

COURSE 113: IP OVER WIRELESS, FIBER AND COPPER

A one-day course for non-engineers on the physical connections that implement the network: how IP is communicated over wireless, fiber and copper.

We'll begin with wireless, first covering radio and cellular mobile fundamentals, how voice and data are communicated over cellular and a roundup of technologies and generations. Then, we'll cover non-mobile wireless: WiFi and Bluetooth.

Next is a chapter on fiber optics and how fiber is used in every part of the network, including DWDM in the core and Passive Optical Networks (PONs) for residences.

The last chapter is IP packets on copper for the "last mile": DSL on twisted pair and cable modems on hybrid fiber-coax networks.

1. MOBILE IP: CELLULAR

- Radio fundamentals
- Spectrum
- Cellular Concepts
- Digital Cellular: Voice
- Digital Cellular: Data = Internet Access
- Spectrum-Sharing Technologies: FDMA, TDMA, CDMA, OFDM
- 3G: 1X, UMTS, HSPA
- 4G: LTE

2. MORE WIRELESS IP: WI-FI AND BLUETOOTH

- WiFi standards & speeds
- Hotspots and SSIDs
- Voice over IP over WiFi
- WiFi security
- Smartphone WiFi hotspots
- Bluetooth

3. IP ON FIBER OPTICS

- Fundamentals of fiber & fiber cables
- Wavelengths, single-mode and multimode
- WDM: Wave-Division Multiplexing
- Fiber in the Core
- MAN: Metropolitan Area Network
- Fiber to the Premise
- PON: Passive Optical Network
- Fiber to the Apartment Building

4. IP LAST MILE ON COPPER

- Twisted-Pair Outside Plant
- CATV Hybrid Fiber-Coax Plant
- Fiber to the Neighborhood
- DSL & DSLAMs for twisted pair
- VDSL for TV over twisted pair
- Cable Modems