

Presents

Fibre Optics for Engineers

By Dr Steven Trpkovski *Managing Director, Diamond Defence Pty Ltd*



This 2-day comprehensive course into the fundamentals of fibre-optics is designed for managers, engineers and technicians looking to acquire basic knowledge in the theory and practice of optical fibre technology for applications into the telecommunications and defence industries.

Introduction

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 200km 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 backbone of the information superhighway in this information age.

Due to the numerous advantages that optical fibre have compared to electrical/copper as a transmission medium, they can be found in many applications. The increased requirements/demands for data speed and capacity has seen a significant rise in the application of fibre optics in most industries such as communications platforms, sensor and weapons systems.

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 and data communication. 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 or LANs. The course can enable these participants to fill their knowledge gaps and expand their existing areas of expertise.

About the Instructors

Dr Steven Trpkovski completed his PhD in Fibre Optics at Victoria University in 2003. He has 25 years experience with fibre optics including research (at The University of Melbourne and Harvard University), new product development in optics and design and manufacturing of fibre optic products for Australia's Defence and Telecommunications industries. Steven is a holder of many patents, has published numerous journal articles and has presented at both national and international conferences. Steven is considered a leading expert in the field of fibre optics and fibre optic sensors.

Harvey Heinrich completed his B.Sc. in Applied Physics at RMIT University and has spent his career in design and manufacture of fibre optic harness assemblies for the telecommunications and defence industries.

Course Outline

1. Introduction

- ◇ 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
- ◇ Preform Measurements
- ◇ Fibre Testing
 - ◇ OTDR
 - ◇ Attenuation
 - ◇ Bandwidth
 - ◇ Dispersion (CD & PMD)
 - ◇ Cutoff Wavelength
 - ◇ Mode Field Diameter

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
- ◇ Cleaning and Inspection
- ◇ Properties of Light Sources
- ◇ Basic Optoelectronics
- ◇ Light Emitting Diodes (LEDs)
- ◇ How Lasers Work
- ◇ Laser Diodes (LDs)
- ◇ 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

9. Systems

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

A number of practical demonstrations will be used during the 2 day course.

Customized In-House Courses

This program can be customized to suit specific needs of your organization. Please contact us for more details.

Registration Details

You can register by :

EMAIL Email completed registration form [click here](#)

Individual Fee : AUD\$1,800.00 + AUD\$180.00(GST) = AUD\$1,980.00 per delegate (minimum 3 delegates)

Group Discount: 10% discount off the registration fee for each delegate if you register 5 or more delegates

20% discount off the registration fee for each delegate if you register 10 or more delegates

Payment Method : Direct Debit

Bank: Commonwealth Bank

Account Name: Diamond Defence

BSB: 063 101

Account No.: 1066 2439

Payment Terms : Your place is automatically reserved upon receipt of payment/company order. Payment is required before the event. Delegates may be refused admission if payment is not received prior to the event.

Cancellation : Any cancellation of registration must be made in writing. An administration charge of 20% will be levied for any cancellation received up to 2 weeks before the event commences. We regret that there will be no refund for any cancellation made less than 2 weeks before the event commences. A substitute or replacement is always welcome at no extra charge.

Location: Training courses are generally run in a suitable room at client location. If alternate off-site location is preferred additional charges apply.

Dates: Course dates are typically confirmed 4 weeks before event.

Note : The organizer reserves the right to make changes to the event schedule, contents and venue.

Registration Form

Please register the following delegates for the event - "Fibre Optics For Engineers" Course

Delegates :

1) Mr/Ms : Job Title :

Email : Telephone :

2) Mr/Ms : Job Title :

Email : Telephone :

Name of Organisation / Company :

Address : Postcode : Country :

Contact Person : Mr/Ms Job Title :

Department : Telephone :

Fax : Email :