QUALIFICATION FILE FOR

CONTACT DETAILS OF THE SUBMITTING BODY

Name and address of Submitting body :

NIELIT, Aurangabad, Dr. B. A. M. University Campus, Aurangabad – 431 004 (Maharashtra)

Name and contact details of individual dealing with the submission:

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List of documents submitted in support of the Qualifications File :

1. Annexure 1.- Detailed Syllabus
2. Annexure II - Placement records
3. Annexure III - Industry validation
4. Annexure IV - : Occupational Map as identified by SSC mapped to Jobroles

Nature and Purpose of qualification
To meet the requirement of PCB Design and fabrication professionals in the electronics manufacturing industry. A certificate qualification at the level 4 has been created.

QUALIFICATION FILE SUMMARY:

Qualification Title	**Certificate Course on Printed Circuit Board Design , Analysis and Manufacturing Techniques. (250 hrs)**
Body/bodies which will assess candidates	Examination Cell, National Institute of Electronics and Information Technology 6-CGO Complex, Electronics Niketan Lodhi Road, New Delhi. 110003
Body/bodies which will	National Institute of Electronics and Information Technology

award the certificate for the qualification.	6-CGO Complex, Electronics Niketan Lodhi Road, New Delhi. 110003
Body which will accredit providers to offer the qualification.	National Institute of Electronics and Information Technology 6-CGO Complex, Electronics Niketan Lodhi Road, New Delhi. 110003
Occupation(s) to which the qualification gives access	After completion of this course students can work in Industries as a a PCB Service technician b. Supervisor- Electronics Product Assembly Section c. Supervisor- PCB Manufacturing / testing Section d. Technicians /Electronic Lab Incharge in Academic Institute
Proposed level of the qualification in the NSQF.	Level 4
National Learning Hours	250 hours.
Entry requirements / recommendations.	Diploma/ B. SC in Electronics /Telecommunication/ Instrumentation/Electrical
Progression from the qualification.	**<u>Progression from the Qualifications:</u>** **In Academic:** PCB Design Engineer- **ELE/Q8703**(Electronics Sector Skills Council of India) **In Profession**: Lab Technican of PCB->PCB Design Engineer, PCB fabrication Engineer-> Supervisor -- >Design Head
Planned arrangements for RPL.	Presently only candidates who undergo the training shall be assessed. It will be incorporated once RPL strategy is finalized
Date of Planned Review of the Qualification	Three Years

Formal structure of the qualification			
Title of unit or other component	**Mandatory/**	**Estimated size**	**Level**

(include any identification code used)	**Optional**	**(learning hours)**	
M1- : **Printed circuit Board Design and Analysis Techniques**	Mandatory	50	4
M2 - PCB Manufacturing Techniques		50	
M3- PCB Assembly Techniques		50	
Practical:	Mandatory	100	

Please attach any document giving further detail about the structure of the qualification – Detail Syllabus - **Annexure- A**

Section 1:

ASSESSMENT

Body/Bodies which will carry out assessment:

Theory - National Institute of Electronics and Information Technology
6-CGO Complex, Electronics Niketan
Lodhi Road, New Delhi. 110003

Practical - National Institute of Electronics and Information Technology
Aurangabad

Will the assessment body be responsible for RPL assessment?

At present not included

Describe the overall assessment strategy: (specific arrangements which have been put in place to ensure that assessment is always valid, consistent and fair and show that these are in line with the requirements of the NSQF)

a) Assessment of each module has theory and lab part assessment.
b) Student will be well informed about the dates.
c) Details of marks distribution is as follow:

- The theory exam would be of 100 marks & the practical exam would be of 50 marks for each module. To pass the course, 50% marks are required in both theory and practical in all three Modules.

- After completing the course, the training institute would conduct the practical examination.
- The duration of each practical examination shall be of three hours. Maximum marks in each practical examination shall be 50.
- Every candidate has to pass in both Theory and Practical Examinations separately, where the passing marks are half of the maximum marks.

Theory examinations are conducted on line through computers with multiple choice questions.

A candidate shall be entitled to appear in examination after fulfilling following conditions:
1) Registered on or before due date
2) Completed the said course by attending more than 75% classes.
3) Completed tutorials and internal assignments.
4) If he/she has a valid registration (each registration is valid for a period of two years).
5)One failed the candidate can reappear during the registration period.

Pass Percentage:
To qualify for a pass in a module, a candidate must have obtained at least 50% in each theory and practical examination. The marks will be translated into grades, while communicating results to the candidates. The gradation structure is as below:-

Pass percentage	**Grade**
Failed (<50)	F
50%-55%	D
55%-65%	C
65%-75%	B
75%-85%	A
85% and over	S

ASSESSMENT EVIDENCE- Annexure -B

Complete the following grid for each grouping of NOS, assessment unit or other component as listed in the entry on the structure of the qualification on page 1.

Job Role:

a. PCB Service / PCB Design Engineer.
b. PCB fabrication Engineer
c. Supervisor- Electronics Product Assembly Section
d. Supervisor- PCB Manufacturing / testing Section e. Technicians /Electronic Lab In-charge in Academic Institute

ASSESSMENT EVIDENCE

Assessable Outcomes	**Assessment criteria for the outcome**	**Total Mark**	Theory Marks	**Practical Marks**
1.Module-1 Familiarize with the basic	Define Information packages of Electronic components, types of PCBs and history of PWB/PCBs.	**100**	**50**	**50**

knowledge of Electronic components like types of PCBs and history of PWBs/PCBs. DFM And DFA concept	Describe the rules before PCB Designing. Demonstration of Flow of computer aided design packages.			
	Importance of manufacturing documents.			
	Basic concept of thermal analysis			
	Design PCB for Manufacturing as per procedure and assembly point of view.			
	Total	**100**	**50**	**50**
1.Module-2 Will learn skills of Manufacturing process of PCB and fault finding methods	Execute and Demonstrate the process of Film Master generation, material used for manufacturing, cleaning methods of base material. Analysis the manufacturing process of PCB and fault finding methods	100	50	50
	Total	100	50	50
Assessable Outcomes	**Assessment criteria for the outcome**	**Total Mark**	Theory Marks	**Practical Marks**
1.Module-3 Will acquire skills of Assembly methods, Soldering Tools and Soldering Technology for leaded and SMD.	Implement assembly techniques for leaded and SMDs.	**100**	**50**	**50**
	Use of various tools during assembly.			
	Methods of soldering of PCBs, material used in soldering process.			
Total	**100**	**50**	**50**	

Section 2

SUMMARY EVIDENCE OF LEVEL:

Level of qualification : L4

Certficate Course on Printed Circuit Board Design ,Analysis and Manufacturing Techniques. (250 hrs)					
Process required	**Professional knowledge**	**Professional skill**	**Core skill**	**Responsibility**	**Level**
Expected to work in PCB Industries in design and Manufactring Sector. Expected to works in academic Area for conduction of Practiacals /Project Development Phase. Expeted to start setup for design and devepment of PCBS.	After completion of certification as per the curriculum on this course students 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.	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.	They will be able to handle alone as well as in /with the team in the area as per the curriculum.	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.	4

SECTION -3
EVIDENCE OF NEED

What evidence is there that the qualification is needed?

As per the past experience Diploma ,B.SC ,B.Tech and B.E. Students are required training in this area before their Project completions as well as acceptance in Electronics manufacturing companies. Skill of PCB Design helps during Project and getting a job. NIELIT Aurangabad has conducted courses in this area and regularly conduct short term courses for the said area**.**

Presently **some part** of this course is included in the courses under the project "Skill Development in ESDM Sector" under DeiTY, MCIT, Gov. of India.

What is the estimated uptake of this qualification and what is the basis of this estimate?

Estimated about 1000 candidates per year.

Estimation is done on the basis regular advertisement coming in different newspapers / websites about this skill.

What steps were taken to ensure that the qualification(s) does/do not duplicate already existing or planned qualifications in the NSQF?

This is the only course, covering the syllabus mentioned, by NIELIT-Aurangabad .This qualification does not exist as per the information in public domain.

What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated?

The qualification is to be monitored and reviewed every two years.

The following data will be used

1. Results of assessments
2. Employer feedback will be sought post-placement Student feedbacks
3. Workshops and seminar for reviewing the qualifications
4. Industry Requirements
5. Consultation/ Tie-up with Industries or Expert for review of the Curriculum.

Please attach any documents giving further information about any of the topics above.
Attached - **Annexure-C**

SECTION 4
EVIDENCE OF RECOGNITION AND PROGRESSION

What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?

Student with Diploma/ B. SC in Electronics /Telecommunication/ Instrumentation/Electrical Engineering can join this course.
This qualification comprises technical skill in design and manufacturing of PCBs.After completing this course students can directly join companies based on the job openings. With this qualification students can develop experience and they can also start their set up in this area.

Occupational MAP of The sector

Level 4	1.In Profession Assembly operator 2.In Academic : Lab Assistant	1.In Profession Technician/ Assembly line supervisor / 2.In Academic : PCB lab Technician	1.In Profession Electronics Design team member. PCB Design / test Engineer - 2.In Academic : PCB Lab supervisor

SECTION 5
EVIDENCE OF INTERNATIONAL COMPARABILITY --------NIL