



# Koinonia Academy



# TIMING AND SYNCHRONIZATION IN ETHERNET NETWORKS IN 5G

## Course Overview:

This course covers carrier Ethernet concepts, attributes and Ethernet architecture also we will covered all details about timing and synchronization in 5G networks and how be testing. Timing and synchronization is not new to the wireless world. Previous network generations (i.e., 2G, 3G, and 4G) all required a certain degree of timing and synchronization for correct handover to occur between macro base stations and user equipment. However, unlike its predecessors, 5G is bringing more stringent performance requirements to wireless networks and mandating nanosecond timing between the various elements in the radio access network (RAN). Another approach used for 5G network synchronization is Synchronous Ethernet (SyncE) will be discussed.

## Course Objectives:

**Upon completion of the course, participants will be able to understand:**

### 1- Carrier Ethernet

- **Ethernet Basics:**
  - 802.3 Frame Format.
  - Ethernet Switching.
  - 802.1Q VLANs and 802.1p.
  - Ethernet Timeline.
- **Carrier Ethernet Key Attributes:**
  - E-Line, E-LAN, E-Tree and E-Access services.
  - Carrier Ethernet Use Case
  - Mobile Backhaul.
- **Carrier Ethernet Architecture.**
  - Carrier Ethernet Transport Technologies.

### 2- Timing and Synchronization

- **Timing and Synchronization Basics:**
  - Timing and Synchronization in Telecommunications.
  - Timing and Synchronization in Packet Switched Networks.
  - Hybrid Timing System.
  - Network Time Protocol.
  - Global Positioning System.
- **SyncE (Synchronous Ethernet).**
  - IEEE 1588v2
  - Precision Time Protocol

## Target Audience:

- Communication and Network Engineers.
- Engineers looking to work on 4G/5G network or looking to familiarize themselves with timing and synchronization
- Time Testing Telecom Engineers