

NSDA Code

2020/EHW/DGT/03690

CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE

Directorate General of Training (DGT)
Government of India, Ministry of Skill Development and Entrepreneurship,
1st and 2nd Floor, CIRTES Building
Next to Pusa ITI, Pusa Campus
New Delhi – 110012.

Name and address of submitting body:

Directorate General of Training (DGT)
Government of India, Ministry of Skill Development and Entrepreneurship,
1st and 2nd Floor, CIRTES Building
Next to Pusa ITI, Pusa Campus
New Delhi – 110012.

Name and contact details of individual dealing with the submission

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Position in the organisation: Deputy Director General (C & P)

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List of documents submitted in support of the Qualifications File

1. Competency-based curriculum with following details:

Model Curriculum to be added which will include the following:

1. Indicative list of tools/equipment to conduct the training: Enclosed with curriculum
2. Trainers qualification: Indicated in the curriculum
3. Lesson Plan: All DGT curricula are designed indicating specific practical to be carried out during training along with details of trade theory. Based on this the

concerned instructor prepares the Lesson Plan and demonstration plan with support of IMPs developed by NIMI,DGT.

4. Distribution of training duration into theory/practical/OJT component: Indicated in the curriculum.
2. Curriculum for Core Skills (Workshop Calculation & Science, Engineering Drawing and Employability Skills).

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5. SUMMARY

| | | |
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| 1 | Qualification Title | 'ELECTRONICS MECHANIC' |
| 2 | Qualification Code, if any | DGT/1005 |
| 3 | NCO code and occupation | 7421.0100 - Electronics Fitter, General 7421.0300 - Electronics Mechanic 7422.1100 - Television Installation Man 7422.1200 - Cable Television Installer 7422.1300 - Television Service and Repairman 7422.1302 - Television Repair Technician 7422.1400-Radio Technician (Radio Manufacturing) 7421.1401 - Solar Panel Installation Technician 7422.0801 - Optical fibre technician 7421.0801 - Field Technician: UPS and Inverter |
| 4 | Nature and purpose of the qualification (Please specify whether qualification is short term or long term) | Prepare skilled Technician to undertake the job roles of Electronics Mechanic and will enable the trainee to test and repair electronic equipments such as computers, industrial controls, transmitters and telemetering control systems following blueprints and manufacturer's specifications and using hand tools and test instruments or measure different process parameters selecting the right electronic equipment etc. It is long term qualification. |
| 5 | Body/bodies which will award the qualification | Directorate General of Training (DGT). |
| 6 | Body which will accredit providers to offer courses leading to the qualification | Directorate General of Training (DGT) accredits the Training providers (ITIs/ NSTIs/ MSTIs/ BTCs/ BTPs / Industries / Establishments). |
| 7 | Whether accreditation/affiliation norms are already in place or not , if applicable (if yes, attach a copy) | Yes. The accreditation/ affiliation norms and any amendments made from time to time are available on DGT web portal. |
| 8 | Occupation(s) to which the qualification gives access | <ul style="list-style-type: none"> • 7421.0100 - Electronics Fitter, General • 7421.0300 - Electronics Mechanic |

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|-----------|--|--|---------------------------------------|--------------------------------|
| | | <ul style="list-style-type: none"> • 7422.1100 - Television Installation Man • 7422.1200 - Cable Television Installer • 7422.1300 - Television Service and Repairman • 7422.1302 - Television Repair Technician • 7422.1400-Radio Technician (Radio Manufacturing) • 7421.1401 - Solar Panel Installation Technician • 7422.0801 - Optical fibre technician • 7421.0801 - Field Technician: UPS and Inverter | | |
| 9 | Job description of the occupation | ELECTRONICS MECHANIC will be able to test and repair electronic equipments such as computers, industrial controls, transmitters and telemetering control systems following blueprints and manufacturer's specifications and using hand tools and test instruments or measure different process parameters selecting the right electronic equipment etc. | | |
| 10 | Licensing requirements | NOT REQUIRED | | |
| 11 | Statutory and Regulatory requirement of the relevant sector (documentary evidence to be provided) | NOT APPLICABLE | | |
| 12 | Level of the qualification in the NSQF | Level 5 | | |
| 13 | Anticipated volume of training/learning required to complete the qualification | Sl. No. | Course Element | Notional Training Hours |
| | | 1 | Professional Skill (Trade Practical) | 2000 |
| | | 2 | Professional Knowledge (Trade Theory) | 640 |
| | | 3 | Workshop Calculation & Science | 160 |
| | | 4 | Engineering Drawing | 160 |

NSQF QUALIFICATION FILE

Approved in 24th NSQC, dated: 27th Feb, 2020

Electronics Mechanic

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| | | 5 | Employability Skills | 240 |
| | | | Total | 3200 |
| 14 | Indicative list of training tools required to deliver this qualification | As per Annexure I of curriculum. | | |
| 15 | Entry requirements and/or recommendations and minimum age | Passed 10 th class examination with Science and Mathematics or its equivalent. Minimum age 14 years as on first day of academic session | | |
| 16 | Progression from the qualification (Please show Professional and academic progression) | An Individual can proceed for: | | |
| | | Professional | Technical / Academic | |
| | | <ul style="list-style-type: none"> • Technician • Senior Technician • Supervisor • Manager • Entrepreneur | <div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto;"></div> | |
| | | | ATS CITS | Diploma/ Advance Diploma (Vocational) |
| 17 | Arrangements for the Recognition of Prior learning (RPL) | <ul style="list-style-type: none"> • Yes (For more details refer “Guidelines for Private candidate” in DGT website MIS portal). | | |
| 18 | International comparability where known (research evidence to be provided) | - | | |
| 19 | Date of planned review of the qualification. | 5 Yrs. from the Date of Approval | | |
| 20 | Formal structure of the qualification | | | |
| | Mandatory components | | | |
| | Title of component and identification code/NOSs/ Learning Outcomes | Estimated size (learning hours) | | Level |
| | | Skills | Knowledge | |
| TRADE SPECIFIC | | | | |

NSQF QUALIFICATION FILEApproved in 24th NSQC, dated: 27th Feb, 2020*Electronics Mechanic*

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| (i) | Perform basic workshop operations using suitable tools for fitting, riveting, drilling etc. observing suitable care & safety following safety precautions. | 75 | 21 | 4 |
| (ii) | Select and perform electrical/electronic measurement of single range meters and calibrate the instrument. | 50 | 14 | 4 |
| (iii) | Test & service different batteries used in electronic applications and record the data to estimate repair cost. | 25 | 7 | 5 |
| (iv) | Plan and execute soldering & de-soldering of various electrical components like Switches, PCB& Transformers for electronic circuits. | 25 | 7 | 5 |
| (v) | Test various electronic components using proper measuring instruments and compare the data using standard parameter. | 125 | 35 | 5 |
| (vi) | Assemble simple electronic power supply circuit and test for functioning. | 100 | 28 | 5 |
| (vii) | Install, Configure, interconnect given computer system(s) and demonstrate & utilize application packages for different application. | 125 | 35 | 5 |
| (viii) | Construct, test and verify the input/output characteristic of various analog circuits. | 100 | 28 | 5 |
| (ix) | Plan and construct different power electronic circuits and analyse the circuit functioning. | 75 | 21 | 5 |
| (x) | Select the appropriate opto electronics components and verify the characteristics in different circuit. | 50 | 14 | 5 |
| (xi) | Assemble, test and troubleshoot various digital circuits. | 125 | 35 | 5 |
| (xii) | Simulate and analyze the analog and digital circuits using Electronic simulator software. | 50 | 14 | 5 |
| (xiii) | Identify , place, solder and desolder and test different SMD discrete components and IC's package with due care and following safety norms using proper | 75 | 27 | 5 |

NSQF QUALIFICATION FILE**Approved in 24th NSQC, dated: 27th Feb, 2020***Electronics Mechanic*

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| | tools/setup. | | | |
| (xiv) | Construct and test different circuits using ICs 741 Operational amplifiers & ICs 555 linear integrated circuits and execute the result. | 75 | 21 | 5 |
| (xv) | Measure the various parameters by DSO and execute the result with standard one. | 25 | 9 | 5 |
| (xvi) | Rework on PCB after identifying defects from SMD soldering and de-soldering. | 50 | 18 | 5 |
| (xvii) | Construct different electrical control circuits and test for their proper functioning with due care and safety. | 50 | 18 | 5 |
| (xviii) | Prepare, crimp, terminate and test various cables used in different electronics industries. | 50 | 18 | 5 |
| (xix) | Assemble and test a commercial AM /FM receiver and evaluate performance. | 75 | 27 | 5 |
| (xx) | Test, service and troubleshoot the various components of different domestic/ industrial programmable systems. | 75 | 27 | 5 |
| (xxi) | Execute the operation of different process sensors, identify, wire & test various sensors of different industrial processes by selecting appropriate test instruments | 75 | 27 | 5 |
| (xxii) | Plan and carry out the selection of a project, assemble the project and evaluate performance for a domestic/ commercial applications. | 100 | 36 | 5 |
| (xxiii) | Prepare fibre optic setup and execute transmission and reception. | 25 | 9 | 5 |
| (xxiv) | Plan and Interface the LCD, LED DPM panels to various circuits and evaluate performance. | 50 | 18 | 5 |
| (xxv) | Detect the faults and troubleshoot SMPS, UPS and inverter. | 150 | 54 | 5 |
| (xxvi) | Install a solar panel, execute testing and evaluate performance by connecting the panel to the inverter. | 75 | 27 | 5 |
| (xxvii) | Dismantle, identify the various parts and interface of a cell phone to a PC. Estimate and troubleshoot. | 50 | 18 | 5 |

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| (xxviii) | Check the various parts of a LED lights and stacks and troubleshoot | 25 | 9 | 5 |
| (xxix) | Identify, operate various controls, troubleshoot and replace modules of the LCD/LED TV & its remote. | 50 | 18 | 5 |
| CORE SKILL | | | | |
| EMPLOYABILITY SKILLS | | | | |
| (i) | Apply safe working practices. | - | 30 | 5 |
| (ii) | Comply with environment regulation and housekeeping. | - | 30 | 5 |
| (iii) | Interpret & use formal and technical communication. | - | 30 | 5 |
| (iv) | Apply the concept in productivity & quality management in day to day work to improve productivity & quality. | - | 30 | 5 |
| (v) | List and interpret various acts of labour welfare legislation. | - | 30 | 5 |
| (vi) | Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources. | - | 30 | 5 |
| (vii) | Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth. | - | 30 | 5 |
| (viii) | Utilize computer applications and internet to take benefit of IT developments in the industry. | - | 30 | 5 |
| WORKSHOP CALCULATION & SCIENCE | | | | |
| (i) | Demonstrate mathematical concept and principles to perform practical operations. | - | 80 | 5 |
| (ii) | Explain science in the field of study including simple machine. | - | 80 | 5 |
| ENGINEERING DRAWING | | | | |

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Electronics Mechanic

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| (i) | Read and apply engineering drawing for different application in the field of work. | - | 160 | 5 |
| | Total | 3200 | | |

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SECTION 1
ASSESSMENT

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| <p>21</p> | <p>Body/Bodies which will carry out assessment: Controller of Examinations, DGT</p> |
| <p>22</p> | <p>How will RPL assessment be managed and who will carry it out? DGT will carry out the RPL assessment following the below mentioned eligibility criteria for Trainee: Applicants aspiring to appear as Private Candidates in the AITT under CTS for award of NTC, have been categorized based on their educational background and experience. Subsequently ‘Private Candidates’ may be admitted under one of the following categories. Category wise ‘eligibility criteria’ for appearing as ‘Private Candidate’ in AITT under CTS has been listed below: Category I: Ex-trainees (successful pass-outs) of ITI A. Ex-trainees of ITI who already possess NTC in one of the trades under CTS, are eligible for applying as Private candidate for an allied trade, provided he/ she fulfils all the conditions regarding educational qualification etc. prescribed for that allied trade. B. In addition, the applicant should possess minimum of 1 year experience (as on date of submission of application) post the date of AITT result declaration in the desired allied trade in establishments implementing Apprenticeship Training Scheme (ATS)/ establishments registered under the Apprenticeship portal or registered MSMEs or Entities registered with any government/local authorities / shops covered under Factories Act 1948 and Shops and Establishments Act applicable for the concerned State. Category II: ‘Ex-trainees (successful pass-outs) and current trainees under CoE scheme A. The applicant should have the minimum prescribed entry qualification and should fulfil eligibility criteria for the desired trade under CTS, in which he/she intends to appear for AITT as Private Candidate. CoE candidates must register as ‘Private Candidate’ under CTS in the relevant/mapped CTS trade only. B. There should be a minimum gap of 1 year between successful completions of CoE training i.e. from the date of result declaration to the date of submission of application for ‘Private Candidate’ certification. C. During this gap of 1 year, the candidate must have undergone Industry training or gained experience in desired trade in establishments implementing Apprenticeship Training Scheme (ATS)/ establishments registered under the Apprenticeship portal or registered MSMEs or Entities</p> |

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| | <p>registered with any government/local authorities / shops covered under Factories Act 1948 and Shops and Establishments Act applicable for the concerned State.</p> <p>Category III: SCVT Candidates (admitted till August 2018 session)</p> <p>A. No special provisions have been made for SCVT Trainees to enrol as 'Private Candidate'. Going forward, SCVT trainees have been granted equivalence vide G.S.R 186(E) dated 2nd March 2017 for undergoing apprenticeship training under the Apprentices Act 1961 to obtain 'NAC'.</p> <p>B. Only for SCVT trainees admitted till August 2018 batch, provision has been made for obtaining NTC by appearing in AITT under 'Private Candidate'. Such trainees will continue to be governed by old guidelines for 'Private Candidate'.</p> <p>Category IV: Other Candidates (candidate not falling in any of the above 3 categories, including SCVT trainees enrolled from admission session 2019 onwards)</p> <p>A. The applicant should have the minimum prescribed entry qualification and should fulfil eligibility criteria for the relevant trade under CTS, in which he/she desires to appear for AITT as Private Candidate.</p> <p>B. Applicant should be minimum 21 years of age on the date of submission of application. There is no upper age limit.</p> <p>C. The applicant should possess minimum of 3 years' experience (on the date of submission of application) in the relevant trade in establishments implementing Apprenticeship Training Scheme (ATS)/ establishments registered under the Apprenticeship portal or registered MSMEs or Entities registered with any government/local authorities / shops covered under Factories Act 1948 and Shops and Establishments Act applicable for the concerned State.</p> <p>For detail and updated information please refer to DGT web portal.</p> |
| <p>23</p> | <p>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.</p> <p>(1) Assessment process:</p> <p>The assessment for the qualification is carried out by conducting formative assessments, and end of year examinations (Summative). The formative assessments in respect of each Learning Outcome for practical and related theory are conducted by the concerned instructors for evaluating the</p> |

knowledge and skill acquired by trainees and the behavioural transformation of the trainees. This formative assessment is primarily carried out by collecting evidence of competence gained by the trainees by evaluating them at work based on assessment criteria, asking questions and initiating formative discussions to assess understanding and by evaluating records and reports. Summative assessment is carried out by All India Trade Test on Trade Theory, Trade practical, Workshop Calculation & Science, Engineering Drawing and Employability Skills. The question papers for the theory Examinations contain objective type questions.

The marking pattern and distribution of marks for the qualification are as under:

| Marking Pattern | | | | |
|-----------------|---|-----------------------------------|------------------------|------------------------|
| Sl. No. | Type of Assessment | Subject for the Trade Test | Marks for the 1st Year | Marks for the 2nd Year |
| 1 | Summative Assessment | Practical | 250 | 250 |
| 2 | | Trade Theory | 100 | 100 |
| 3 | | Employability Skills | 50 | 50 |
| 4 | | Workshop Calculation and Science. | 50 | 50 |
| 5 | | Engineering Drawing | 50 | 50 |
| 6 | Formative assessment based on Learning Outcomes | | 200 | 200 |
| TOTAL: | | | 700 | 700 |

(2) Minimum pass marks:

The minimum pass percent for Trade Practical and Formative assessment is 60% & for all other subjects is 33%. There will be no Grace marks.

Testing and certifications for the course:

Controller of examinations, DGT carries out the assessment and issues National Trade Certificate (NTC) following the norms and guidelines issued

by the Directorate from time to time.

Overall assessment strategy:

Assessment of the qualification evaluates trainees to show that they can integrate knowledge, skills and values for carrying out relevant tasks as per the defined learning outcomes and assessment criteria. The trainees may choose the preferred language for assessment. The underlying principle of assessment is fairness and transparency. While assessing the trainee, assessor is directed to assess as per the defined assessment criteria against the learning outcomes. The evidence of the competence acquired by the trainees can be obtained by conducting theory and practical examinations, observing the trainees at work, asking questions and initiating discussions to assess, understand and evaluate records and reports. The ultimate objective of the assessment is to assess the candidates as per the defined assessment criteria for the learning outcomes.

Specific Arrangements for assessment:

- Assessment is outcome-based.
- There are formative and summative assessments in Theory and Practical.
- Assessment is carried out in Trade theory, Trade Practical, Workshop Calculation and Science, Engineering Drawing and Employability Skills.
- While Trade Theory and Trade Practical are used for assessing Trade-related jobs, Workshop Calculation and Science is used to test trainee's numerical and logical skills, Drawing is used to test the ability of the trainee to draw and read sketches and Employability skills is used to test the communication, professional language, leadership, entrepreneurship and team-work abilities of the trainee.
- In addition to demonstration of theory and practical knowledge, trainees get a chance to present total personality.

Quality assurance activities:

Question papers are set by external paper setters/ software generated. Evaluation of Theory Examinations in Trade, Workshop Calculation & Science, Engineering Drawing and Employability Skill is done by third-party agency.

Trade Practical is examined by External Examiner.

24. Assessment evidences

Title of Component: Formative Assessment Breakup
 (On half yearly average of the learning assessment covered)

Means of assessment

Assessment will be evidence based comprising the following for each Learning Outcome:

| Serial No. | Terminal Competency | Maximum Weightage (%) |
|------------|--|-----------------------|
| 1 | Safety consciousness | 15 |
| 2 | Workplace hygiene | 5 |
| 3 | Attendance/ Punctuality | 10 |
| 4 | Ability to follow Manuals/ Written instructions | 5 |
| 5 | Application of Knowledge | 10 |
| 6 | Skills to handle tools / equipment/ Instruments/ Devices | 10 |
| 7 | Economical use of materials | 5 |
| 8 | Working Strategy | 10 |
| 9 | Quality in workmanship/ Performance | 15 |
| 10 | VIVA | 15 |
| | Total Maximum Weightage (%) | 100 |

Pass/Fail

The minimum pass percentage is 60% marks for formative assessment.

LEARNING OUTCOME WITH ASSESSMENT CRITERIA:

| LEARNING OUTCOME (TRADE SPECIFIC) | |
|---|--|
| LEARNING OUTCOME | ASSESSMENT CRITERIA |
| FIRST YEAR | |
| 1. Perform basic workshop operations using suitable tools for fitting, riveting, drilling etc. observing suitable care & safety following safety precautions. | Identify basic hand tools for fitting, riveting, drilling etc. with due care and safety. |
| | Fix surface mounting type of accessories in a panel board. |
| | Connect electrical accessories. |
| | Make and Wire up of a test board and test it. |
| 2. Select and perform | Plan work in compliance with standard safety norms. |

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| electrical/ electronic measurement of single range meters and calibrate the instrument. | Identify the type of electronic instruments. |
| | Determine the measurement errors while measuring resistance by voltage drop method. |
| | Extend the range of MC voltmeter and ammeter. |
| | Measure the value of resistance, voltage and current using digital multimeter. |
| | Calibrate analog multimeter. |
| 3. Test & service different batteries used in electronic applications and record the data to estimate repair cost. | Identify Tools and instruments for testing of batteries. |
| | Observe safety procedure during testing of batteries and work as per standard norms and company guidelines |
| | Identify the primary and secondary cells. |
| | Measure and test the voltages of the given cells/battery using analog / digital multimeter. |
| | Charging and discharging the battery. |
| | Maintain and estimate the repair cost of secondary battery. |
| | Use a hydro meter to measure the specific gravity of the secondary battery. |
| 4. Plan and execute soldering & de-soldering of various electrical components like Switches, PCB & Transformers for electronic circuits. | Plan work in compliance with standard safety norms. |
| | Identify different types of mains transformers and test. |
| | Identify the primary and secondary transformer windings and test the polarity. |
| | Measure the primary and secondary voltage of different transformers. |
| | Solder the given components |
| | Identify and test the variac. |
| | Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal. |
| 5. Test various electronic components using proper measuring instruments and compare the data using standard parameter. | Ascertain and select tools and materials for the job and make this available for use in a timely manner. |
| | Plan work in compliance with standard safety norms. |
| | Identify the different types of resistors. |
| | Measure the resistor values using colour code and verify the reading by measuring in multi meter. |
| | Identify the power rating using size. |

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| | <p>Measure the resistance, Voltage, Current through series and parallel connected networks using multi meter.</p> <p>Identify different inductors and measure the values using LCR meter.</p> <p>Identify the different capacitors and measure capacitance of various capacitors using LCR meter.</p> <p>Ascertain and select tools and materials for the job and make this available for use in.</p> |
| 6. Assemble simple electronic power supply circuit and test for functioning. | <p>Practice soldering on components, lug and board with safety.</p> <p>Identify the passive /active components by visual appearance, Code number and test for their condition.</p> <p>Identify the control and functional switches in CRO and measure the D.C. & A.C. voltage, frequency and time period.</p> <p>Construct and test a half & full wave rectifiers with and without filter circuits.</p> <p>Construct and test a bridge rectifier with and without filter circuits.</p> <p>Construct and test a Zener based voltage regulator circuit.</p> |
| 7. Install, configure, interconnect given computer system(s) and demonstrate & utilize application packages for different application. | <p>Plan, work in compliance with standard safety norms.</p> <p>Select hardware and software component.</p> <p>Install and configure operating systems and applications.</p> <p>Integrate IT systems into networks.</p> <p>Deploy tools and test programmes.</p> <p>Avoid e-waste and dispose the waste as per the procedure.</p> |
| 8. Construct, test and verify the input/ output characteristics of various analog circuits. | <p>Ascertain and select tools and instruments for carrying out the jobs.</p> <p>Plan and work in compliance with standard safety norms.</p> <p>Practice on soldering components on lug board with safety.</p> <p>Identify the passive /active components by visual appearance, Code number and test for their condition.</p> <p>Construct and test the transistor based switching circuit</p> |

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| | Construct and test CB,CE & CC amplifier circuit |
| | Ascertain the performance of different oscillator circuits. |
| | Construct and test Clipper, Clamper and Schmitt trigger circuit. |
| 9. Plan and construct different power electronic circuits and analyse the circuit functioning. | Construct and test of Transistor and JFET amplifiers, oscillators and multi vibrators. |
| | Construct and test a UJT as relaxation oscillator. |
| | Construct and test lamp dimmer using TRIAC/DIAC with safety. |
| | Construct and test MOSFET, IGBT test circuit and apply for suitable operation with proper safety. |
| | Construct and test the universal motor speed controller using SCR with safety. |
| | Construct and test a switching circuits using optical devices. |
| 10. Select the appropriate opto electronics components and verify the characteristics in different circuit. | Plan work in compliance with standard safety norms. |
| | Identify the different types of LEDs and IR LEDs. |
| | Measure the resistance, voltage, current through electronic circuit using multimeter. |
| | Construct and test a circuit using photo transistor and verify its characteristics. |
| | Identify photo coupler/ optical sensor input/output terminals and measure the quantum of isolation between the terminals. |
| 11. Assemble, test and troubleshoot various digital circuits. | Illustrate to practice the digital trainer kit with safety. |
| | Identify various digital ICs, test IC using digital IC tester and verify the truth table. |
| | Construct and verify the truth table of all gates using NOR and NAND gates. |
| | Construct an adder cum subtractor circuits and verify the truth table. |
| | Construct a decoder and encoder, multiplexer and de-multiplexer circuits and verify the truth table. |
| | Construct a multiplexer and de-multiplexer and verify the truth table. |
| | Construct and verify the truth table of various flip flop, counter and shift register circuits. |

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| 12. Simulate and analyze the analog and digital circuits using Electronic simulator software. | Plan the work in compliance with standard procedure. |
| | Prepare simple analog and digital electronic circuits using the simulator software. |
| | Simulate and test the prepared analog and digital circuits. |
| | Convert the prepared circuit into layout diagram. |
| | Explore various trouble shooting and fault finding the resources provided in the simulation software |
| 13. Identify, place, solder and desolder and test different SMD discrete components and ICs package with due care and following safety norms using proper tools/setup. | Identify the various crimping tools for various IC packages. |
| | Identify different types of soldering guns and choose the suitable tip for the application. |
| | Practice the soldering and de-soldering the different active and passive components, IC base on GPCBs using solder, flux, pump and wick. |
| | Make the necessary setting on SMD soldering station to solder and de-solder various IC's of different packages by following the safety norms. |
| | Identify SMD components, de-solder and solder the SMD components on the PCB. |
| | Check the cold continuity, identify loose/dry solder and broken track on printed wired assemblies and rectify the defects. |
| | Avoid waste, ascertain unused materials and components for safe disposal. |
| 14. Construct and test different circuits using ICs 741 operational amplifiers & ICs 555 linear integrated circuits and execute the result. | Demonstrate analog trainer kit with safety precautions. |
| | Identify various ICs, differentiate by code No. and test for their condition. |
| | Construct and test various OPAMP circuits. |
| | Construct and test R-2R ladder type digital to analog converter circuit. |
| | Construct and test different configurations of 555 IC e.g. astable, monostable, bi-astable and VCO circuits. |
| SECOND YEAR | |
| 15. Measure the various parameters by DSO and execute the result with standard one. | Identify and demonstrate various control elements on front panel of a DSO. |
| | Measure different parameters of electronic signals using DSO. |
| | Store the waveform of a signal in DSO. |

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| | Connect DSO with a printer and take printout of signal waveforms. |
| 16. Rework on PCB after identifying defects from SMD soldering and de-soldering. | Plan the work in compliance with standard safety procedures. |
| | Demonstrate various tools and accessories used in PCB rework. |
| | Construct a PCB to demonstrate defects on soldered joints. |
| | Repair defective soldered joints. |
| 17. Construct different electrical control circuits and test for their proper functioning with due care and safety. | Measure the coil winding of the given motor. |
| | Prepare the setup and control an induction motor using a DOL starter by following the safety norms. |
| | Construct a direction control circuit to change direction of an induction motor. |
| | Connect an overload relay and test for its proper functioning. |
| 18. Prepare, crimp, terminate and test various cables used in different electronics industries. | Plan and work in compliance with standard safety norms. |
| | Prepare, terminate and test various electronics cable using proper crimping tools. |
| 19. Assemble and test a commercial AM/ FM receiver and evaluate performance. | Plan and select tools to assemble the receiver. |
| | Modulate and Demodulate various signals using AM and FM on the trainer kit and observe waveforms. |
| | Construct and test IC based AM Receiver. |
| | Construct and test IC based FM transmitter and receiver. |
| | Modulate and Demodulate a signal using PAM, PPM, PWM Techniques. |
| | Troubleshoot and replace the faulty components. |
| | Check the functionality of AM/FM receiver. |
| 20. Test, service and troubleshoot the various components of different domestic/ industrial programmable systems. | Understand and interpret the procedure as per manual of Micro controller. |
| | Identify various ICs & their functions on the given Microcontroller Kit. |
| | Identify the address range of RAM & ROM. |
| | Write data into RAM & observe its volatility. |
| | Identify the port pins of the controller & configure the ports |

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| | for Input & Output operation. |
| | Demonstrate entering of simple programs, execute & monitor the results. |
| 21. Execute the operation of different process sensors, identify, wire & test various sensors of different industrial processes by selecting appropriate test instruments. | <p>Ascertain and select tools, material for the job and make this available for use in the timely manner.</p> <p>Plan work in compliance with safety norms.</p> <p>Demonstrate possible solution and agree task within the team.</p> <p>Identify sensors used in process industries such as RTDs, Temperature ICs, Thermocouples, proximity switches (inductive, capacitive and photo electric), load cells, strain gauge. LVDT by their appearance.</p> <p>Measure temperature of a lit fire using a Thermocouple and record the readings referring to data chart.</p> <p>Measure temperature of a lit fire using RTD and record the readings referring to data chart.</p> <p>Measure the DC voltage of a LVDT.</p> <p>Detect different objectives using capacitive, inductive and photoelectric proximity sensors.</p> |
| 22. Plan and carry out the Selection of a project, assemble the project and evaluate performance for a domestic/commercial applications. | <p>Plan, analyze and estimate the cost of the particular project.</p> <p>Identify the various tools required for the job.</p> <p>Prepare the simple digital/ analog electronic circuit.</p> <p>Simulate and test the prepared circuit.</p> <p>Assemble and test the circuit.</p> |
| 23. Prepare fibre optic setup and execute transmission and reception. | <p>Plan and select appropriate tools to complete the job safely.</p> <p>Identify the resources and their need on the given fiber optic trainer kit.</p> <p>Make optical fibre setup to transmit and receive analog and digital data.</p> <p>Demonstrate and apply FM modulation and demodulation using OFC trainer kit using audio signal and voice link.</p> <p>Demonstrate PWM modulation and demodulation using OFC trainer kit using audio signal and voice link.</p> <p>Demonstrate PPM modulation and demodulation using OFC trainer kit using audio signal and voice link.</p> |

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| 24. Plan and Interface the LCD, LED, DPM panels to various circuits and evaluate performance. | Identify LCD/LED Display module and its decoder/driver ICs and display a word on a two line LCD/LED. |
| | Measure/current flowing through a resistor and display it. Measure/current flowing through a sensor and display it on a LCD/LED module (DPM). |
| | Avoid waste and dispose the waste as per the procedures. |
| 25. Detect the faults and troubleshoot SMPS, UPS and inverter. | Identify the tools and equipments to perform the job with due care and safety. |
| | Dismantle the given stabilizer and find major sections/ ICs components. |
| | Identify various input and output sockets / connectors of the given SMPS. |
| | Identify major sections/ ICs/components of SMPS. |
| | Identify and replace the faulty components and construct and test IC Based DC-DC converter for different voltages. |
| | Identify front panel control & indicators of UPS. |
| | Connect Battery & load to UPS & test on battery mode. |
| | Open Top cover of UPS & identify isolator transformer & UPS transformer & additional circuit other than inverter. |
| | Identify various circuit boards in UPS and monitor voltages at various test points. |
| Test UPS under Fault condition & rectify fault. | |
| 26. Install a solar panel, execute testing and evaluate performance by connecting the panel to the inverter. | Select appropriate tools and equipment. |
| | Install a solar panel to a roof. |
| | Wire a solar panel to a solar controller. |
| | Wire a solar controller to a battery storage station. |
| | Connect storage batteries to a power inverter. |
| | Wire a power inverter to an electrical service panel. |
| | Connect and test solar panel to the Inverter and run the load. |
| | Installation of Solar Inverter. |
| Demonstrate the installation with team. | |
| 27. Dismantle, identify the various parts and interface of a cell phone to a PC. Estimate and troubleshoot. | Understand and interpret repair procedure as per manual of cell phone and select appropriate tools & equipment for undertaking job. |
| | Plan to repair and assemble the components used as per circuit diagram. |
| | Dismantle, identify the parts and assemble different types |

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| | of smart phones. |
| | Interface the cell phone/smart phone to the PC and transfer the data and browse internet. |
| | Flash the various brands of cell phone/smart phone (at least 3) and upgrade the OS. |
| | Format the cell phone/smart phone for virus (approach the mobile repair shop/service centre). |
| | Identify the defective parts and rectify. |
| | |
| 28. Check the various parts of a LED lights & stacks and troubleshoot. | Understand and interpret measuring procedure as per manual. |
| | Conduct systematic trouble shooting. |
| | Dismantle the LED light, identify the connections of LEDs stacks, protection circuits, regulator. |
| | Measure the voltage across LED stacks. |
| | Identify the rectifier, controller part of LED lights. |
| | Test various subassemblies of the given LED light system. |
| | Comply with safety rules when performing the above operations. |
| | Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal. |
| | |
| 29. Identify, operate various controls, troubleshoot and replace modules of the LCD/LED TV & its remote. | Ascertain and select tools and materials for the job and make this available for use in a timely manner. |
| | Plan to Dismantle and assemble modules as per circuit diagram. |
| | Identification and operate different Controls on LCD, LED TV. |
| | Dismantle, Identify the parts of the remote control. |
| | Trace and rectify the faults of a various remote controls. |
| | Identify various connectors and connect the cable operator's external decoder (set top box) to the TV. |
| | Comply with safety rules when performing the above operations. |
| | Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal. |

| LEARNING OUTCOME (CORE SKILL) | |
|---|---|
| LEARNING OUTCOME | ASSESSMENT CRITERIA |
| EMPLOYABILITY SKILLS | |
| 1. Apply safe working practices | Follow and maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements and according to site policy. |
| | Recognize and report all unsafe situations according to site policy. |
| | Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures. |
| | Identify, handle and store / dispose off dangerous goods and substances according to site policy and procedures following safety regulations and requirements. |
| | Identify and observe site policies and procedures in regard to illness or accident. |
| | Identify safety alarms accurately. |
| | Report supervisor/ Competent of authority in the event of accident or sickness of any staff and record accident details correctly according to site accident/injury procedures. |
| | Identify and observe site evacuation procedures according to site policy. |
| | Identify Personal Protective Equipment (PPE) and use the same as per related working environment. |
| | Identify basic first aid and use them under different circumstances. |
| Identify different fire extinguisher and use the same as per requirement. | |
| 2. Comply with environment regulation and housekeeping | Identify environmental pollution & contribute to the avoidance of instances of environmental pollution. |
| | Deploy environmental protection legislation & regulations |
| | Take opportunities to use energy and materials in an environmentally friendly manner. |
| | Avoid waste and dispose waste as per procedure |
| | Recognize different components of 5S and apply the same in the working environment. |
| 3. Interpret & use formal and technical | Obtain sources of information and recognize information. |
| | Use and draw up technical drawings and documents. |

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| communication. | Use documents and technical regulations and occupationally related provisions. |
| | Conduct appropriate and target oriented discussions with higher authority and within the team. |
| | Present facts and circumstances, possible solutions & use English special terminology. |
| | Resolve disputes within the team. |
| | Conduct written communication. |
| | |
| 4. Apply the concept in productivity & quality management in day to day work to improve productivity & quality. | Explain the concept of productivity and apply during execution of job. |
| | Explain the concept of quality tools and apply during execution of job. |
| | |
| 5. List and interpret various acts of labour welfare legislation. | Explain concept of labour welfare legislation, adhere to responsibilities and remain sensitive towards such laws. |
| | Knows benefits guaranteed under various acts. |
| | |
| 6. Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources. | Explain the concept of energy conservation, global warming, pollution and utilize the available resources optimally & remain sensitive to avoid environment pollution. |
| | Explain standard procedure for disposal of waste. |
| | |
| 7. Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth. | Explain personnel finance and entrepreneurship. |
| | Explain role of various schemes and institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non-financing support agencies to familiarize with the policies/ programmes, procedure & the available scheme. |
| | Prepare a report to become an entrepreneur for submission to financial institutions. |
| | |
| 8. Utilize computer applications and internet to take benefit of IT developments in the industry. | Explain the hardware of personal computer. |
| | Use common application software viz., word, excel, power point etc., in day to day work. |
| | Awareness about useful internet websites, search relevant information pertaining to the assigned tasks. |

| WORKSHOP CALCULATION & SCIENCE | |
|---|---|
| 1. Demonstrate mathematical concept and principles to perform practical operations. | Solve different problems like phase angle, etc. with the help of a calculator. |
| | Demonstrate conversion of Fraction to Decimal and vice versa. |
| | Explain BCD code, conversion from decimal to binary and vice-versa, all other conversions. |
| 2. Explain science in the field of study including simple machine. | Explain concept of science related to the field such as Material science, Mass, weight, density, speed, velocity, heat & temperature, force, motion, pressure, heat treatment, centre of gravity, friction. |
| | Explain levers and its types. |
| | Explain relationship between Efficiency, velocity ratio and Mechanical Advantage. |
| | Prepare list of appropriate materials by interpreting detail drawings and determine quantities of such materials. |
| | Solve simple problems on lifting tackles like crane-Solution of problems with the aid of vectors. |
| ENGINEERING DRAWING | |
| 1. Read and apply engineering drawing for different application in the field of work. | Read & interpret the information on drawings and apply in executing practical work. |
| | Read & analyse the specification to ascertain the material requirement, tools and assembly/maintenance parameters. |
| | Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work. |

SECTION 2

25. EVIDENCE OF LEVEL

OPTION A

| Title/Name of qualification/component: ELECTRONICS MECHANIC | | | Level: 5 |
|---|---|--|------------|
| NSQF Domain | Outcomes of the Qualification/Component | How the outcomes relate to the NSQF level descriptors | NSQF Level |
| Process | <p>Requires Well Developed Skill</p> <ul style="list-style-type: none"> Assemble and test a commercial AM /FM receiver and evaluate performance. Prepare fibre optic setup and execute transmission and reception. Execute the operation of different process sensors, identify, wire & test various sensors of different industrial processes by selecting appropriate test instruments. <p>Clear choice of procedures in familiar context</p> <ul style="list-style-type: none"> Execute the operation of different process sensors, identify, wire & test various sensors of different industrial processes by selecting appropriate test instruments. Test, service and troubleshoot the various | <p>The learner requires to demonstrate well developed skill for example in learning outcomes like 'Assemble and test a commercial AM /FM receiver and evaluate performance' and 'Prepare fibre optic setup and execute transmission and reception'. One needs to perform complex set of hard core electronic skill activities for performing these outcomes and there is no scope for error as well.</p> <p>The learner requires to apply clear choice of procedures in familiar context for example in learning outcomes like 'Execute the operation of different process sensors, identify, wire & test various sensors of different industrial processes by selecting appropriate test instruments' etc. where the learner has to apply one's knowledge and decide what needs to be done to either meet</p> | 5 |

NSQF QUALIFICATION FILE

Approved in 24th NSQC, dated: 27th Feb, 2020

Electronics Mechanic

| Title/Name of qualification/component: ELECTRONICS MECHANIC | | | Level: 5 |
|---|---|---|------------|
| NSQF Domain | Outcomes of the Qualification/Component | How the outcomes relate to the NSQF level descriptors | NSQF Level |
| | <p>components of different domestic/ industrial programmable systems.</p> <ul style="list-style-type: none"> • Check the various parts of a LED lights and stacks and troubleshoot . | <p>the Process requirement or identify fault and decide how to rectify it or plan as per the layout and conditions available.</p> <p>Hence NSQF Level is 5 for this descriptor.</p> | |
| Professional knowledge | <p>Knowledge of facts in the field of work or study</p> <ul style="list-style-type: none"> • Multi meter, use of meters in different circuits. • Function of different ICs used in the Microcontroller Kit. <p>Knowledge of Principles and general concepts in the field of work or study</p> <ul style="list-style-type: none"> • Ohm's law and Kirchhoff's Law. • Different types of biasing, various | <p>The learner requires to demonstrate knowledge of facts, principles, processes and general concepts in the Electronics field of work or study to test and repair various electronics equipments or to measure different process parameters choosing and using the right electronic equipment.</p> <p>Hence NSQF Level is 5 for this descriptor.</p> | 5 |

NSQF QUALIFICATION FILE

Approved in 24th NSQC, dated: 27th Feb, 2020

Electronics Mechanic

| Title/Name of qualification/component: ELECTRONICS MECHANIC | | | Level: 5 |
|---|--|--|------------|
| NSQF Domain | Outcomes of the Qualification/Component | How the outcomes relate to the NSQF level descriptors | NSQF Level |
| | <p>configurations of transistor (C-B, C-E & C-C).</p> <p>Knowledge of processes in the field of work or study</p> <ul style="list-style-type: none"> Working and application of LED, IR LEDs, Photo diode, photo transistor, their characteristics and applications. | | |
| Professional skill | <ul style="list-style-type: none"> Construct and test different circuits using ICs 741 Operational amplifiers & ICs 555 linear integrated circuits and execute the result. Measure the various parameters by DSO and execute the result with standard one. Execute the operation of different process sensors, identify, wire & test various sensors of different industrial processes by selecting appropriate test instruments. Check the various parts of a LED lights and stacks and troubleshoot. | <p>The learning outcomes indicated in the adjacent cell require cognitive and practical skills to accomplish tasks that involve checking and repairing electronic equipments and measurement of various process parameters selecting the right equipment etc. It requires planning as per conditions available or detecting fault and deciding course of action for repair including problem solving by selecting and applying relevant methods, tools, materials and information.</p> <p>Hence NSQF Level is 5 for this descriptor.</p> | 5 |
| Core skill | <p>Desired Mathematical Skills</p> <ul style="list-style-type: none"> Explain science in the field of study including simple machine. | <p>The learning outcomes for example 'Explain science in the field of study including simple machine' and 'Interpret & use formal and</p> | 5 |

NSQF QUALIFICATION FILE

Approved in 24th NSQC, dated: 27th Feb, 2020

Electronics Mechanic

| Title/Name of qualification/component: ELECTRONICS MECHANIC | | | Level: 5 |
|---|---|--|------------|
| NSQF Domain | Outcomes of the Qualification/Component | How the outcomes relate to the NSQF level descriptors | NSQF Level |
| | <p>Understanding of social/political skill</p> <ul style="list-style-type: none"> Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth. <p>Organizing information and communication</p> <ul style="list-style-type: none"> Interpret & use formal and technical communication. | <p>technical communication' etc. display the learning outcomes where the learner needs to display desired mathematical skill; understanding of social, political skill and some skill of collecting and organizing information, communication.</p> <p>Hence NSQF Level is 5 for this descriptor.</p> | |
| Responsibility | <ul style="list-style-type: none"> Test various electronic components using proper measuring instruments and compare the data using standard parameter. Assemble simple electronic power supply circuit and test for functioning. Detect the faults and troubleshoot SMPS, UPS and inverter. Identify, operate various controls, troubleshoot and replace modules of the LCD/LED TV & its remote. Check the various parts of a LED lights and stacks and troubleshoot. Install a solar panel, execute testing and | <p>The role of ELECTRONICS MECHANIC is independently responsible to perform the works as per specifications and their own analysis of what needs to be done based on their understanding of various electronic devices and their applications in different fields and processes applying basic principles and complying with the standards. Moreover, they have got some responsibility for other's works and learning as well; Learning outcomes like "Install a solar panel, execute testing and evaluate performance by connecting the panel to the inverter" etc. reveal the same.</p> | 5 |

NSQF QUALIFICATION FILEApproved in 24th NSQC, dated: 27th Feb, 2020*Electronics Mechanic*

| Title/Name of qualification/component: ELECTRONICS MECHANIC | | | Level: 5 |
|---|---|---|------------|
| NSQF Domain | Outcomes of the Qualification/Component | How the outcomes relate to the NSQF level descriptors | NSQF Level |
| | evaluate performance by connecting the panel to the inverter. | Hence NSQF Level is 5 for this descriptor. | |

SECTION 3
EVIDENCE OF NEED

| 26 | <p>What evidence is there that the qualification is needed? What is the estimated uptake of this qualification and what is the basis of this estimate?</p> <table border="1" data-bbox="339 555 1390 1704"> <thead> <tr> <th data-bbox="339 555 627 696">Basis</th> <th data-bbox="627 555 1390 696">In case of other Awarding Bodies (Institutes under Central Ministries and states departments)</th> </tr> </thead> <tbody> <tr> <td data-bbox="339 696 627 1077">Need of the qualification</td> <td data-bbox="627 696 1390 1077"> <p>Electronics & Hardware Sector has a significant presence of organized as well as unorganized skilled manpower requirement. This sector is poised to grow exponentially in the years to come and is highly labour intensive and there are many emerging trends in this sector. Hence the qualification has been designed keeping in view to cater to the ever-increasing demand of skilled manpower in consultation with stakeholders.</p> </td> </tr> <tr> <td data-bbox="339 1077 627 1503">Industry Relevance</td> <td data-bbox="627 1077 1390 1503"> <p>The job role defined for the qualification is as per the National Classification of Occupations 2015 which is developed by Employment Directorate under the ministry of Labour and Employment in collaboration with different industry partners and as per ILO guidelines. Moreover, the training is imparted in ITIs/ NSTIs/ MSTIs/ BTC/ BTPs/ Industries / Establishments etc. where such requirement is available. This justifies the qualification is very much relevant for industry.</p> </td> </tr> <tr> <td data-bbox="339 1503 627 1630">Usage of the qualification</td> <td data-bbox="627 1503 1390 1630"> <p>The Proposed qualification will create skilled Technician for various establishments in different Sectors.</p> </td> </tr> <tr> <td data-bbox="339 1630 627 1704">Estimated uptake</td> <td data-bbox="627 1630 1390 1704"> <p>The present seating capacity is 116402.</p> </td> </tr> </tbody> </table> | Basis | In case of other Awarding Bodies (Institutes under Central Ministries and states departments) | Need of the qualification | <p>Electronics & Hardware Sector has a significant presence of organized as well as unorganized skilled manpower requirement. This sector is poised to grow exponentially in the years to come and is highly labour intensive and there are many emerging trends in this sector. Hence the qualification has been designed keeping in view to cater to the ever-increasing demand of skilled manpower in consultation with stakeholders.</p> | Industry Relevance | <p>The job role defined for the qualification is as per the National Classification of Occupations 2015 which is developed by Employment Directorate under the ministry of Labour and Employment in collaboration with different industry partners and as per ILO guidelines. Moreover, the training is imparted in ITIs/ NSTIs/ MSTIs/ BTC/ BTPs/ Industries / Establishments etc. where such requirement is available. This justifies the qualification is very much relevant for industry.</p> | Usage of the qualification | <p>The Proposed qualification will create skilled Technician for various establishments in different Sectors.</p> | Estimated uptake | <p>The present seating capacity is 116402.</p> |
|----------------------------|---|--------------|--|---------------------------|---|--------------------|---|----------------------------|---|------------------|--|
| Basis | In case of other Awarding Bodies (Institutes under Central Ministries and states departments) | | | | | | | | | | |
| Need of the qualification | <p>Electronics & Hardware Sector has a significant presence of organized as well as unorganized skilled manpower requirement. This sector is poised to grow exponentially in the years to come and is highly labour intensive and there are many emerging trends in this sector. Hence the qualification has been designed keeping in view to cater to the ever-increasing demand of skilled manpower in consultation with stakeholders.</p> | | | | | | | | | | |
| Industry Relevance | <p>The job role defined for the qualification is as per the National Classification of Occupations 2015 which is developed by Employment Directorate under the ministry of Labour and Employment in collaboration with different industry partners and as per ILO guidelines. Moreover, the training is imparted in ITIs/ NSTIs/ MSTIs/ BTC/ BTPs/ Industries / Establishments etc. where such requirement is available. This justifies the qualification is very much relevant for industry.</p> | | | | | | | | | | |
| Usage of the qualification | <p>The Proposed qualification will create skilled Technician for various establishments in different Sectors.</p> | | | | | | | | | | |
| Estimated uptake | <p>The present seating capacity is 116402.</p> | | | | | | | | | | |
| 27 | <p>Recommendation from the concerned Line Ministry of the Government/Regulatory Body. To be supported by documentary evidences.</p> <p>The qualification, originally designed for Craftsman Training Scheme is in existence for many years and approved by DGT (Regulatory Body) under Ministry of Skill Development and Entrepreneurship, Govt. of India.</p> | | | | | | | | | | |

| | |
|------------------|--|
| <p>28</p> | <p>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</p> <p>The qualification is originally designed and approved by DGT for the Craftsman Training Scheme and is in existence for many years. No such duplicate qualification of same duration and competencies exists.</p> |
| <p>29</p> | <p>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</p> <ul style="list-style-type: none"> • The research wing of CSTARI & DGT reviews and updates the qualification, in consultation with industries and other stakeholders, on a regular basis by conducting trade committee meetings. • DGT will monitor any duplicity by comparing existing qualifications with upcoming ones in the National Qualifications Register (NQR) and relevant sectors. |

SECTION 4
EVIDENCE OF PROGRESSION

30 **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? Show the career map here to reflect the clear progression**

On completion of the training the trainee will have an opportunity to move in vertical/horizontal pathways to promote to higher designations. The learner can further undergo other specialised courses to excel in the relevant field.

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    graph LR
      Technician[Technician] --> Senior[Senior Technician]
      Senior --> Supervisor[Supervisor]
      Supervisor --> Manager[Manager]
      Senior --> Entrepreneur[Entrepreneur]
  
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The diagram illustrates a career progression path. It starts with a box labeled 'Technician'. A double-lined arrow points to a box labeled 'Senior Technician'. From 'Senior Technician', a double-lined arrow points to a box labeled 'Supervisor', which in turn has a double-lined arrow pointing to a box labeled 'Manager'. Below the 'Senior Technician' box, a vertical line descends to a horizontal line that spans the width of the top four boxes. From the center of this horizontal line, a double-lined arrow points downwards to a box labeled 'Entrepreneur'.