

Syllabus For Optical Fiber Installer

Course Name	OPTICAL FIBER INSTALLER
Sector	TELECOM
Course Code	STC-TEL/2025/3602
Level	4
Occupation	• Optical Fiber Installer • Optical Fiber Technician • FTTH (Fiber to the Home) Technician • Optical Fiber Testing Technician • Optical Fiber Maintenance Technician
Job Description	The job role involves installing, connecting, testing and maintaining optical fiber systems used in telecommunications and data networks. It includes handling fiber optic tools, interpreting network designs and ensuring high-performance fiber connectivity.
Course Duration	Total Duration Minimum: 390 Hrs. (T-80, P-190, OJT-60 and ES-60) Maximum: 450 Hrs. (T-100, P-230, OJT-60 and ES-60)
Trainees' Entry Qualification	• 12th grade pass or • Completed 2nd year of 3-year diploma (after 10th) or • Pursuing 2nd year of 3-year regular Diploma (after 10th) or • 10th grade pass with two years of any combination of NTC/NAC/CITS or equivalent. or • 8th pass plus 2-year NTC plus 1-Year NAC plus 1-Year CITS or • 10th grade pass and pursuing continuous schooling (for 2-year program) or • 10th grade pass with 2 years' relevant experience or • Previous relevant Qualification of NSQF Level 3.0 with 3 years' relevant experience
Trainers Qualification	B. TECH in ECE/ETCE/EE/CSE/Instrumentation with 1-year experience in the relevant field. OR Diploma in EE/ETCE/ECE/EIE/Fiber Optics with a minimum of 2 years' experience in the relevant field OR NTC/NAC in Electronics Mechanics with a minimum of 3 years' experience in the relevant field. OR 12 th grade pass with a minimum of 5 years' experience in the relevant field.

Different Combination in which course may be offered

Course Name	Course Code	Course Duration	Full Marks
OPTICAL FIBER INSTALLER	STC-TEL/2025/3602	390 Hours	1000
OPTICAL FIBER INSTALLER [with Optional: IoT and Wireless Integration]	STC-TEL/2025/3602 [with Optional TEL/3602/OC9]	450 Hours	1100

Structure of Course:

Module No.	Module name	Outcome	Compulsory/ Optional	Theory (Hrs)	Practical (Hrs)	Total (Hrs) [Multiple of 30]
1	Introduction to Optical Fiber communication	Describe the importance and applications of optical fiber in modern communication systems.	Compulsory	10	20	30
2	Basics of Light & Optical Fiber Principles	Explain the principles of light transmission as applied in optical fibers.	Compulsory	10	20	30
3	Types of Optical Fibers & Cables	Identify different types of fiber optic cables and their uses	Compulsory	10	20	30
4	Optical Fiber Components & Connectivity	Assemble fiber connections using appropriate connectors and accessories.	Compulsory	10	20	30
5	Installation & Handling of Fiber Optic Cables	Install fiber optic cables following industry-standard practices and safety measures.	Compulsory	20	70	90
6	Troubleshooting and maintenance	Test, analyze and troubleshoot fiber optic links for performance and signal issues.	Compulsory	10	20	30
7	Safety & Industry Standards	Apply industry standards and guidelines during fiber optic work	Compulsory	10	20	30
8	OJT	Work in real job	Compulsory		60	60

		situation with special emphasis on basic safety and hazards in this domain (OJT).				
9	Employability Skill	As per guided curriculum	Compulsory	60	--	60
10	IoT and Wireless Integration	Integrate advanced fiber technologies with IoT and wireless systems	Optional	20	40	60
TOTAL			Minimum	140	250	390
			Maximum	160	290	450

SYLLABUS:**Module 1:** Introduction to Optical Fiber communication

Outcome: Describe the importance and applications of optical fiber in modern communication systems.

Theory Content:

- Define the concept of optical fiber technology and its evolution.
- Identify key applications in telecommunications, internet and data transmission.
- Outline the development of fiber technology in the telecom sector.
- Explain the advantages over traditional copper systems.
- Identify the major industries and sectors utilizing optical fiber
- Explain the importance of fiber optics in supporting 5G and IoT technology

Practical Content:

- Identify fiber optic components.
- Demonstrate light transmission in fiber.
- Identify fiber optic testing tools.
- Sketch a block diagram showing basic components in a fiber optic link
- Set up a simple fiber optic communication link.

Tools & Equipment needed:

Multimedia projector/smart board, Optical Fiber Samples (Single-mode & Multi-mode), Laser Light Source Fiber Strippers & Cleavers, Optical Power Meter, Visual Fault Locator (VFL), Connector Inspection Microscope Safety Gear (Gloves, Safety Glasses, Fiber Disposal Bin)

Module 2: Basics of Light & Optical Fiber Principles

Outcome: Explain the principles of light transmission as applied in optical fibers

Theory Content:

- Define fundamental light properties.
- Illustrate the concepts of refraction, reflection and total inter reflection.
- Describe how light propagates in optical fiber.
- Compare different fiber types based on optical principles.
- Identify the concept of attenuation, signal loss and dispersion.

- Describe the modes of light propagation-single and multi-mode.

Practical Content:

- Identify different sources of light used in fiber optics.
- Demonstrate reflection and refraction.
- Demonstrate Total Internal Reflection (TIR) in fiber optics.
- Measure critical angle at which total internal reflection occurs
- Compare single-mode vs. multi-mode transmission.
- Set up a fiber optic transmission system.
- Measure attenuation using an Optical Power Meter.
- Draw labeled diagrams to visualize light behavior in different scenarios

Tools & Equipment needed:

Laser Light Source (650nm, 850nm, 1310nm, 1550nm), LED Light Source, Mirrors, Prisms, and Glass Slabs

Plastic & Glass Rods for TIR Demonstration, Optical Fiber Samples (Single-mode & multi-mode)

Numerical Aperture Measurement Kit, Optical Power Meter (OPM) & Light Source Visual Fault Locator (VFL)

Microscope for Fiber Inspection, Safety Gear (Gloves, Glasses, Fiber Waste Bin)

Module 3: Types of Optical Fibers & Cables

Outcome: Identify different types of fiber optic cables and their uses

Theory Content:

- Define optical fiber and its types.
- Explain the structure of fiber optic cables.
- Classify different types of fiber optic cables.
- Compare fiber cables for different applications.
- Assess factors affecting cable selection.

Practical Content:

- Identify different types of fiber optic cables.
- Demonstrate cable construction and fiber arrangement.
- Perform fiber optic cable handling and preparation.
- Identify cable jacket markings to determine fiber count and classification
- Test cable flexibility and durability under stress.
- Compare the performance of different fiber cables.
- Perform basic fiber optic splicing and termination.
- Perform physical tests like bending and coiling to observe flexibility.
- Set up a fiber optic cable installation simulation.

Tools & Equipment needed:

Various Fiber Optic Cables (Single-mode, Multi-mode, Armored, Loose-tube, FTTH, Aerial, Underground)

Fiber Optic Stripper, Cleaver, and Cutter, Visual Fault Locator (VFL), Optical Power Meter (OPM) & Light Source

Fusion Splicer & Mechanical Splicer, Cable Testing Tools (Bend Tester, Tension Tester), Connector Inspection

Microscope, Safety Gear (Gloves, Safety Glasses, Fiber Waste Bin)

Module 4: Optical Fiber Components & Connectivity

Outcome: Assemble fiber connections using appropriate connectors and accessories.

Theory Content:

- Define the role of connectors, splices, adapters and couplers
- Identify fiber optic components.
- Describe fiber optic termination methods and polishing
- Compare different splicing techniques.
- Recognize the impact of poor connectorization on network performance

Practical Content:

- Identify different fiber optic connectors and adapters.
- Demonstrate connector handling and cleaning.
- Practice fusion splicing using splicing machines
- Perform fiber optic termination.
- Test fiber optic connectivity performance.
- Assemble a simple patch panel setup using connectors and adapters
- Record and report insertion loss during connectivity testing

Tools & Equipment needed:

Fiber Optic Connectors (SC, LC, ST, FC, MPO), Fiber Optic Adapters & Couplers, Fiber Stripper, Cleaver, and Cutter
Fusion Splicer & Mechanical Splicer, Quick Connectors & Termination Kits, Fiber Polishing Kit
Optical Power Meter (OPM) & Light Source, Visual Fault Locator (VFL), Patch Panels & Fiber Enclosures
Fiber Cleaning Tools (Alcohol Wipes, Cleaning Pens, Swabs), Safety Gear (Gloves, Safety Glasses, Fiber Waste Bin)

Module 5: Installation & Handling of Fiber Optic Cables

Outcome: Install fiber optic cables following industry-standard practices and safety measures.

Theory Content:

- Explain the procedures involved in installing fiber optic cables
- Identify correct methods for pulling, routing and securing fiber cables.
- Highlight the dangers of exceeding tensile strength limits during installation.
- Discuss the use of conduits, raceways, and cable trays for organized deployment.
- Define environmental considerations like moisture protection and UV resistance.
- Recognize common installation errors and how to prevent them.

Practical Content:

- Unroll and prepare fiber optic cables for indoor or outdoor use.
- Route fiber through conduits and trays while maintaining bend radius.
- Secure cables using clips and ties to avoid movement and stress.
- Use a cable-pulling grip to pull long cable runs safely.
- Install and label fiber drop points according to the plan.
- Measure and cut cables using safety cutters and stripping tools.
- Identify and correct common physical installation faults.
- Document the installed route and components using layout drawings

Tools & Equipment needed:

Fiber Optic Connectors (SC, LC, ST, FC, MPO), Fiber Optic Adapters & Couplers, Fiber Stripper, Cleaver, and Cutter Fusion Splicer & Mechanical Splicer, Quick Connectors & Termination Kits, Fiber Polishing Kit, Optical Power Meter (OPM) & Light Source, Visual Fault Locator (VFL), Optical Time Domain Reflectometer (OTDR), Patch Panels & Fiber Enclosures, Fiber Cleaning Tools (Alcohol Wipes, Cleaning Pens, Swabs), Safety Gear (Gloves, Safety Glasses, Fiber Waste Bin)

Module 6: Troubleshooting and maintenance

Outcome: Test, analyze and troubleshoot fiber optic links for performance and signal issues.

Theory Content:

- Explain working principles of fiber optic test equipment.
- Describe the steps in pre-installation and post-installation testing.
- Interpret OTDR traces to locate faults and measure link loss.
- Describe common fiber optic faults and their causes.
- Demonstrate fiber optic link testing techniques.
- Summarize troubleshooting procedures to restore normal operation.
- Highlight the role of documentation in fault analysis.
- Recognize the importance of routine maintenance for network reliability
- Explain preventive maintenance techniques for fiber networks.
- Outline standard procedures for inspecting and cleaning connectors.
- Explain steps in diagnosing and locating faults using testing tools.
- Discuss the repair techniques for broken or damaged cables.
- Highlight the significance of keeping maintenance logs and service records.
- Review safety considerations while performing maintenance tasks.

Practical Content:

- Identify the tools used for fiber testing, such as OTDR, power meters and light sources.
- Define key fiber optic testing parameters.
- Demonstrate calibration and setup of fiber optic testing tools.
- Calibrate and use a power meter and light source to test a fiber link.
- Connect an OTDR and capture trace data for a fiber cable.
- Measure insertion loss across connectors and splices.
- Simulate a fiber fault (e.g., bend or break) and observe changes in readings.
- Record and interpret test data using standard forms or software.
- Troubleshoot a fiber circuit with intermittent connectivity issues.
- Clean and inspect fiber ends as part of routine diagnostics.
- Inspect a live fiber network and identify potential issues.
- Clean connectors using approved fiber cleaning kits.
- Perform regular checks on enclosures and patch panels.
- Replace damaged connectors or patch cords.
- Locate a fiber break using OTDR and mark the fault zone.
- Cut and re-splice a faulty fiber link and test for signal restoration.
- Update maintenance logs and fault reports for record keeping.
- Conduct a mock maintenance drill and review response time and actions

Tools & Equipment needed:

Optical Time Domain Reflectometer (OTDR), Optical Power Meter (OPM), Light Source (Laser/LED), Visual Fault Locator (VFL), Fiber Inspection Microscope, Fiber Identifier & Continuity Tester, Fiber Cleaning Kit (Alcohol Wipes, Cleaning Pens, Swabs), Patch Cords & Adapters, Fusion Splicer & Mechanical Splicer, Fiber Cleaver & Stripper Connector Repair & Replacement Kits, Fiber Inspection Microscope, Safety Gear (Gloves, Safety Glasses, Fiber Waste Bin)

Module 7: Safety & Industry Standards

Outcome: Apply industry standards and guidelines during fiber optic work

Theory Content:

- Define key safety hazards in fiber optic work. (Eye damage from laser light)
- Describe safe handling practices for fiber cables and sharp tools.
- Outline the use of personal protective equipment (PPE) such as safety glasses.
- Discuss the importance of proper ventilation when using chemical cleaners.
- Emphasize safe disposal of fiber scraps and chemicals.

Practical Content:

- Demonstrate correct use of PPE during fiber handling and splicing.
- Display and follow safety signage for laser warning and work zones.
- Practice safe disposal methods for fiber clippings.
- Implement a cleaning routine to keep the work area free from fiber dust.
- Role-play emergency procedures for laser-related accidents.
- Fill out a safety checklist after completing installation or repair work.

Tools & Equipment needed:

Personal Protective Equipment (PPE) – Safety Glasses, Gloves, Fiber Waste Bin, Fiber Disposal Tools – Tweezers, Fiber Scrap Containers, Laser Safety Equipment, Fire Extinguisher (for electrical and fiber optic-related risks) First Aid Kit (for fiber-related injuries), ISO, ITU, IEEE, TIA/EIA Standard Reference Materials, Fiber Cleaning Kit (Alcohol Wipes, Cleaning Pens, Swabs), Workplace Safety Signage and Labels

Module 8: OJT

Outcome: Work in real job situation with special emphasis on basic safety and hazards in this domain

Practical Content:

Assessor will check report prepared for this component of Practical training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for **60 Hours**.)

Module 9: Employability Skills (60 Hrs)

Key Learning Outcomes

Introduction to Employability Skills

Duration: 1.5 Hours

After completing this programme, participants will be able to:

1. Discuss the Employability Skills required for jobs in various industries
2. List different learning and employability related GOI and private portals and their usage

Constitutional values - Citizenship

Duration: 1.5 Hours

3. 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
4. Show how to practice different environmentally sustainable practices.

Becoming a Professional in the 21st Century

Duration: 2.5 Hours

5. Discuss importance of relevant 21st century skills.
6. 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.
7. Describe the benefits of continuous learning.

Basic English Skills

Duration: 10 Hours

8. Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone
9. Read and interpret text written in basic English
10. Write a short note/paragraph / letter/e -mail using basic English

Career Development & Goal Setting

Duration: 2 Hours

11. Create a career development plan with well-defined short- and long-term goals

Communication Skills

Duration: 5 Hours

12. Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette.
13. Explain the importance of active listening for effective communication
14. Discuss the significance of working collaboratively with others in a team

Diversity & Inclusion

Duration: 2.5 Hours

15. Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD
16. Discuss the significance of escalating sexual harassment issues as per POSH act.

Financial and Legal Literacy

Duration: 5 Hours

17. Outline the importance of selecting the right financial institution, product, and service
18. Demonstrate how to carry out offline and online financial transactions, safely and securely
19. List the common components of salary and compute income, expenditure, taxes, investments etc.
20. Discuss the legal rights, laws, and aids

Essential Digital Skills

Duration: 10 Hours

21. Describe the role of digital technology in today's life
22. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely
23. Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely
24. Create sample word documents, excel sheets and presentations using basic features
25. utilize virtual collaboration tools to work effectively

Entrepreneurship

Duration: 7 Hours

26. Explain the types of entrepreneurship and enterprises
27. Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan
28. Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement
29. Create a sample business plan, for the selected business opportunity

Customer Service

Duration: 5 Hours

30. Describe the significance of analyzing different types and needs of customers
31. Explain the significance of identifying customer needs and responding to them in a professional manner.
32. Discuss the significance of maintaining hygiene and dressing appropriately

Getting Ready for apprenticeship & Jobs

Duration: 8 Hours

33. Create a professional Curriculum Vitae (CV)
34. Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively
35. Discuss the significance of maintaining hygiene and confidence during an interview
36. Perform a mock interview
37. List the steps for searching and registering for apprenticeship opportunities

Module 10: (Optional): IoT and Wireless Integration**Outcome:** Integrate advanced fiber technologies with IoT and wireless systems**Theory Content:**

- Define Dense Wavelength Division Multiplexing (DWDM) and Coarse Wavelength Division Multiplexing (CWDM).
- Explain Passive Optical Networks (PON) and their role in high-speed broadband.
- Describe the role of fiber in connecting IoT devices and smart infrastructure.
- Explain how fiber supports 5G backhaul and high-density networks.
- Evaluate network performance for different fiber and wireless deployments.

Practical Content:

- Identify components of advanced fiber technologies.
- Demonstrate optical signal multiplexing using DWDM/CWDM.
- Set up and test a Passive Optical Network (PON).
- Integrate fiber optics with a wireless network.
- Check the performance of fiber-optic IoT infrastructure.
- Assist to design a hybrid fiber-wireless network for a smart city or 5G application.

Tools & Equipment needed:

DWDM & CWDM Multiplexers/Demultiplexers, Optical Line Terminal (OLT) and Optical Network Unit (ONU) for PON, Fiber Splicing & Connectorization Kits, Optical Spectrum Analyzer (OSA), Optical Power Meter (OPM) and OTDR, Wi-Fi 6E and 5G Small Cell Equipment, IoT Devices with Fiber Connectivity, Hybrid Fiber-Wireless Network Simulation Software, Network Performance Testing Tools

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Learning Outcome – Assessment Criteria

Module No.	Outcome	Assessment Criteria
1	Describe the importance and applications of optical fiber in modern communication systems.	After completion of this module students will be able to: 1.1 Explain the concept and evolution of optical fiber communication. 1.2 Identify key applications of fiber optics in different industries. 1.3 Describe the advantages of optical fiber over traditional mediums. 1.4 Outline the development of fiber technology in the telecom sector. 1.5 Interpret industry trends related to fiber deployment. 1.6 Differentiate between guided and unguided transmission media. 1.7 Discuss real-life scenarios where fiber optic technology is used. 1.8 Summarize the importance of fiber optics in high-speed data transfer.
2	Explain the principles of light transmission as applied in optical fibers.	After completion of this module students will be able to: 2.1 Define the principles of light behavior (reflection, refraction). 2.2 Illustrate the concept of total internal reflection in optical fibers. 2.3 Demonstrate how light propagates through a fiber core. 2.4 Explain the role of core and cladding in signal transmission. 2.5 Compare different types of light sources used in fiber optics. 2.6 Distinguish between attenuation, dispersion and bending loss. 2.7 Analyze how wavelength affects fiber optic performance. 2.8 Apply basic formulas to calculate numerical aperture and acceptance angle.
3	Identify different types of fiber optic cables and their uses	After completion of this module students will be able to: 3.1 Identify different types of optical fibers (single-mode, multimode). 3.2 Classify optical cables based on construction and application. 3.3 Explain the structural components of fiber optic cables.

Module No.	Outcome	Assessment Criteria
		3.4 Compare tight-buffered and loose-tube cables. 3.5 Evaluate the suitability of various fiber types for given scenarios. 3.6 Label the parts of optical fiber and cable cross-sections. 3.7 Select appropriate cables for indoor and outdoor use.
4	Assemble fiber connections using appropriate connectors and accessories.	After completion of this module students will be able to: 4.1 List the different passive and active components used in fiber optics. 4.2 Demonstrate the correct method of using fiber connectors. 4.3 Identify types of connectors such as SC, LC, ST, and FC. 4.4 Assemble a basic optical fiber link using patch cords and adapters. 4.5 Inspect connectors for alignment, dirt and damage. 4.6 Explain the function of couplers, splitters and splicing trays. 4.7 Match the right connector to the required fiber type. 4.8 Illustrate the importance of proper interfacing for signal quality.
5	Install fiber optic cables following industry-standard practices and safety measures.	After completion of this module students will be able to: 5.1 Demonstrate proper techniques for pulling and laying fiber cables. 5.2 Follow safety protocols while handling optical cables. 5.3 Perform cable routing in ducts, conduits, or trenches. 5.4 Secure cables using clamps and routing accessories.

Module No.	Outcome	Assessment Criteria
		5.5 Interpret installation layouts and cable schedules. 5.6 Avoid common mistakes such as bending beyond the minimum radius. 5.7 Check cable integrity post-installation.
	Test, analyze and troubleshoot fiber optic links for performance and signal issues.	After completion of this module students will be able to: 6.1 Operate test tools like OTDR, power meter, and light source. 6.2 Identify causes of signal loss such as microbends or connector faults. 6.3 Calibrate and maintain testing instruments. 6.4 Record and interpret test results accurately. 6.5 Troubleshoot common issues like breakages or poor terminations 6.6 Follow a standard procedure for periodic maintenance checks. 6.7 Clean fiber connectors and ports using proper tools. 6.8 Locate and diagnose faults in a fiber optic system. 6.9 Replace damaged components such as connectors or patch cords. 6.10 Use appropriate test instruments for fault analysis. 6.11 Restore connectivity while minimizing downtime.
7	Apply industry standards and guidelines during fiber optic work	After completion of this module students will be able to: 7.1 Identify hazards associated with fiber optic handling. 7.2 Wear appropriate PPE during installation and testing.

Module No.	Outcome	Assessment Criteria
		7.3 Dispose of fiber scraps safely. 7.4 Follow safety norms set by international standards (e.g., TIA/EIA). 7.5 Ensure eye safety while using lasers and light sources. 7.6 Comply with electrical and structural installation codes.
8	OJT	Assessor will check report prepared for this component of Practical training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for 60 Hours.)
9	Employability Skill	As per guided curriculum
10	IoT and Wireless Integration	After completion of this module students will be able to: 8.1 Explain the role of fiber optics in IoT and smart systems. 8.2 Identify the need for high-speed backhaul in wireless networks. 8.3 Explore integration points between fiber, IoT devices, and 5G. 8.4 Compare traditional vs. hybrid fiber-wireless systems. 8.5 Describe passive optical network (PON) architecture. 8.6 Assess the impact of fiber on emerging communication technologies. 8.7 Propose a basic integration plan for fiber in an IoT application.

List of Tools, Equipment & materials needed for 30 Trainees (Practical)

Sl No	Item Name	Specification	Qty
1	Optical Power Meter (OPM)	Handheld, -70 to +10 dBm, with interchangeable adapters (SC, LC, ST)	5
2	Light Source	1310/1550 nm wavelength, compatible with OPM	5
3	Optical Time Domain Reflectometer (OTDR)	Multi-mode & single-mode, 1310/1550 nm, with touch screen display	2
4	Visual Fault Locator (VFL)	10mW, red laser, SC/LC adapter	5
5	Fusion Splicer	Core alignment, automatic arc calibration, with cleaver	3
6	Mechanical Splicing Kit	Includes splice holders, cleaver, and index-matching gel	5
7	Fiber Cleaver	High-precision, single-action	5
8	Fiber Stripper	3-hole, for 250µm & 900µm coatings	10
9	Kevlar Scissors	Heavy-duty, fiber optic Kevlar cutting	5
10	Cable Jacket Stripper	Adjustable blade, compatible with various cable diameters	5
11	Alcohol Dispenser Bottle	250ml, anti-static, with push-top lid	10
12	Fiber Cleaning Kit	Alcohol wipes, cleaning sticks, lint-free cloth	10
13	Fiber Inspection Microscope	200x-400x magnification, LED illumination	5
14	Patch Cords	Single-mode & multi-mode, SC-SC, LC-LC, 3m	30
15	Pigtails	Single-mode & multi-mode, SC, LC, 1m	30
16	Fiber Optic Adapters	SC-SC, LC-LC, ST-ST, simplex & duplex	30
17	Optical Splitters	1x2, 1x4, 1x8 (PLC Splitters)	10
18	Splice Protectors	Heat shrink sleeves, 40mm	30
19	Fiber Enclosure Box	Indoor & outdoor, wall-mountable	10
20	Optical Distribution Frame (ODF)	12-port, SC/LC connectors, rack-mountable	2
21	Drop Cable	FTTH, G.657A, single-mode, 3mm diameter	30
22	Loose Tube Cable	G.652D, armoured, 12-core	30
23	Fiber Cable Drum	500m, single-mode, G.652D	1
24	Ethernet Cable (Cat6)	305m box, for fiber-to-Ethernet testing	1
25	Media Converter	Gigabit, SC/LC to RJ45	5
26	Fiber Optic Termination Kit	Includes connectors, crimping tools, curing oven	5
27	Safety Glasses	Anti-UV, scratch-resistant	30
28	Safety Gloves	Anti-static, cut-resistant	30
29	Fiber Waste Bin	Anti-static, for safe fiber scrap disposal	5
30	First Aid Kit	Includes bandages, antiseptic, eyewash	2

Marks Distribution

Outcome	Outcome Code	Type	Total Th Hrs	Total Pr Hrs	Total OJT Hrs
Describe the importance and applications of optical fiber in modern communication systems.	TEL/3602/OC1	Compulsory	20	90	0
Explain the principles of light transmission as applied in optical fibers.	TEL/3602/OC2	Compulsory	20	90	0
Identify different types of fiber optic cables and their uses	TEL/3602/OC3	Compulsory	20	80	0
Assemble fiber connections using appropriate connectors and accessories.	TEL/3602/OC4	Compulsory	20	90	0
Install fiber optic cables following industry-standard practices and safety measures.	TEL/3602/OC5	Compulsory	30	120	0
Test, analyze and troubleshoot fiber optic links for performance and signal issues.	TEL/3602/OC6	Compulsory	20	90	0
Apply industry standards and guidelines during fiber optic work	TEL/3602/OC7	Compulsory	20	90	0
Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	TEL/3602/OC8	Compulsory	0	0	150
Employability Skills – 60 Hrs	DGT/VSQ/N0102	Compulsory	50	0	0
Integrate advanced fiber technologies with IoT and wireless systems	TEL/3602/OC9	Optional	20	80	0
Full Marks: Minimum 1000 (Th 200, Prac. 800) without Optional Maximum marks 1100 ((Th 220, Prac. 880) with Optional					