DWDM for Modern Optical Transport Networks

COURSE DESCRIPTION:

This course provides a practical and up-to-date introduction to modern DWDM transport networks, covering how today's metro, backbone, mobile and data centre networks are built and operated.

Participants will learn how high-capacity services (100G, 200G, 400G) are transmitted over optical fibre using DWDM, ROADM, coherent optics, Flex-Grid and ZR/ZR+ technologies. The course bridges the gap between optical theory and real-world network deployment, with a strong focus on DCI, mobile backhaul, metro and backbone networks.

This is a vendor-neutral, market-driven course designed for engineers who want to understand how modern optical transport networks actually work in today's telco and data centre environments.

WHO SHOULD ATTEND:

This course is designed for transport, NOC, DCI, mobile backhaul and field engineers who work with or are moving into modern DWDM optical transport networks.

PREREQUISITE TRAINING:

No formal prerequisites are required. A basic understanding of networking or telecommunications is recommended but not essential.

SOME COURSE BENEFITS:

Participants will gain a practical understanding of modern DWDM networks, improve troubleshooting skills, understand 100G/400G transport, and build a strong foundation for advanced optical and OTN technologies.

COURSE OBJECTIVES:

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

- Understand the fundamentals of **modern DWDM optical transport networks**
- Differentiate between **CWDM, DWDM, ROADM and ZR/ZR+ routed optical architectures**
- Understand how **100G–400G services are transported**, with a roadmap to **800G and beyond**
- Understand the role of **coherent optics, modulation formats and DSP**
- Understand **optical amplification (EDFA/Raman)** in multi-span DWDM systems

- Understand **ROADM-based metro and backbone network designs**
- Perform basic **optical power budget and performance analysis**
- Identify common **DWDM alarms and troubleshooting scenarios**
- Understand DWDM applications in **DCI, mobile backhaul and backbone networks**
- Build a technical foundation for **advanced topics such as OTN and grooming**

FORMAT:

1-day, theory classroom, with quizzes and hands on exercises.
Maximum attendees 12 per course

CONTENT:

Morning - DWDM Fundamentals (Optical Layer)

- Role of DWDM in modern networks (cloud, data centres, AI traffic)
- Fibre & optical transmission fundamentals (high-level)
- CWDM vs DWDM – why DWDM dominates high-capacity transport
- Wavelengths, ITU grid & channel spacing
- Optical power vs signal quality (intro to OSNR)
- Introduction to coherent optics & DSP (why it matters today)
- Evolution of DWDM: 100G → 400G → 800G (roadmap view)

Afternoon - DWDM Systems, Design & Operations

- DWDM system architecture (transponders, muxponders, line systems)
- Optical multiplexing & ROADM concepts
- Directionless / Colorless / Contentionless (high level)
- Optical amplification strategies (EDFA & Raman)
- Coherent optics in practice: DSP impact on OSNR, reach & capacity
- DWDM design principles (metro vs long-haul)
- Commissioning & turn-up overview
- Operations & troubleshooting fundamentals
- DWDM in modern networks (DCI & ZR/ZR+ context only)