Open Awards Qualification Unit

This unit forms part of a regulated qualification.

1 Unit Details

Unit Title:	Advanced Fibre Networks and Technology
Unit Reference Number:	A/618/8305
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 light propagation through optical fibres	1.1 Explain the physics behind the wavelength windows used for fibre optic transmission
	1.2 Explain at least 3 of the basic optical characteristics important to optical fibres
	1.3 Explain the structure of an optical fibre and understand how light travels along a fibre
	1.4 Explain the difference between analogue and digital transmission
2. Understand the principles of power/loss budgets and evaluate the options for optical amplification	2.1 Explain why dB units are used in fibre optics and describe the origins of the dBm unit
	2.2 Analyse loss budgets against power budgets in dBs
	2.3 Explain the principles, potential use and limitations of an EDFA amplifier
	2.4 Explain the principles, potential use and limitations of a RAMAN amplifier
3. Understand the principles of dispersion and be able to calculate a dispersion budget	3.1 Explain how dispersion limits the potential signal transmission speed
	3.2 Explain the origin of modal, chromatic (CD) and polarisation mode dispersion (PMD)
	3.3 Analyse a dispersion budget for an optical link

		3.4	Critically compare methods of dispersion compensation
4.	Understand the principles and use of advanced fibre types and optical components	4.1	Explain the international specifications for fibre types, explain the difference and how this affects their potential usage and limitations
		4.2	Explain the difference between passive and active optical components
		4.3	Explain the principles and technology of splitters, couplers, WDMs, circulators, gratings, interleavers, add/drop multiplexers, modulators and MEMS
		4.4	Critically compare the usage of splitters, couplers, WDMs, add/drop multiplexers and modulators in an optical network
5.	Understand multiplexing basics and how this is used in optical transmission	5.1	Explain the principles of TDM, WDM, DWDM and CWDM multiplexing
		5.2	Explain the limitations imposed by fibre types, optical amplifier bandwidth and other optical components
		5.3	Critically compare the potential and limitations of the different types of multiplexing for different network models

Required Equipment List
Exercises and case studies based on real networks Relevant BS EN/IEC standards