5	Trainer Chair & Table	1	
6	Pinup Boards	1	
7	White Board	1	
	PCB Design and Manufacturing Lab		
8	PCB Layout and Thin Film Preparation	1/Product	PCB Toner paper, PCB Shearing machine, PCB Film Making Machine, UV Exposure Machine, DIP Coating Machine, Etching Machine, Developer Chemicals
9	Software	10	AUTODESK Eagle
10	Desktop	10	64-bit operating system, 500 GB Hard Disk, 8 GB RAM

Annexure III: Industry Validations Summary

S. No	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID
1	LRC Computer	Ranajoy Roy Chowdhury	Proprietor	New Manikya Press Building, L.N Bari Road, Agartala, Pin-799001	9436122428	ranajoyroychowdhury@rediffmail.com
2	Raima Energy LLP	Subham Ch. Das	Operational Manager	T.G. Road, Ramnagar-2/3, Agartala, Pin-799002	6033322529	team@raimaenergy.com
3	ECO Green India Corporation	Er. Mohd. Uvaish Ansari	Managing Director	08 Khwaja Enclave, Peer Bahora, Izzatnagar, Bareilly(U.P), Pin-243122	8630752821	Eco.bareilly@gmail.com
4	Mahalaxmi Electronics	Subrata Paul	Technical Head	G.B. Bazar ITI Road, Indranagar, Pin-799006	9774448740	Mahaxmi8740@gmail.com
5	Positiv Television Pvt. Ltd.	Sanjib Deb	Technical Co-ordinator	NETV Building, A.K. Azad Road, Rehabari, Guwahati-8	7005195177	pt@netvindia.com
6	Dinabandhu Traders	Surata Paul	Managing Director	A.A. Road, Teliamura, Tripura, Pin-799205	9366044040	Ssumitroy4321@gmail.com
7	Krishna Industrial Services	Debajit Dey	Proprietor	Badharghat Chowmuhani Agartalal, Tripura (W): 799003	9862770077	krshnaindstrlsrvcs@gmail.com
8	Software World	Amrita Saha	Proprietor	Ujan Abhoynagar, Manipuripara, West Tripura, Pin: 799001	03817963527	support@softwareworld.co.in
9	Bada Biplab Power Solution LLP	Iduli Debbarma	Designated Partner	Agartala West Tripura, Pin: 799003	03812372501	bbpsllp@gmail.com

10	JB Youth Computer Solution & Educational Society	Nishi Kanta Das	Sec & Project Coordinator	Badharghat Chowmuhani, Siddhi Ashram Agartala, West Tripura, Pin: 799003	9436740983	jbyacademy@gmail.com

Annexure IV: 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
2024	100	50	30	15	5	2
2025	150	50	30	15	5	2
2026	150	50	30	15	5	2

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
V1	2021	75	75	56	15	24	24	16	6	-	-	-	-
V1	2022	40	40	34	11	7	5	4	4	-	-	-	-
V1	2023	70	62	55	30	22	20	12	7	-	-	-	-

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. Project titled "Self-employment Capacity building of the Engineering pass-out students belonging to Scheduled Caste/Scheduled Tribe community" Funded by MeitY, GoI.

2. Project titled " Capacity building and training in emerging technologies for enhancing employment opportunities and skilling" Funded by MeitY, GoI.

Content availability for previous versions of qualifications:

☐ Participant Handbook ☐ Facilitator Guide ☐ Digital Content ☐ Qualification Handbook

Languages in which Content is available: English

Annexure V: Blended Learning

Blended Learning Estimated Ratio & Recommended Tools:

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	Online interaction platforms like JitSi Meet, Bharat VC, Google Meet, MS Teams, etc.	20:80
2	☐Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners	Online interaction platforms like JitSi Meet, Bharat VC, Google Meet, MS Teams, etc.	20:80
3	☐Showing Practical Demonstrations to the learners	Through Virtual Simulation Software (AUTODESK Eagle) and Online interaction platforms like JitSi Meet, Bharat VC, Google Meet, MS Teams, etc.	20:80
4	☐Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training	Through Virtual Simulation Software (AUTODESK Eagle) and Online interaction platforms like JitSi Meet, Bharat VC, Google Meet, MS Teams, etc.	20:80
5	☐Tutorials/ Assignments/ Drill/ Practice	Online interaction platforms like JitSi Meet, Bharat VC, Google Meet, MS Teams, etc.	20:80
6	☐Proctored Monitoring/ Assessment/ Evaluation/ Examinations	NIELIT Remote Proctored Software	Online: 100% Theory Offline: 100% Practical
7	☐On the Job Training (OJT)/ Project Work Internship/ Apprenticeship Training	Simulated Platform	Either 100% online in a virtual environment Or 100% offline in the Industry.

Annexure VI: 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	Assignment/ Internal Marks
NOS1: : Fundamentals of PCB Design NOS Code: NIE/ELE/N0914	**Introduction to Printed Circuit Board** PC1- Understand PCB as a vital electronic component for interconnecting electronic parts. PC2- Differentiate between PCB and PWB, noting PCB's complexity and integration with integrated circuits. PC3- Recognize types of PCBs (Single Sided, Multi-Layer) and materials used (e.g., FR-4), and understand their impact on performance and cost.	10	7	0	0
	Electronic design Automation (EDA) PC4- Learn about the history of EDA and current market trends, emphasizing its importance in modern electronics development. PC5- Explore various EDA tools and their functionalities for design, analysis, and optimization of electronic circuits. PC6- Get introduced to SPICE and PSPICE for circuit simulation, and understand their role in design validation and optimization. PC7- Familiarize with AUTODESK Eagle for PCB design, learning its interface, tools, and workflow for efficient project implementation.	20	8	0	0
	Component and their categories and Package Types PC8- Understand the different kinds of components used in PCB design and as well as the categories of the components that are used to do the development of the PCB board. PC9- Acquire the knowledge of the through-hole packages.	20	8	0	0
	Total Marks	**50**	**23**	**0**	**0**
NOS2: Printed Circuit Board Design and Analysis Techniques NOS Code: NIE/ELE/N0915	**Study of Foot Print Design & Analysis** PC1- Understand the rules before PCB Designing. PC2- Understanding the flow of computer aided design packages. PC3- Acquire the importance of manufacturing documents.	15	7	0	0
	PCB Designing Flow Chart and Layers PC4- Understand the designing of flow chart of PCB board. PC5- Understand the various layers and materials used to	20	8	0	0

	design the PCB. Acquire the basic knowledge				
	Simulation on AutoDesk Eagle PC6- Understand and simulate basic and analog electronic circuits. PC7- Analyze power supplies to ensure efficient power delivery. PC8- Master simulation techniques for various sensor modules and digital circuits.	15	7	0	0
	Total Marks	**50**	**22**	**0**	**0**
NOS3: PCB Manufacturing and Assembly Techniques NOS Code: NIE/ELE/N0916	**PCB Manufacturing Techniques** PC1- Learn both traditional film and modern digital techniques for PCB design, focusing on converting electronic designs into physical layouts and understanding precise layout creation methods. PC2- Gain insight into critical steps of PCB manufacturing, including plating, etching, and cleaning techniques to ensure accurate and reliable board production. PC3- Apply acquired knowledge to real-world manufacturing scenarios, emphasizing quality control for consistent and reliable results.	35	15	0	0
	PCB Assembly Techniques PC4- Understand the basic level knowledge required to understand assembly techniques for leaded and Surface mounted devices. PC5- Acquire the basic level knowledge of use of various tools during assembly.	35	15	0	0
	Study Soldering Techniques PC6- Understand the methods of soldering of PCBs, material used in soldering process. Pc7- Understand methods of soldering.	30	15	0	0
	Total Marks	**100**	**45**	**0**	**0**
NOS4: Project / OJT NOS Code: NIE/ELE/N0913	Project/OJT	-	-	-	60
NOS5: Employability Skills NOS Code: DGT/VSQ/N0102	Employability Skills	**-**	**-**	**-**	50

*Major Project/ Dissertation	-	**-**	**-**	**100**	-
Grand Total- 500		**200**	**90**	**100**	**110**

Annexure VII: Assessment Strategy

- Assessment of the qualification evaluates candidates to ascertain that they can integrate knowledge, skills and values for carrying out relevant tasks as per the defined learning outcomes and assessment criteria.
- The underlying principle of assessment is fairness and transparency. The evidence of the outcomes and assessment criteria. competence acquired by the candidate can be obtained by conducting Theory (Online), Practical assessment, Internal assessment, Project/Presentation/ Assignment, Major Project.
- The emphasis is on the practical demonstration of skills & knowledge gained by the candidate through the training. Each OUTCOME is assessed & marked separately. A candidate is required to pass all OUTCOMES individually based on the passing criteria.
- **About Examination Pattern:**

  1. The question papers for the theory and practical exams are set by the Examination wing (assessor) of NIELIT HQS.
  2. The assessor assigns roll number
  3. The assessor carries out theory online assessments through remote proctoring methodology. Theory examination would be conducted online and the paper comprise of MCQ. Conduct of assessment are through trained proctors. Once the test begins, remote proctors have full access to candidate's video feeds and computer screens. Proctors authenticate the candidate based on registration details, pre-test image captured and I- card in possession of the candidate. Proctors can chat with candidates or give warnings to candidates. Proctors can also take screenshots, terminate a specific user's test session, or re-authenticate candidates based on video feeds.
  4. An External Examiner/ Observer may be deployed including NIELIT officials for evaluation of Practical examination/ internal assessment / Project/ Presentation/. Major Project (if applicable) would be evaluated preferably by external/ subject expert including NIELIT officials.
  5. Pass percentage would be 50% marks in each component.
  6. Candidates may apply for re-examination within the validity of registration (only in the assessment component in which the candidate failed).
  7. For re-examination prescribed examination fee is required to be paid by the candidate only for the assessment component in which the candidate wants to reappear.
  8. There would be no exemption for any paper/module for candidates having similar qualifications or skills.
  9. The examination will be conducted in English language only.

- Quality assurance activities: A pool of questions is created by a subject matter expert and moderated by other SME. Test rules are set beforehand. Random set of questions which are according to syllabus appears which may differ from candidate to candidate. Confidentiality and impartiality are maintained during all the examination and evaluation processes.

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