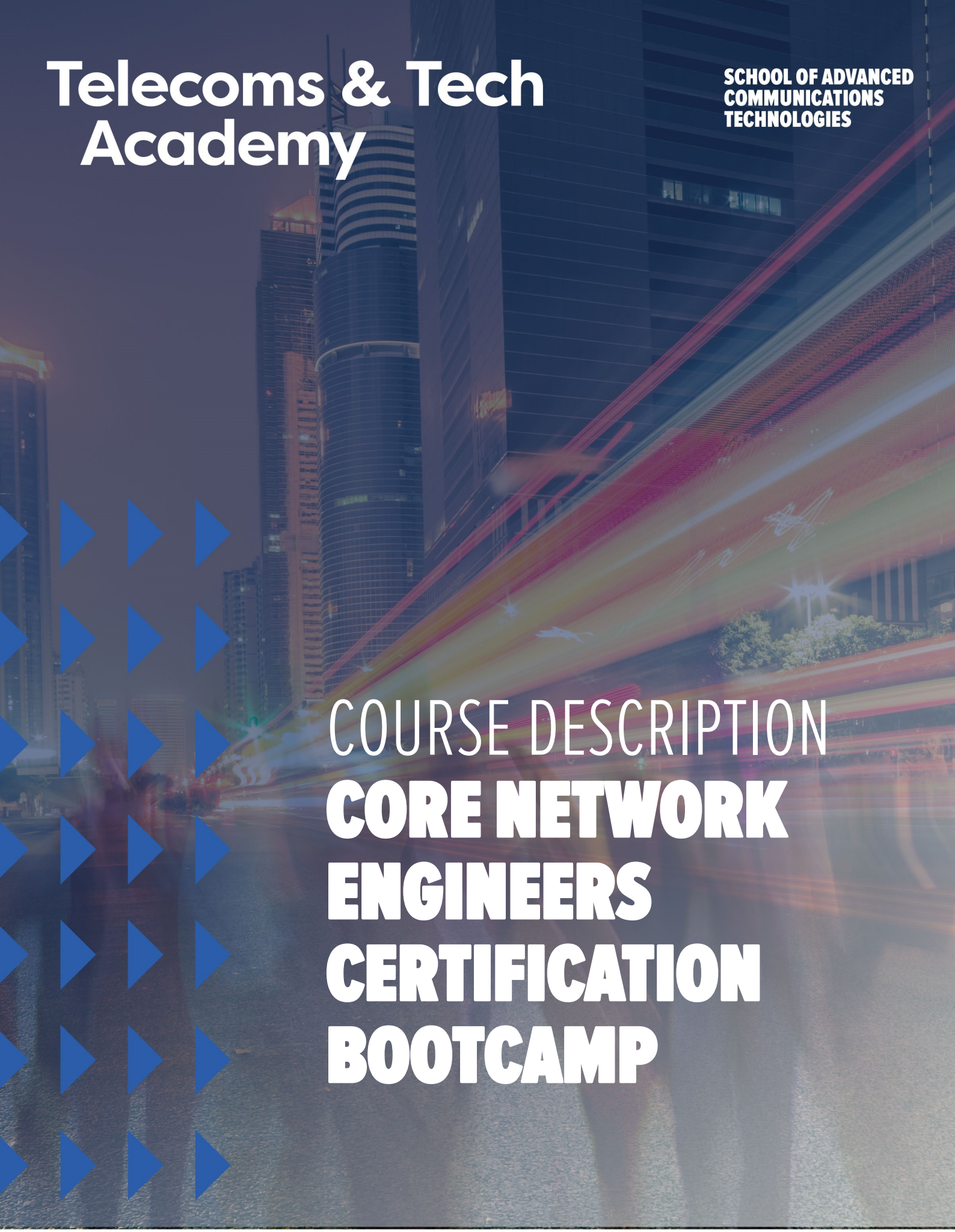
Telecoms & Tech Academy

SCHOOL OF ADVANCED COMMUNICATIONS TECHNOLOGIES



COURSE DESCRIPTION

CORE NETWORK ENGINEERS CERTIFICATION BOOTCAMP

Format:
Face-Face or Live-on -Web

Duration:
5 Days or 10 x 3 Hours

KNect365 Learning
an informa business

COURSE SUMMARY

HIGHLIGHTS

- **Highly focused engineering training from the experts - bringing network engineers fully up to date on latest technologies and implementation**
- **Includes updates from Informa's extensive research team**
- **Trainers and programme directors that are technical experts, industry experienced, and highly accomplished training professionals**
- **Competency development that meets specific needs of engineers & technical managers**

"The course was very insightful and the lessons learnt from the course will be very relevant to the telecoms industry

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COURSE SUMMARY

This programme is ideal for engineers and technical managers focusing on the core network that need a deep understanding of the current network, as well as a clear technical vision of the IP-based multi-media core network being specified, developed and implemented by the Industry (including the Evolved Packet Core - EPC). It is suitable for technical professionals working for operators, vendors or solutions providers. It focuses squarely on the issues affecting professionals working with the core network and those in related job roles, and delivers the knowledge and competencies needed for the individual and their organisation to be as effective as possible.

The programme steps through a range of topics that enable individuals to better evaluate, plan, innovate, and de-risk both technology choices and operations - and ensure their organisation can build value as effectively and efficiently as possible. The programme reviews current technology in order to set the context for in-depth discussion and evaluation of the emerging core network technologies, and implementation options. The topics then include major issues affecting operators, including optimising the IP-based architecture, meeting increasing capacity requirements, IP-based signalling and control, policy control, security, quality of service (QoS) implementation, the integration of femtocells and WiFi into a single core network, service delivery and the IMS, third-party services, roaming, interconnection, and vendor selection.

Participants will finish the programme much better equipped to excel in their roles, and will gain the confidence to deliver the technology foundation on which their business can be developed.

OUTCOMES & COMPETENCY DEVELOPMENT

Participants will develop or be able to:

- Contribute much more effectively to decisions and discussions centred around core network technology and technical implementation
- Fully understand the requirements and likely technology scenarios of future IP-based Core Networks, including the integration of different access solutions into a common core
- Evaluate more rigorously the implementation options for emerging Core Network architectures and solutions
- Plan technology solutions that will fully meet the needs of their organisation in the short, medium and long term.
- Develop solutions in a more structured and informed manner, helping to de-risk investment choices whilst delivering technical solutions that can underpin future business development
- A solid foundation of knowledge and competencies, enabling innovative thinking and the confidence to develop and implement ideas
- Make decisions on technology implementation and procurement that are commercially viable, minimise risk, and in line with the strategy of the organization

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

Book via email
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COURSE CONTENTS

DAY 1

WELCOME AND INTRODUCTION TO THE CERTIFICATION EXERCISE

The first session is used to outline the programme, objectives and certification process, including the exercise that runs throughout the 5-Day programme.

CORE NETWORK ARCHITECTURE AND PROTOCOLS

- 3GPP Release History
- The Operational Network
- The Circuit Switched Domain
- Core Network Databases
- Core Network Interfaces & Protocols
- Circuit to Packet Switching
- Control & Protocol Evolution
    - Signaling System No 7 (SS7)
    - SIGTRAN
    - Session Initiated Protocol (SIP)
- Transmission in the Core Network
- Transport Requirements & Protocols
    - Dense Wave Division Multiplexing (DWDM)
    - Plesiochronous Digital Hierarchy (PDH)
    - Synchronous Dig9idal Hierarchy (SDH)

IP-BASED NETWORKS

- The Internet
- The world data explosion & rapid growth
- IP Principles
- IPv4
    - Address Format
    - Class Format
    - Limitations
    - The principles of Sub netting
- IPv6
    - Representation
    - Format
- IPv4 & IPv6 Interworking
- The principles of static routing and link state routing
- Quality of Service Mechanisms
    - IntServ
    - DiffServ
    - RSVP
    - MPLS

CERTIFICATION EXERCISE

This first exercise session focuses on overall core network requirements and in particular in defining the performance and service support requirements of an advanced core network

DAY 2

IP IN THE NEXT GENERATION TELECOMS CORE NETWORK

- The Next Generation Network (NGN)
    - Architecture
    - Service Advantages
    - Technology
- IP in the Next Generation Network
- Mobile Networks & IP Evolution
- Next Generation Network Protocols
    - IPv4
    - IPv6
    - GPRS Tunneling Protocol (GTP)
    - Stream Control Transmission Protocol (SCTP)
    - H.323
    - Session Initiated Protocol (SIP)
    - Real-time Transport Protocol (RTP)
    - RTP Control Protocol (RTCP)
    - Diameter
- Quality of Service Mechanisms
- The GPRS Core Network

THE EVOLVED PACKET CORE (EPC)

- Towards All IP Networks
- Introduction to SAE and the EPC
- Towards the all-IP network - Upgrade paths to LTE & LTE terminology
- Evolution to 3GPP Release 10
- The Evolved Packet Core (EPC)
    - Architecture & Element Functionality
    - Interfaces
    - Reference Points
    - Protocols
- EPS Bearers & Bearer Types
- QoS Mechanisms
- Interworking Mechanisms
    - Interoperability
    - Interworking with 2 & 3G Access
    - Trusted and non-trusted 3GPP accesses
- EPC Procedures
- EPC & the IP Multimedia Subsystem

CERTIFICATION EXERCISE

This session is used to analyze the implementation options for the Next Generation Fixed Network and Evolved Packet Core, including migration issues and time lines.

DAY 3

SERVICE DELIVERY IN THE ADVANCED CORE NNETWORK AND EVOLVED PACKET CORE

- Service Delivery Concepts & Domains
- The Telecoms Value Chain
- Categories of Service
    - Applications
    - Teleservices
    - Bearer Services
    - Supplementary Services
    - Value Added Services
- Third Party/Over the Top (OTT) Services
- Media Content & Service Delivery
    - Music
    - Applications
    - Games
    - Images
    - Video
- Connected TV Service Delivery
- Service Provision & Intelligent Networks
- IMS in the Advanced Core Network
- Service Provision in the EPC & LTE

COURSE CONTENTS

ADVANCED BILLING FOR NEXT GENERATION NETWORKS

- A Next Generation Billing Outline
- Next-Generation Billing strategies & why operators need to adopt them
- Trends & forecasts driving change
- Legacy billing system issues
- The characteristics & advantages of Next-Generation Billing systems
- Online & Offline charging features & procedures
- Policy Control and Charging (PCC)
- Revenue Assurance
- Customer Data & Real Time Billing
- Stages in transiting from legacy billing systems to Next-Generation Billing systems
- Converged Billing
- The eTOM system, with specific reference to billing

POLICY AND CHARGING CONTROL

- What PCC is, and why it is increasingly necessary for operators to adopt it
- How PCC differs from traditional billing systems
- The offline and online charging functionalities
- The importance of the service data flow and how it is applied in PCC, with some SDF charging flow examples
- The importance of PCC rules and how they are used
- What we mean by the term 'policy control'
- The functions of each element and reference point that comprises the PCC architecture
- 'Policy 2' and evolution towards the Sy interface
- Roaming and PCC
- Credit control and credit management triggers
- The purpose of the 'Termination' action
- IP Connectivity Access Networks
- Example message flows showing bearer establishment, bearer termination and bearer modification

CERTIFICATION EXERCISE

Service delivery is now brought into the exercise plan, with a focus on effective and efficient service delivery architectures and mechanisms that maximise competitive advantage and delivers the required capacity, flexibility and control.

DAY 4

CORE NETWORK TRAFFIC PLANNING PROCESSES

- Network Planning Processes
  - Requirements Analysis
  - Network Planning Inputs and Outputs
- Network Planning Work Packages
  - Traffic Planning
  - Security Solutions
  - Migration and Expansion Planning
  - Core Network Architecture Solutions
  - Signaling Solutions
  - Interconnection Planning Requirements
  - Transport and Transmission Solutions
  - Audits and Verification Processes
- Traffic Planning
  - Overview of the Traffic Planning Process
  - Traffic Modeling and Analysis
  - Network Traffic Modelling and Forecasting
  - Traffic Distribution / Dispersion
- Transport Plane Planning Process
  - Inputs and Outputs to Planning
  - Interconnection Planning
  - Solutions - IP/TDM/ATM and VoIP
  - Transport Principles
  - Cross Connections
- Control Plane Design (Signaling)
  - Overview of the Traffic Signaling Design
  - Signaling Interfaces
  - SS7 / SIGTRAN / IP Requirements
  - Signaling Network Architectures
  - Performance Requirements
  - Redundancy and Reliability
  - Signalling Volume Calculations
- Network Traffic Theory
  - Traffic Types - Signaling and Service
  - Traffic Formulas
  - Erlang Descriptions
  - Busy Call Hours Calculations
  - Traffic Intensity

IP CAPACITY PLANNING & NODE DIMENSIONING

- IP Link Capacity and Planning
  - IP User Data Session
  - Offered Traffic and Carried Traffic
  - Dimensioning Based on Offered IP Traffic
  - Dimensioning Parameters for Packet Switched Domain
  - Dimension Node Input Parameters in IP PS Domain
  - Number of GPRS Support Nodes Based on SAU
  - Number of GSNs Based on PDP
  - Dual SGSN Pool Service Area
  - SGSN Pool
  - Network Topology Plan
  - GSN Capacity Overview
  - Topology Subscription Distribution
  - PS Subscriber Information for UMTS
  - PS Subscriber Information for GSM/GPRS
  - Total IP PS Traffic in MBPS
- Processor Capacity
  - Processor Load Definitions
  - Distributed Traffic Loads
  - Dimensioning Capacity
  - Engineering Capacity
- Node Dimensioning
  - Network Design Activities
  - Service Deliverables
  - Delivery Process
  - Design Considerations
  - Backbone Connectivity
  - Requirements and Assumptions
  - Logical Network Design
  - Physical Network Design

COURSE CONTENTS

CERTIFICATION EXERCISE

Accurate capacity planning and sizing of the network is essential in order to maximise efficiency, scalability and flexibility. This session provides an opportunity to explore these concepts more thoroughly as part of the certification exercise.

DAY 5

STRATEGIES FOR MIGRATION FROM LEGACY ARCHITECTURES

This session provides an opportunity to discuss the Certification Exercise topics (see below) in more detail - bringing the various elements together so they can be developed into a comprehensive and holistic plan.

FINAL CERTIFICATION EXERCISE ASSESSMENT

This is the final assessment in which participants are asked to undertake a comprehensive exercise that consolidates and applies all the major competencies required of a certified Core Network Engineer

- Core Network Principles and Evolution
- Architecture Planning—Traffic / Signalling / IP Elements
- Detailed Network Design Requirements
    - Redundancy
    - Risk
    - Efficiency
    - Cost Effective
    - Future Proofing
    - Service Platforms / Support
- Transport and Transmission
- Cost Analysis

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 Management
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.

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