



### **Course Description**

#### **TCN0312 | Fiber Optics and Splicing Techniques | 3.83 credits**

This hands-on course provides students with a comprehensive understanding of fiber optic technology and essential splicing techniques crucial for modern telecommunications networks. Students will explore the fundamental principles of fiber optic transmission, including light propagation, cable types, and optical components.

### **Competencies**

**Competency 1:** The student will learn to understand fiber optic transmission principles and terminology by:

1. Explaining the fundamental concepts of light propagation in optical fibers
2. Identifying key components of a fiber optic system, including transmitters, receivers, and amplifiers
3. Describing different types of signal degradation in fiber optic transmissions
4. Comparing single-mode and multi-mode fiber characteristics and applications

**Competency 2:** The student will learn to identify and work with various fiber optic cable types by:

1. Distinguishing between different fiber optic cable constructions, such as loose tube and tight buffered
2. Selecting appropriate cable types for various installation environments and requirements
3. Handling and storing fiber optic cables according to manufacturer specifications and industry best practices
4. Interpreting cable markings and specifications to determine fiber count, type, and performance characteristics

**Competency 3:** The student will learn to perform fiber optic cable preparation and termination by:

1. Stripping and cleaning fiber optic cables using proper tools and techniques
2. Cleaving optical fibers with precision to ensure optimal signal transmission
3. Installing various types of fiber optic connectors, such as SC, LC, and ST
4. Polishing fiber optic connectors to achieve low insertion and return loss

**Competency 4:** The student will learn to demonstrate basic fusion and mechanical splicing techniques by:

1. Preparing fibers for splicing by removing coatings and cleaving to precise lengths
2. Operating fusion splicing equipment to join optical fibers with minimal signal loss
3. Assembling mechanical splices using industry-standard tools and procedures
4. Evaluating splice quality through visual inspection and loss measurements

**Competency 5:** The student will learn to use basic test equipment to verify fiber optic installations by:

1. Operating optical time-domain reflectometers (OTDRs) to measure fiber length and locate faults
2. Using optical power meters to measure signal strength and calculate link loss
3. Interpreting test results to determine if installations meet industry standards and specifications
4. Troubleshooting fiber optic links based on test measurements and performance criteria

**Competency 6:** The student will learn to apply fiber optic safety practices by:

1. Implementing proper handling and disposal procedures for fiber optic materials and chemicals
2. Utilizing appropriate personal protective equipment (PPE) during fiber optic installation and maintenance tasks
3. Identifying potential hazards associated with laser light sources and taking necessary precautions
4. Applying safe work practices when using tools and equipment in fiber optic installations

### **Learning Outcomes:**

- Solve problems using critical and creative thinking and scientific reasoning
- Formulate strategies to locate, evaluate, and apply information