



Model Curriculum

QP Name: Technical Supervisor – Automatic Train Protection System (ATPS)

QP Code: TEL/Q6303

Version: 2.0

NSQF Level: 5

Model Curriculum Version: 2.0

Telecom Sector Skill Council of India (TSSCI)
Estel Building, 3rd Floor, Plot No 126,
Sector – 44, Gurgaon – 122003

Table of Contents

Training Parameters.....	3
Program Overview.....	4
Training Outcomes.....	4
Compulsory Modules.....	4
Module 1: High density hand soldering of component on telecom boards.....	7
Module 2: Handling fiber constructs, performance and selection criteria.....	8
Module 3: Installation of passive FTTH/X components.....	9
Module 4: Tower site performance measurement and parameter recording.....	10
Module 5: Tower site data analysis and reporting.....	11
Module 6: Tower Site Optimization and troubleshooting.....	12
Module 7: Lay Wiring for Locomotives and perform testing.....	13
Module 8: Process of planning and supervising the installation of RFID tags and readers.....	14
Module 9: Installation of Towers/Foundation (Bay).....	15
Module 10: Installation of Tower Structure design and verticality test.....	16
Module 11: Process of carrying out the testing, installing and troubleshooting of iATP-Kavach sub-systems	18
Module 12: Process of setting up, simulating and testing the Station and Loco iATP-Kavach.....	20
Module 13: Provisioning of Active Network Equipment.....	22
Module 14: On-the-Job Training.....	25
Module 15: DGT/VSQ/N0102 Employability Skills (60 hours).....	27
Annexure.....	29
Trainer Requirements.....	29
Assessor Requirements.....	30
Assessment Strategy.....	33
References.....	35
Glossary.....	35
Acronyms and Abbreviations.....	36

Training Parameters

Sector	Telecom
Sub-Sector	Network Managed Services
Occupation	Project Engineering
Country	India
NSQF Level	5
Aligned to NCO/ISCO/ISIC Code	NCO-2015/NA
Minimum Educational Qualification and Experience	Completed 2nd year of 3-year/ 4-years UG OR Pursuing 2nd year of 3-year/ 4-years UG and continuing education OR Completed 2nd year of diploma (after 12th) OR Pursuing 2nd year of 2-year diploma after 12th with No Experience required OR Previous relevant Qualification of NSQF Level 4 with 3-year relevant experience
Pre-Requisite License or Training	NA
Minimum Job Entry Age	21 Years
Last Reviewed On	26/05/2022
Next Review Date	26/05/2025
NSQC Approval Date	26/05/2022
QP Version	2.0
Model Curriculum Creation Date	26/05/2022
Model Curriculum Valid Up to Date	26/05/2025
Model Curriculum Version	2.0
Minimum Duration of the Course	600 Hours
Maximum Duration of the Course	600 Hours

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills to:

- High density hand soldering of component on telecom boards.
- Handling fiber constructs, performance and selection criteria.
- Installation of passive FTTH/X components.
- Tower site performance measurement and parameter recording.
- Tower site data analysis and reporting.
- Tower Site Optimization and troubleshooting.
- Describe the process of planning and supervising the installation of RFID tags and readers.
- Demonstrate the process of carrying out the testing and troubleshooting of iATP - Kavach sub-systems.
- Demonstrate the process of setting up, simulating and testing the Station and Loco iATP-Kavach.
- Provisioning of Active Network Equipment.

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

Skills Provided by IRISET	NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
Wiring and Soldering	TEL/N2500 High density hand soldering of component on telecom boards NOS Version-1.0 NSQF Level- 4	6:00	14:00	00:00	10:00	30:00
	Module 1: High density hand soldering of component on telecom boards	06:00	14:00	00:00	10:00	30:00
Optical Fiber Cable (OFC) Measurements, Fiber Testing & Rectification	TEL/N4126 Handling fiber constructs, performance and selection criteria NOS Version - 2.0 NSQF Level- 4	6:00	14:00	00:00	10:00	30:00
	Module 2: Handling fiber constructs, performance and selection criteria	06:00	14:00	00:00	10:00	30:00
	TEL/N4200 Installation of passive FTTH/X components NOS Version - 2.0 NSQF Level- 4	8:00	12:00	00:00	10:00	30:00

	Module 3: Installation of Passive FTTH/X Components	08:00	12:00	00:00	10:00	30:00
GPS Signal Strength Measurements	TEL/N6238 Tower site performance measurement and parameter recording NOS Version - 2.0 NSQF Level - 5	08:00	12:00	00:00	10:00	30:00
	Module 4: Tower site performance measurement and parameter recording	08:00	12:00	00:00	10:00	30:00
Radio Survey & RF/GSM/GPRS/GPS signal coverage and Signal strength measurement	TEL/N6239 Tower site data analysis and reporting NOS Version - 2.0 NSQF Level - 5	08:00	12:00	00:00	10:00	30:00
	Module 5: Tower site data analysis and reporting	08:00	12:00	00:00	10:00	30:00
	TEL/N6240 Tower Site Optimization and troubleshooting NOS Version - 2.0 NSQF Level - 5	04:00	06:00	00:00	20:00	30:00
	Module 6: Tower site Optimization and troubleshooting	04:00	06:00	00:00	20:00	30:00
Loco iATP-Kavach Wiring	TEL/N6315: Lay Wiring for Locomotives and perform testing NOS Version - 1.0 NSQF Level - 5	10:00	20:00	00:00	30:00	60:00
	Module 7: Lay Wiring for Locomotives and perform testing	10:00	20:00	00:00	30:00	60:00
RFID Plan, Documentation and Data Entry	TEL/N6312: Plan and supervise the installation of RFID tags and readers NOS Version - 1.0 NSQF Level - 5	08:00	12:00	00:00	10:00	30:00
	Module 8: Process of planning and supervising the installation of RFID tags and readers	08:00	12:00	00:00	10:00	30:00
Soil Testing & Tower Foundation	TEL/N4118: Tower/Bay Installation - Mechanical NOS Version - 1.0 NSQF Level - 4	20:00	20:00	00:00	20:00	60:00
	Module 9: Installation of Towers/ Foundation (Bay)	20:00	20:00	00:00	20:00	60:00

Tower Structure	TEL/N4119: Tower/Bay Installation - Electrical NOS Version - 1.0 NSQF Level - 4	10:00	10:00	00:00	10:00	30:00
	Module 10: Installation of Tower Structure design and verticality test	10:00	10:00	00:00	10:00	30:00
Testing of Each Sub-system	TEL/N6313: Carry out testing, and troubleshooting of iATP-Kavach sub-systems NOS Version - 1.0 NSQF Level - 5	12:00	18:00	00:00	30:00	60:00
	Module 11: Process of carrying out the testing, installing and troubleshooting of iATP-Kavach sub-systems	12:00	18:00	00:00	30:00	60:00
Station iATP-Kavach and Loco iATP-Kavach	TEL/N6314: Set up, simulate and test the Station and Loco iATP-Kavach NOS Version - 1.0 NSQF Level - 5	10:00	30:00	00:00	20:00	60:00
	Module 12: Process of setting up, simulating and testing the Station and Loco iATP-Kavach	10:00	30:00	00:00	20:00	60:00
Fault localisation, Troubleshooting and Maintenance of iATP-Kavach systems & sub-systems	TEL/N6307: Provisioning of Active Network Equipment NOS Version - 2.0 NSQF Level - 5	10:00	30:00	00:00	20:00	60:00
	Module 13: Provisioning of Active Network Equipment	10:00	30:00	00:00	20:00	60:00
	DGT/VSQ/N0102 Employability Skills (60 Hours)	60:00	00:00	00:00	00:00	60:00
	Total Duration	180:00	210:00	00:00	210:00	600:00

Module 1: High density hand soldering of component on telecom boards

Mapped to TEL/N2500 v1.0

Terminal Outcomes:

- Demonstrate the process of hand soldering of components.
- Understand different kinds of electronic parts or components and connectors and their specifications.

Duration: 06:00	Duration: 14:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Develop board and material/components for soldering on telecom boards. • Explain the basics of CAD specification. • Follow IPC standards for soldering activity. • Select correct solder bit, soldering wire and correct flux and check component leads and boards for any contamination. 	<ul style="list-style-type: none"> • Examine the impact of temperature and humidity on high-density soldering. • Handle different kinds of electronic parts or components and connectors and their specifications. • Set the correct orientation of components on telecom boards.
Classroom Aids	
Training Kit (Trainer Guide, Presentations), Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Ball Grid Array (BGA) chip, de-soldering and soldering station, hot air gun, microscope, zinc and copper wire fume extractor, flux, Sponge, Brass wool, ESO brush, Isopropyl Alcohol (IPA), lint-free cloth, automatic screwing machine, Hand Tools – (Precision screwdrivers, solder, flux, jumper wires, cutter, tweezers, wire strippers etc.)	

Module 2: Handle fiber constructs, performance and selection criteria

Mapped to TEL/N4126 v2.0

Terminal Outcomes:

- Demonstrate the process of fiber constructs.
- Classify different kinds of optical fiber cable types and identify their selection criteria.

Duration: 06:00	Duration: 14:00
<p>Theory – Key Learning Outcomes</p> <ul style="list-style-type: none"> • Explain basics of optical fiber cable constructions. • Identify primary fiber cable differentiators – simplex and zip cords, distribution cable and break-out cables. • Relate cable identifiers and primary requirements. • List the fiber standard colour codes. • Outline single mode optical fiber cable specifications and ITU-T standardisations. 	<p>Practical – Key Learning Outcomes</p> <ul style="list-style-type: none"> • Classify the optical fiber cable types – ribbon fiber cables, underground/ buried cables, aerial cables, underwater and submarine cables. • Identify the optical fiber cable selection criteria like pulling strength, rodent penetration, grounding and bonding.
<p>Classroom Aids</p> <p>Training Kit (Trainer Guide, Presentations), Whiteboard, Marker, Projector, Laptop</p>	
<p>Tools, Equipment and Other Requirements</p> <p>Different types of optical fiber cables – multi-tube single jacket duct fiber cable, multi-tube double jacket dielectric armoured fiber, uni-tube single jacket ribbon fiber cable, multitube single jacket armoured figure-8 cable, multitube double jacket ADSS fiber cable</p>	

Module 3: Installation of passive FTTH/X components

Mapped to TEL/N4200 v2.0

Terminal Outcomes:

- Demonstrate the process of installation of fiber cables and its deployment.
- Identify feeder and distribution and power test using OLTS.

Duration: 08:00	Duration: 12:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Trace the passive network components and their deployment environment. • Outline the concept of feeder and distribution connections in a splitter • Distinguish types of optical splitter and relative features. • Identify the splitter required on ground. • Identify feeder and distribution – ports, cables/pigtails and connections on the devices. • Define power test procedure and principle. 	<ul style="list-style-type: none"> • Demonstrate installation for wall mount splitters (1X8, 1X16, 1X32) • Test the optical splitters – insertion loss and power output measurement (using OLTS and Light Source)
Classroom Aids	
Training Kit (Trainer Guide, Presentations), Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Optical power meter, Fiber optic test source, Optical Line Test Set (OLTS), Optical splitters, Pigtails	

Module 4: Tower site performance measurement and parameter recording

Mapped to TEL/N6238 v2.0

Duration: 08:00	Duration: 12:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Classify the active network equipment – BTS (Base Trans receiver Station), microwave propagation, IF cable and different types of GSM & microwave antenna. • Outline the drive test path of the site • Create log files for short calls and long calls separately • Identify the faults and rectify it • Escalate the issues (if required) and report accordingly 	<ul style="list-style-type: none"> • Perform clockwise and anti-clockwise handover drive • Check the feeder cable swap • Construct log files for dropped calls, blocked calls, handover failures, TA and inter-connectivity between GSM/ UMTS/ LTE/ VoLTE • Perform a benchmark/cluster/data/handover drive test
Classroom Aids	
Training Kit (Trainer Guide, Presentations), Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Laptop with TEMS Software or compatible software, data card, magnetic GPS/Garmin 72, a handset (e.g., Sony W995) compatible with software (MapInfo, Google Map)	

Module 5: Tower site data analysis and reporting

Mapped to TEL/N6239 v2.0

Duration: 08:00	Duration: 12:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> List the record of faults on sites visited and rectify the related issues Examine parameters common to 2G/ 3G/4G – coverage, neighbour site handover, call drop, KPI analysis 	<ul style="list-style-type: none"> Examine the 2G parameters – Rx level, Rx Quality, C/I, SQI, UL/DL throughput Examine the 3G parameters – RSCP, EC/No, RSSI, SC, CQI, UL/DL throughput Examine the 4G/VoLTE parameters –RSRP, RSRQ, PCI, SINR, UL/DL throughput, MO/MT, AT/DT, ping testing Generate performance report covering – vector map, cell site details, export of log files
Classroom Aids	
Training Kit (Trainer Guide, Presentations), Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Laptop with TEMS Software/ other compatible Software, Dongle and MapInfo	

Module 6: Tower Site Optimization and Troubleshooting

Mapped to TEL/N6240 v2.0

Duration: 04:00	Duration: 06:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> Compare and change (if required) certain parameters from NOC – Broadcast channel, Traffic channel number, cell ID, time slot etc. 	<ul style="list-style-type: none"> Examine the site optimisation parameters at antenna end – azimuths, antenna tilts (E/M), antenna height and orientation Optimise the cells cluster-wise Implement corrective actions based on cell parameters
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Laptop with TEMS Software/other compatible Software, Dongle and MapInfo	

Module 7: Lay Wiring for Locomotives and Perform Testing

Mapped to TEL/N6315 v1.0

Terminal Outcomes:

- Demonstrate plan for RDSO approved Loco fitment wiring and equipment installation.
- Perform testing of the EMC/EMI and unit test cases.
- Demonstrate the process of carrying out documentation and review.

Duration: 10:00	Duration: 20:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Examine scope of work by studying the relevant documents or coordinating with the supervisor • Arrange tools, equipment and materials required for laying of wires • Ensure installation material is not defective or damaged, and replace defective/damaged material (if any) • Ensure record sheets are completed accurately, as per company guidelines. • Maintain documents for specific period, as per company procedure. • Develop the report of assembly work for future inspection. 	<ul style="list-style-type: none"> • Perform Loco iATP - Kavach wiring as per the Loco wiring plan document. • Perform integration tests and other tests as per the unit test cases. • Demonstrate Bore Gauge for measurement of internal diameters of End Shield/ Racer during bearing fitment in traction motors for Electric Locomotives • Demonstrate the use of Dial Snap Gauges for measurement of shaft diameter of traction motor for Electric Locomotives • Perform Electromagnetic Interference (EMI) test to determine the source and degree of possible electromagnetic interference to Station and Loco iATP-Kavach equipment • Ensure materials availability (such as components, equipment, tools and other inventory) as per organizational procedures. • Ensure that tools, equipment and other devices are in proper working condition and calibrated.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Hand tools (pliers, screwdrivers, etc.), RDSO Equipment tool, SKAVACH configuration tool	

Module 8: Plan and Supervise the Installation of RFID tags and Readers

Mapped to TEL/N6312 v1.0

Terminal Outcomes:

- Describe the process of planning the installation of RFID tags and readers.
- Describe the process of arranging the required resources.
- Describe the process of managing the RFID tag and reader installation process.
- Demonstrate the process of collecting data and carry out documentation.

Duration: 08:00	Duration: 12:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the Kavach or iATP-Kavach project of the Indian Railways. • Explain the benefits and functioning of Indigenous Automatic Train Protection System (iATP-Kavach). • Explain the benefits of using RFID tags in railway operations to track wagons, locomotives and railway coaches. • Explain the limitations of RFID technology and how to overcome them. • Explain the use of RFID programming and data configuration kits for stationary iATP-Kavach and Loco iATP-Kavach Configuration. • Explain the use of relevant tools and equipment. • Explain the use of RFID simulator and RFID tag reader. • Explain different RFID sub-systems and the process of their testing. • Explain the importance and process of recording the relevant data and maintaining the appropriate documentation. • Explain how to use an RFID programming kit to program RFID tags. 	<ul style="list-style-type: none"> • Prepare a sample plan for the delivery of the project, estimating the requirement of resources and time required. • Show how to check that RFID readers on locomotives and RFID tags on PSC sleepers are installed as per the given specifications. • Demonstrate how to use the relevant PPE to avoid any personal injuries. • Show how to conduct the relevant tests after installation to ensure RFID tags are readable by RFID readers on locomotives and can function without any issues. • Prepare sample relevant reports and documents concerning the work completed, any issues experienced, and the remedial action taken.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
RFID Tag Simulator, Radio Frequency Identification (RFID) Programming, Tool, RFID-TAG data Configuration Tool, RFID-Reader /Programmer etc.	

Module 9: Tower/Bay Installation Mechanical

Mapped to TEL/N4118 v1.0

Terminal Outcomes:

- Describe the process of preparing for soil testing.
- Read and interpret civil engineering drawings
- Demonstrate the process of carrying out documentation and review.

Duration: 20:00	Duration: 20:00
<p>Theory – Key Learning Outcomes</p> <ul style="list-style-type: none"> • Understand the suitability of soil for proposed construction work. • Explain the different kinds of soil testing (moisture content test, Atterberg limits test, specific gravity of soil, dry density of soil, compaction test etc.) • Describe the basic engineering concepts • Describe the process of traditionally deployed structures and bays. • Explain the importance of understanding and checking correlate bill of material. • Assess the risks and impact of the procedures. • Engage with both internal and external specialists for support in order to resolve incidents and service requests. • Explain the basics of civil & mechanical engineering drawing. • Explain the basics of mechanical hardware and software tools. • Explain the basics of mechanical assembly and associated techniques. • Explain the structural basics of telecom systems and devices. • Ensure engineering documents are available to all appropriate authorities to inspect. • Ensure issued inventory items are document and work summary are shared with appropriate teams. 	<p>Practical – Key Learning Outcomes</p> <ul style="list-style-type: none"> • Conduct tests on soil to decide the quality of soil for building construction. • Perform soil sample collection from randomly selected locations in the field. • Collect samples early enough to allow for interpretation and soil management adjustments. • Interpret design layout of telecom structures. • Interpret civil drawings of complex mechanical structures using manual and software driven methods. • Demonstrate the use technical drawing software like Auto-CAD/CREO 2.0 (for reading drawing) • Arrange components required for erection and assembly of tower. • Ensure materials availability (such as components, equipment, tools and other inventory) as per organizational procedures. • ensure that tools, equipment and other devices are in proper working condition and calibrated. • Demonstrate the use of protection equipment (anti-static wrist bands, shoes, dress, packaging, and other appropriate insulations) which are required in the field. • Arrange the required hardware tools like combination pliers, spanner, drill machine. • Supervise civil foundation and structural works.
<p>Classroom Aids</p> <p>Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop</p>	
<p>Tools, Equipment and Other Requirements</p> <p>Standard Sieves, Digital Sieve Shaker, Digital Display Constant Temperature Convection Oven, Standard Proctor Compactor & Modified Proctor Compactor, Sand Replacement Test Sets (Galvanized Steel), automatic soil compactor etc.</p>	

Module 10: Tower/Bay installation Electrical

Mapped to TEL/N4119 v1.0

Terminal Outcomes:

- Describe the process of preparing documents for tower design.
- Perform Tower verticality test.
- Perform galvanizing thickness check.
- Demonstrate the process of carrying out documentation and review.

Duration: 10:00	Duration: 10:00
<p>Theory – Key Learning Outcomes</p> <ul style="list-style-type: none"> • Interpret the design layout of telecom structures for cable fabrication • Interpret electrical drawings of complex mechanical structures using manual and software driven methods. • Explain the graphic symbols used on drawing sheet. • Check tower verticality works during construction with great precision and accuracy. • Measure the slope of out of plumb line of the member by using Theodolite in combination with a tape. • Set up the digital Theodolite centred on a peg that installed 500 mm from the column grid. • Measure reading of the steel tape through the telescope. • Measure readings of two positions at the same level on both top and bottom levels of the formwork. • Identify any curvature on the surface to measure two readings at the same level. • Measure zinc coating thickness of hot-dip galvanized steel by magnetic thickness gauge. • Measure the uncoated substrate/ part at a number of spots to obtain a representative average value. • Measure the zinc thickness at the number of spots required by the relevant procedure or standard. • Ensure that the test surface is free from dirt, grease, oxide, and corrosion products. • Obtain a true average coating thickness. • Ensure record sheets are completed accurately, as per company guidelines. • Maintain documents for specific period of time, as per company procedure. 	<p>Practical – Key Learning Outcomes</p> <ul style="list-style-type: none"> • Arrange components required for erection and assembly of tower. • Ensure materials availability (such as components, equipment, tools and other inventory) as per organizational procedures. • ensure that tools, equipment and other devices are in proper working condition and calibrated. • Demonstrate the use of protection equipment (anti-static wrist bands, shoes, dress, packaging, and other appropriate insulations) which are required in the field. • Arrange the required hardware tools like combination pliers, spanner, drill machine. • Calculate wind load on tower body, antennas, ladder, cables, platforms and other accessories exposed to wind facing. • Perform structural assessments (applicable loading & design requirements). • Supervise mechanical assembly and erection works.
Classroom Aids	

Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop

Tools, Equipment and Other Requirements

Standard Sieves, Digital Sieve Shaker, Digital Display Constant Temperature Convection Oven, Standard Proctor Compactor & Modified Proctor Compactor, Sand Replacement Test Sets (Galvanized Steel), automatic soil compactor etc.

Module 11: Carry out the testing and troubleshooting of iATP sub-systems

Mapped to TEL/N6313 v1.0

Terminal Outcomes:

- Demonstrate the process of installing optical fibre ring topology and fibre communication interface.
- Demonstrate the process of carrying out the testing of trackside sub-systems and on-board sub-systems.

Duration: 12:00	Duration: 18:00
<p>Theory – Key Learning Outcomes</p> <ul style="list-style-type: none"> • State the working mechanism of optical fibre ring topology. • Describe the process of data transmission through optical fibre cables and nodes on an optical fibre network. • Explain the importance and process of carrying out testing for data transmission in an optical fibre ring topology and the appropriate troubleshooting to be carried out. • Explain the importance and functioning of trackside sub-systems of iATP-Kavach, i.e. RFID tags, c, towers and antennas. • Explain the importance and functioning of on-board sub-systems of iATP-Kavach, i.e. RFID reader, Loco iATP-Kavach Vital Computer, Loco iATP-Kavach Radio Unit, Driver Machine Interface (DMI) Brake Interface Unit (BIU). • Explain the use of stationary iATP-Kavach for various types of signalling, including colour light signalling. • Explain the benefit of using stationary iATP-Kavach at Intermediate Block Locations (IBS) and midsection interlocked Level Crossing Gates to overcome the problem of inadequate radio signal coverage of station iATP-Kavach tower. • Explain the functions of the components of stationary iATP-Kavach, i.e. Station/LC/IB iATP-Kavach Vital Computer, Stationary iATP-Kavach Radio Unit, Remote Interface Unit, and Station Master Operation cum Indication Panel (SMOCIP). • State the architecture of Loco iATP-Kavach vital computer with Real-Time Clock synchronization facility with Global Navigation Satellite System (GNSS) clock that helps in synchronizing with other iATP-Kavach systems in hot standby manner. • Explain effectiveness of iATP-Kavach in preventing Signal Passing at Danger (SPAD) 	<p>Practical – Key Learning Outcomes</p> <ul style="list-style-type: none"> • Demonstrate the process of installing the appropriate number of optic fibre cables and nodes in the optical fibre ring topology. • Show how to connect the fire cables through nodes in the optical ring topology. • Demonstrate the process of setting up the optical fibre communication interface. • Demonstrate the process of carrying out relevant tests to ensure data transmission takes place through the optic fibre cables and nodes in the optical ring topology without any issues. • Demonstrate the process of performing appropriate troubleshooting for any issues identified during the testing. • Demonstrate how to examine the stationary iATP-Kavach unit is installed appropriately as per the specifications given by the manufacturer. • Show how to test the stationary iATP-Kavach control unit to ensure it is able to maintain the recommended distance between trains. • Demonstrate the process of carrying out the relevant tests on RFID tags to ensure the RFID tag data is correct and RFID tags are programmed correctly. • Demonstrate the process of testing the stationary iATP-Kavach has unobstructed Ultra High Frequency (UHF) radio communication to receive real-time information regarding location, speed and other parameters of trains within its jurisdiction. • Demonstrate the process of performing the appropriate tests using a simulator to ensure stationary iATP-Kavach is able to detect relevant emergencies and send prompt commands to locomotives to stop. • Demonstrate the process of testing the functioning of Loco iATP-Kavach vital computer using a simulator to ensure it is able to supervise the movement of trains

<p>cases, and unsafe situations arising due to over speeding of trains and train collisions.</p> <ul style="list-style-type: none"> • Explain the importance of ensuring high speed and low-latency communication between trains and protection systems for real-time tracking and management of trains. • Explain the functions of key system components of iATP-Kavach, i.e., Loco iATP-Kavach, Loco Pilot – OCIP, Brake Interface Unit, RFID Reader, Station iATP-Kavach, Radio Tower, Station Master – OCIP. • Explain the functioning of relevant signalling and telecommunications equipment used by railways. • Describe the communication process between Stationary iATP-Kavach and Loco iATP-Kavach. • Describe the process through which Loco iATP-Kavach units installed in the locomotive determine the location of trains by reading pre-programmed RFID Tag data using the RFID reader. • Explain the importance of ensuring the RFID fixing arrangement is strong enough to withstand impact during normal ballast unloading. • Explain the importance of maintaining detailed records regarding the testing and troubleshooting activities. • Explain the importance of identifying and resolving the safety and recurring issues to ensure maximum safety and efficiency while using iATP-Kavach. 	<p>based on the information exchanged with stationary iATP-Kavach units and other Loco iATP-Kavach units.</p> <ul style="list-style-type: none"> • Show how to check for Loco iATP-Kavach vital computer's correct interfacing with RFID reader to read RFID tags on the tracks. • Demonstrate the process of testing the USB interface to ensure error-free downloading of logs and other appropriate data for diagnostic purposes. • Demonstrate the process of testing the Loco iATP-Kavach unit's RFID readers to ensure they are able to read the RFID tags installed on the trackside and obtain the relevant information. • Demonstrate the process of testing the Brake Interface Unit (BIU) to ensure it is able to apply normal/ service and emergency of locomotives based on the type of brake command received from the Loco iATP-Kavach unit. • Demonstrate the process of carrying out troubleshooting for common issues experienced with iATP-Kavach trackside and on-board sub-systems.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Station iATP-Kavach -Application generation Software, LOCO- iATP-Kavach -Application generation Software etc.	

Module 12: Set up, simulate and test the Station and Loco Kavach

Mapped to TEL/N6314 v1.0

Terminal Outcomes:

- Describe the process of preparing the SIP/TOC and interface table.
- Demonstrate the process of setting up the Station and Loco iATP-Kavach.
- Demonstrate the process of carrying out Station and Loco iATP-Kavach simulations.
- Demonstrate the process of carrying out the relevant tests on Station and Loco iATP-Kavach.

Duration: 10:00	Duration: 30:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • List the information to be recorded in a SIP. • State different types of blocks working, and telecommunication facilities provided at a station signal. • Explain the importance of drawing SIP to scale in metric dimensions • Explain the process of preparing the (SIP)/(TOC) for station yard • Explain the importance of following the relevant checklists to ensure correct information in the SIP • Explain the importance and process of getting the signalling plan approved by the Principal Chief Signal & Telecommunication Engineer (PCSTE) • Describe the process of preparing the interface table as per the railway's guidelines • Describe the process of preparing the relevant data using the SKAVACH data preparation tool • Describe the process of using the SKAVACH configuration tool for carrying out appropriate configurations • Describe the process of installing an opto-electrical converter and how it converts optical signals into electrical signals • Explain the importance of ensuring the correct set up of Station and Loco iATP-Kavach as per the approved plan and the OEM's instructions • Describe the process of testing the Station and Loco iATP-Kavach system and sub-systems as per the approved checklists and OEM's instructions • Describe the process of troubleshooting the Station and Loco iATP-Kavach system and sub-systems • Explain the relevant documentation to be carried out regarding the installation, testing 	<ul style="list-style-type: none"> • Demonstrate how to prepare the interface table as per the railway's guidelines. • Demonstrate how to prepare the relevant data using the SKAVACH data preparation tool. • Demonstrate the process of carrying out appropriate configurations using the SKAVACH configuration tool. • Demonstrate the process of installing the opto-electrical converter to convert optical signals into electrical signals. • Demonstrate the process of carrying out troubleshooting for any issues identified with the Station and Loco iATP-Kavach systems and sub-systems. • Show how to simulate loco inputs for Loco iATP-Kavach startup and Loco speed control using the Loco iATP-Kavach simulator. • Show how to simulate the station interlocking inputs using the Station Interlocking (IXL) Simulator. • Show how to simulate the Loco movement using the RFID simulator. • Show how to prepare the setup for conducting the Factory Acceptance Test (FAT). • Demonstrate the process of carrying out the FAT for the stationary iATP-Kavach equipment. • Demonstrate the process of carrying out Site Acceptance Test (SAT) as per the Research Designs and Standards Organisation (RDSO) specifications to check features, such as SPAD prevention, override, etc. • Demonstrate the process of performing the integration tests and other tests as per the unit test cases. • Prepare sample documents regarding the tests conducted.

<p>and troubleshooting of the Station and Loco iATP-Kavach systems and sub-systems</p> <ul style="list-style-type: none"> • Describe the process of simulating loco inputs for Loco iATP-Kavach startup and Loco speed control using the Loco iATP-Kavach simulator • Describe the process of simulating the station interlocking inputs using the Station Interlocking (IXL) Simulator • Describe the process of simulating the Loco movement using the RFID simulator • Describe the process of simulating the train movement using RFID and Signal Passing at Danger (SPAD) • Describe the process of connecting RS-232 to a computer and using for bi-directional point to point link • Explain the use of RS-485 EIA standard interface for data acquisition through the balanced transmission line • Explain the benefit of using RS-485 in high data rates communications over long distances • Describe the process of using RS-485 in multi-drop mode • State different inputs of a Loco iATP-Kavach simulator. 	
<p>Classroom Aids</p>	
<p>Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop</p>	
<p>Tools, Equipment and Other Requirements</p>	
<p>iATP-Kavach Equipment, SKAVACH configuration tool</p>	

Module 13: Provisioning of Active Network Equipment

Mapped to TEL/N6307 v1.0

Terminal Outcomes:

- Analyse the pre-requisites for provisioning.
- Perform provisioning using the NMS.
- Provide ethernet services.
- Report and record provisioning.

Duration: 10:00	Duration: 30:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • List the networking equipment specifications and system requirements for configuration. • Explain how to launch Network Management System (NMS) with credential provided for GUI. • Define Software-Defined Networking (SDN) or DWDM with its applications. • Explain different amplifier modules and Erbium-Doped Fibre Amplifier (EDFA). • Discuss how to select amplifier gain and amplifier type for DWDM networks. • Elaborate on the implementation of Dynamic Circuit Network (DCN) management amplification. • Describe how to select transmission cards based on even or odd channel multiplexing and channel spacing. • Discuss the importance of providing correct DWDM SFPs in the Multiple Dwelling Units (MDU) cards for multiplexing performance. • Emphasize the importance of providing express channels in transmission cards for proper pass-through of other channels. • Examine client's small form-factor pluggable (SFPs) as per requirements. • Explain Plesiochronous Digital Hierarchy (PDH), SDH, Virtual Concatenation Group (VCG) circuit types. • Discuss the test results to find faults and provide resolutions. • List the basic requirements for the protected circuit such as protected class of service menu, etc. • Examine the protected circuit and filter them as per the guidelines. 	<ul style="list-style-type: none"> • Perform steps for provisioning and system support using node view. • Prepare a sample design of a network hierarchy, mapped to network view of Network Management System (NMS) and Element Management System (EMS). Demonstrate how to install, configure and connect NMS server and client software/switch. • Demonstrate how to use spectrometer for checking gains as per requirements. • Perform steps to configure channels based on the applications of Reconfigurable Optical Add-Drop Multiplexer (ROADM). • Employ proper technique to configure NMS GUI to check its connectivity and layout using topology view. • Perform steps to configure, label and verify nodes and unprotected circuits. • Perform necessary steps to configure NMS as per the instructions specified in the reference guide. • Demonstrate how to connect the links between Ethernet and Layer 2 devices and also analyse the traffic flow between the two devices. • Perform steps to measure parameters such as Quality-of-service (QoS), Administration and Maintenance (OAM). • Employ proper technique to configure per hop behaviour and traffic conditioning profiles. • Demonstrate how to identify, deactivate/delete circuit from NMS and verify the same. • Record and update all the circuits and NMS records so that they are available at the

- | | |
|--|---|
| <ul style="list-style-type: none"> • Elaborate how to analyse the status of the circuit and activate them as per the instructions. • Describe different services such as point-to-point and point-to-multipoint services. • Explain how to use Ethernet services from the NMS GUI. • Discuss how to inform concerned parties about circuit provisioning, activation, deactivation or any other task related to circuits. • Explore the various risks and impact of not following defined work instructions/procedures. • Outline the reporting structure of incidents, trouble or emergencies such as system failures, etc. • Explain the basic network management concepts, elements such as OSI architecture, LAN-MAN-WAN-VLAN, TCP/IP, IP addressing, etc. • Expound the various applications of NMS and configuration of server and client. • Explain PDH, SDH technology, mapping and multiplexing technology of SDH, ROADM and cross-connects. • Describe basic equipment design and application of network system, optical fiber transmission. • Outline TMF814 Multi-Technology Network Management (MTNM) Solution Set standards. • Discuss the functions of attenuators, test equipment, line tester, Ethernet tester, VSWR meter, RF power, etc. • Describe mapping and multiplexing technology of DWDM. • Discuss Ethernet networking, Ethernet media, Ethernet-over-SDH technology and connector requirement. • Explain core, distribution and access layer architecture. • Describe the basics of L2 switching technologies. • Discuss different WAN protocols. • List login cables for different site equipment. • State common security aspects and lowest security levels of the components of the network. • Explain the working of different | <ul style="list-style-type: none"> time of inspection. • Demonstrate use of LINUX, MYSQL and simple Java commands. • Perform steps how to configure switches inside a network element. |
|--|---|

management frameworks in the NOC.	
Classroom Aids	
Whiteboard and markers, chart paper and sketch pens, LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements	
Reference Guide, Manuals, User Guide, Login Cables, Report Formats, NMS GUI, Enterprise Website Or Manufacturer's Technical Documentation, Computers, Hard Drives, Printers, Phone Systems, Gateways, Routers, Network Bridges, Modems, Wireless Access Points, Networking Cables, Line Drivers, Switches, Hubs, And Repeaters	

Module 14: On-the-Job Training

Mapped to Technical Supervisor - Automatic Train Protection System (ATPS)

Mandatory Duration: 210:00	Recommended Duration: 00:00
Location: On-Site	
<p>Terminal Outcomes</p> <ol style="list-style-type: none"> 1. Verify post rework/ re-soldering. 2. Demonstrate use of cleaning chemicals/solvents for PCBs. 3. Demonstrate use of vapour de-freezer equipment for PCB cleaning. 4. Illustrate basics of optical fiber manufacturing and construction 5. Demonstrate the optical fiber light transmission basics 6. Demonstrate the working principles of multi-mode and single mode fibers 7. Knowledge of optical fiber characteristics like refraction, polarization, attenuation, dispersion 8. Bands in optical fiber and their usability, loss characteristics 9. Signal strength and quality kpis – design values and margins 10. Functionality of optical equipment like cleaver, mechanical and fusion splicing kit, protection sleeves, fiber stripper, fiber reinforced plaster during splicing and jointing 11. Basic knowledge of electrical and electronic components 12. Knowledge of AMT (Amplifier Mount Transceiver) 13. Knowledge of passive infrastructure on site. (DG, PIU, SMPS, Tower, Cables, shelter etc. 14. Troubleshooting technique for laptop, GPS, Mobile phone, software, dongle 15. Principle of directional antennas, sectorization, tilting (E/M), frequency bands, GSM architecture 16. Fundamentals of GSM, UMTS, LTE network elements. 17. Functionality and operations of BTS 18. Types of antennas and its radiation pattern 19. Basic concepts of handovers, frequency reuse, scrambling codes, PCI, GSM channels, UMTS & LTE channels, interference, types of interferences, Signal strength, power, unit conversion 20. Effects of antenna tilt, direction, azimuth, and height on performance (BTS, NodeB, eNodeB) 21. Site performance parameters and their optimal values 22. Effects of obstructions on tower site performance 23. Corrective and mitigating actions to improve site performance 24. Operation and troubleshooting of site equipment (GPS, handset, car charger, dongle, mouse, data card) 25. Explain the benefits and functioning of Indigenous Automatic Train Protection System (iATP-Kavach). 26. Explain the benefits of using RFID tags in railway operations to track wagons, locomotives and railway coaches. 27. Check that RFID readers on locomotives and RFID tags on PSC sleepers are installed as per the given specifications. 28. Conduct the relevant tests after installation to ensure RFID tags are readable by RFID readers on locomotives and can function without any issues. 	

29. Prepare relevant reports and documents concerning the work completed, any issues experienced, and the remedial action taken.
30. Test the stationary iATP-Kavach control unit to ensure it is able to maintain the recommended distance between trains.
31. Carry out the relevant tests on RFID tags to ensure the RFID tag data is correct and RFID tags are programmed correctly.
32. Test the USB interface to ensure error-free downloading of logs and other appropriate data for diagnostic purposes.
33. Carry out troubleshooting for common issues experienced with iATP-Kavach trackside and on-board sub-systems.
35. Create a sample design of the network hierarchy, mapped to network view of Network Management System (NMS) and Element Management System (EMS).
36. Install, configure and connect NMS server and client software/switch.
- 37.** Use spectrometer for checking gains as per specifications & requirements.
38. Configure channels based on the applications of Reconfigurable Optical Add-Drop Multiplexer (ROADM).
39. Configure NMS GUI to check its connectivity and layout using topology view.
40. Configure, label, and verify nodes and unprotected circuits.
41. Configure NMS as per the instructions specified in the reference guide
42. Examine the protected circuit and filter them as per the guidelines.
43. Demonstrate how to identify, deactivate/delete circuit from NMS and verify the same.
44. Record and update all the circuits and NMS records so that they are available at the time of inspection.
45. Demonstrate use of LINUX, MYSQL and simple Java commands.
46. Perform steps how to configure switches inside a network element.

Module 8: DGT/VSQ/N0102 Employability Skills (60 hours)

Mapped to Technical Supervisor - Automatic Train Protection System (ATPS)

Mandatory Duration: 60:00			
Location: On-Site			
S.No.	Module Name	Key Learning Outcomes	Duration (hours)
1.	Introduction to Employability Skills	<ul style="list-style-type: none"> Discuss the Employability Skills required for jobs in various industries. List different learning and employability related GOI and private portals and their usage. 	1.5
2.	Constitutional values - Citizenship	<ul style="list-style-type: none"> Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen. Show how to practice different environmentally sustainable practices. 	1.5
3.	Becoming a Professional in the 21st Century	<ul style="list-style-type: none"> Discuss importance of relevant 21st century skills. Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life. Describe the benefits of continuous learning. 	2.5
4.	Basic English Skills	<ul style="list-style-type: none"> Show how to use basic English sentences for every day conversation in different contexts, in person and over the telephone. Read and interpret text written in basic English Write a short note/paragraph / letter/e -mail using basic English. 	10
5.	Career Development & Goal Setting	<ul style="list-style-type: none"> Create a career development plan with well-defined short- and long-term goals. 	2
6.	Communication Skills	<ul style="list-style-type: none"> Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette. Explain the importance of active listening for effective communication. Discuss the significance of working collaboratively with others in a team. 	5
7.	Diversity & Inclusion	<ul style="list-style-type: none"> Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD. Discuss the significance of escalating sexual harassment issues as per POSH act. 	2.5
8.	Financial and Legal Literacy	<ul style="list-style-type: none"> Outline the importance of selecting the right financial institution, product, and service. Demonstrate how to carry out offline and online financial transactions, safely and securely. List the common components of salary and compute income, expenditure, taxes, investments etc. 	5

		<ul style="list-style-type: none"> Discuss the legal rights, laws, and aids. 	
9.	Essential Digital Skills	<ul style="list-style-type: none"> Describe the role of digital technology in today's life. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely. Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely. Create sample word documents, excel sheets and presentations using basic features. Utilize virtual collaboration tools to work effectively. 	10
10.	Entrepreneurship	<ul style="list-style-type: none"> Explain the types of entrepreneurship and enterprises. Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan. Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement. Create a sample business plan, for the selected business opportunity. 	7
11	Customer Service	<ul style="list-style-type: none"> Describe the significance of analyzing different types and needs of customers. Explain the significance of identifying customer needs and responding to them in a professional manner. Discuss the significance of maintaining hygiene and dressing appropriately. 	5
12	Getting Ready for Apprenticeship & Jobs	<ul style="list-style-type: none"> Create a professional Curriculum Vitae (CV). Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively. Discuss the significance of maintaining hygiene and confidence during an interview. Perform a mock interview. List the steps for searching and registering for apprenticeship opportunities. 	8

LIST OF TOOLS & EQUIPMENT FOR EMPLOYABILITY SKILLS

S No.	Name of the Equipment	Quantity
1.	Computer (PC) with latest configurations – and Internet connection with standard operating system and standard word processor and worksheet software (Licensed) (all software should either be latest version or one/two version below)	As required
2.	UPS	As required
3.	Scanner cum Printer	As required
4.	Computer Tables	As required
5.	Computer Chairs	As required
6.	LCD Projector	As required
7.	White Board 1200mm x 900mm	As required

Note: Above Tools & Equipment not required, if Computer LAB is available in the institute.

Annexure

Trainer Requirements (Technical Supervisor - Automatic Train Protection System (ATPS))

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
B. Tech/ B.E./ BCA/B.Sc.	Science/ Electronics/ Telecom/ IT and other relevant domain	3	Active Network Domain	0	NA	Eligible for ToT program

Trainer Certification	
Domain Certification	Platform Certification
Certified for Job Role “ Technical Supervisor ”, mapped to QP: “ TEL/Q6303, v2.0 ”, Minimum accepted score is 80%	Certified for the Job Role: “ Trainer (VET and Skills) ”, mapped to the QP: “ MEP/Q2601, v2.0 ”, with a minimum score of 80% .

Assessor Requirements (Technical Supervisor - Automatic Train Protection System (ATPS))

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training/Assessment Experience		Remarks
		Years	Specialization	Years	Specialization	
B. Tech/ B.E./ BCA/B.Sc.	Science/ Electronics/ Telecom/ IT and other relevant domain	3	Active Network Domain	0	NA	Eligible for ToA program

Assessor Certification	
Domain Certification	Platform Certification
Certified for Job Role “ Technical Supervisor ”, mapped to QP: “ TEL/Q6303, v2.0 ”, Minimum accepted score is 80%	Certified for the Job Role: “ Assessor (VET and Skills) ”, mapped to the QP: “ MEP/Q2701, v2.0 ”, with a minimum score of 80% .

Trainer Requirements (Employability Skills 60 hours)

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Graduate/CITS	Any discipline			2	Teaching experience	Prospective ES trainer should: <ul style="list-style-type: none"> • have good communication skills • be well versed in English • have digital skills • have attention to detail • be adaptable • have willingness to learn
Current ITI trainers	Employability Skills Training (3 days full-time course done between 2019-2022)					
Certified current EEE trainers (155 hours)	from Management SSC (MEPSC)					
Certified Trainer	Qualification Pack: Trainer (MEP/Q0102)					

Trainer Certification	
Domain Certification	Platform Certification
Certified in 60-hour Employability NOS (2022), with a minimum score of 80% OR Certified in 120-, 90-hour Employability NOS (2022), with a minimum score of 80%	NA

Master Trainer Requirements (Employability Skills 60 hours)

Master Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Graduate/CITS	Any discipline			3	Employability Skills curriculum training experience with an interest to train as well as orient other peer trainers	Prospective ES Master trainer should: <ul style="list-style-type: none"> • have good communication skills • be well versed in English • have basic digital skills
Certified Master Trainer	Qualification Pack: Master Trainer (MEP/Q2602)			3	EEE training of Management SSC (MEPSC) (155 hours)	<ul style="list-style-type: none"> • have attention to detail • be adaptable • have willingness to learn • be able to grasp concepts fast and is creative with teaching practices and likes sharing back their learning with others

Master Trainer Certification	
Domain Certification	Platform Certification
Certified in 60-hour Employability NOS (2022), with a minimum score of 90% . OR Certified in 120-, 90-hour Employability NOS (2022), with a minimum score of 90%	NA

Assessment Strategy

1. Assessment System Overview:

- Batches assigned to the assessment agencies for conducting the assessment on SDSM/SIP or email.
- Assessment agencies send the assessment confirmation to VTP/TC looping SSC.
- The assessment agency deploys the ToA certified Assessor for executing the assessment.
- SSC monitors the assessment process & records.

2. Testing Environment:

- Confirm that the centre is available at the same address as mentioned on SDMS or SIP.
- Check the duration of the training.
- Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
- If the batch size is more than 30, then there should be 2 Assessors.
- Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
- Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
- Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
- Check the availability of the Lab Equipment for the particular Job Role.

3. Assessment Quality Assurance levels / Framework:

- Question papers created by the Subject Matter Experts (SME).
- Question papers created by the SME verified by the other subject Matter Experts.
- Questions are mapped with NOS and PC.
- Question papers are prepared considering that level 1 to 3 are for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor & higher management.
- An assessor must be ToA certified & the trainer must be ToT Certified.
- The assessment agency must follow the assessment guidelines to conduct the assessment.

4. Types of evidence or evidence-gathering protocol:

- Time-stamped & geotagged reporting of the assessor from assessment location.
- Center photographs with signboards and scheme-specific branding.
- Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period.
- Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos.

5. Method of verification or validation:

- A surprise visit to the assessment location.
- A random audit of the batch.
- A random audit of any candidate.

6. Method for assessment documentation, archiving, and access:

- Hard copies of the documents are stored.
- Soft copies of the documents & photographs of the assessment are uploaded/accessed from cloud Storage.
- Soft copies of the documents & photographs of the assessment are stored in the Hard Drives.

Assessment Strategy (Employability Skills 60 hours)

The trainee will be tested for the acquired skill, knowledge and attitude through formative/summative assessment at the end of the course and as this NOS and MC is adopted across sectors and qualifications, the respective AB can conduct the assessments as per their requirements.

References

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
Key Learning Outcome	The key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
OJT (M)	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on-site
OJT (R)	On-the-job training (Recommended); trainees are recommended the specified hours of training on-site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work or produce a tangible work output by applying cognitive, affective or psychomotor skills.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training.
Terminal Outcome	The terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module. A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

Term	Description
NOS	National Occupational Standard (s)
NSQF	National Skills Qualifications Framework
OJT	On-the-job Training
QP	Qualifications Pack
PwD	People with Disability
PPE	Personal Protective Equipment
ES	Employability Skills