Satellite Communication Systems & IP in Modern Networks

Telecom Engineering
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Introduction

Successful as they are today, satellite systems are on the brink of a revolution that will doubtless have a significant impact in the future. With new and promising technology appearing every day, this satellite communications training course delves into the most recent advancements in satellite communication systems.

Participants in this course will learn about satellite basics and components and gain insights into building a communications satellite in accordance with the latest updates. Additionally, they will explore major approaches, including network topologies, Very Small Aperture Terminal VSAT systems, and IP networking over satellite.

Course Objectives of Satellite Communication Systems & IP in Modern Networks

- Being introduced to satellite communication systems and their functioning.
- Learning about satellite band frequencies.
- Identifying the requirements for an effective network IP design in satellite communications.
- Examining the potential security risks in Authentication, Authorization, and Accounting AAA.
- Understanding the integration of wireless LAN and other access technologies in satellite networks.
- Learning how to check the used network IP in network environments.

Satellite Communication Systems & IP in Modern Networks Course Outlines

Day 1

Introduction to Satellite Communication Systems

- Introduction to Advanced Satellite Systems and satellite communication basics.
- Multiple Access Techniques: FDMA, TDMA, CDMA, Random Access
- All Digital Modulation Techniques.
- Amplitude Shift Keying ASK and Frequency Shift Keying FSK.
- Binary Phase Shift Keying BPSK and Quadrature Phase Shift Keying QPSK.
- Understanding Data Rate And Baud Rate.

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Day 2

Earth Station Antenna

- Review of Earth Station Antenna types.
- SNG, Fly Away, On-the-Move, Maritime, and TVRO Antennas.
- Antenna Pointing and Tracking Mechanisms.

Day 3

Satellite Band Frequencies Analysis

- Utilization of small antennas in the Ku-band.
- Regulatory aspects: FCC, Intelsat, ITU antenna requirements, and EIRP density limitations.
- A comprehensive examination of satellite band frequencies.
- Exploring the electromagnetic and radio spectrums.
- Frequencies ranging from L-band 1-2 GHz to Ka-band 26-40 GHz.

Day 4

Modern Modulation and Communication Services

- Overview of modern modulation types in satellite communications.
- Protocol Suite Overview, emphasizing the TCP/IP protocol in computer networks.
- IP and Data Networks utilization in satellite technology.
- Introduction to IP Network Operation.

Day 5

Network Security and Access Technologies

- Understanding IP Telephony and Voice over IP VoIP.
- IP integration in Mobile Networks and IPv6 advancement.
- Domain Name System DNS and Dynamic Host Configuration Protocol DHCP.
- Signal System No. 7 SS7 Functions, Architecture, and the Message Transfer Part.
- Addressing security concerns and AAA protocols.
- Exploring Wireless LAN and other access technologies in satellite systems.

Enhancing Satellite Communication Networks with IP Strategies

In this module, we will explore incorporating network IP strategies into satellite communication systems. Upon completion, participants will understand how to leverage the TCP/IP protocol in satellite networks, ensuring network functionality and security optimization and enhancement. This will encompass studying IP networking architecture, subnetting tactics, and the role of network identifiers in IP addressing, all of which are critical components in modern satellite design and satellite technology courses.

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