# Program Information

## Lesson:

### *Fiber Optics*

## Training:

## Premises Cabling

## Time frame:

### 30-60 minutes

# Instruction Section

## Learning Objectives:

# Describe how fiber optics are used in premises cabling.

# Identify the types of fiber and cable used in fiber optic systems.

# Describe the process of terminating and testing fiber optic cables.

# Explain the differences between the use of copper and fiber cables in premises cabling.

## Assessment Tools/Methods:

* Participants should be assessed based on participation in group discussions.

## Learner Prior Knowledge:

## Prior to class, participants will need to read:

## Reference Guide: The Role of Fiber Optics in Premises Networks (<https://www.thefoa.org/tech/ref/premises/fiber.html>)

## Reference Guide: Copper or Fiber? What’s the real story? (<https://www.thefoa.org/tech/fo-or-cu.htm>)

## Reference Guide: FOA Online Reference Guide (<https://www.thefoa.org/tech/ref/contents.html#Components>)

## Reference Guide: Terminating Fiber Optic Cable (<https://www.thefoa.org/tech/ref/termination/Term/Term.htm>)

## Reference Guide: Optical Fiber Testing- Loss and Attenuation Coefficient (<https://www.thefoa.org/tech/ref/testing/test/loss.html>)

## Prior to class, the participants will need to watch:

## [Premises Cabling Lecture 9: Fiber Optics](http://www.youtube.com/watch?v=B2oaf9RD6nc&list=PL3F0669372E06AE8B&index=9&feature=plpp_video)

## Instructional Activities:

# Briefly discuss the increasing popularity of fiber optics in premises cabling and its advantages over traditional copper wiring.

# Activity 1: Discussion on Fiber Optics in Premises Cabling:

# Ask participants to discuss the role of fiber optics in LAN backbone cabling and centralized fiber to the desktop architectures.

# Hold a group discussion to explain the concept of Optical LANs (OLANs) and their benefits in large networks.

# Continue the discussion by touching on other premises uses for fiber optics, such as surveillance systems, indoor cellular wireless systems, industrial networks, and data centers.

# Ask participants to review the differences between step index multimode fiber, graded index multimode fiber, and singlemode fiber as explained in their self-guided learning.

# Discuss the various sizes and bandwidth capabilities of multimode fiber, including OM1, OM2, OM3, and OM4 fibers with the group.

# Activity 2: Discussion on Terminating and Testing Fiber Optic Cabling:

# Ask participants to list and discuss the process of terminating fiber optic cables, including field terminations and factory-made pigtails as described in their self-guided learning.

# Discuss the different termination procedures such as adhesive/polish, prepolished/splice connectors, and prefabricated systems.

# Ask participants to explain the purpose and importance of testing fiber optic cables, focusing on the three tests that should be performed on connections.

# Visual inspection with a microscope to verify polishing

# Insertion loss testing using a light source and power meter.

# Polarization: fibers are arranged so one end of each fiber link is connected to a transmitter and the other end to a receiver.

# Emphasize the need for cleanliness in fiber optic systems to prevent dust contamination and maintain optimal performance.

# Activity 3: Participant Insights and Discussions:

# Explain to participants that they will be participating in a discussion on the types of fiber and cable used in premises cabling.

# Prompt participants to discuss challenges, best practices, and effective tools or techniques for achieving reliable terminations.

# Shift the focus to testing methodologies for fiber optic cables while guiding participants in discussing the importance of testing, such as OTDR and insertion loss testing, in ensuring performance.

# Engage participants in a dialogue about the decision-making process between the use of copper and fiber in premises cabling.

# Encourage discussions on bandwidth, reliability, cost, and future scalability as factors influencing this decision.

# Facilitate a reflection on the participants' point of view regarding copper and fiber technologies in premises cabling.

# Prompt discussions on critical factors for clients to consider when planning cabling projects.

# Summarize key takeaways from the discussion and encourage participants to ask questions and seek clarification on any topics discussed.

## Resources:

# Whiteboard, markers or display to record discussion points

# Reflection Section

Reflect on the skills you learned during the lesson. What specific skills did you gain understanding or improve upon? How do you plan to apply the skills and knowledge gained from this lesson in your professional or personal projects?

*This lesson is supplemental to the Fiber Optics lesson within FOA's Fiber U curriculum and not part of the FOA required curriculum to obtain the Certified Premises Cabling Technician certification. If interested in becoming an approved school and/or obtaining a certification, please contact FOA at*[*thefoa.org/contact-foa.html*](https://www.thefoa.org/contact-foa.html)*.*

*Note: AI, specifically ChatGPT 3.5, was used to generate timeline for this contextualized lesson plan.*