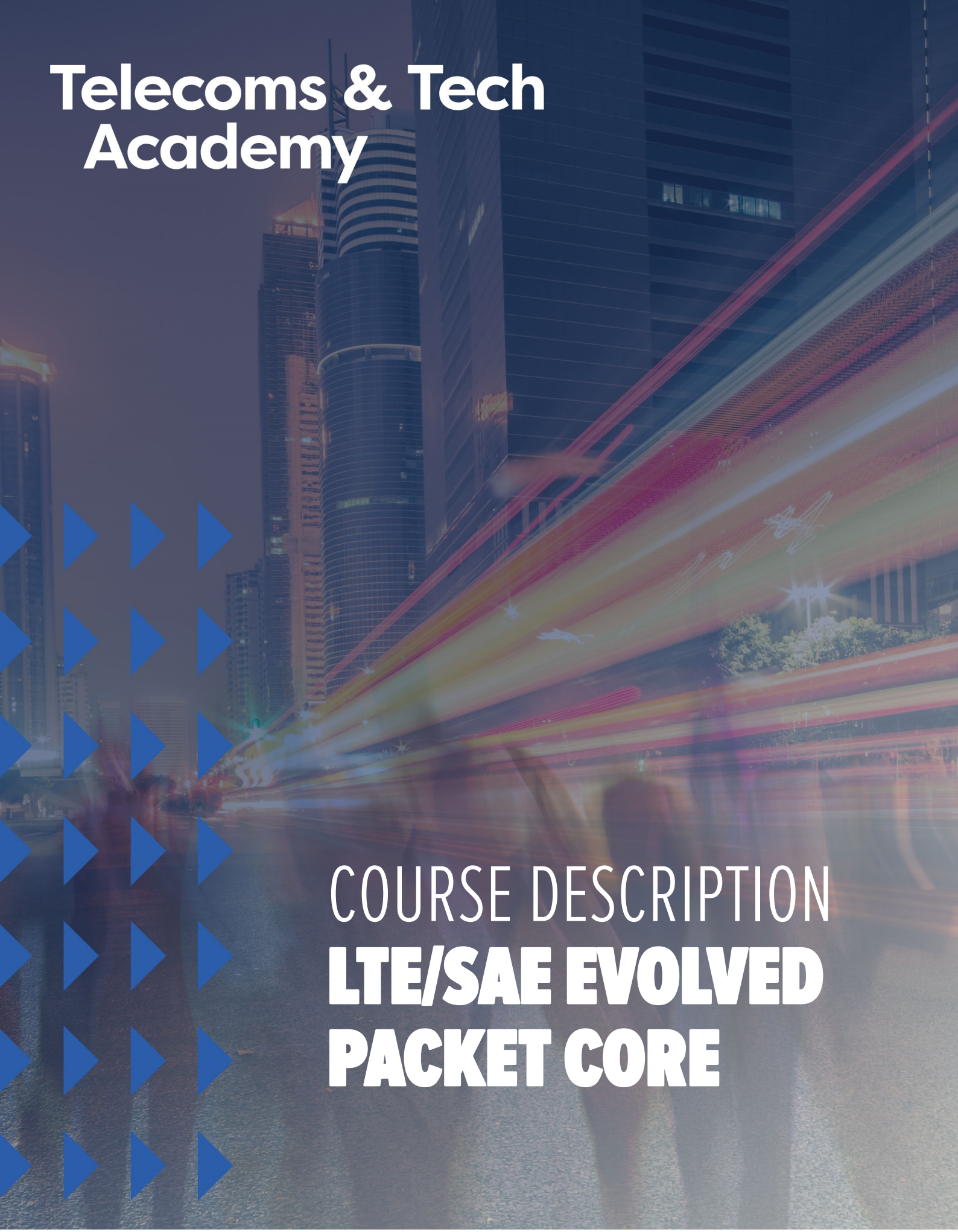
Telecoms & Tech Academy



COURSE DESCRIPTION
LTE/SAE EVOLVED PACKET CORE

Format:
Classroom

Duration:
3 Days

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COURSE SUMMARY

HIGHLIGHTS

- **Highly focused and in-depth training from the experts - including relevant updates from Informa'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**

"Very useful and much related to my job!

LA, ZAIN

COURSE SUMMARY

This course describes, in detail, the architecture of the LTE/SAE Evolved Packet Core (EPC) network which is an essential component of next generation mobile networks. The overall requirements of the LTE/SAE proposals are examined along with the relationship with the existing components within a mobile network, this is developed into a description of the key interfaces and the protocols deployed.

A detailed analysis of the LTE/SAE architectural functionality is provided along with a description of the architectural reference points and protocols including the SGW, PGW, PCRF and interfaces, S1, S5, S6, S11 as well as a detailed look at the interactions between the IMS and EPC.

The importance of Policy Control and Charging is studied with a description of the PCRF and functions it provides in respect of managing user connections. VoLTE, SIP and the IMS will also be explained, outlining the concepts of VoLTE and the network requirements to support voice and voice based services.

VoLTE SIP signalling examples will be described, giving a global view of the end to end procedures for typical VoLTE events

OUTCOMES & COMPETENCY DEVELOPMENT

Participants will develop or be able to:

- Relate theoretical diagrams of the SAE/EPC with practical implementations.
- Detailed understanding of each network node, eNB, MME SGW
- Be fully conversant with the EPC interfaces and protocol sets.
- Be able to describe the detailed relationship between core network nodes.
- Understand and explain the S1_U and S1_MME interface and describe the protocol stacks for each interface.
- Follow detailed procedures and appreciate the function of each interface for various scenarios such as, Registration, Bearer Functions, Handover, QoS Modifications.
- Describe the protocols used on the EPC interfaces S1, S5, S11, S6, S3 and S4
- Use message flow diagrams to explain the operation of the networks nodes for various scenarios
- Use the theoretical knowledge gained to follow real network protocol captures.
- Confidence to 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.

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COURSE CONTENTS

EVOLUTION OF LTE

- Evolution of Mobile Broadband
- LTE Capabilities and Services
- Comparison of Mobile Broadband
- LTE Market Analysis
- Review of LTE market players and activities

EPC ARCHITECTURE

- Introduction to the Evolved Packet Core (EPC)
- MME Functions
    - Admission Control
    - Session Control
    - Mobility Management
    - S11 Reference Point
    - GTP-Control
- Gateway Functions in the EPC
- SGW Functions
    - Bearer Establishment
    - GTP on the S1 and S5
    - Handover Control
- PGW Functions
    - IP Address Allocation
    - Service Control
    - EPS Bearers and QCI
- Policy Control Functions
    - PCRF Functions and Architecture
    - PCC Rules
- Charging Requirements and Functionality
    - Online and Offline Charging
- SGW – PGW Options
- S1-Flex
- Pooling
- Roaming in LTE
- Trusted and Non-Trusted Architectures

S1 INTERFACE

- S1 Control Plane (S1AP)
- S1 Context Management/Setup/ Modification
- S1 Paging and Mobility Functions
- S1 Signalling Procedures
    - Paging procedure
    - UE Context Release procedure
    - Initial Context Setup procedure
    - UE Context Modification procedure
- E-RAB signalling procedures
    - E-RAB Setup procedure
    - E-RAB Modification procedure
    - E-RAB Release procedure
- Handover signalling procedures
    - Handover Preparation procedure
    - Handover Resource Allocation procedure
    - Handover Notification procedure
    - Handover Cancellation
- Path Switch procedure
- NAS transport procedures
- S1 Setup procedure
- eNB Configuration Update procedure
- Location Reporting procedures

X2 INTERFACE

- Interference Coordination Concepts
- X2 Control Plane (X2AP)
- X2 Messages
    - X2 Control Plane Procedures
- Handover Preparation procedure
- Handover Cancel procedure
- UE Context Release procedure
- SN Status Transfer procedure
- Error Indication procedure
- Load Indication procedure
    - X2 Setup procedure
- X2 Setup/Load Indication
- X2 User Plane
    - X2_U Operation

CHARGING AND POLICY CONTROL

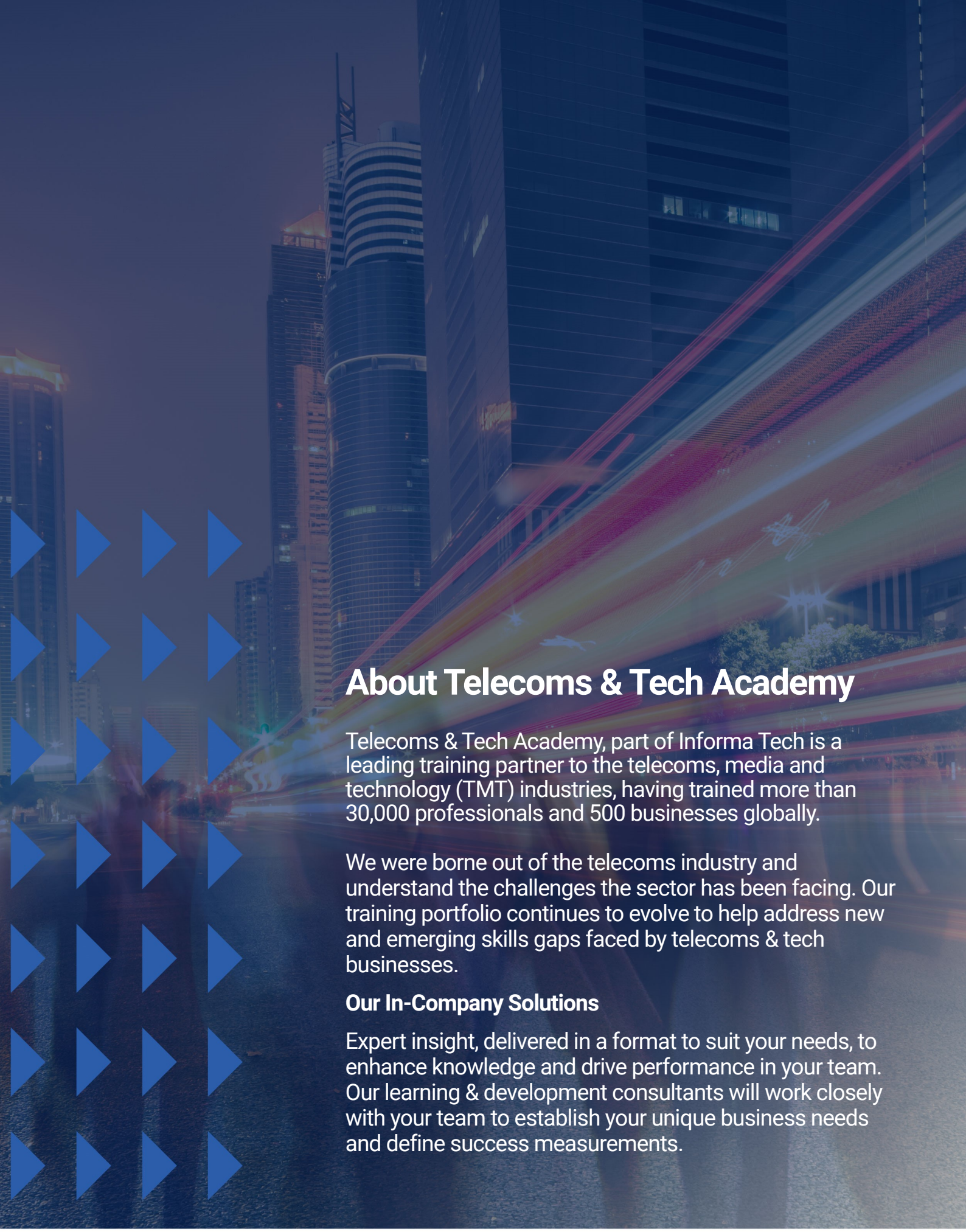
- Review of the high-level billing architecture
- Charging models and requirements
- 3GPP specifications relating to charging
- Online and offline charging functions
- Credit management triggers
- Termination actions
- Flow-based charging concept and SDF charging examples
- Charging rules
- Gating and QoS control
- SDF detection
- Bearer service establishment, modification and termination procedures (online and offline)
- The IMS and charging

IMS AND VOLTE

- IMS Elements, Interfaces and Protocols
- LTE Bearers for VoLTE
    - QoS and Scheduling
- LTE and IMS Identities
- SIP Basics
- VoLTE Call Procedures Overview
- VoLTE and Mobility
- CS Fallback
    - Text
    - Fallback Principles
    - Fallback Architectural Requirements
    - Fallback to GSM
    - Fallback to UMTS
- Voice Call Continuity
    - SR-VCC Concepts
    - SR-VCC Architecture
    - SR_VCC Signalling

GLOBAL PROCEDURES FOR LTE

- Mobility Management
- LTE UE State management
- Registration Procedures
- UE Network Discovery
- System Information
- Access and Registration
- Cell Selection and Reselection
- Session Establishment and Control
- Session Management Protocol
- Bearer Establishment and Control
- Interworking with 3GPP Networks
- LTE – UMTS Handovers
- Bearer Switch during handover
- Interworking with External Networks
- Negotiating and Controlling QoS
- Support of non-3GPP Access



About Telecoms & Tech Academy

Telecoms & Tech Academy, part of Informa Tech is a leading training partner to the telecoms, media and technology (TMT) industries, having trained more than 30,000 professionals and 500 businesses globally.

We were borne out of the telecoms industry and understand the challenges the sector has been facing. Our training portfolio continues to evolve to help address new and emerging skills gaps faced by telecoms & tech businesses.

Our In-Company Solutions

Expert insight, delivered in a format to suit your needs, to enhance knowledge and drive performance in your team. Our learning & development consultants will work closely with your team to establish your unique business needs and define success measurements.