Practical
FIBER OPTICS
for Engineers & Technicians

YOU WILL LEARN:

- The fundamentals of fiber optic communications systems
- State of the art fiber optics technology and installation practices
- How to apply practical techniques in jointing, splicing and testing fiber optic systems
- The correct procedures for cable installation and termination
- How to design and install your own fully operational fiber optics system
- New approaches to troubleshooting

WHO SHOULD ATTEND:

- Instrumentation and Control Engineers & Technicians
- Electrical Engineers
- Project Engineers
- Telecommunications Engineers & Technicians
- Process Control Engineers
- Consulting Engineers
- Maintenance Engineers & Technicians
- Systems Engineers
- Project Managers
- Electricians
THE WORKSHOP

This is a comprehensive two-day workshop that provides the necessary background to understand the fundamentals of fiber optic systems and their individual components including fibers, cable construction, connectors, splices and optical sources and detectors. Attendees will use this knowledge to develop the required techniques for design, installation and maintenance of fiber optic systems.

The workshop places significant emphasis on the practical techniques of component installation and system design. Attendees will have the opportunity to get hands on experience with mechanical and fusion splicing and with fitting the popular industrial fiber connectors. A fiber optic link design software package is provided to allow the attendee to practice actual link design practicals using various parameters. Finally, attendees will have the opportunity to practice using various Fiber Optic test equipment such as optical sources, power meters and Optical Time Domain Reflectometers (OTDR’s).

The material presented in this workshop has been developed from the many years experience gained by IDC Technologies’ engineers working in consulting and contracting roles in industry. It is a practical, hands-on workshop enabling participants to work through practical exercises which reinforce the concepts discussed during the workshop.

WORKSHOP OBJECTIVES

This workshop is designed to provide a thorough background to fiber optic communications systems and to illustrate how to design and install these systems. Various pitfalls associated with the implementation of fiber optic systems are discussed and workable solutions to these problems are provided. It will benefit engineers, technicians and scientists involved in specifying, commissioning and maintaining industrial fiber optic systems, but who have little previous experience in this field.

PRACTICAL SESSIONS

- Fiber Optic Link Design - a complete design of a fiber optic link
- Optical Time Domain Reflectometer (OTDR) - practical use of an OTDR in checking fiber optic cable
- Bit Error Rate - perform simple tests and examine the practical implications of the results
- Fusion Splicer - perform a fusion splice and gain experience in the techniques
- Mechanical Splice - perform a simple mechanical splice
- Optical Power Measurement - the use of an optical source and an optical power meter
- Continuity Tester - the principles of operation of a simple fiber optic continuity tester

ON-SITE TRAINING

✔ SAVE over 50% by having an IDC workshop presented at your premises.
✔ Customise the training to YOUR workplace.
✔ Have the training delivered when and where you need it.

Contact us for a FREE proposal.

THE PROGRAM

DAY ONE

INTRODUCTION TO FIBER OPTIC SYSTEMS
- Introduction
- Outline of workshop
- Historical background to fiber optics
- Comparison of fiber optics and copper systems

DEFINITIONS AND BASIC PRINCIPLES
- Data communications
- Communications channels
- Transmission modes
- The electromagnetic spectrum
- Revisiting copper

THEORY OF FIBER OPTIC TRANSMISSION
- Fundamental principles of operation
- Light transmission nature of glass
- Numerical aperture
- Modal propagation in fibers
- Multimode / singlemode / step-index / graded index
- Bandwidth of fibers
- Modal and chromatic dispersion
- Absorption / scatter / bending / radiation / mismatches
- Other types of fibers

CONSTRUCTION OF FIBER OPTIC CABLES
- Cable objectives
- Tensile ratings
- Structural elements
- Strengthening members
- Housings - loose tube / slotted core / tight buffered
- Sheaths and moisture barriers
- Classes of cables - aerial / underground / subaqueous / indoor

DAY TWO

OPTICAL DRIVERS AND DETECTORS
- Light emitting diodes
- Lasers
- Transmitter modules
- Safety considerations
- PIN photodiodes
- Receiver modules
- Optical amplifiers

INSTALLING FIBER OPTIC CABLES
- Preparation - site survey and design
- Installation rules and procedures
- Bending radius / cable tension / cable reels
- Cable trays / conduits / lubricants
- Indoor cable installation / leaving extra cable
- Outdoor cable installation / environmental conditions
- Splicing trays / organisers / termination cabinets / patch panels / distribution panels / breakout boxes

FIBER OPTIC SYSTEM DESIGN
- Initial design considerations
- Future capacity / reliability / operating wavelength
- Repeaters and amplifiers
- Design loss calculations / link loss budgets
- Design bandwidth calculations

TESTING OF FIBER OPTIC SYSTEMS
- Concepts of optical measurement
- Continuity testing
- Insertion loss testing
- Optical Time Domain Reflectometry (OTDR)
- Bit Error Rate (BER) testing
- Eye diagrams
- Laboratory fiber tests

TECHNOLOGIES THAT USE OPTICAL FIBERS
- Low speed modems
- 10 Base F / FDDI / FIOIRL
- 100 Base F
- ATM
- LANs / MANs / WANs
- Analog modulators for video and microwave links
- HDTV

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