

Open Awards Qualification Unit



This unit forms part of a regulated qualification.

1 Unit Details

Unit Title:	Advanced Polarisation Mode Dispersion and Chromatic Dispersion Testing
Unit Reference Number:	K/618/8302
Level:	3
Credit Value:	5
Minimum GLH:	30

2 Learning Outcomes and Criteria

Learning Outcome (The Learner will):	Assessment Criterion (The Learner can):
1. Understand the impact of signal dispersion on a digital communications system	1.1 Describe the relationship between the signal bit rate to the time duration of each bit in the signal
	1.2 Explain how the spreading of a series of digital pulses can degrade the quality of the digital signal at the receiver
	1.3 Apply a dispersion limit (e.g. ITU 10% limit) to a digital signal to determine the maximum permitted pulse spread
2. Understand the concept of light as an electromagnetic wave and the effects of the refractive index	2.1 Identify the wave length for a sinusoidal wave
	2.2 Describe how the refractive index of a material relates to the speed of a light wave
3. Understand the concept of chromatic dispersion	3.1 Describe the concept of chromatic dispersion in optical fibres
	3.2 Explain the concept of the 'wave group'
	3.3 Explain how the optical fibre dispersion value is related to the group delay curve
	3.4 Describe how the dispersion of standard optical fibre varies with wavelength
	3.5 Identify the wavelength of minimum dispersion in a dispersion curve
	3.6 Demonstrate the use the chromatic dispersion value of an optical fibre to calculate the amount

	of pulse spreading
	3.7 Describe the basic principle of chromatic dispersion compensation
4. Understand the principles of chromatic dispersion testing	4.1 Identify why it might be necessary to measure the chromatic dispersion of an optical fibre link
	4.2 Describe one method for measuring Chromatic Dispersion in the field
	4.3 Describe the concept of curve fitting with regard to Chromatic Dispersion measurement
	4.4 Recognise when a curve fit is appropriate to the data
	4.5 Demonstrate an awareness of suitable wavelength test ranges
	4.6 Identify the characteristic chromatic dispersion curves for a standard 'unshifted' optical fibre and dispersion shifted fibre
5. Understand the concept of polarisation mode dispersion	5.1 Explain how birefringence in an optical fibre can affect the time of propagation of the polarised components of a light signal travelling along an optical fibre
	5.2 Identify the units most commonly associated with the Differential Group Delay
	5.3 Describe one possible cause for the birefringence of an optical fibre
	5.4 Describe the phenomenon of Mode Coupling and how this affects the Differential Group Delay of an optical fibre
	5.5 Understand the statistical nature of polarisation mode dispersion and how this differs from most other transmission properties of an optical fibre
6. Understand the principles of polarisation mode dispersion testing	6.1 Identify two reasons why it might be necessary to measure the polarisation dispersion of an optical fibre link
	6.2 Identify a PMD measurement trace (interferometric method) showing evidence of strong polarisation mode dispersion and very low mode coupling
	6.3 Describe one method for measuring PMD in the field

Required Equipment List

In order to deliver this unit, centres must have the following equipment for every **six (6)** trainees on the course:

Sample traces from real fibre systems

CD and PMD test equipment or equivalent test system emulation software

Suitable fibre test systems and accessories