

**QUALIFICATION FILE – CONTACT DETAILS OF SUBMITTING BODY****Name and address of submitting body:**

NATIONAL INSTITUTE OF ELECTRONICS AND INFORMATION TECHNOLOGY  
NIELIT Bhawan,  
Plot No. 3, PSP Pocket, Sector-8,  
Dwarka, New Delhi-110077

**Name and contact details of individual dealing with the submission**

<b>Name</b>	:	Anil Raina
<b>Position in the organization</b>	:	Joint Director (Technical)
<b>Address if different from above</b>	:	NA
<b>Tel number(s)</b>	:	0191-2455515, 2455514
<b>E-mail address</b>	:	<a href="mailto:anil.raina@nielit.gov.in">anil.raina@nielit.gov.in</a>

**List of documents submitted in support of the Qualifications File**

1. Industry Validation (Annexure I)
2. Detailed Curriculum (Annexure II)
3. Sector demand in terms of request letters (Annexure III)

## SUMMARY

1	<b>Qualification Title:</b>	Repair & Maintenance Assistant (Dental Equipment)
2	<b>Qualification Code</b>	–
3	<b>NCO code and occupation</b>	3251.0101: Dental Assistant
4	<b>Nature and purpose of the qualification (Please specify whether qualification is short term or long term)</b>	<p><b>Nature:</b></p> <ul style="list-style-type: none"> <li>❖ Assistant Technician level Course which will help in employment in the area of repair &amp; maintenance of Dental equipment.</li> </ul> <p><b>Purpose:</b></p> <ul style="list-style-type: none"> <li>❖ To get unemployed youth to jobs.</li> <li>❖ To upgrade the skills of incumbent already in work in the field of repair of electronic dental equipment .</li> <li>❖ Entrepreneurship development.</li> </ul>
5	<b>Body/bodies which will award the qualification</b>	National Institute of Electronics and Information Technology (NIELIT) NIELIT Bhawan, Plot No. 3, PSP Pocket, Sector-8, Dwarka, New Delhi-110077
6	<b>Body which will accredit providers to offer courses leading to the qualification</b>	NIELIT
7	<b>Whether accreditation/affiliation norms are already in place or not , if applicable (if yes, attach a copy)</b>	The Handbook for TP accreditation norm is available at: <a href="https://www.nielit.gov.in/content/nsqf">https://www.nielit.gov.in/content/nsqf</a>
8	<b>Occupation(s) to which the qualification gives access</b>	Dental Equipment Repair and Maintenance Assistant
9	<b>Job description of the occupation</b>	Bio-Medical Equipment Repair Assistant
10	<b>Licensing requirements</b>	NA
11	<b>Statutory and Regulatory requirement of the relevant sector (documentary evidence to</b>	330 Theory: 120 Practical: 150

	<b>be provided)</b>	Employability Skill : 30 OJT: 30
<b>12</b>	<b>Level of the qualification in the NSQF</b>	Level-3
<b>13</b>	<b>Anticipated volume of training/learning required to complete the qualification</b>	<p><u>Academics</u></p> <p>Dental course-&gt;Course on repair &amp; maintenance of Imaging equipment-&gt;repair &amp; maintenance of hospital equipment</p> <p>After completion of this course, students can go for course that provides further skill enhancement courses in Repairs of medical equipments like Repair &amp; maintenance of Imaging Equipment or advanced level courses as post diploma in medical electronics. Almost all companies provide initial breakthrough to fresher to join as a trainee intern. The trainee / interns could use experience gained while working in company as a platform to enhance their technical skills and achieve better jobs.</p> <p><u>Professional</u></p> <p>Bio-Medical Technician &gt; Sr Technician &gt; In-charge of Lab &gt; Entrepreneur</p> <p>During the initial stages of career candidate might work as a trainee / intern whose role would be to take up the general repair of dental chairs &amp; other dental equipment work &amp; can be used by the organisation in the field work job like maintenance of their dental chairs, attend to the complaints of the customers.</p> <p>Further candidate could communicate with the clients directly and can discuss/resolve various issues in the field of repairs &amp; maintenance of new products of a particular company. Over a period of time &amp; after gaining sufficient experience and upgrading his technical qualifications he could develop himself as an entrepreneur.</p>
<b>14</b>	<b>Indicative list of training tools</b>	Multimeters, Soldering Iron, power supply, Serew

**NSQF QUALIFICATION FILE****Approved in 21st NSQC – NCVET, Dated: 28<sup>th</sup> July, 2022**

	<b>required to deliver this qualification</b>	Driver sets, pliers, Cutters, wires, equipments for repair
15	<b>Entry requirements and/or recommendations and minimum age</b>	10th Pass Or 8th Class Pass and pursuing continuous regular schooling Or 8th Class Pass + 2 Years ITI in relevant field Or 8th Class Pass + 1 Year of Experience in relevant field Or NSQF Level 2 with 1 Year of Experience in relevant field
16	<b>Progression from the qualification (Please show Professional and academic progression)</b>	Professional: Technician -> Sr. Technician -> Service Engineer -> Entrepreneur  Academics: Higher Level Courses in Medical Electronics
17	<b>Arrangements for the Recognition of Prior learning (RPL)</b>	The candidate can undergo such training after passing 8 <sup>th</sup> and without having any prior knowledge about repairs
18	<b>International comparability Where known (research evidence to be provided)</b>	NA
19	<b>Date of planned review of the Qualification.</b>	28/07/2025

<b>20</b>	<b>Formal structure of qualification</b>
-----------	--

Sl. no.	Module Name	Theory	Lab	Level
1.	Tools DC & AC Electricity Test & Measuring instruments	5	5	3
2.	Passive components	10	10	3
3.	Active Components	15	10	3
4.	Soldering and Disordering	10	20	3
5.	Dental Chairs	10	20	3
6.	Study of Dental Chair functions	30	40	3
7.	Dental X Ray	20	10	3
8.	The Ultrasonic Scalar	20	10	3
9.	Troubleshooting	10	25	3
10.	Employability Skills	30		3
11.	On Job Training	30		3
<b>Total Hours</b>			<b>330</b>	<b>3</b>

Detail Curriculum attached at **Annexure I**.

### SECTION -1

#### **ASSESSMENT**

<b>21</b>	<b>Body/Bodies which will carry out assessment:</b> The Examination Section National Institute of Electronics and Information Technology NIELIT Bhawan, Plot No. 3, PSP Pocket, Sector-8, Dwarka, New Delhi-110077
<b>22</b>	<b>How will RPL assessment be managed and who will carry it out?</b> The candidates who will undergo such training shall be accessed through viva only. Later on, candidate can appear for advanced level of course if they fulfil entry requirements there
<b>23</b>	<b>Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, reliable and fair and show that these are in line with the requirements of the NSQF.</b>

The emphasis is on practical demonstration of skills & knowledge based on the performance criteria. Student is required to pass in all OUTCOMES individually and marks are allotted.

The Following assessment methodologies are used.

- A. Written Assessment (Multiple Choice Questions)
- B. Practical Assessment & class Performance

The assessment results are backed by following evidences.

1. The assessor collects a copy of the attendance for the training done under the scheme. The attendance sheets are signed and stamped by the In-charge / Head of the Training Centre.
2. The assessor verifies the authenticity of the candidate by checking the photo ID card issued by the institute as well as any one Photo ID card issued by the Central/Government. The same is mentioned in the attendance sheet.
3. The assessor assigns roll number.
4. The assessor takes photograph of all the students along with the assessor standing in the middle and with the centre name/banner at the back as evidence.

## 24. ASSESSMENT EVIDENCE

### Title of Unit/Component:

Outcomes to be assessed	Assessment Criteria for the outcome	Means of Assessment			
		Total Marks	Written	Practical	Project
Handling and working with equipments/Tools required for repair, servicing, Testing & Measuring.	Use of tools used in repair and servicing Use of CRO for testing purposes, Multimeter and other Measuring equipments. Testing of components Analysis of different	07	03	04	NA

	types of waveforms				
	Use & identification of Mechanical & electromechanical components  Use of Logic Analyser, Signal generator, LCR meters for testing and measurement.	08	03	05	NA
	<b>Total Marks</b>	<b>15</b>	<b>06</b>	<b>09</b>	<b>NA</b>
Will be able to identify components and Soldering & De-soldering components.	Soldering, De - Soldering on different Types of PCBs.	05	02	03	NA
	Identify Resistors, capacitors using Colour Coding , Inductors testing & their usage.	07	03	04	NA

	<p>Testing of semiconductors devices like PN Diode, Zener Diode, LEDs and Transistors.</p> <p>Identification of pins of ICs like 741, timer &amp; other general purpose ICs &amp; Its Usage.</p>	08	03	05	NA
	<b>Total Marks</b>	<b>20</b>	<b>08</b>	<b>12</b>	<b>NA</b>
<b>Will be able to operate, Repair and Servicing of Dental Chair.</b>	Identify basic parts of a dental chair.	5	00	05	NA
	<p>Can demonstrate the various controls of the chair, the Up/down motion of chair and chair back rest motion i.e. front and back motions.</p> <p>Installation of dental chair.</p> <p>Use of up/down &amp; forward/reverse control system of dental chair.</p>				
	<p>Identify various parts of Control circuit for the motions of electric controlled motor.</p> <p>Use of up/down control using hydraulic pump,</p> <p>Use of Foot switch</p>	03	01	02	NA



	used for up/down and front/back rest motions				
	Working of Light System, its control circuit for dim and bright light, Light adjusting arm. X-Ray Viewer circuit	06	02	04	NA
	Use of Air Rotor hand piece for drilling teeth.  Use of micro motor for drilling of bones.  Will be able to locate faults in a particular section.  Will be able to repair faults and can replace parts if required.	06	02	04	NA
	<b>Total Marks</b>	<b>20</b>	<b>06</b>	<b>14</b>	<b>NA</b>
Will be able to take Dental X Ray & Use and repair of Ultrasonic Scalar Unit.	Use of X ray machine for dental purposes.  Developing of X ray Film and technique of x ray exposure on teeth.	06	02	04	NA
	Identify various parts in the control circuit for X Ray.	07	02	05	NA

	Use of ultrasonic scalar unit, its different controls  Use & handling of probes.  Use of machine on patients.  Can Identify faults in a particular section and repair/replace parts if required.	07	02	05	NA
	<b>Total Marks</b>	<b>20</b>	<b>06</b>	<b>14</b>	<b>NA</b>
Communicate clearly and can prepare job reports and Employability Skills	Can communicate with clients and Colleagues	04	02	02	NA
	Can interact with seniors.  Preparation of Job reports	04	02	02	NA
	<b>Total Marks</b>	<b>08</b>	<b>04</b>	<b>04</b>	<b>NA</b>
Identify & rectify faults by using appropriate tool & comply safe working practices, environment aspects.	Fault finding by using specified steps	05	00	05	NA
	Interpret immediate results & progress of fault rectification	05	00	05	NA
	Utilize appropriate tools to rectify & repair the fault Can replace part if necessary.	07	02	05	NA
	<b>Total Marks</b>	<b>17</b>	<b>02</b>	<b>15</b>	<b>NA</b>
	<b>Grand Total</b>	<b>100</b>	<b>32</b>	<b>68</b>	<b>NA</b>

### Means of Assessment:-

Online assessments carried out using multiple-choice question formats applicable for the course & practical skills.

Sl No	Examination Pattern	Modules Covered	Duration in Minutes	Maximum Marks
1	Theory Paper – 1: Basics of Biomedical Equipments	1-4	90	100
2	Theory Paper – 2: Repair and Maintainance of Dental Equipments	5-8	90	100
3	Practical -1: Repair and Maintainance of Hospital Equipments Practices	1-8	180	90
4	Internal Assessment	1-8	-	30
5	OJT/ Project	1-8	-	30
	<b>Total</b>			<b>350</b>

### Pass/Fail

Following Grading Scheme (on the basis of total marks) will be followed:

### Note:

1. Pass percentage would be 50% marks in each component, with aggregate pass percentage of 50% and above.
2. Grading will be as under:

Grade	S	A	B	C	D
Marks Range (in %)	$\geq 85\%$	$\geq 75\%$ and $< 85\%$	$\geq 65\%$ and $< 75\%$	$\geq 55\%$ and $< 65\%$	$\geq 50\%$ and $< 55\%$

3. The OJT and Employability Skills will be assessed by concerned NIELIT Centre itself.

**\*Assessment for the Qualification will be conducted as per the guidelines as applicable from time to time.**

## SECTION 2

### 25. EVIDENCE OF LEVEL

Level of

Qualification: 3

Title/Name of Qualification/Component: (Dental Equipment)		Repair & Maintenance Assistant	
NSQF Domain	Outcomes of the Qualification/Component	How the Job role relates to the NSQF level descriptor	NSQF Level
Process	Tools, Test & Measuring Equipments ,Electrical & electromechanical components & user skill	After this portion of course the candidate will get all the skills for the efficient use of various tools required for repair & servicing. He will also have a knowhow about the use of Test & Measuring Equipments & electromechanical components used in various equipments	3
Professional Knowledge		After acquiring Professional Knowledge on use of tools ,He will be able to open the equipment confidently & identify the various components used in the system	3
Professional Skill		After acquiring the professional skill the candidate will have sufficient practical knowledge of the tools & use of various Test & Measuring Equipments	3
Core Skill		After acquiring core skill the student will have the knowledge about the efficient use of various equipments used in the repair purposes	3
Responsibility		The candidate will learn how to work in a group .	3

Process	Components: Passive & Active ,ICs, Component identification, Soldering & De-soldering Skills	After this portion of course the candidate will get all the skills for the identification & testing of electronic components both active and passive alongwith the general purpose IC. He will also have skills to do the soldering & de-soldering of the PCBs.	3
Professional Knowledge		After acquiring Professional Knowledge about Soldering & De-Soldering candidate will have all factual and theoretical knowledge regarding actual repairs, identify the faulty components & replace them.	3
Professional Skill		After acquiring Professional skill on Soldering & De-Soldering Skills candidate will learn how to perform the process of soldering & de-soldering & can professionally take out the job .	3
Core Skill		After acquiring Core skill on Soldering & De-Soldering and about the components the candidate will have the theoretical as well as the practical knowledge about the soldering techniques & de-soldering of components	3
Responsibility		After acquiring knowledge on Soldering & De-Soldering Skills the candidate can take out the job of repairs as a technician.	3

Process	<b>Dental Chairs Repair</b>	In Learning theory about the Dental Chair the candidate will have knowledge about various controls of the chair used in our hospitals .Their usage & their faults	3
Professional Knowledge		After acquiring Professional Knowledge the candidate will be able to handle & take care of the general maintenance of a dental chair. He will be able to locate the faults & can repair the faults	3
Professional Skill		After acquiring Professional Knowledge the candidate will be able to locate the different faults & identify the fault in a particular section. He will then repair all types of faults occurred in the chair	3
Core Skill		After acquiring Core skill on Repairing the incumbent will be able to operate the machine ,locate faults in various sections & if parts available can replace them	3
Responsibility		The candidate can work in as dental chair technician & can rectify the general faults occurring frequently .Also be able to install a dental chair	3

Process	<b>Dental X Ray &amp; The Ultrasonic Scalar Repair</b>	In Learning Ultrasonic scanner the candidate will learn both theoretical & practical knowledge about the functioning of the equipments .He will also have knowhow about the Dental X Ray	3
Professional Knowledge		After acquiring Professional Knowledge .the candidate will be able to operate & have knowledge about various controls of an Dental X Ray Machine .He will be having enough knowledge about the repairs .	3
Professional Skill		The Professional skill will be that the candidate will be able to operate & have knowledge about various controls of an Ultrasound machine. How to handle the probes & their safety & repair the various faults	3
Core Skill		As core skill the incumbent will be able to check the general faults occurring with the machines , loose connections & its safety.	3
Responsibility		The candidate will be responsible for the general maintenance of machine and its repairs	3

Process	<b>Troubleshooting Skills, Safety &amp; Security Procedures</b>	The candidate will be given the logical tips to troubleshoot a particular equipment. What will be the different safety procedures to be maintained during repairs	3
Professional Knowledge		After acquiring Professional Knowledge on troubleshooting skills the candidate will have a knowhow of general fault finding , earthing & security against electrical shocks	3
Professional Skill		After acquiring Professional skill candidate will have knowledge about Trouble shooting ,safety procedures taken while on job & importance of earthing	3
Core Skill		The incumbent will be able to check the general faults occurring with the equipments &logical faults will be carried out by him.	3
Responsibility		The candidate will get enough knowledge to install an equipment ,use with patient & check the general faults occurring	3



## **SECTION 3**

### **EVIDENCE OF NEED**

<b>26</b>	<b>What evidence is there that the qualification is needed?</b> Bio Medical technicians contribute enormously to the patient care by repairing, maintaining, calibrating & installing various test & measuring equipments existing in hospitals these days. Healthcare services in the country have drastically improved even at the block level. Numerous equipments are being installed in hospitals as testing, measuring & diagnostic aids. However it has been observed that the downtime of the equipments is growing at an alarming rate due to the absence of adequate repair & servicing set-up. This affects the patient care. Thus people need to be trained in the field of biomedical equipment repairs, so as to improve the capacity utilization ,overall healthcare facilities & at the same time benefit practicing engineers, technicians,& fresher's in their skill up gradation. The proposed course will result in reducing the downtime of hospital equipment by increasing their availability. The facility will ensure prompt repairs of faulty equipment to be attended locally, where there is dearth of trained manpower & has to be flown in from the other parts of the country
<b>27</b>	<b>What is estimated uptake of this qualification and what is the basis of this estimate?</b>  Estimated uptake is 25 students / Batch / centre and on the basis of Facilities and Infrastructure available in respective NIELIT Centres
<b>28</b>	<b>What steps were taken to ensure that the qualification(s) does (do) not duplicate already existing or planned qualifications in the NSQF? Give justification for presenting a duplicate qualification</b>  Similar Qualification does not exist as per information available in NQR portal.
<b>29</b>	<b>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? Specify the review process here</b>  The Qualification is to be monitored and reviewed every three years. The following data will be used. <ul style="list-style-type: none"><li>❖ Constant interaction &amp; feedback of health services department</li><li>❖ Results of assessments</li><li>❖ Employer feedback will be sought post-placement</li><li>❖ Student feedbacks</li><li>❖ Workshops and seminar for reviewing the qualifications</li><li>❖ Consultation/ Tie-up with self help groups, Industries , Expert for review of the Curriculum so as to meet the changing pace of technology and general health care requirements.</li></ul>

## SECTION 4

### EVIDENCE OF PROGRESSION

30	<p><b>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?</b></p> <p>After skilling himself through this certification course the incumbent can either start his own enterprise or get associated with any hospital/health centre/Diagnostic Lab. NIELIT shall facilitate forming of small manageable self help groups of such Qualifiers &amp; introduce them at various levels in the health services set-up to establish their repair &amp; se servicing business.</p> <p>They shall also be encouraged to take up higher level courses in furtherance of their skill in repair &amp; maintenance of hospital equipments.</p>
----	--

## SECTION 5

### EVIDENCE OF INTERNATIONAL COMPARABILITY

<p><b>List any Comparisons which have been established</b></p> <p>Bio-Medical engineering courses have been introduced at the undergraduate /post-graduate in various technical institutions. This will be the best bio-medical technician level skill certificate for further progression to a candidate.</p> <p>Voluntary certifications such as <b>Certified Biomedical technician (CBET)</b>, <b>Certified Laboratory Equipment Specialist (CLES)</b>, <b>Certified Radiology Equipment Specialist (CRES)</b> are offered by institutions which are accredited to <b>Medical Equipment &amp; Technicians Association (META) .USA.</b></p>
---