

A 3-Day Technical Training Course on

Fibre Optics For Engineers & Technical Professionals

By

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Who Should Attend

This 3-day comprehensive course is specially designed for telecommunications and data-communications managers, engineers, technicians and professionals who wish to acquire the essential knowledge in the theory and practices of optical fibre communications.

Presented By :

LIGHT NETWORKING

Fibre Optic Consultancy, Training & Education

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Optical fibres are made of glass, usually about 125 micrometers in diameter, they are used to carry signals in the form of pulses of light for over 150km without the need for repeaters.

They have transformed telecommunications, data and video communications in the 21st century allowing us to communicate at the speed of light. Optical Fibre Cables are the back-bone of the information superhighway in this information age.

Optical fibres not only find extensive applications in various forms of communication, but also used as sensors with military, security and industrial applications. Minute changes in pressure, temperature, acoustic signals and many other variables can be detected.

WHO SHOULD ATTEND ?

This comprehensive course is designed for managers, engineers and technicians who wish to acquire a basic knowledge in the theory and practice of optical fibre communications in the telecommunication, data communication and CATV fields. Sensor applications are also introduced. No prior knowledge of the field is assumed though a technical background is helpful.

• Staff with limited fibre optic experience

This course is an excellent 'quick start' for engineers, technicians and technical sales personnel who are just starting to deal with fibre optics. These participants could range from experienced staff moving into an area involving new fibre optics responsibilities, to recent graduates with a good theoretical background but perhaps lacking the industry context.

• Staff with specific fibre optic experience

Often people become experienced in one area of fibre optics, e.g. splicing, cables or systems, but have limited knowledge of other areas, e.g. laser, detectors of LANs. The course can enable these participants to fill their knowledge gaps and expand their existing areas of expertise.

DAY 1

1. OVERVIEW

- ◇ History
- ◇ Fibre Fundamentals
- ◇ Applications Areas
 - ◇ Power Transmission
 - ◇ Sensors
 - ◇ Communications
- ◇ Pros & Cons of Fibre

2. OPTICAL THEORY

- ◇ Wavelength & Frequency
- ◇ Diffraction
- ◇ Photons
- ◇ Light as an E-M Field
- ◇ Rays of Light
- ◇ Refractive Index
- ◇ Snell's Law
- ◇ Total Internal Reflection

3. OPTICAL FIBRE THEORY

- ◇ Decibel and Attenuation
- ◇ Dispersion
- ◇ Reflection
- ◇ Gaussian Beams
- ◇ Standing Waves
- ◇ Slab Waveguide
- ◇ What is a Mode ?

4. FIBRE MANUFACTURING & TESTING

- ◇ Types of Fibre
- ◇ Fibre Manufacture
- ◇ Perform Measurements
- ◇ Fibre Testing
 - ◇ OTDR
 - ◇ Attenuation
 - ◇ Bandwidth
 - ◇ Dispersion (CD & PMD)
 - ◇ Cutoff Wavelength
 - ◇ Mode Field Diameter
 - ◇ Dimensions
 - ◇ Measurement Systems

DAY 2

5. CABLES AND INSTALLATION METHODS

- ◇ Purpose of Cable
- ◇ Cable Elements
- ◇ Cable Properties
- ◇ Cable Examples
- ◇ Installation Methods
- ◇ Fibre Strength
- ◇ Fibre Life Prediction
- ◇ Fibre Strain Measurement
- ◇ Cable Design & Installation Paper

6. SPLICING, CONNECTORS & COMPONENTS

- ◇ Fibre End Preparation
- ◇ Losses in Splices & Connectors
- ◇ Splicing

- ◇ Splice Losses
- ◇ Connectors
- ◇ Connector Losses
- ◇ Components
 - ◇ Couplers
 - ◇ Modulators
 - ◇ Switches
 - ◇ WDM & DWDM
 - ◇ Fibre Gratings
 - ◇ Isolators
 - ◇ MEMS
- ◇ Cable Installation & Jointing Paper

DAY 3

7. LIGHT SOURCES

- ◇ Properties of Light Sources
- ◇ Basic Optoelectronics
- ◇ Light Emitting Diodes (LEDs)
- ◇ How Lasers Work
- ◇ Laser Diodes (LDs)
- ◇ VCSELs
- ◇ Comparison of LDs & LEDs
- ◇ Optical Amplifiers
- ◇ Optical Safety

8. DETECTORS

- ◇ Properties of Detectors
- ◇ Simple PN Photodiode
- ◇ PIN Photodiode
- ◇ Detector Noise
- ◇ Detector Rise Time
- ◇ Avalanche Photodiode (APD)
- ◇ Comparison of Detectors
- ◇ Detector Circuits

9. SYSTEMS

- ◇ Overview
- ◇ System Design Procedure
- ◇ Decisions
- ◇ Power Budget
- ◇ Bandwidth/Dispersion Budget
- ◇ Example of Link Design
- ◇ Comparison of MM & SM Systems Analysis
- ◇ Systems Tests
- ◇ Systems Bottom Line
- ◇ Systems Design Paper

10. DATA, TELECOMS AND VIDEO NETWORKS

- ◇ LAN Standards
- ◇ Open Systems Interconnection (OSI)
- ◇ LAN Connectivity
- ◇ Ethernet
- ◇ Token Ring
- ◇ Fibre Distributed Data Interface (FDDI)
- ◇ Synchronous Digital Hierarchy (SDH)
- ◇ DWDM
- ◇ Cable TV-HFC, PONs & CCTV

Ross Finlay received a B.Sc in Electronics and Electrical Engineering from Glasgow University in 1979. He has 25 years experience with fibre optics including industrial research (at STL and Telecom Australia) cable and fibre quality assurance to ISO 9000 (at Olex Cables and Optix Australia) and measurement/sensor instrumentation marketing and development with Fibernet (Australia). Ross has presented several papers and tutorials at the Australian Conference on Optical Fibre Communications.

In 1986 while he was the Quality Manager at Optix Australia, Ross began conducting fibre optic course on a part time basis. Since then over one thousand people have participated on courses presented in London, Glasgow, Tokyo, Australia, Singapore, Malaysia and Hong Kong. During his time in Australia he sat on the Australian Standards Committee responsible for fibre optics and was elected a member of the IEE Victorian Overseas Committee. In 1990 Ross returned to the UK and set up the Glasgow office of Light Networking. In 2004 he returned to Australia to live and work. He has a wealth of expertise and experience in the field of fibre optics and its applications.



A number of practical demonstrations and videos will be used during the 3 day course.

CUSTOMISED IN-HOUSE PROGRAM AVAILABLE

A customised version of this course can be offered as an in-house program at your facility at significant cost savings.

Please contact us on (02) 8448 2078 or email enquiry@cpdint.com.au for more details.