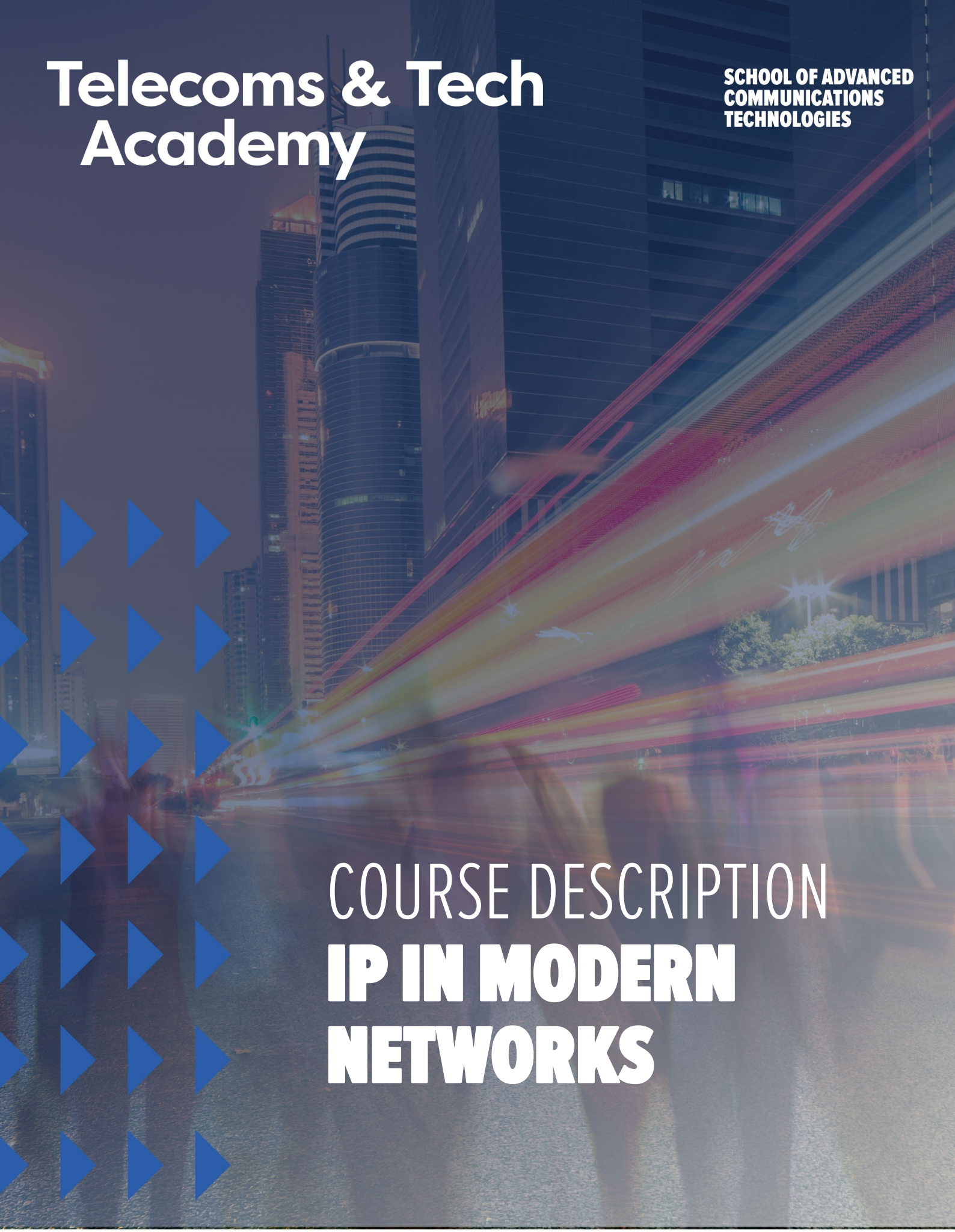
Telecoms & Tech Academy

SCHOOL OF ADVANCED COMMUNICATIONS TECHNOLOGIES



COURSE DESCRIPTION

IP IN MODERN NETWORKS

Format:
Classroom

Duration:
2 Days

KNect365 Learning
an informa business

COURSE SUMMARY

HIGHLIGHTS

- **Highly focused and in-depth training from the experts - including relevant updates from Ovum's extensive research team**
- **Trainers and programme directors that are experts, industry experienced, and highly accomplished training professionals**
- **Training outcomes and competency development designed to meet your specific requirements**

"Excellent presenters, very professional and experts in their fields"

FA, MTN

COURSE SUMMARY

This 2-day training course gives a clear understanding of IP technology and its use in modern data / telecommunication networks. The requirements for an effective IP Network are explored, followed by a detailed analysis of existing and emerging technologies and systems. The use of IP in both fixed and mobile networks (including GPRS and UMTS), IP applications, addressing, routing, Quality of Service, security, AAA and VoIP are all explained.

Concentrating primarily on the core network (elements, architecture, protocols and operation), access techniques are also examined in order to give the delegate a good overall view of the converging world of modern communications and the supporting technology. Demonstrations are used where appropriate to illustrate concepts and operation.

OUTCOMES & COMPETENCY DEVELOPMENT

Participants will develop or be able to:

- Contribute more effectively to technical discussions on IP infrastructure requirements and issues.
- Evaluate implementation options for transport networks and transmission
- Fully understand the security risks faced by modern IP based networks and identify steps to mitigate and minimise these risks.
- Develop solutions for various IP addressing mechanisms within the IP network
- A solid foundation in IP protocol suite structure and functions
- Confidence to distinguish the key differences between IPv4 and IPv6
- Discuss, with confidence, the types of applications that may be provided using IP technologies
- Identify three mechanisms for controlling the quality of services for specific applications
- Make decisions on technology implementation and procurement that are commercially viable.
- Minimise risk, and in line with the strategy and goals of the wider organization.
- Identify scenarios where standard AAA (Authentication, Authorisation, and Accounting) techniques may / should be used to facilitate a data service

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telecomstechacademy.com

Book over the phone
+44 (0)20 7017 4144

Book via email
training@telecomstechacademy.com

COURSE CONTENTS

PROTOCOL SUITE OVERVIEW

- The "TCP/IP" Protocol Stack
- The IPv4 Datagram
- IP Addressing and Routing - Basics
- Transmission Control Protocol (TCP)
- User Datagram Protocol (UDP)
- Point to Point Protocol (PPP), and Serial Line IP (SLIP)
- Domain Name Service (DNS)
- Address Resolution Protocol (ARP)
- Management Protocols
- Applications for IP technology
- Quality of Service - Basics
- Standardisation

IP AND DATA NETWORKS

- Enterprise Applications
- The Local Area Network (LAN)
    - Architectures
    - Technology Choices
    - Routers
    - Bridges
    - Repeaters
- Wide and Metropolitan Area Networks (WANs & MANs)
    - Principles
    - Technology Choices
- The Internet
- The Architecture
    - Limitations
    - Quality Issues
    - Secure Paths
- Transport Technologies
    - Ethernet
    - ATM
    - Frame Relay
    - PDH
    - SDH
    - Optical / DWDM
- Virtual Private Networks

IP NETWORK OPERATION

- IP Addressing
    - IP Version 4 Address Limitations
    - Network Address Translation
- DNS and ARP
- Routing Protocols
    - Overview
    - Dynamic Routing
    - Distance Vector Routing
    - Open Shortest Path First (OSPF)
    - Other Routing Protocols
    - Tunneling
- TCP and Congestion Control
- QoS Requirements
- Content and Media Types
- QoS Mechanisms in:
    - ATM
    - MPLS
    - DiffServ (Differentiated Services)
    - IntServ (Integrated Services)
    - Resource Reservation Protocol (RSVP)
- IP Version 6
    - The IPv6 Header
    - Header Fields Explained
    - Traffic Classes
    - Source and Destination Addressing
- IPv4 to IPv6 – Making the Transition
    - Dual IP Layers
    - Tunneling

IP TELEPHONY AND VOIP

- Softswitch Principles
- The Media Gateway
- VoIP Call Control
- Real-Time Transport Protocol (RTP)
- Real-Time Control Protocol (RTCP)
- Session Description Protocol (SDP)
- MEGACO and Media Gateway Control
- Bearer-Independent Call Control (BICC)
- Signalling over IP
    - SS7 and IP
    - SIGTRAN Protocols
    - MTP3 User Adaptation Layer (M3UA)
    - Stream Control Transport Protocol (SCTP)

IP IN THE MOBILE NETWORK

- The Requirements
- Mobile Networks and IP Evolution
- The General Packet Radio Service
- The GPRS Core Network
    - Network Architecture and Network Elements
    - GPRS Support Nodes
    - The GPRS Context
    - Servers (DHCP/Radius)
- GPRS Access
- Best Effort Services
- Advanced Services
    - Streaming / Advanced Media Support
- Quality of Service in GPRS – DiffServ, IntServ, RSVP
- Use of E.164 numbering & ENUM Protocol
- Evolution to 3G UMTS
- The IP Multimedia Subsystem (IMS)
    - IMS Architecture
    - Session Initiation Protocol (SIP)
    - SIP and SDP Messages
    - Provision of QoS
    - IMS Call Signalling Examples
    - SIP and Quality of Service Issues
- Push to Talk over Cellular (PoC)
- IP in the Radio Access Network
    - Support for IPv6
    - Header Compression
    - IP on the RAN interfaces
    - Quality of Service in Radio Access Networks
    - Use of ATM in the Radio access Network
- Integrating Wireless LAN into the Network

COURSE CONTENTS

SECURITY AND AAA

- Security Considerations
- Types of Network Attacks
- Transport Layer Security (TLS)
- Wireless Transport Layer Security (WTLS)
- IPSec (IP Security)
- Secure Connections and Virtual Private Networks
- Internet Key Exchange (IKE)
- Public Key Infrastructure (PKI)
- Radius (Authentication, Authentication & Accounting)
- Diameter AAA
- Managing the Network

WIRELESS LAN AND OTHER ACCESS TECHNOLOGIES

- Fixed Network Access
    - Dial-Up Connections
    - Broadband Connections
- Wireless LAN access
    - Requirements for Wireless Systems
    - Wireless LAN Standards (802.11b, 802.11a and 802.11g)
    - The Protocol Stack
    - WLAN PC Cards
    - Wireless Access Points
    - Broadband Access for Fixed Networks
    - Network Architecture
        - Public Wireless LANs
        - Private Wireless LANs
- The use of Virtual Private Networks (VPNs)
- Wireless LAN Radio principles
- Wireless LANs and Mobile Networks
- 802.11 Security Mechanisms
    - Wired Equivalent Privacy (WEP)
    - Wireless Protected Access (WPA)
    - 802.1x / Extensible Authentication Protocol (EAP)
    - 802.11i / Robust Security Network (RSN)
    - WiMAX – the emerging 802.16 Standard)
- IP and: Bluetooth; Home RF; ZigBee; HiperLAN and HiperLAN

OUR TRAINING SERVICES

TELECOMS & TECH ACADEMY STRUCTURE

Our training programmes are delivered worldwide as part of the training and development plans of many operators, vendors, and service providers. The programmes cover a wide range of competency development requirements.

To ensure we meet the training needs of the industry as effectively as possible, we operate three schools:

School of Telecoms & Tech Business
Business training tailored to the telecoms industry, ranging from the intensive 5-day Telecoms Mini MBA to specialist leadership and marketing training.

School of Advanced Communication Technologies
Covering a multitude of technologies, these courses range from overviews aimed at nontechnical staff to in-depth engineering training.

Distance Leaning
Our comprehensive suite of Distance Learning programmes provide an excellent opportunity to expand knowledge and build confidence.

OUR TRAINERS

We only use trainers and programme directors that satisfy the following three criteria:

- Experts in their field
- High level of Industry Experience
- Expert facilitators and training professionals.

All our trainers have undergone a rigorous election process and are subject to continuous monitoring and evaluation. Each trainer is accredited for specific courses or topic areas. Whether engineers or business experts, all our trainers are required to continue their own development within their specialist areas, and to broaden their Industry view of trends, best practice and technology.

This is achieved by our on-going work with many tier 1 operators and vendors, and by full exposure to Ovum research and KNect 365 TMT worldwide events.

UNIVERSITY ACCREDITATION

Some of our programmes have been accredited by the University of Derby Corporate; a UK-based university highly acclaimed in the area of employer engagement. They are at the forefront of the drive to integrate highly focused industry -led training with the academic rigor and quality control of university-based education. Our comprehensive Advanced Telecoms Management Series have been accredited Post-Graduate Level, with our extensive suite of Distance Learning at Undergraduate Level)

We would be happy to discuss extending accreditation to tailored ATMS or programmes based on our Distance Learning modules. Although accreditation is specific to these programmes, the work we do with the University of Derby enable us to develop and apply best practice across our portfolio.

CUSTOMISED IN-HOUSE TRAINING

Telecoms & Tech Academy has worked with countless companies to deliver customised training programmes. We take time to understand your requirements, you'll work with our specialist training team to ensure that we deliver your perfect training programme for your business.

A customised training programme from Telecoms & Tech Academy ensures you get a course that precisely matches your organisation's needs, presented by a first-rate training organisation, with access to all the latest industry research and analysis.

WHY CHOOSE IN-HOUSE TRAINING FROM TELECOMS & TECH ACADEMY?

- Content can be customised to focus on the issues you want – work with us to develop the training course to match the exact needs.
- Unique industry research – from Ovum's team of industry leading analysts
- Expert trainers – our team of versatile trainers have the knowledge and experience to deliver a highly effective learning experience
- The most efficient way to train your staff – at the time and location to minimise disruption
- Flexible delivery options – with a range of instructor led, distance learning and virtual classroom formats available you can build a blended solution to maximise training effectiveness over the long term
- Pre and post course assessment – can be included in programmes to measure competencies and check on the required progress.

Contact us to discuss how we can build your perfect programme.

www.telecomstechacademy.com

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