Hybrid Cabling, RRU Installations & High-Density Fibre Systems (Australia)

Duration: 1 Full Day
Level: Advanced
Pre-Requisite: Completion of *Connector Mastery & Installation Practices (Intermediate)*
Suitable for:
Senior installers, carrier and ISP technicians, mobile network specialists, data centre engineers, and infrastructure designers.

Course Overview

This advanced course is designed for experienced fibre professionals working in carrier-grade, mobile, and data centre environments. It focuses on complex hybrid power-and-fibre systems, high-density optical infrastructure, and the practical differences between traditional telecom deployments and modern data centre architectures.

Participants gain deep insight into RRU hybrid systems, high-current power delivery, advanced testing and fault isolation, and future-ready fibre infrastructure, using real-world case studies and Diamond Optics production systems.

MODULE STRUCTURE

Module 1 – Hybrid Cabling Architectures (Carrier & Mobile Networks)

Topics Covered

- **Evolution of hybrid fibre & power cabling in Australia**
- **Comparison of 4 RRU, 6 RRU, and 9 RRU hybrid architectures**
- **Backwards compatibility considerations in legacy Telstra sites**
- **Power and fibre segregation vs integrated hybrid designs**
- **Hybrid trunks vs hybrid tails vs breakout architectures**
- **Mechanical and electrical design constraints for tower deployments**

Key Outcomes

- **Ability to select the correct hybrid architecture for each site type**
- **Understanding of upgrade paths without full tower rework**

Module 2 – High-Current Power Delivery in Hybrid Systems

Topics Covered

- **Managing high-current DC feeds (up to 50 A) in mobile deployments**
- **Conductor sizing and derating principles**
- **Voltage drop calculations and thermal rise**
- **Effects of ambient temperature on conductor performance**
- **Australian outdoor and aerial installation considerations**
- **Bird-proofing requirements specific to Australian environments**

Practical Focus

- **Real-world examples using Diamond Optics high-current hybrid cables**
- **Common failure points and how to avoid them**

Module 3 – RRU Installation Best Practices (Australian Conditions)

Topics Covered

- **Telstra-aligned installation practices**
- **Correct installation of:**
    - **1¼" hybrid trunks**
    - **Heavy-gauge power conductors**

    - **Weatherproofed and grounded terminations**

- **Routing, strain relief, and anchoring on towers**
- **Grounding and bonding requirements**
- **Managing wind load, UV exposure, and vibration**

Key Outcomes

- **Reduced installation time**
- **Improved long-term reliability and safety**

Module 4 – High-Density Fibre Systems & MPO/MTP Deployments

Topics Covered

- **High-density MPO/MTP architectures (12F, 24F, ribbon-based systems)**
- **Polarity methods (A/B/C) in complex deployments**
- **MPO trunk-to-cassette design strategies**
- **Managing insertion loss across multi-interface systems**
- **Connector performance at scale (Grade A vs standard)**

Practical Focus

- **Deployment scenarios using Diamond Optics MPO trunks and cassettes**
- **Avoiding common polarity and performance mistakes**

Module 5 – Data Centre Cabling vs Traditional Telecom Cabling

Topics Covered

- **Key differences between:**

    - **Carrier / telco networks**
    - **Enterprise and hyperscale data centres**
- **High-density rack design vs long-haul fibre considerations**
- **Airflow, accessibility, and serviceability constraints**
- **Modular vs fixed patching strategies**
- **Change management without service disruption**

Key Outcomes

- **Ability to design fibre systems optimised for uptime, density, and scalability**
- **Understanding why data centre fibre demands different design logic**

Module 6 – Advanced Testing, Commissioning & Analytics

Topics Covered

- **Advanced OTDR techniques**
- **iOLM analysis for complex fibre paths**
- **Interpreting multi-event traces in high-density systems**
- **Hybrid system testing:**
    - **Optical IL/RL testing**
    - **Electrical continuity and insulation testing**
- **Commissioning documentation and handover standards**

Practical Focus

- **Identifying faults in real-world mixed fibre/power systems**

- **Reducing Mean Time to Repair (MTTR)**

Module 7 – Fault Isolation & Troubleshooting in Harsh Environments

Topics Covered

- **Common failure modes in outdoor and industrial fibre**
- **Heat-related degradation and micro-bending**
- **Water ingress and sheath damage**
- **Identifying connector contamination at scale**
- **Emergency repair strategies for live networks**

Module 8 – The Future of Optical Infrastructure & High-Density Design

Topics Covered

- **Trends in fibre density and modularity**
- **Evolution of high-density patch panels (144F, 288F per RU)**
- **Plug-and-play architectures vs field termination**
- **Role of automation and pre-terminated systems**
- **Preparing networks for future bandwidth growth**
- **How modular systems reduce long-term CAPEX and OPEX**

Strategic Focus

- **Designing fibre infrastructure that scales without full replacement**
- **Future-proofing carrier and data centre investments**

Product & Tool Integration (Hands-On)

Participants will work with:

- **Diamond Optics 4, 6, and 9 RRU hybrid systems**
- **High-current power & fibre hybrid cables**
- **MPO/MTP trunks and high-density modular panels**
- **Field installation and test toolkits**
- **Advanced test equipment (OTDR, power meters, inspection scopes)**

Certification Outcome

- **Advanced Course Certificate of Completion**
- **Recognition as an Advanced Hybrid & High-Density Fibre Installer**
- **Clear pathway to specialised project-based or OEM-specific training**