



**Australian Government**

# **ICTOPN603 Design a dense wavelength division multiplexing system**

**Release: 1**

# ICTOPN603 Design a dense wavelength division multiplexing system

## Modification History

Release	Comments
Release 1	This version first released with ICT Information and Communications Technology Training Package Version 2.0.

## Application

This unit describes the skills and knowledge required to design a high-capacity dense wavelength division multiplexing (DWDM) optical network suitable for a metropolitan area network (MAN) or long haul applications.

It applies to individuals who are skilled technicians and excellent communicators who use optical technologies for the deployment of high capacity networks. The work involves link budget design and providing specification details for configuration and commissioning teams.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Unit Sector

Telecommunications – Optical Networks

## Elements and Performance Criteria

Element	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Prepare to produce a DWDM system design	1.1 Obtain the planning document from appropriate person and determine site details 1.2 Obtain the service type and number of channels required between customer traffic sources and destinations and the type of protection required 1.3 Obtain specifications of optical fibre between sites 1.4 Determine fibre loss between sites

2. Calculate link budget for each wavelength path	<p>2.1 Use vendor’s engineering design rules, specifications and data to calculate link budget and link margin for each DWDM wavelength and path</p> <p>2.2 Evaluate link budget and assess calculated margin and make recommendations for improvement if warranted</p> <p>2.3 Analyse specifications of installed optical fibre and determine if dispersion will limit the maximum traffic data rate</p> <p>2.4 Generate options for system design that are realistic for the enterprise and network</p> <p>2.5 Evaluate and select preferred option based on enterprise business strategy outcomes, service policy and compliance with relevant legislation</p> <p>2.6 Discuss and confirm selected option with customer</p>
3. Prepare detailed configuration documents for the DWDM system	<p>3.1 Outline detailed requirements of the DWDM system for configuration document</p> <p>3.2 Prepare a configuration document according to customer’s traffic needs</p> <p>3.3 Prepare an internet protocol (IP) address allocation for all DWDM shelves and associated routers and gateways</p> <p>3.4 Submit documentation to appropriate person for approval and sign off</p>
4. Investigate upgrade options using emerging technologies	<p>4.1 Investigate option of using a reconfigurable optical add-drop multiplexer (ROADM) and make recommendations outlining benefits</p> <p>4.2 Investigate feasibility of a future upgrade up to 100 Gbps system using optical transport network (OTN) - DWDM technology</p>

## Foundation Skills

*This section describes language, literacy, numeracy and employment skills incorporated in the performance criteria that are required for competent performance.*

Skill	Performance Criteria	Description
Reading	2.1, 2.3, 2.5	<ul style="list-style-type: none"> <li>Interprets textual information from relevant sources to identify and plan for all job requirements and adhere to procedures and standards</li> </ul>

Writing	1.1, 2.2, 2.4, 3.1, 3.2, 3.4, 4.1	<ul style="list-style-type: none"> <li>Accurately prepares project briefs, technical documentation and reports using clear and technically specific language, numerical data and diagrammatic information</li> </ul>
Oral Communication	1.1, 2.2, 2.6, 4.1	<ul style="list-style-type: none"> <li>Uses listening and questioning skills to confirm technical and operational requirements and participates in a verbal exchange of ideas and solutions and uses appropriate, detailed and clear language to address installation personnel, vendors, customers and contractors</li> </ul>
Numeracy	1.4, 2.1, 2.2, 2.3	<ul style="list-style-type: none"> <li>Uses mathematical equations to evaluate all relevant technical data</li> </ul>
Navigate the world of work	2.5	<ul style="list-style-type: none"> <li>Monitors adherence to legal and regulatory rights and responsibilities</li> </ul>
Interact with others	3.4	<ul style="list-style-type: none"> <li>Actively identifies requirements of important communication exchanges, selecting appropriate channels, format, tone and content to suit purpose and audience and monitoring impact</li> </ul>
Get the work done	1.1-1.4, 2.2, 2.4, 2.5, 3.3, 4.1, 4.2	<ul style="list-style-type: none"> <li>Understands key principles and concepts underpinning the design and operation of digital systems and tools and applies these when seeking to understand the potential of new technology</li> <li>Takes responsibility for defining key aspects of workload, balancing own needs and priorities with job requirements</li> <li>Takes responsibility for high-impact decision in complex situations involving many variables and constraints</li> <li>Recognises and addresses complex problems involving multiple variables</li> </ul>

## Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
ICTOPN603 Design a dense wavelength division multiplexing	ICTOPN6128A Design a dense wavelength division	Updated to meet standards for	Equivalent unit

<b>Code and title current version</b>	<b>Code and title previous version</b>	<b>Comments</b>	<b>Equivalence status</b>
system	multiplexing system	Training Packages	

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=a53af4e4-b400-484e-b778-71c9e9d6aff2>