LTE-Advanced Pro to 5G Evolution and Wireless Tech Training Course

21 - 25 Dec 2026

Madrid

5900 € (Per Person)

Ref: #TEL7180_146955

Course Introduction / Overview:

The global transition from LTE-Advanced Pro to 5G represents one of the most significant technological shifts in modern history, fundamentally reshaping industries and daily life. This training course provides a comprehensive exploration of this evolution, guiding participants from the foundational principles of advanced 4G to the complex architecture and capabilities of 5G and beyond. We delve into the critical drivers for this change, including the insatiable demand for enhanced mobile broadband (eMBB), the need for ultra-reliable low-latency communication (URLLC) for critical applications, and the massive machine-type communications (mMTC) required for the Internet of Things (IoT). As detailed by leading experts like Erik Dahlman in his seminal work "5G NR: The Next Generation Wireless Access Technology," understanding the intricate details of technologies like Massive MIMO, beamforming, network slicing, and the 5G New Radio (NR) is paramount. BIG BEN Training Center has designed this program to bridge the knowledge gap, equipping professionals with the strategic insights and technical expertise needed to design, deploy, and manage next-generation wireless networks effectively. This course is not just a technical overview but a strategic roadmap for navigating the complexities of the 5G era.

Target Audience / This training course is suitable for:

- Telecommunications Engineers.
- Network Architects and Planners.
- Radio Frequency (RF) Engineers.
- System Integration Specialists.
- Technical Project and Program Managers.
- Network Operations and Maintenance Personnel.
- Research and Development (R&D) Professionals.
- IT Professionals involved in network infrastructure.
- Regulators and Technology Policy Makers.

Target Sectors and Industries:

- Telecommunication Service Providers and Mobile Network Operators.
- Information Technology and Cloud Services.
- Automotive and Intelligent Transportation Systems.
- Manufacturing and Industrial Automation (Industry 4.0).
- Healthcare and Remote Medicine.
- Public Safety and Emergency Services.
- Energy and Utilities.
- Government, Defense, and Aerospace Agencies.
- Media and Entertainment.

Target Organizations Departments:

- Network Planning and Design.
- Radio Access Network (RAN) Engineering.
- Core Network Engineering and Operations.
- Technology Strategy and Innovation.
- Research and Development (R&D).
- IT Infrastructure and Support.
- Product Development and Management.
- Cybersecurity and Network Security.
- Corporate Training and Development.

Course Offerings:

By the end of this course, the participants will have able to:

- Analyze the key performance indicators and architectural enhancements of LTE-Advanced Pro.
- Differentiate the core components of the 5G New Radio (NR) and the 5G Core (5GC) network.
- Master the principles of Massive MIMO, beamforming, and advanced antenna systems.
- Design and implement network slicing strategies for diverse service requirements.
- Evaluate the role of NFV and SDN in creating agile and scalable 5G networks.
- Develop migration strategies for a smooth transition from 4G to 5G infrastructure.
- Assess security vulnerabilities in 5G networks and identify mitigation techniques.
- Understand the impact of 5G on IoT, V2X, and other emerging applications.
- Explore the foundational concepts and potential technologies for future 6G systems.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to foster a deep and practical understanding of next-generation wireless technologies. This course moves beyond traditional lectures to create a dynamic and interactive learning environment. We employ a blended approach that combines expert-led instruction with hands-on exercises, real-world case studies, and collaborative group discussions. Participants will analyze practical scenarios, such as planning a private 5G network for an industrial campus or optimizing spectrum management for a dense urban environment. Interactive sessions encourage participants to ask questions, share their professional experiences, and solve complex problems collectively. The curriculum is structured to build knowledge progressively, ensuring that foundational concepts are firmly established before moving on to more advanced topics. Our instructors provide continuous feedback and facilitate discussions that link theoretical principles to their practical application in the field. This immersive approach ensures that participants not only learn the material but also gain the confidence to apply their new skills directly to their professional roles, driving innovation within their organizations.

Course Agenda (Course Units):

Unit One: Foundations of Modern Wireless Communication

- The evolution of mobile networks from 1G to 4G.
- An overview of the 3GPP standards and release timelines.
- Key concepts of OFDM, MIMO, and carrier aggregation.
- Introduction to LTE and its core architecture (EPC).
- Understanding the limitations of LTE and the need for advancement.
- Deep dive into the enhancements of LTE-Advanced.
- Introduction to LTE-Advanced Pro (4.5G/Pre-5G) features.

Unit Two: Mastering LTE-Advanced Pro

- Advanced carrier aggregation techniques across multiple bands.
- Licensed Assisted Access (LAA) and spectrum sharing.
- Massive MIMO and 3D beamforming in the 4G context.
- Enhanced support for IoT with NB-IoT and LTE-M.
- Device-to-Device (D2D) communication and Proximity Services (ProSe).
- Latency reduction features in LTE-Advanced Pro.
- Performance benchmarks and real-world deployment challenges.

Unit Three: Key Technologies Enabling the 5G Transition

- The three primary 5G use cases: eMBB, URLLC, and mMTC.
- Principles of Software-Defined Networking (SDN) in mobile networks.
- Network Function Virtualization (NFV) and its impact on network agility.
- Introduction to Mobile Edge Computing (MEC).
- Flexible numerology and Orthogonal Frequency-Division Multiple Access (OFDMA).
- Understanding new spectrum bands including sub-6 GHz and mmWave.
- The role of C-RAN (Cloud-RAN) in network architecture.

Unit Four: The 5G New Radio (NR) Architecture

- Detailed overview of the 5G New Radio (NR) air interface.
- 5G Core (5GC) network architecture and its service-based approach.
- Deployment options: Standalone (SA) vs. Non-Standalone (NSA).
- Network slicing architecture and end-to-end management.
- Massive MIMO and advanced beam management in 5G.
- Control and User Plane Separation (CUPS).
- Quality of Service (QoS) mechanisms in 5G networks.

Unit Five: Advanced 5G Applications, Security, and the Road to 6G

- Implementing URLLC for industrial automation and autonomous vehicles.
- Deploying massive IoT networks using 5G capabilities.
- Vehicle-to-Everything (V2X) communication use cases.
- Security architecture in 5G: challenges and solutions.
- Private 5G networks for enterprises and vertical industries.
- The global 5G deployment landscape and future 3GPP releases.
- Emerging concepts and research directions for 6G.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

As network functions become increasingly virtualized and software-defined, how does the role of the traditional network engineer transform to encompass skills from software development and data science?

What unique qualities does this course offer compared to other courses?

This training course distinguishes itself by providing a holistic and strategic evolutionary path, rather than treating LTE-Advanced Pro and 5G as isolated subjects. We focus on the "why" behind the technological shift, connecting advanced 4G features directly to their culmination in the 5G framework. This unique narrative helps participants understand the logic of network evolution, making complex concepts more intuitive and memorable. Unlike courses that remain purely theoretical, our curriculum emphasizes the practical implications of deploying these technologies, exploring real-world case studies on network slicing for diverse enterprise clients and spectrum management trade-offs. Furthermore, the course is intentionally forward-looking, dedicating significant time not only to current 5G standards but also to the security challenges, advanced applications like V2X, and the emerging concepts that will define 6G. This provides a durable and future-proof skill set, empowering participants to think strategically about long-term network planning and innovation. The academic rigor, combined with a focus on business and operational impact, ensures a learning experience that is both deep and broadly applicable.