Advanced 5G Network Architecture and Deployment Training Course

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Sharm El-Sheikh

4100 € (Per Person)

Ref: #TEL2979_285114

Course Introduction / Overview:

The global transition to 5G technology represents a paradigm shift in connectivity, enabling unprecedented speeds, ultra-low latency, and massive device connectivity. This course provides a comprehensive exploration of 5G network architecture and strategic deployment, moving beyond theoretical concepts to address practical implementation challenges. As detailed by experts like Harri Holma in the seminal work "5G for the Connected World", a successful 5G rollout hinges on a deep understanding of its new components, including the 5G Core (5GC), network slicing, and Multi-access Edge Computing (MEC). This program, offered by BIG BEN Training Center, is meticulously designed to equip professionals with the knowledge to navigate the complexities of both Non-Standalone (NSA) and Standalone (SA) architectures. Participants will delve into the Service-Based Architecture (SBA), analyze radio access network (RAN) evolution, and master the strategic planning required for efficient and secure network deployment. The curriculum covers everything from spectrum management and site selection to implementing robust security protocols and optimizing network performance, ensuring a holistic mastery of the 5G ecosystem from A to Z. This training empowers attendees to lead and execute successful 5G infrastructure projects, driving innovation and competitive advantage for their organizations.

Target Audience / This training course is suitable for:

- Telecommunications Engineers and Architects.
- Network Planners and RF Engineers.
- IT Managers and Infrastructure Specialists.
- System Integrators and Solutions Architects.
- Project Managers overseeing 5G rollouts.
- Technical Consultants in the telecom sector.
- Cybersecurity professionals focused on network infrastructure.
- Regulatory and policy-making officials in the technology sector.

Target Sectors and Industries:

- Telecommunications Service Providers.
- Information Technology and Services.
- Manufacturing and Industrial IoT (IIoT).
- Automotive and Connected Vehicles.
- Healthcare and Telemedicine.
- Media and Entertainment.
- Government, Public Safety, and Defense Agencies.
- Energy and Utilities.

Target Organizations Departments:

- Network Engineering and Operations.
- Technology Strategy and Planning.
- Research and Development (R&D).
- IT Infrastructure and Cloud Services.
- Cybersecurity and Information Security.
- Project Management Office (PMO).
- Product Development and Management.
- Corporate and Enterprise Solutions.

Course Offerings:

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

- Analyze the fundamental differences between 5G NSA and SA architectures.
- Design and plan a comprehensive 5G network deployment strategy.
- Evaluate the components and functions of the 5G Core (5GC) and Service-Based Architecture (SBA).
- Implement network slicing to support diverse service requirements like eMBB, URLLC, and mMTC.
- Assess the role of Multi-access Edge Computing (MEC) in enabling low-latency applications.
- Develop robust security frameworks to mitigate threats in 5G environments.
- Optimize 5G network performance using key metrics and automation tools.
- Formulate migration strategies for a smooth transition from 4G/LTE to 5G.
- Understand the principles and benefits of Open RAN (O-RAN) architectures.
- Evaluate various 5G use cases and their impact on different industries.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to be highly interactive, immersive, and practical, ensuring that participants gain not just theoretical knowledge but also applicable skills. Our approach moves beyond traditional lectures to foster a dynamic learning environment. The course heavily utilizes real-world case studies of successful and challenging 5G deployments from around the globe, allowing participants to analyze strategic decisions and their outcomes. Interactive sessions, group discussions, and collaborative workshops are central to the learning process, encouraging participants to share experiences and solve complex deployment scenarios together. Practical exercises will focus on network planning simulations, security risk assessments, and designing network slicing configurations for specific industry verticals. Expert instructors will facilitate these activities, providing continuous feedback and guidance. This hands-on, problem-solving approach ensures that attendees can confidently apply the learned concepts of 5G architecture and deployment strategies directly to their professional roles, bridging the gap between theory and real-world execution. The emphasis is on building a deep, functional understanding of the entire 5G ecosystem.

Course Agenda (Course Units):

Unit One Foundations of 5G Technology and Architecture

- Introduction to the evolution from 4G to 5G.
- Key performance indicators (KPIs) and capabilities of 5G.
- Understanding 5G frequency bands and spectrum management.
- Deep dive into 5G Non-Standalone (NSA) architecture.
- Exploring 5G Standalone (SA) architecture and its advantages.
- The role of virtualization (NFV) and software-defined networking (SDN) in 5G.
- Comparing 5G deployment models and their respective use cases.

Unit Two The 5G Core (5GC) and Radio Access Network (RAN)

- Overview of the 5G Core network and its key principles.
- Detailed analysis of the Service-Based Architecture (SBA).
- Key network functions (AMF, SMF, UPF, AUSF, UDM).
- Control and User Plane Separation (CUPS) in 5G.
- Evolution of the Radio Access Network (RAN) architecture.
- Understanding Centralized RAN (C-RAN) and Distributed RAN (D-RAN).
- Introduction to Open RAN (O-RAN) concepts and ecosystem.

Unit Three Strategic 5G Network Deployment and Planning

- Phases of a 5G network deployment project.
- Site selection, acquisition, and infrastructure considerations.
- Backhaul and fronthaul design and capacity planning.
- Migration strategies from legacy 4G/LTE networks to 5G.
- Interworking between 4G EPC and 5G Core.
- Utilizing network planning and simulation tools.
- Cost-benefit analysis for different deployment scenarios.

Unit Four Advanced 5G Services and Monetization

- Mastering the concept of End-to-End Network Slicing.
- Designing network slices for eMBB, URLLC, and mMTC.
- Implementing Multi-access Edge Computing (MEC) for low-latency services.
- 5G for the Internet of Things (IoT) and massive connectivity.
- Fixed Wireless Access (FWA) as a key 5G use case.
- Voice over New Radio (VoNR) and emergency services.
- Developing business models and monetization strategies for 5G services.

Unit Five 5G Security, Optimization, and Future Outlook

- The 5G security architecture and threat landscape.
- Key security challenges in the core, edge, and RAN.
- Authentication, authorization, and privacy in 5G networks.
- Techniques for 5G network performance monitoring and optimization.
- The role of AI and machine learning in network automation.
- Introduction to private 5G networks for enterprise use.
- Emerging trends and the roadmap towards 6G technology.

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 slicing allows for the logical partitioning of a physical network, what are the primary regulatory and net neutrality challenges that operators might face when offering differentiated quality of service guarantees to enterprise clients?

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

This course distinguishes itself by focusing intensely on the practical application of 5G deployment strategies, rather than remaining purely theoretical. While many programs cover the technical specifications of 5G, our curriculum is built around real-world implementation scenarios, addressing the "how" and "why" behind architectural choices. We bridge the gap between understanding 5G components and mastering the strategic planning required to deploy them effectively, securely, and profitably. The content delves deeply into the operational challenges that engineers and planners face, such as spectrum coexistence, backhaul planning, and seamless migration from 4G. A significant differentiator is the emphasis on the business and service aspects, including network slicing monetization and the development of MEC-enabled applications. By integrating case studies of actual deployments and facilitating discussions on overcoming common hurdles, the course provides actionable insights that participants can immediately apply. It is designed not just to educate but to empower professionals to lead complex 5G projects with confidence, strategic foresight, and a comprehensive understanding of the entire ecosystem.