Course: **Fiber Optic Installer Certification**

Guided Learning Hours: **45**

Pre-requisite: **Basic Science**

Abstract

This unit provides an overview of the operation and installation of fiber optic systems. The increasing need for bandwidth requirements worldwide has driven the need for better capacity handling mediums. Fiber optics is thus far, the only medium that can provide unlimited bandwidth while protecting data transmission.

This unit will provide learners with the ability to design and install fiber optic systems either in residential or commercial buildings. Learning will take place through a combination of lectures and laboratory sessions.

Target Audience

Individuals, IT personnel, engineers, and technicians wishing to learn about basic fiber optic practices, implementation and applications.

Learning outcomes

On completion of this course, learners will be able to:

1. Understand the basic principles associated with a fiber optic network.
2. Understand how to choose appropriate materials and how it affects fiber systems.
3. Identify and size the basic components which comprise any fiber network.
4. Complete a fiber circuit with all components.
5. Design and test a simple fiber optic system to meet specific energy or bandwidth consumption requirements.

Course Content

1. **Understand the basic principles associated with a fiber optic network.**

   History and fundamentals of fiber optics: Chronology of fiber optics globally; Key personnel in the development of fiber optics; Principles of fiber optic transmission; Basic principles of light; Optical fiber characteristics and terminologies used.

2. **Understand how to choose appropriate materials and how it affects fiber systems.**

   Optical fiber construction: Fiber cables types and construction; Standards and codes in fiber systems; Safety in the fiber network and importance.

3. **Identify and size the basic components which comprise any fiber network**

   Components: Connector types and applications, Fiber patch panels, Closures, and pedestals.

4. **Complete a Fiber Optic circuit with all components.**
   Practicals: Fiber installation guidelines, Fusion and mechanical splicing; Hot melt connectorisation; Aerial and underground placing best practices

5. **Design and test a simple fiber optic System to meet specific energy or bandwidth consumption requirements.**

   Fiber system design: Using loss/energy budget calculations to design a bandwidth optimized system based on user requirements; testing and troubleshooting simple systems using a visual fault locator, power meter/light source, and the optical time domain Reflectometer.

Assessment Criteria

In order to achieve Learning Outcome…	The Learner must…
1. Understand the basic principles associated with a fiber optic network.	1.1 Explain the evolution of light in communication 1.2 Identify the names involved in the early development of fiber communication 1.3 Describe the evolution of optical fiber manufacturing and technology 1.4 Compare the relationship between wavelength & frequency 1.5 Explain reflection inclusive of the angles of incidence/refraction and the critical angle 1.6 Explain propagation of light through multi & single mode fibers
2. Understand how to choose appropriate materials and how it affects fiber systems.	2.1 Identify various optical fiber applications and integration systems 2.2 List the basic parts of a fiber optic link 2.3 Describe the principle of operation of transmitters & receivers 2.4 Explain the fundamentals of multiplexing 2.5 Explain A~D conversion through use of simple diagrams 2.6 Describe Fresnel reflections and how it influences fiber optic performance 2.7 Identify the various hazards associated with fiber optic installation
3. Identify and size the basic components which comprise any fiber network.	3.1 Explain the various optical fiber manufacturing techniques used presently 3.2 Identify various factors which influences cable selection 3.3 Describe the various components of a fiber optic cable 3.4 Explain the various types of cable termination
4. Complete a Fiber Optic circuit with all components.	4.1 Demonstrate the ability to perform mechanical & fusion Splicing 4.2 Describe the various factors that can

	affect the integrity of a splice 4.3 List various types of connectors used on fiber optic cables 4.4 Demonstrate the ability to patch panels using a centralized location for connecting fibers, testing, monitoring, and restoring riser or trunk cables.
5. Design and test a simple Fiber Optic system to meet specific energy or bandwidth consumption requirements.	5.1 Explain dispersion in optical fiber 5.2 Explain the causes of attenuation 5.3 Explain numerical aperture, macro & micro-bends 5.4 Describe basic operation/purpose of: OTDR, VFL, PM/LS 5.5 Link Loss and power Level measurement 5.6 Demonstrate the ability to use a combination of Light Source and Power Meter for bi and Uni-directional measurement @ 2, 3 or 4 wavelengths (850/1300/1310/1490/1550/1625nm)

Essential Learning Resources:

Learners will need access to a wide range of publications relating to Fiber Optics and a suitably equipped laboratory for practical training.

Textbooks and Manuals

1. Basic fiber optic theory and installation

Websites

http://www.eta-i.org/
www.lightbrigade.org
www.teracomtraining.com