Course overview

Description
A concise overview of Wave Division Multiplexing (WDM) with both Coarse Wave Division Multiplexing (CWDM) and Dense Wave Division Multiplexing (DWDM) being covered. The course starts with a review of the relevant elements of fibre transmission and multiplexing before then studying WDM components and architectures. Reliability, resilience and management are then followed by WDM services and futures.

Who will benefit?
Anyone working with CWDM/DWDM.

Prerequisites
Introduction to Telecommunications.

Objectives
By the end of the course delegates will be able to:

- Compare CWDM and DWDM.
- Explain the benefits of WDM.
- Describe Dispersion and four way mixing.
- Describe the different WDM equipment components.
- Describe different WDM architectures.
- Explain How DWDM works.

Duration: 2 days

Contents

**Fibre communications review**
- Optical transmission, Fibre characteristics, Fibre component parts. Multi Mode Fibre (MMF).
- Single Mode Fibre (SMF): Fibre connections, Lasers, Attenuations, dispersion, optical signal noise ratios (OSNR) and their effects. Channel Spacing and Signal Direction. Limiting factors to single wavelength.

**WDM overview**
- Multiplexing, TDM, WDM benefits. WDM standards: CWDM vs. DWDM. Four Wave Mixing (FWM). Impact and countermeasures to FWM on WDM.

**CWDM**
- ITU G.694.2, channels, channel spacing.

**DWDM**
- ITU G.694.1, channels, channel spacing.

**WDM Equipment Components**

**WDM Architectures**
- WDM network sections. Point-to-Point, optical switches, mesh, ring and star topology. Example of combined WDM and other technology network. Wavelength converting transponders, 1R, 2R, 3R.
- **Protection for WDM**

**WDM Management Options**
- In-band management. Out of band management. The Optical Supervisory Channel (OSC). OSC capabilities.

**WDM services**
- WDM Access. Bit rates. Transparent Networks. Modulation, QPSK, SDH over WDM. Migrating from SDH to DWDM. Ethernet over WDM. IP over WDM.

**Optical Transport Networks**
- G.709, “digital wrapper”, Optical Channel Payload Unit (OPU), Optical Channel Transport Unit (OTU), Optical Channel Data Unit (ODU). OTU1, OTU2, OTU3, OTU4.

**WDM Futures**

Generic training

Generic training compliments product specific courses covering the complete picture of all relevant devices including the protocols “on the wire”.

“...because it covers the WHY, not just the how. ”

W.G. – BBC

Small class sizes

We limit our maximum class size to 8 delegates; often we have less than this. This ensures optimal interactivity between delegates and instructor.

“Excellent course. The small class size was a great benefit...”

M.B. - IBM

Hands on training

The majority of our courses use hands on sessions to reinforce the theory.

“Not many courses have practice added to it. Normally just the theoretical stuff is covered.”

J.W. Vodafone

Our courseware

We write our own courses; courseware does not just consist of slides and our slides are diagrams not bullet point text.

“Well presented & lots of it.”

P.A. Livingston

Customise your course

Is there more than one of you? Please contact us if you would like a course to be customised to meet your specific requirements. Have the course your way.

“I was very impressed by the combination of practical and theory. Very informative. Friendly approachable environment, lots of hands on.”

S.R. Qinetiq

Our clients

You can be reassured that when you receive training from us, you are in good company. Clients range from service providers and large multinationals down to one man businesses.

“Material covered is relevant to ISP operation, more so than many vendor courses.”

A.F. LINX

What our customers say

“Big thanks to SNT. I found this course to be well planned and delivered by your professional staff.”

S.H. Deutsche Bank AG

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