COURSE 112: IP NETWORK FUNDAMENTALS

A one-day course on the network protocols used to implement the new-generation telecom network: Ethernet and IP.

Specifically designed for non-engineers, we'll begin with the basic concepts of what used to be called "data communications": MAC frames and IP packets.

Next, to understand all of the functions that must be performed and how they are organized, we'll cover the OSI layers. Then we'll cover Layer 2: Ethernet LANs and VLANs, and Layer 3: IP packets, addresses and routing.

This course is for anyone who wants to understand terms like "Layer 2", "Layer 3", MAC address, MAC frame, IP address, DHCP, static and dynamic addresses, NAT, ports and sockets and subnets… and how it all fits together.

1. "DATA" FUNDAMENTALS
- Multidrop Circuits, e.g. WiFi
- Access Control, Error Control
- Frames and MAC Addresses
- Packets and IP Addresses
- How packets and frames are related
- How MAC addresses and IP addresses relate

2. OSI LAYERS
- Protocols and Standards
- Framework to organize discussions
- The 7 Layers
- How protocol stacks work
- Protocol Headers & Deep Packet Inspection

3. ETHERNET, LANS AND VLANS
- Ethernet and 802.11
- Broadcast Domain
- Cables & Categories
- Optical Ethernet
- LAN Switches
- VLANs

4. IP ADDRESSES & TCP/IP
- IPv4 Address Classes, Dotted-Decimal Notation
- DHCP: Static and Dynamic Addresses
- Private Addresses
- NAT: Network Address Translation
- TCP, UDP, Ports and Sockets
- Multicast
- IPv6

5. IP ROUTING
- Subnets and CIDR
- Prefix and Subnet Mask
- Assigning Subnets to Broadcast Domains
- Routing Tables
- Interior Routing: RIP, OSPF
- Exterior Routing, Autonomous Systems and BGP

