

Telecommunication System Engineering

Telecom Engineering
Berlin (Germany)
03 - 14 Feb 2025

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Introduction

This course describes the basic concepts of key technologies prevalent in the telecommunication industry, authoritatively covering significant topics such as cellular radio, asynchronous transfer mode ATM, broadband technologies, and network management. It explores the future applications of telecommunications networks and the anticipated direction of the industry. This area is integral for anyone involved in telecommunications training or looking to understand the future of telecom.

Telecommunications Systems Course Objectives

- Understanding the basics of Telephony.
- Mastery of Switching in an Analog Environment, including analog switch principles.
- Introduction to Transmission for Telephony.
- Insights into the Design of Long-Distance Links.
- Comprehensive knowledge of Digital Transmission Systems and digital switch operations.
- Exploring Digital Switching and Networks.
- Grasping the Essentials of Introduction to Data Communications.
- A deep dive into Data Networks and telecom network frameworks.
- Expertise in Network Management.

Course Outlines of Telecommunication System

Day 1: Basic Telephony

- The Simple Telephone Connection.
- Sources and Sinks.
- Telephone Networks: Introductory Terminology.
- Essentials of Traffic Engineering.
- Basis of Network Configurations.
- Variations in Traffic Flow.
- Quality of Service.

Day 2: Switching in an Analog Environment

- Numbering, One Basis of Switching.
- Concentration and Expansion.
- Basic Switching Functions.
- Introductory Switching Concepts.
- Grading.
- The Crossbar Switch.

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- System Control.
- Telephone Traffic Measurement.
- Dial-Service Observation.

Day 3: Introduction to Transmission for Telephony

- Purpose and Scope.
- The Three Basic Impairments to Voice Channel Transmission.
- Two-Wire and Four-Wire Transmission.
- Multiplexing.
- Shaping of a Voice Channel and its Meaning in Noise Measurement Units.

Day 4: The Design of Long-Distance Links

- The Bearer.
- Introduction to Radio Transmission.
- Design Essentials for Line-of-Sight Microwave Systems.
- Satellite Communications.
- Fiber-Optic Communication Links.

Day 5: Digital Transmission Systems

- Digital versus Analog Transmission.
- Basis of Pulse-Code Modulation.
- Development of a Pulse-Code Modulation Signal.
- PCM Line Codes.
- Regenerative Repeaters.
- Signal-to-Gaussian-Noise Ratio on Pulse-Code Modulation Repeated Lines.
- PCM System Enhancements.
- Digital Loop Carrier.
- SONET and SDH.
- Summary of Advantages and Disadvantages of Digital Transmission.

Day 6: Digital Switching and Networks

- Advantages and Issues of PCM Switching Compared to Its Analog Counterpart.
- Approaches to PCM Switching.
- Digital Switching Concepts.
- The Digital Network.

Day 7: Introduction to Data Communications

- Removing Ambiguity—Binary Convention.
- Coding.
- Errors in Data Transmission.
- The DC Nature of Data Transmission.
- Binary Transmission and the Concept of Time.

A graphic of a chessboard with several chess pieces (a king, a pawn, and a knight) on it, set against a background of concentric circles. The text 'UK Training PARTNER' is overlaid on the right side of the board.

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- Data Interface—The Physical Layer.
- Digital Transmission on an Analog Channel.

Day 8-9: Data Networks

- Applications.
- Initial Design Considerations.
- Data Terminals, Workstations, PCs, and Servers.
- Network Topologies and Configurations.
- Overview of Data Switching.
- Packet Networks and Packet Switching.
- Interior Gateway Routing Protocol.
- Circuit Optimization.
- Data Network Operation.
- Protocols.
- X.25: A Packet-Switched Network Access.
- TCP/IP and Related Protocols.
- TCP/IP and Data-Link Layers.
- The IP Routing Function.
- The Transmission Control Protocol TCP.
- Brief Overview of Internet Protocol Version 6 IPV6.
- Virtual Private Networks VPNs.
- Specialized VPN Internet Protocols.
- Voice-Over IP.

Day 10: Network Management

- Fault, configuration, performance, security, and accounting Management.
- Survivability.
- Network Management from a PSTN Perspective.
- Network Management Systems in Enterprise Networks.
- Telecommunication Management Network TMN.

The Future of Telecom

This course covers the longstanding principles of analog and digital data transmission. It sets the stage for understanding the dynamic and evolving landscape of telecommunications. By examining current technologies and protocols like SONET, SDH, and TCP/IP, participants are well-prepared for the next wave of developments in the telecom industry.

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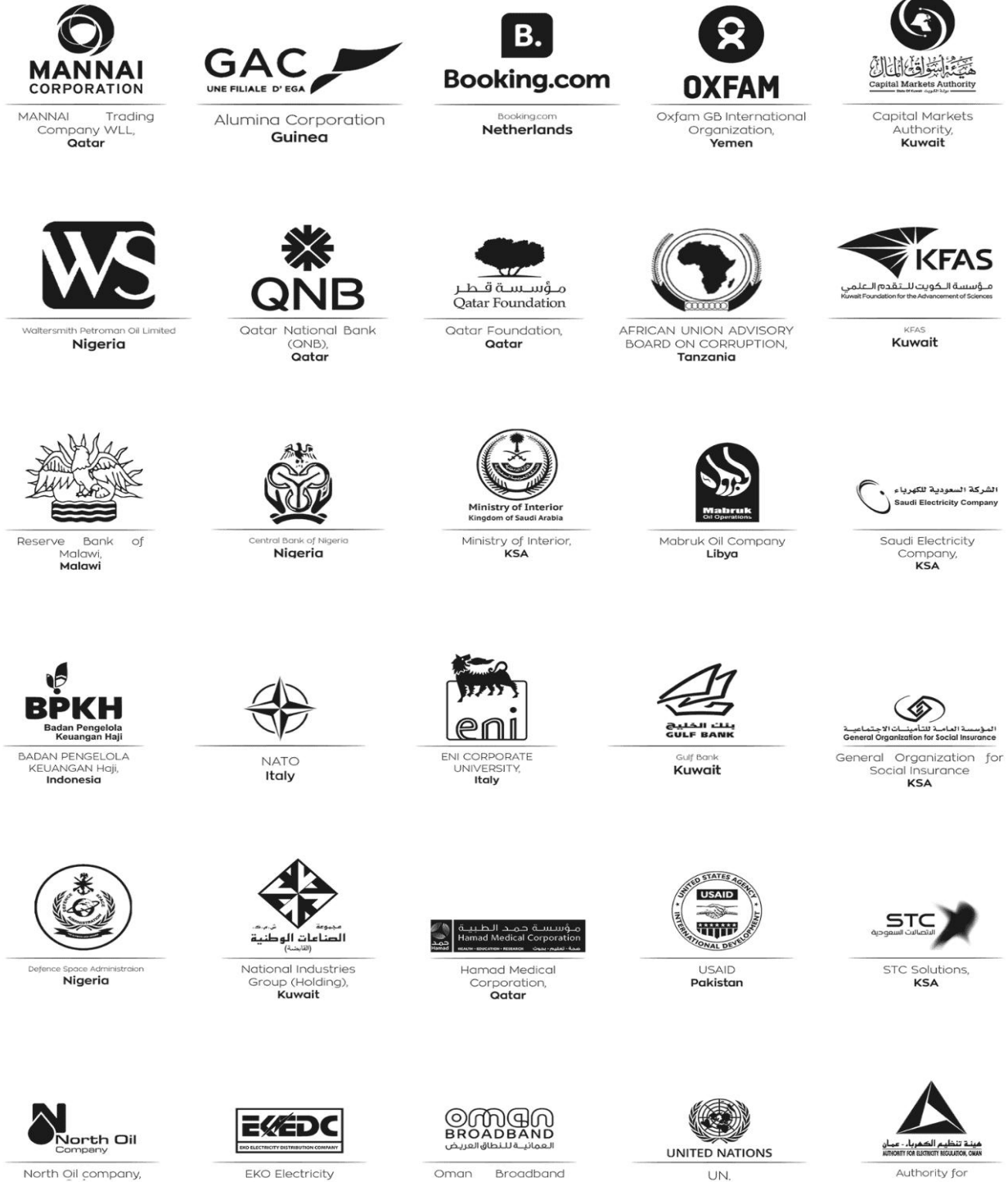
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training@blackbird-training.com



+44 7480 775526 / +44 7401 177335