ENG-510 - Réseaux mobiles 4G



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Description

Driven by the user demand for increasingly complex applications built on data intensive platforms. 4G LTE was developed to augment the data handling capabilities of 3G UMTS. 3GPP (3rd Generation Project Partnership - the mobile industry's standards body) identified the requirements and built the standards which constitute the foundation for today's 4G LTE networks.

This 2-day course concentrates on the cellular deployment of the 4G LTE platform at a conceptual high level, delving into topics such as the LTE system sub-architecture of radio access and core network, the handling and mobility aspects of todays' services provided over LTE, including end-to-end QoS and security. It also discusses the aspect of spectral efficiency achieved through the application of the developed standards.

Learning Outcomes

Upon completion of the course, participants will be able to:

- Explain what LTE (Long Term Evolution) and EPC (Evolved Packet Core) really are
- Describe LTE standardization and the role of 3GPP
- Discuss LTE services and business environment
- Compare and contrast evolving service functionalities enabled by 4G LTE List LTE and EPC terminology, services and features
- Describe how mobility and hand-over enhancements work over earlier platforms
- Explain how spectral efficiency is achieved in the 4G LTE environment
- Appreciate the struggle to allow low bandwidth applications, such as voice to utilize the 4G LTE platform

Topics

MODULE 1:

- Introduction
- 4G current market overview
    - Services
    - 4G ecosystem and its stakeholders – manufacturers, vendors, operators, standards bodies, consumers
- 3GPP Standard Body and its involvement in the development of 4G LTE Standards and determination of:
    - 4G requirements
    - 4G technology expectations
    - 4G protocol stack - user plane and control plane
- All IP – what does it mean?
- LTE discovery of high bandwidth UEs in proximity
- 4G LTE Architecture and comparison to earlier platforms
    - Radio Access Network
    - Core Network
    - Roaming architecture

- User Equipment (UE)

- Interface capabilities with other wireless platforms
  - Cellular, including 3G and 2G
  - Fixed wireline, including WiMAX and WiFi

- Cellular design concepts in 4G
- Cell configurations from small cells (femto, pico, micro) to macro cell sites
- Deployment issues

MODULE 2:

- Radio Access Network in 4G
- Frequency Utilization and Spectrum Management in 4G
- Multipath propagation issues
- Spectral Efficiency in 4G
  - MIMO (Multiple Input/Multiple Output)
  - Dynamic Allocation of Bandwidth

- Differences in Uplink and Downlink configurations
  - OFDMA (Orthogonal Frequency Division Multiplex Access) downlink
    - Overview and application in 4G LTE

  - SCFDMA (Single Carrier Frequency Division Multiplex Access) uplink
    - Difference with 4G LTE WiMAX

- Explanation of PHY Layer vs. MAC Layer in 4G RAN

MODULE 3:

- Core Network
  - Evolved Packet Core (EPC) Architecture
  - EPC interfaces with 4G RAN (Radio Access Network)
  - Optimized architecture for high-speed 3G/HSPA/4G traffic
  - Combined SGSN/MME
  - SGSN/MME and GGSN/SGN/PGW (GGSN – Gateway GPRS Support Node)
  - EPC network topologies

        - 4G access dimensioning

- IP in the core network
    - IP multimedia subsystem (IMS) in 4G EPC
        - IMS protocols

MODULE 4:

- Mobility and Bearer Management
- Mobility Management Entity (MME)
    - MME pooling and pool area
    - MME selection and addressing

- QoS parameters, policy management and extension across networks
- EPS bearer architecture
- Policy and charging control architecture
- EPS mobility management (EMM) states
- EPS connection management (ECM) states
- Handling of specific traffic states: Attach/Detach, bearer activation, deactivation, handover, TAU, PDP context establishment, transitions between idle and active modes

MODULE 5:

- Other considerations
- Voice in 4G
    - Voice over LTE (VoLTE)
    - Circuit switched fall back (CSFB)
    - Simultaneous Voice and LTE (SVLTE)
    - Over the Top (OTT) Services

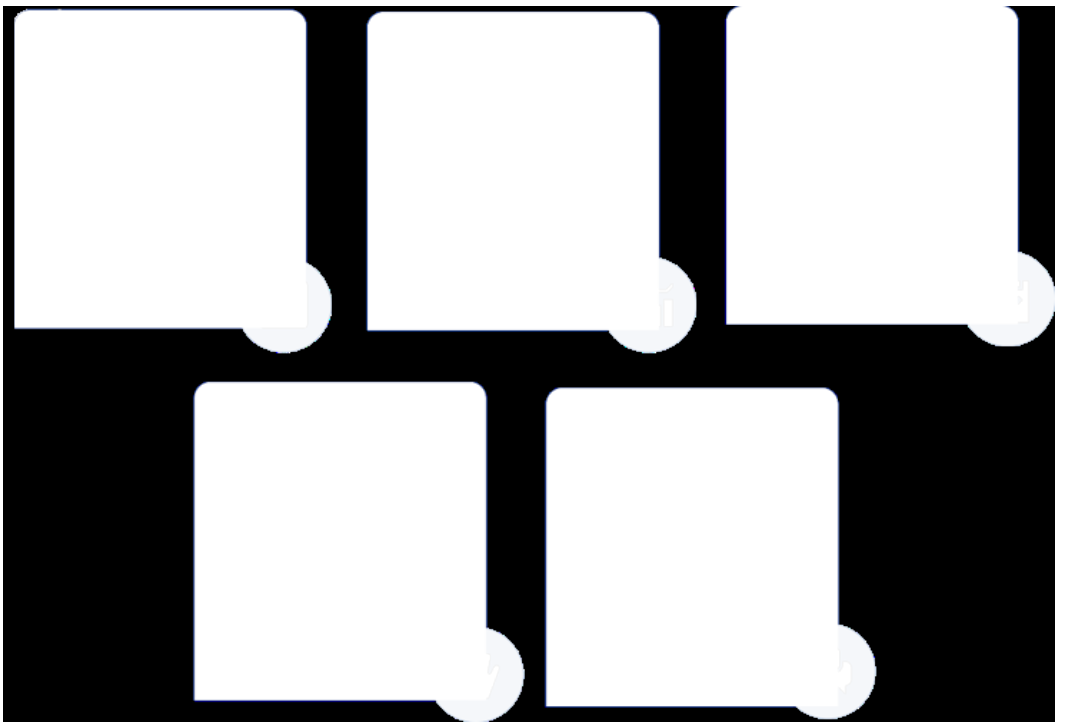
- Future
    - Trends in 4G
    - 5G

Target Audience

- Telecommunications managers and personnel responsible for the design, planning, deployment and management of mobile network technologies and services
- Managers looking to complement their skill-set by gaining a good understanding of 4G mobile networks

Méthodologie

Une combinaison d'activités pratiques et de présentations interactives pour favoriser et optimiser l'apprentissage :



Lieu

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À propos de Neotelis

Neotelis fournit des services de formation, de conseil ainsi que des conférences et des publications à l'industrie mondiale des télécommunications. Son équipe d'experts seniors a formé des milliers de dirigeants et gestionnaires travaillant pour des opérateurs, des régulateurs et des gouvernements dans plus de 120 pays à travers le monde.

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