



LTE for Business Professionals — LTE001

This course provides a high-level overview of LTE. It is intended for business professionals and generally non-technical staff who need to have a high-level image of the LTE technology. The course provides a detailed view on the place of LTE in the plethora of 4G wireless systems together with technology deployment and evolution options, impacts on currently deployed 2G/3G network, applications and services, and the critical network parts concerned by an LTE deployment. This course allows you to:

- List the motives behind the adoption and deployment of LTE by a Telco.
- Explain evolution options from UMTS and CDMA to LTE and its deployment options.
- Describe key technologies used in LTE.
- Explain the spectrum flexibility allowed by LTE and be aware of LTE spectrum bands and how they can be used/shared with existing technologies.
- List QoS classes supported by LTE.
- Describe essential LTE operations.
- List the role of LTE backhaul and its building technologies.
- Explain the main functions of IP and IMS and describe LTE voice solutions.

Exploring LTE/LTE Advanced — LTE002

This course provides a deep description of LTE technology based on 3GPP Release 8 and Release 10. It is intended for engineers and technical managers who need to have a clear image of the LTE network architecture and nodes, protocols, network interfaces and their functions. Also, this training discusses LTE/LTE-A network deployment considerations, and interworking options with other radio access technologies (RATs). This course allows you to:

- Describe the background of 3G and its evolution towards LTE.
- Explain LTE design targets and its spectrum flexibility.
- List the elements of EPC and E-UTRAN and describe the role of each one, and the corresponding interfaces and protocols.
- Explain LTE mechanisms, protocols, and channels.
- Describe the LTE radio framing, procedures, and operations.
- Explain the spectrum flexibility allowed by LTE.
- Describe key radio features required in a LTE deployment.
- Describe network deployment considerations and interworking options.

Mastering Core EPC — LTE003

This course focuses on Core EPC features and functionalities, it provides detailed descriptions of EPC network elements and their functions. It provides in-depth description of EPC mobility management, session management functionalities, 3GPP Subscriber data management concepts, charging and policy control mechanisms, and EPC QoS management rules. Also, the course gives a deep view of core EPC protocols, such as GTP, diameter, and Non-access stratum. This course allows you to:

- Understand the Core EPC architecture and its elements and functions.
- Understand Core EPC interfaces and protocols.
- Explain the NAS protocol: Session management procedures, mobility management procedures, NAS states, and NAS message format.
- Understand the Core EPC Mobility and session management features through case studies and call flows.
- Understand charging and policy control aspects through case studies and call flow.
- Understand S1AP and X2AP: Procedures, Link setup.
- Understand EPS interworking: GTP protocol, PS interworking, and CS interworking.
- Describe the LTE signaling flows: handover, initial attach, and PCC connection establishment.

Mastering LTE Radio — LTE004

This course focuses on LTE Radio interface, it provides a deep description of the LTE air interface and corresponding protocol stack. The course provides a detailed description of PHY layer technologies, mechanisms and procedures such as OFDMA/SC-FDMA, MIMO, scheduling, physical channels, and transmission schemes. Also, it provides a deep description of MAC mapping procedures, RRC, RLC, and PDCP protocols. This training is intended for Radio engineers and technical managers and allows you to:

- Deeply explain LTE radio mechanisms, protocols, and channels.
- Explain Scheduling and rate adaptation.
- Explain Hybrid-ARQ.
- Understand radio interface protocols: RRC, PDCP, RLC, and Media Access Control.
- Describe LTE radio framing, procedures, and operations.
- Explain Inter-cell Interference coordination.
- Explain Multiple Antenna Technique.
- Explain LTE uplink/downlink transmission schemes.
- Describe S1AP and X2AP procedures and link setup
- Understand the main features and items to be considered in a LTE radio deployment

Voice in LTE — LTE005

This course focuses on voice paradigm in LTE. It provides a clear image on voice service options and challenges that radio and core engineers might face in a voice deployment over LTE. This training gives in-depth description of voice service solutions in LTE such as CS fallback (CSFB), VoLTE, and SRVCC/eSRVCC. It also provides recommendations on voice service deployment scenarios in LTE based on operators' case studies. After completing this course you will be able to:

- Explain the voice paradigm in LTE.
- Explain CSFB concept and call flows.
- Describe voice over LTE concepts.
- Understand the role of IMS in voice over LTE solution — IR92.
- Describe SRVCC/eSRVCC concept and call flows.
- Explain the QoS of voice services in LTE.
- Describe voice deployment considerations in LTE and interworking options.

LTE Network Planning — LTE006

This course focuses on LTE Network planning, it is intended for radio network planning and operations engineers and technical managers who need to gain a deep knowledge in the area of LTE network planning. This training provides a clear image of LTE coverage planning and design processes, capacity planning and traffic/service design. The course provides also LTE planning challenges in overlay deployments (LTE/HSPA, LTE/2G, and LTE/CDMA 2000). This course uses practical specific tools for LTE network planning. It also introduces Excelsicom LTE capacity planning and KPI reporting tools. At the end of this course you will be able to:

- Understand LTE network dimensioning processes .
- Understand link budget components and calculation methods.
- Understand and practice DL/UL capacity calculation methods — cell capacity, network capacity.
- Understand frequency and CID planning processes.
- Practice LTE network planning using specific planning tools.
- Understand the impact of bandwidth on capacity and coverage design.
- Understand the planning consideration in a overlay deployment: LTE/HSPA.
- Describe the network deployment considerations and interworking options.
- Practice capacity planning and forecasting using Excelsicom tools.

LTE Network Optimization — LTE007

This course provides a deep description of LTE optimization processes, it is intended for radio network engineers and technical managers who need to gain advanced knowledge in the area of LTE network optimization. This training provides in-depth description of key performance indicators (KPI) and measurements used in LTE optimization, options and techniques for coverage and capacity quality enhancements. The course uses specific planning and optimization tools. It also introduces Excelsicom LTE capacity planning and KPI reporting tools in order to enhance network coverage and quality. At the end of the course, a fresh view of key mechanisms and procedures used in self organizing networks is provided. This course allows you to:

- Understand LTE optimization objectives and processes.
- Gain a clear image on KPIs and measurements for LTE network optimization.
- Understand main factors affecting LTE coverage quality and the corresponding mitigation solutions.
- Understand main factors affecting LTE capacity and the corresponding mitigation solutions.
- Understand main factors affecting mobility functioning and the corresponding mitigation solutions.
- Practice LTE optimization using specific tools.
- Use Excelsicom LTE capacity planning and KPI reporting tool.

EPC Design and Planning — LTE008

This course focuses on core EPC network planning and design principals. It provides a clear image on core EPC network design challenges. The course is intended for core planning and operations engineers. This training provides detailed description of core EPC deployment scenarios using operators case studies. This course allows you to:

- Explain the Core EPC dimensionning, design, and planning processes.
- Describe node dimensioning (MME, S-GW, P-GW, HSS, PCFR, DPI).
- Explain core EPC capacity planning processes: S1 interface, S5/S8 interface, S11 interface, S6a interface.
- Describe subscriber traffic models.
- Understand planning considerations in a overlay deployment: EPC/CS&PS core.
- Understand planning considerations in a unified EPC/CS&PS core.
- Describe network deployment considerations.
- Practice EPC dimensionning and planning with the aid of practical case studies.