Advanced Optical Network Planning and Maintenance Training Course



26 - 30 Oct 2026

Cape town

4600 € (Per Person)

Ref: #NO9316_279202

Course Introduction / Overview:

This comprehensive course provides an in-depth exploration of optical network planning and fiber optic maintenance, designed to equip professionals with the critical skills needed in today's high-speed telecommunications landscape. The curriculum delves into the entire lifecycle of a fiber optic network, from initial strategic planning and design to deployment, testing, and long-term maintenance. As highlighted by renowned author Gerd Keiser in his seminal work, "Optical Fiber Communications," a robust understanding of both theoretical principles and practical application is paramount for network reliability and performance. This program bridges that gap by covering advanced topics such as Dense Wavelength Division Multiplexing (DWDM) planning, Fiber to the Home (FTTH) architecture, and the proficient use of diagnostic tools like the Optical Time-Domain Reflectometer (OTDR). BIG BEN Training Center has structured this course to address real-world challenges, ensuring participants can not only design efficient and scalable networks but also implement proactive maintenance strategies to minimize downtime and ensure optimal service delivery. Participants will gain the expertise to manage complex optical transport networks, troubleshoot faults effectively, and plan for future capacity demands, making them invaluable assets to any organization reliant on fiber optic infrastructure.

Target Audience / This training course is suitable for:

- Telecommunications Engineers and Technicians.
- Network Planners and Designers.
- Fiber Optic Field Engineers and Supervisors.
- IT Professionals managing network infrastructure.
- Project Managers overseeing telecom projects.
- Network Operations Center (NOC) personnel.
- Data Center Engineers.
- Technical staff new to the fiber optics field.

Target Sectors and Industries:

- Telecommunications Service Providers.
- Internet Service Providers (ISPs).
- Data Center and Cloud Service Providers.
- Utility companies (Power, Water, Gas).
- Government, Public Sector, and Military agencies.
- Broadcasting and Media companies.
- Large enterprise and corporate entities.
- Transportation and railway networks.

Target Organizations Departments:

- Network Planning and Engineering.
- Field Operations and Maintenance.
- Network Operations Center (NOC).
- IT Infrastructure and Support.
- Project Management Office (PMO).
- Technical Support and Service Delivery.
- Research and Development.
- Infrastructure and Facilities Management.

Course Offerings:

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

- Develop comprehensive plans for optical network deployments, including FTTH and metro networks.
- Design resilient and scalable network architectures using technologies like DWDM and OTN.
- Perform and interpret advanced fiber optic tests using OTDR, power meters, and light sources.
- Execute precise fusion splicing and connectorization techniques according to industry standards.
- Implement a proactive fiber optic maintenance and inspection program.
- Troubleshoot and rapidly resolve common and complex network faults and outages.
- Manage network documentation, including splice diagrams and test reports.
- Ensure compliance with fiber optic safety procedures during installation and maintenance.
- Evaluate new optical technologies for network upgrades and future-proofing.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to be highly interactive, practical, and engaging, ensuring a deep and lasting understanding of the course material. We move beyond traditional lectures by integrating a blended learning approach that combines expert-led instruction with hands-on activities and real-world problem-solving. Participants will engage in detailed case studies of actual network planning projects and outage scenarios, allowing them to analyze complex situations and develop strategic solutions. Interactive sessions, group discussions, and collaborative workshops encourage the sharing of experiences and foster a dynamic learning environment. The course places a strong emphasis on practical skill development through simulated exercises on network design software and virtual demonstrations of testing equipment like OTDRs. Our experienced instructors provide continuous feedback and personalized guidance, facilitating a supportive atmosphere where participants can confidently ask questions and master complex concepts. This immersive approach ensures that attendees not only learn the theory but also gain the practical confidence to apply their new skills immediately in their professional roles.

Course Agenda (Course Units):

Unit One: Fundamentals of Fiber Optic Communication

- Introduction to optical fiber principles.
- Light propagation, reflection, and refraction.
- Single-mode vs. multi-mode fiber.
- Understanding attenuation, dispersion, and non-linear effects.
- Types of fiber optic cables and connectors.
- Standards and recommendations (ITU-T, IEC).
- Safety procedures for handling optical fibers.

Unit Two: Optical Network Planning and Design

- Network topology and architecture (Ring, Star, Mesh).
- Passive Optical Network (PON) and FTTx planning.
- Dense Wavelength Division Multiplexing (DWDM) design principles.
- Link power budget and rise time budget calculations.
- Network capacity planning and scalability strategies.
- Site surveys and route planning considerations.
- Introduction to network planning and simulation tools.

Unit Three: Fiber Optic Cable Installation and Splicing

- Best practices for cable pulling and installation.
- Fusion splicing theory and practical application.
- Step-by-step fusion splicing machine operation.
- Mechanical splicing and connectorization techniques.
- Splice loss measurement and acceptance criteria.
- Enclosure and patch panel preparation and management.
- Proper cable management and documentation.

Unit Four: Optical Network Testing and Commissioning

- Introduction to fiber optic test equipment.
- Using Optical Power Meters and Light Sources (OPM/OLS).
- Insertion Loss (IL) and Optical Return Loss (ORL) testing.
- Mastering the Optical Time-Domain Reflectometer (OTDR).
- Analyzing OTDR traces to identify events and faults.
- Fiber characterization (CD, PMD, AP).
- Network commissioning and acceptance testing procedures.

Unit Five: Advanced Maintenance and Troubleshooting

- Proactive vs. reactive maintenance strategies.
- Developing a routine network maintenance plan.
- Common fiber optic network faults and their causes.
- Systematic troubleshooting methodologies.
- Advanced fault localization using OTDR and other tools.
- Network restoration and emergency repair procedures.
- Monitoring optical network performance and trends.

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:

Considering the rise of 5G and IoT, how must traditional optical network planning strategies evolve to accommodate the unprecedented demand for bandwidth and low latency?

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

This course distinguishes itself by offering a holistic and integrated curriculum that seamlessly connects high-level strategic network planning with the practical, hands-on skills required for maintenance and troubleshooting. Unlike programs that focus narrowly on either design theory or field techniques, this training provides a complete A-to-Z perspective on the entire fiber optic network lifecycle. We emphasize the critical relationship between design choices and long-term maintainability, teaching participants how to plan networks that are not only high-performing but also resilient and cost-effective to operate. The content is deeply rooted in real-world applications, utilizing case studies of complex network deployments and challenging fault scenarios to build practical problem-solving abilities. Furthermore, the curriculum is forward-looking, addressing how to future-proof networks for emerging technologies like 5G and the Internet of Things. By focusing on the "why" behind the techniques and the strategic implications of technical decisions, the course cultivates a deeper level of expertise that transcends basic operational knowledge, empowering participants to become true experts in the field.