Syllabi of Courses

for

Skill Development in ESDM sector

Under the “Scheme for Financial assistance to select seven (07) States/UTs for Skill Development in ESDM sector”

of

Department of Electronics and Information Technology
Ministry of Communications & Information Technology,
Government of India

Submitted by

TELECOM SECTOR SKILLS COUNCIL

VERSION: 2.2 Dated: 22nd January 2015
ESDM Courses
(Broadband Technician)

Level Code: 4  Vertical Name: Service Providers

Course Code: TEL/Q0102  Course Name: Broadband Technician

Objective of the Course:
The person is responsible for installation, configuration and testing of CPE (modem, routers, and Switches) for broadband access. He also establishes connectivity between CPE and end-user device (CPU, Laptop, tablets, Smart/IP TV etc.) at customer premises and carries out basic trouble-shooting for identifying, localizing & rectifying cable, connectivity and equipment fault in coordination with NOC.

Learning Outcomes:
By the end of the training, the person should be able to perform the following activities:

TEL/N0111 (Cable/system wiring and equipment installation at customer premises)
1. arrange access to site according to required procedure
2. organize tools, equipment and materials for a given work
3. match cable type and connectors to installation environment and customer requirements
4. check cable length for continuity
5. verify cable route is free of electrical hazards and obstructions both outdoors and indoors
6. verify that the cable running length is within the permissible limit to ensure designed throughput
7. select suitable location for equipment installation wrt power point and signal coverage
8. ensure structured wiring from PoP to Customer premise JB
9. ensure neat wiring and clipping within customer premise
10. ensure proper cable termination and use of appropriate connectors
11. Test the cable & joints for transmission loss and strength. Re-terminate if loss exceeds prescribed limits
12. install equipment following electrical safety principals and manufacturer’s instructions
13. power-up the system ensuring proper earthing arrangement
14. removal and proper dispose of installation waste
15. restore worksite to customer's satisfaction
16. update plans and records with details of installation and test results
17. complete all installation documents and customer signoff

TEL/N0112 (Configuration of equipment and establishing Broadband connectivity)
1. connect up laptop/PC, Smart/IP TV and other appropriate device to the CPE (modem, router, switch) and establish connectivity
2. access CPE setting using default login credentials
3. Configure CPE as per the base setting (IP, Gateway, Mask etc.)
4. ensure all cables/connectors are correctly plugged in
5. ping service provider gateway
6. analyse test results for connectivity and throughput parameters
7. configure end user device to establish LAN connectivity with the CPE
8. ping CPE from end user device and analyze response
9. record CPE configuration settings
10. record end user device configuration setting
11. record pinging procedure and expected result parameters
12. brief customer on basic trouble-shooting steps/self-help

**TEL/N0113 (Trouble-shoot to localize and rectify faults)**

1. Differentiate between types of cables
2. Identify correct cable pairs
3. Undertake continuity check and localize fault distance
4. Understand relevance of various indicative lights on the CPE
5. Connect CPE to laptop/CPU/portable device for fault diagnostic
6. Install CPE access software, if required
7. Access CPE through browser/software application and run diagnostic application
8. decipher results to localize fault
9. Carry out re-conectorization/crimping (of cable pairs with connector) or replace cable, if required
10. re-configure the CPE to correct settings
11. Reset CPE, if required.
12. Record steps undertaken for fault localization/isolation
13. Record changes undertaken for fault rectification
14. Restore any changes made to the worksite during fault repair to the client's satisfaction

**TEL/N0114 (UPS installation & Domestic Power Supply checks)**

1. Arrange access to site according to required procedure
2. Organize tools, equipment and materials for a given work
3. Match cable type and connectors to installation environment and customer requirements
4. Check cable length for continuity
5. Verify cable route is free of electrical hazards and obstructions both outdoors and indoors
6. Verify that the cable running length is within the permissible limit to ensure designed throughput
7. Select suitable location for equipment installation wrt power point and signal Coverage
8. Ensure structured wiring from PoP to Customer premise JB
9. Ensure neat wiring and clipping within customer premise
10. Ensure proper cable termination and use of appropriate connectors
11. Test the cable & joints for transmission loss and strength. Re-terminate if loss exceeds prescribed limits
12. Install equipment following electrical safety principals and manufacturer’s instructions
13. Power-up the system ensuring proper earthing arrangement
14. Removal and proper dispose of installation waste
15. Restore worksite to customer's satisfaction
16. Update plans and records with details of installation and test results
17. Complete all installation documents and customer signoff
Expected Job Roles:

Broadband Technician

Duration of the Course (in hours) 350 Hours approx.

Minimum Eligibility Criteria and pre-requisites, if any 10+2/ITI/Diploma

Professional Knowledge:

Knowledge of Customer Premise Equipment (CPE), Cable Laying, Connectorisation, structured cabling norms
Basic concepts of Network topologies, TCP/IP, Broadband Network Elements, Gateways, IP Address, Subnet masks, Ethernet and MAC Address, IPv4, IPv6
Identification of cables and cable pairs and their maintenance
Basic knowledge of EMI / EMC
Basic knowledge of UPS and its handling

Professional Skill:

Equipment installation/Task Management Skills
Technical interpretation
Equipment Configuration / Operating Skills
Problem solving skills
Analytical Skills
Planning and Execution

Core Skill:

Basic Reading & Writing Skills
Communication Skills
Reading Skills
Oral communication Skills

Detailed Syllabus of Course

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Module name and content</th>
<th>Number of hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>As per the NOSs listed in the Qualification pack</td>
<td>150 Hours</td>
</tr>
<tr>
<td></td>
<td>Total Theory/Lecture Hours</td>
<td>150 Hours</td>
</tr>
<tr>
<td></td>
<td>Total Practical/ Tutorial Hours</td>
<td>200 Hours</td>
</tr>
<tr>
<td></td>
<td>Total Hours</td>
<td>350 Hours</td>
</tr>
</tbody>
</table>

Page 4 of 24
## Recommended Hardware:
Customer Premise Equipment (CPE - Modem, Router, Switches) wireless router,Wirings (Co-axial, Fiber, UTP, STP,CU), Junction Box, connectors including RJ 45,Splitter, Crimping Tools, Splicing Tools like Optical Fibre Splicer with accessories,OTDR, Optical Fibre Cable, Power meter, patch cords,Wiring installation tools and test equipment

## Recommended Software:
OEM Software installed as part of CPE, MS Office for Managing reports

## Text Books:
Training material for students aligned with TSSC QP by affiliated training partners.

## Reference Books:
NA
Objective of the Course:

The person should be able to maintain tower sites which are live 24x7, maintain and repair level-1 faults/issues at telecom tower site, undertake preventive and corrective maintenance of the site equipment (Generator, Battery Banks, ACs, and SMPS) and analyse & report/escalate faults.

Learning Outcomes:

By the end of the training, the person should be able to perform the following activities:

**TEL/N4100 (Site hygiene)**

1. Maintain site hygiene of AC, DG, PIU, SMPS and battery bank, as per organization’s norms
2. Check leakage, rattles and shakes at the tower site
3. Check if installation of fire safety instruments is in place
4. Control fire accident incidents
5. Check the site as per electrical safety norms
6. Check proper floor markings, shadow board display and labels
7. Check diesel consumption and highlight excessive consumption to supervisor
8. Conduct work area audit as per company checklists
9. Maintain checklist of standards laid by the company

**TEL/N4101 (Preventive Maintenance)**

1. Adhere to PM (preventive maintenance) plan
2. Comply with Beat plan execution, for self
3. Conduct site PM (preventive maintenance)
4. Keep a check on site up-time
5. Perform unique site down PM (preventive maintenance)
6. Perform health check on site like checking engine oil, voltage etc.
7. Check premature ageing of Battery Bank, Diesel Generator, Air Conditioner, PIU and SMPS
8. Monitor outages due to Diesel Generator
9. Close maximum number of complaints registered
10. Provide timely resolutions to trouble tickets raised
11. Comply with preventive maintenance schedule

**TEL/N4102 (Site Management)**

1. Monitor reading as per EB (electricity bill) against reading on PIU (power interface unit)
2. Timely collect and submit the EB (electricity bill) at the office
3. Check number of alarms active at the site
4. Check site for faulty alarms
5. Attend alarms within the defined SLA
6. Identify the reasons for site lock
7. Co-ordinate with service providers for quality fuel to be filled
8. Interact with site owners w.r.t. rent, access issues etc.

**TEL/N4103 (Task reporting)**

1. Escalate faults/issues at site to supervisor
2. Fill the preventive maintenance checklists/reports
3. Fill the corrective maintenance checklists/reports
4. Accurately report diesel filling, electricity bill and DG reading
5. Report any changes in the site or movement of any material
6. Report theft if any from the site location
7. Report movement of tower technicians to supervisor

**Expected Job Roles:**

<table>
<thead>
<tr>
<th>Tower Technician</th>
</tr>
</thead>
</table>

**Duration of the Course**

<table>
<thead>
<tr>
<th>(in hours)</th>
<th>350 Hours</th>
</tr>
</thead>
</table>

**Minimum Eligibility Criteria and pre-requisites, if any**

<table>
<thead>
<tr>
<th>10+2 and/or ITI or Diploma in Electrical/Mechanical</th>
</tr>
</thead>
</table>

**Professional Knowledge:**

Functional knowledge of all site equipment, system components, special tools & equipments used for system repairs

**Professional Skill:**

- Planning and Execution
- Relationship Building
- Analytical Skills
- Technical Skills
Core Skill:

- Comprehension Skills
- Reading Skills
- Oral Communication Skills

Detailed Syllabus Overview

<table>
<thead>
<tr>
<th>Module No</th>
<th>Module Name</th>
<th>Minimum No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>As per the NOSs listed in the Qualification pack</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Total Theory / Lecture Hours: 200</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Practical / Tutorial Hours: 150</td>
</tr>
<tr>
<td></td>
<td>Total Hours: 350</td>
</tr>
</tbody>
</table>

Recommended Hardware: D G Set, Air Conditioner, Power Interface Unit (PIU), SMPS, Battery bank, Electrical wiremen hand tools, screwdriver set, Multimeter

Recommended Software: MS Office for reporting

Text Books: Training material for students aligned with TSSC QP by affiliated training partners.

Reference Books: NA
TSSC - ESDM Courses
(Handset Repair Engineer-Level II)

Level Code: 4 | Vertical Name: Telecom (Handset)
Course Code: TEL/Q2201 | Course Name: Handset repair Engineer (Level II)

Objective of the Course:
The person should be able to perform handset / tablet repair including hardware and software components and testing the handset for adequacy post repair. To develop skills that allow an individual to be responsible for performing handset repair including hardware and software components and testing the handset for adequacy post repair.

This engineer will have a working knowledge of the following:
1. Repair, configuration, assembly and testing of mobile phone handsets.
2. Carry out trouble shooting for a vast range of mobile phone handsets.

Learning Outcomes:
By end of the training, the person should be able to perform the following activities:

TEL/N2203 (Perform handset repair- hardware)
1. Ensure faulty handsets are received from the customer facing team
2. Obtain/ note fault details as mentioned by the customer facing team and other handset specifications
3. Obtain the committed repair timelines (SLAs)
4. Prioritize repair activities as per guidelines
5. Ensure clean, neat, dust free and organized working environment
6. Determine components required based on fault diagnosis
7. Obtain materials required( such as components, equipments, testing devices and other inventory) as per organizational procedures
8. Ensure that tools, equipments and testing devices are in proper working condition and calibrated
9. Ensure compliance with lead free soldering techniques
10. Refer the company (handset manufacturer) specific technical database to identify root cause of handset fault and to determine rectification options
11. Isolate the cause of fault by conducting appropriate diagnostic test, in case details are not available
12. Determine the options to rectify the fault and confirm with supervisors, if required
13. Dismantle handset/components as per organizational guidelines/procedures
14. Ensure rectification of handset fault within the SLAs
15. Ensure timely escalation of emergency/ unresolved issues according to established procedures
16. Ensure all repairs conform to the quality targets in terms of bounce and repeat repair percentages, first time fix etc
17. Assess test equipments are appropriately calibrated
18. Confirm effectiveness of the repair process, by utilizing appropriate test equipments as per standard test processes
19. Ensure that fault has been rectified without any collateral damage to handset
20. Handover repaired handset to appropriate authority
21. Ensure completion of administrative jobs like site clearance, return of test equipments
22. pass through ESD test before entering the facility
23. Ensure that protection equipments like ESD equipments, anti-static bands, clothes and gloves are appropriately used as required
24. Ensure compliance with site risk control, OHS, environmental and quality requirements as per company’s norms
25. Ensure escalation of safety incidents to relevant authorities as per guidelines
26. Ensure that handset inventory in hand for repairs is tracked and accounted for appropriately as per company procedures
27. Ensure record sheets are completed accurately, as per company guidelines
28. Ensure all relevant parties (including supervisors, customer teams) are notified of the completion of repair activity
29. Retain documents for specific period of time, as per company procedure

TEL/N2204 (Perform handset repair- software)

1. Ensure faulty handsets are received from customer facing team
2. Obtain/ note fault details as mentioned by the customer facing team and other handset specifications
3. Obtain the committed repair timelines (SLAs)
4. Prioritize repair activities as per guidelines
5. undertake fault diagnosis on software components
6. Interpret results and isolate fault
7. Estimate repair timelines
8. Refer the company (handset manufacturer) specific technical database for optimal rectification options
9. Check availability of correct software versions/modules
10. Ensure clean, dust free and organized working environment
11. Ensure availability of connectors/cables
12. Obtain and ensure all tools are available and diagnostic equipment operational
13. Obtain software required as per organizational procedures
14. Ensure that the software versions are current and ready to use
15. Carry out necessary software fault rectification ( correction/Upgradation, software replacement)
16. Ensure rectification of handset fault within the SLAs
17. Check handset performance to ascertain fault has been rectified
18. Ensure timely escalation of emergency/ unresolved issues according to established procedures
19. ensure all repairs conform to the quality targets
20. Confirm effectiveness of the repair process, by testing the handset utilizing appropriate software jigs and standard test processes
21. Take appropriate action to rectify any deficiencies post testing
22. Ensure that fault has been rectified without any consequal damage
23. Handover repaired handset to QA team
24. Ensure completion of administrative jobs like site clearance, return of test equipments
25. Pass through ESD test before entering the facility
26. Ensure that protection equipments like anti-static bands, clothes and gloves are appropriately used as required
27. Ensure compliance with site risk control, OHS, environmental and quality requirements as per company’s norms
28. Ensure escalation of safety incidents to relevant authorities as per guidelines
29. Ensure that handset inventory in hand (for repairs) is tracked and accounted for appropriately
30. Ensure record sheets are completed accurately, as per company guidelines
31. Ensure all concerned (supervisors, QA team, customer teams) are notified of the completion of repair activity
32. Retain documents for specific period of time, as per company procedure

Expected Job Roles:

Handset Repair Engineer (Level II)
1. Repair Engineer - Mobile phones
2. Sales support executive – Mobile phones
3. Customer Support Executive (Technical)– Mobile phones

Duration of the Course (in hours) 350 Hours

Minimum Eligibility Criteria and pre-requisites, if any 10+2 / ITI

Professional Knowledge:
Functionality / features of handset, specific operating system (OS), hardware components like chipsets, processor etc., basic knowledge of GSM / CDMA, Windows & Android OS.
Test equipments and Hand tools
Handset repairing process, procedures
Troubleshooting techniques (software, fault finding)
Software troubleshooting and Software updates
Tablet troubleshooting skills

Professional Skill:
Equipment operating Skills
Root Cause Analysis skills
Handset Repairing Skills
Handset/Component Handling skills
Troubleshooting Skills
Software Skills
Tablet Repairing Skills
Tablet Handling Skills
Core Skill:

- Reading, Writing and Communication Skills
- Time Management Skills
- Analytical Skills
- Interpersonal Skills
- Oral Communication (Listening & Speaking Skills)

Detail Course Details

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Module name and content</th>
<th>Minimum number of hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>As per the NOSs listed in the Qualification pack</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Theory/Lecture Hours</strong></td>
<td>150 Hours</td>
</tr>
<tr>
<td></td>
<td><strong>Total Practical/ Tutorial Hours</strong></td>
<td>200 Hours</td>
</tr>
<tr>
<td></td>
<td><strong>Total Hours</strong></td>
<td>350 Hours</td>
</tr>
</tbody>
</table>

**Recommended Hardware:**
- Test Bench, test equipment (multimeters, frequency generators etc);
- Setup for end-to-end diagnostics and repair, software jigs;
- Soldering Iron and accessories, SMD Rework Station or Hot Air Blower, PCB Holder, Thinner for PCB Cleaner, Jumper wire, Precision Screw driver set, ESD Safe, BGA Kit, Magnifying glass, Mobile Opener, Liquid Flux, Wrist Strap, PCB Holder.

**Recommended Software:**
- Original OS for various Mobile OS like Windows, Android, Symbian, iOS, Blackberry and others

**Text Books:**
- Training material for students aligned with TSSC QP by affiliated training partners

**Reference Books:**
- NA
Objective of the Course:

The person should be able to undertake the efficient splicing of the optical fibre cables and support in optical fibre installation including fibre joint testing.

Learning Outcomes:

Participants successfully completing this course will:

**TSC/N6400 (Undertake splicing of optical fiber)**

- Have good understanding of Optical fibre communication theory and Hardware.
- Have the ability to handle Fusion Splicing Machine, Optical time domain Reflectometer (OTDR), Optical loss test set and Laser source.
- Have the ability to perform efficient splicing on optical fibres using both mechanical and fusion methods.

**TSC/N6401 (Installation & Commissioning of Optical fiber cables (OFC))**

- Have the ability to handle tools and spare used in splicing.
- Have the ability to find fibre breakdowns, loss on joints, cable and connectors.
- Have good understanding of cable route, trenching, Manhole, Markers, splice tray and Joint closer.
- Be able to perform preventive and corrective maintenance task on fibre link.
- Be able to understand importance of safety components and safety measures.

Expected Job Roles:

Optical Fiber Splicer
Duration of the Course (in hours)

250 Hours

Minimum Eligibility Criteria and pre-requisites, if any

8th

Professional Knowledge:

- Principle of OFC Communication
- Characteristics of OFC
- Important parameters of OFC Communication
- Optical Test Equipments
- Optical Cable Laying methods, procedures and processes

Professional Skill:

- Equipment Operating Skills
- OFC splicing and splice testing skills
- Technical Interpretation Skills
- Problem Solving Skills

Core Skill:

- Basic Reading and Writing Skills
- Communication Skills
- Basic Project Management Skills
- Interpretation Skills
- Interpersonal Skills

Detail Course Outline

<table>
<thead>
<tr>
<th>Module. No</th>
<th>Module. Name</th>
<th>Minimum No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>As per the NOSs listed in the Qualification pack</td>
<td></td>
</tr>
</tbody>
</table>

Total Theory / Lecture Hours: 100 Hours

Total Practical / Tutorial Hours: 150 Hours

Total Hours: 250 Hours
| **Recommended Hardware:** | Optical Fibre Splicer with all standard accessories  
| | Patch Cords  
| | Optical test equipment like OTDR, Splicing Machine, light meter and power meter, Cleaver, Isopropelne  
| | Various types of junction boxes  
| **Recommended Software:** | NIL  
| **Text Books:** | Training material for students aligned with TSSC QP created by affiliated Training Providers.  
| **Reference Books:** | NA  

Level Code: 4  
Vertical Name: Telecom (Network Managed Services)

Course Code: TEL/Q6401  
Course Name: b. Optical Fiber Technician

Objective of the Course:

The person should be able to guide/oversee ‘Optical Fibre Splicer’ and optical cable rollout activities and in carrying out efficient optical splicing, test its effectiveness by undertaking periodic preventive maintenance activities and ensuring effective fault management in case of fault occurrence and support installation and commissioning of optical fiber cables as per route plan.

Learning Outcomes:

By end of the training, the person should be able to perform the following activities:

**TEL/N6402 (Co-ordinate Installation & Commissioning of Optical fiber cables (OFC))**

1. Carry out Inspection of route plan and obtain necessary clearances  
2. Arrange for tools and spares  
3. Coordinate trenching, cable laying, jointing and cable blowing activities  
4. Test effectiveness & close activity

**TEL/N6403 (Undertake Condition based Maintenance & Planned repair activities)**

1. Obtain maintenance schedule and patrol assigned route section  
2. Carry out maintenance testing of dark/ spare OFC, equipments at points of Presence (POPs)  
3. Carry out planned repairs to the OFC  
4. Carry out maintenance of equipments at Points of Presence (POPs)

**TEL/N6404 (Perform corrective maintenance/ restoration of optical fault)**

1. Handling fault notifications on prompt basis  
2. Fault localization and rectification
### Expected Job Roles:

Optical Fiber Technician

### Duration of the Course

| (in hours) | 350 Hours |

### Minimum Eligibility

| Criteria and pre-requisites, if any | 10+2 |

### Professional Knowledge:

- Principle of OFC Communication
- Characteristics of OFC
- Important parameters of OFC Communication
- Optical Test Equipments
- Optical Cable Laying methods, procedures and processes

### Professional Skill:

- Equipment Operating Skills
- OFC splicing and splice testing skills
- Technical Interpretation Skills
- Problem Solving Skills
- Managerial Skills

### Core Skill:

- Basic Reading and Writing Skills
- Communication Skills
- Basic Project Management Skills
- Interpretation Skills
- Interpersonal Skills
## Detail Course Outline

<table>
<thead>
<tr>
<th>Module. No</th>
<th>Module. Name</th>
<th>Minimum No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>As per the NOSs listed in the Qualification pack</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Total Theory / Lecture Hours:</th>
<th>130</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Practical / Tutorial Hours:</td>
<td>220</td>
</tr>
<tr>
<td></td>
<td>Total Hours:</td>
<td>350</td>
</tr>
</tbody>
</table>

### Recommended Hardware:
- Optical Fibre Splicer with all standard accessories
- Patch Cords
- Optical test equipment like OTDR, light meter and power meter
- Various types of junction boxes (Clousers), Cleaver, Isopropyl

### Recommended Software:
- NIL

### Text Books:
- Training material for students supported through affiliated Training Providers.

### Reference Books
- NA
# ESDM Courses
(Installation Engineer (Layer 2 & Layer 3))

**Level Code:** 5  
**Vertical Name:** Telecom (Network Managed Services)  

**Course Code:** TEL/Q6301  
**Course Name:** Installation Engineer – Layer 2 & Layer 3

## Objective of the Course:

An Installation engineer is responsible for installing L2-L3 equipment in the site and carrying out site acceptance testing. As an optional responsibility the engineer may need to undertake commissioning of the site based on network topology.

## Learning Outcomes:

By end of the training, the person should be able to perform the following activities:

**TEL/N6300 (Installation of SDH, DWDM/L2, L3 equipment)**

1. Verifying the Shipment  
2. Undertake Installation as per guidelines  
3. Connect Power and Traffic cable  
4. Record and Report  
5. Health and Safety

**TEL/N6303 (Undertake Acceptance Testing of L2 & L3 equipment)**

1. Develop site acceptance testing plan and test Procedure  
2. Configure equipment as per guideline  
3. Label ports and cables  
4. Test Effectiveness and close activity  
5. Report and Record

**TEL/N6304 (Commissioning of L2 & L3 equipment)**

1. Understand Network topology and Equipment Provisioning  
2. Develop commissioning plan and test Procedure  
3. Configure equipment as per guideline  
4. Test Effectiveness and close activity  
5. Report and Record

## Expected Job Roles:

- Installation Engineer  
- Testing & Commissioning Engineer
Duration of the Course
(in hours)

400 Hrs

Minimum Eligibility
Criteria and pre-requisites, if any

Diploma

Professional Knowledge:

Understand basic Equipment category, transmission media (Optical / Electrical)
Need and requirement of earthing, mechanism to maintain earthing pit to absolute zero
Usage of cable connectors, cable ties and cable tray
Understand Site installation checklist and critical punch points
OSI, LAN, MAN, WAN architecture and protocols
Internet Protocol – TCP/IP, IP addressing, sub-netting
IP Routing protocols – RIP, OSPF, IGRP
Ethernet Networking, functionality of Ethernet test equipment
Layer 2 switching technologies
Layer 3 switching technologies

Professional Skill:

Equipment Installation/Operating Skills
Testing & Calibration skills
Technical Interpretation Skills
Analytical Skills
Problem Solving Skills
Managerial Skills

Core Skill:

Basic Reading and Writing Skills
Communication Skills
Basic Project Management Skills
Interpretation Skills
Interpersonal Skills
Detailed Syllabus of Course

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Module Name</th>
<th>Minimum No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>As per the NOSs listed in the Qualification pack</td>
<td></td>
</tr>
</tbody>
</table>

**Total Theory / Lecture Hours:** 60

**Total Practical / Tutorial Hours:** 90

**Total Hours:** 150

**Recommended Hardware:**
- L2/L3 Switching Equipment
- Cisco Router, Network with PCs
- All requisite Installation material including cables and connectors
- Tools and equipment

**Recommended Software:**
- System Software for Router, L2, L3 Switches

**Text Books:**
- Training material for students aligned with TSSC QP created by affiliated Training Providers.

**Reference Books:**
- NA
ESDM Courses
(Installation Engineer – SDH & DWDM)

Level Code: 5  Vertical Name: Telecom (Network Managed Services)

Course Code: TEL/Q6300  Course Name: Installation Engineer – SDH & DWDM

Objective of the Course:
An Installation engineer is responsible for installing SDH / DWDM equipment in the site and carrying out site acceptance testing. As an optional responsibility the engineer may need to undertake commissioning of the site based on network topology.

Learning Outcomes:
By end of the training, the person should be able to perform the following activities:

TEL/N6300 (Installation of SDH, DWDM/ L2, L3 equipment)
1. Verifying the Shipment
2. Undertake Installation as per guidelines
3. Connect Power and Traffic cable
4. Record and Report
5. Health and Safety

TEL /N6301 (Acceptance Testing of SDH, DWDM equipment)
1. Develop site acceptance testing plan and test Procedure
2. Configure equipment as per guideline
3. Label ports and cables
4. Test Effectiveness and close activity
5. Report and Record

TEL /N6302 (Commissioning of SDH, DWDM equipment)
1. Understand Network topology and Equipment Provisioning
2. Develop commissioning plan and test Procedure
3. Configure equipment as per guideline
4. Test Effectiveness and close activity

Report and Record
Installation of Equipment
Acceptance Testing of Equipment
Commissioning of Equipment
**Expected Job Roles:**

<table>
<thead>
<tr>
<th>Installation Engineer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Testing &amp; Commissioning Engineer</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration of the Course (in hours)</th>
<th>400 Hrs</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Minimum Eligibility Criteria and pre-requisites, if any</th>
<th>Diploma</th>
</tr>
</thead>
</table>

**Professional Knowledge:**

- Understand basic Equipment category, transmission media (Optical / Electrical)
- Need and requirement of earthing, mechanism to maintain earthing pit to absolute zero
- Usage of cable connectors, cable ties and cable tray
- Understand Site installation checklist and critical punch points
- PDH and SDH technology, limitations and advantages
- DWDM technology, key components, architecture, applications
- Optical Add-Drop Multiplexers
- Optical Fiber Transmission, login cables
- Functionality of test equipment, line tester, Ethernet tester
- DWDM amplifiers, MDU units, RODAM features and configurations

**Professional Skill:**

- Equipment Installation/Operating Skills
- Testing & Calibration skills
- Technical Interpretation Skills
- Analytical Skills
- Problem Solving Skills
- Managerial Skills

**Core Skill:**

- Basic Reading and Writing Skills
- Communication Skills
- Basic Project Management Skills
- Interpretation Skills
- Interpersonal Skills
### Detail Course Outline:

<table>
<thead>
<tr>
<th>Module No</th>
<th>Module Name</th>
<th>Minimum No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>As per the NOSs listed in the Qualification pack</td>
<td></td>
</tr>
</tbody>
</table>

| Total Theory / Lecture Hours: | 180 |
| Total Practical / Tutorial Hours: | 220 |
| Total Hours:                  | 400 |

**Recommended Hardware:**
Lab should consists of SDH equipment's, L2 and L3 switching, CWDM / DWDM, and EMS. All these equipment's should be fully equipped with necessary cabinets, cards, chassis, Back plane, accessories, Lasers, Software and licenses.

**Recommended Software:**
System Software will be bundled with equipment.

**Text Books:**
Training material for students supported through affiliated Training Providers.

**Reference Books:**
NA