Advanced 5G Network Implementation and Optimization Training Course



26 - 30 Oct 2026

Cape town

4600 € (Per Person)

Ref: #NO2044_278854

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 that will redefine industries. This course provides a comprehensive, end-to-end exploration of 5G network implementation and optimization, moving beyond theoretical concepts to impart practical, real-world skills. As detailed by prominent authors like Erik Dahlman in his work "5G NR: The Next Generation Wireless Access Technology," a deep understanding of the 5G New Radio (NR) and 5G Core (5GC) is critical for successful deployment. This program, offered by BIG BEN Training Center, is meticulously designed to equip professionals with the expertise needed to plan, deploy, manage, and fine-tune 5G networks for peak performance and reliability. Participants will delve into complex topics such as 5G network architecture, radio frequency (RF) planning, network slicing for diverse service level agreements, and advanced optimization techniques using key performance indicators. The curriculum covers both Non-Standalone (NSA) and Standalone (SA) deployment models, ensuring a thorough grasp of the entire 5G ecosystem and preparing attendees to lead complex 5G projects and strategic initiatives within their organizations.

Target Audience / This training course is suitable for:

- Telecommunications Engineers.
- Network Architects and Planners.
- RF Planning and Optimization Engineers.
- System Integration Specialists.
- Network Operations Center (NOC) Staff.
- IT Professionals and Managers involved in network infrastructure.
- Technical Project Managers overseeing 5G deployments.
- Solutions Architects designing 5G-enabled services.

Target Sectors and Industries:

- Telecommunications Service Providers.
- Information Technology and Services.
- Manufacturing and Industrial Automation (Industry 4.0).
- Automotive and Intelligent Transportation Systems.
- Healthcare and Telemedicine.
- Media and Entertainment.
- Government, Public Safety, and Defense Agencies.
- Energy and Utilities.

Target Organizations Departments:

- Network Engineering and Design.
- Radio Access Network (RAN) Operations.
- Core Network Planning and Management.
- Research and Development (R&D).
- IT Infrastructure and Operations.
- Strategic Technology Planning.
- Service Assurance and Quality Management.
- Field Operations and Technical Support.

Course Offerings:

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

- Analyze and design robust 5G network architectures for both NSA and SA deployments.
- Develop comprehensive RF plans for optimal 5G coverage and capacity.
- Implement and manage network slicing to support diverse use cases and service requirements.
- Master advanced optimization techniques for Massive MIMO and beamforming.
- Monitor, analyze, and interpret 5G network key performance indicators (KPIs).
- Troubleshoot and resolve common issues in 5G RAN and Core networks.
- Evaluate and implement 5G security protocols to protect network integrity.
- Develop strategies for network automation and orchestration in a 5G environment.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to be immersive, interactive, and highly practical, ensuring that participants can immediately apply their learning in a professional context. We move beyond traditional lectures to foster a dynamic learning environment built on a foundation of real-world application. The course heavily utilizes detailed case studies of actual 5G network deployments, allowing participants to analyze challenges and successful strategies from leading global operators. Interactive sessions, including group discussions and problem-solving workshops, encourage collaborative learning and the exchange of diverse perspectives on 5G implementation and optimization challenges. Practical exercises and simulated scenarios will be used to reinforce key concepts such as RF planning, KPI analysis, and troubleshooting procedures. Our expert instructors facilitate a continuous feedback loop, providing personalized guidance and ensuring that all participants master the complex technical skills presented. This hands-on, participant-centered approach guarantees a deep and lasting understanding of 5G network technologies from planning to performance tuning.

Course Agenda (Course Units):

Unit One: Foundations of 5G Technology and Architecture

- Introduction to 5G and its evolution from 4G LTE.
- Understanding the 5G frequency spectrum (Sub-6 GHz and mmWave).
- Deep dive into the 5G New Radio (NR) interface.
- Exploring the 5G Core (5GC) Service-Based Architecture (SBA).
- Comparing Non-Standalone (NSA) and Standalone (SA) deployment models.
- Key 5G performance metrics: latency, bandwidth, and reliability.
- Introduction to Network Functions Virtualization (NFV) and Software-Defined Networking (SDN) in 5G.

Unit Two: 5G Network Planning and Implementation

- The 5G network planning and design lifecycle.
- Site selection criteria and physical infrastructure requirements.
- Radio Frequency (RF) planning and propagation modeling for 5G.
- RAN deployment strategies and cell site engineering.
- Core network implementation and integration procedures.
- Transport network considerations for 5G backhaul and fronthaul.
- Initial network configuration and parameter setting.

Unit Three: Key 5G Technologies and Features

- Massive MIMO and advanced antenna systems.
- Understanding and implementing beamforming and beam management.
- Principles and application of end-to-end network slicing.
- Multi-access Edge Computing (MEC) architecture and integration.
- Quality of Service (QoS) mechanisms in 5G networks.
- Voice over NR (VoNR) and emergency services support.
- Synchronization and timing requirements in 5G networks.

Unit Four: 5G Network Optimization and Performance Management

- Defining Key Performance Indicators (KPIs) for 5G RAN and Core.
- Techniques for 5G network monitoring and data collection.
- Drive testing and post-processing analysis for coverage and quality.
- RF optimization for interference management and mobility performance.
- Parameter tuning for throughput, latency, and handover optimization.
- Troubleshooting common 5G network performance issues.
- Utilizing analytics and machine learning for proactive optimization.

Unit Five: 5G Security, Automation, and Future Evolution

- End-to-end security architecture in 5G networks.
- Authentication, encryption, and subscriber privacy mechanisms.
- Security considerations for network slicing and edge computing.
- Introduction to network automation and orchestration platforms.
- Exploring Open RAN (O-RAN) principles and architecture.
- Emerging 5G use cases: IoT, V2X, and mission-critical communications.
- The future roadmap of 5G Advanced and the path towards 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 5G networks become increasingly software-defined and automated, what is the evolving role of the human network engineer in optimization and troubleshooting?

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

This course distinguishes itself by focusing on the complete lifecycle of a 5G network, from initial planning and implementation to advanced, real-world optimization and security. Unlike programs that remain purely theoretical, our curriculum is built around practical application, addressing the specific challenges that engineers and architects face in live network environments. We provide an in-depth, holistic view that connects radio access network performance with core network functions and service delivery, a crucial perspective often missing in more siloed training. The content delves deeply into strategic topics such as network slicing implementation for varied enterprise needs and the integration of Multi-access Edge Computing, preparing participants not just to manage a network but to leverage it for competitive advantage. Furthermore, the course structure emphasizes proactive performance management and troubleshooting, equipping attendees with the analytical skills to diagnose complex issues and apply sophisticated optimization techniques. It is a comprehensive, hands-on masterclass designed to cultivate true experts capable of leading next-generation network deployments.