

# Core networks in 5G

## Unidad 1: Introducción

- Funcionalidad de la red core
- Core en redes 2G/3G
- Core en 4G: EPS (Evolved Packet System)
  - EPS introduction.
  - EPS terminology.
  - Interconnection with heterogeneous Access networks.
  - EPS architecture.
  - Mobility management.
  - Network connection
  - Handoffs.
  - Connection scenarios.
  - Roaming.
- Procedimientos de señalización en LTE

## Unidad 2: Arquitectura lógica en 5G Core

- Requirements of the 5G core
- Deployment options
- 5G Architecture
- Non-roaming reference architecture
- Roaming architecture
- Data storage architecture
- Service Based Interfaces and Reference points
- Support for non-3GPP access.
- SMS over NAS
- Charging Architecture
- Network Functions

## Unidad 3: Conceptos de 5G Avanzados

- Registration Management states
- Connection Management states
- User Plane Management
- UE reachability management
- Identifiers (SUPI, SUCI, PEI, DNN, GPSI, 5G GUTI, AMF Name, Internal Group Identifier)
- Principles of Discovery and Selection

- Control plane and user plane protocol stacks.

#### **Unidad 4: Network Slicing**

- General aspects of Network Slicing
- 4G: Precursors of Network Slicing: DÉCOR and eDECOR
- 5G: Challenges of Network Slicing
- Identification and selection of a Network Slice
- Role of Network Functions and NG-RAN in Network Slice selection
- Signaling flows: UE registration; PDU Session establishment
- Roaming support
- Interworking with EPS
- Advanced concepts

#### **Unidad 5: Registration Management Procedures**

- General registration
- Registration with AMF re-allocation
- Deregistration
- Service Request Procedures
- UE-initiated service request
- Network-initiated service request

#### **Unidad 6: 5G Session Management Procedures**

- Overview
- PDU Session establishment
- PDU Session modification
- PDU Session release
- Session and service continuity
- UPF SMF interaction

#### **Unidad 7: 5G QoS Model**

- QoS Model overview and concepts
- 5G QoS characteristics
- QoS Profile
- QoS Rules
- Packet Detection Rules
- Reflective QoS
- Signaling flows
- Role of SMF, UPF, AN, and UE

#### **Unidad 8: Policy Control**

- Introduction: conceptual policy control model
- 5G Policy architecture

- Non-session management related policy control
- Session based management related policy control
- Policy and charging control rule
- Charging control
- Procedures and flows for Policy framework.

## **Unidad 9: External Exposure of Network Capabilities**

- Concepts
- 4G: SCEF
- 5G: NEF
- 3GPP Release 15 network exposure services
  - Monitoring events (event exposure)
  - Packet flow descriptor management
  - External parameter provision
  - Background data transfer policy negotiation
  - AF influence on traffic routing
  - Application trigger
  - Set chargeable party
  - AF session with QoS
- Common API framework

## **Unidad 10: Network Data Analytics**

- Background, architecture, and concepts
- Basic procedures
- A review of the NWDAF Analytic services
  - Slice load level
  - Observed service experience
  - NF Load
  - NF Performance
  - UE Mobility
  - UE Communication
  - Abnormal behavior
  - User data congestion
  - Potential QoS change

## **Unidad 11: Orquestación y gestion de network slices**

- Logical Architecture
- Software Architecture
- Roles and models
- Management Functions
- Orchestration Architecture
- Network Slicing examples and use cases