

**NEW ZEALAND INSTITUTES OF TECHNOLOGY AND POLYTECHNIC
QUALIFICATIONS IN INFORMATION & COMMUNICATIONS TECHNOLOGY**

PRESCRIPTION: WN500 WIRELESS NETWORKING

AIM OF MODULE:	To provide students with an understanding of wireless networking principles and the knowledge and skills required for installing and maintaining wireless networks.
CREDITS:	7
STUDENT LEARNING HOURS:	70
CONTENT REVISED:	2010
PRESCRIPTION EXPIRY DATE:	November 2013
NOTE:	Based on the CISCO FUNDAMENTALS OF WIRELESS NETWORKING programme content

Level and Assessment Schedule

TOPICS	Highest Skill Level				Suggested Assessment Percentage
	R	C	A	P	
1. Wireless networks, standards and network interface cards (NICs)			*		15
2. Wireless radio technology		*			10
3. Wireless topologies		*			10
4. Access points and bridges			*		10
5. Antennas		*			10
6. Security			*		10
7. Wireless Network Design		*			10
8. Site surveys			*		10
9. Wireless network management				*	5
10. Emerging technologies		*			5
11. Wireless certification and product families		*			5
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LEARNING OUTCOMES

The student will:

- A 1. Describe the key features and components of wireless networks, 802.11 standards and configure client adaptors and utilities
- C 2. Describe the underlying physics and mathematics used to analyse wireless networks
- C 3. Describe the key features and components and of wireless LANs WLANs and their topologies
- A 4. Describe and explain the operation of wireless bridges and connect access points and configure Ethernet and radio ports to provide client network services
- C 5. Describe and explain the operation and installation of various antennas in wide use and define their performance
- A 6. Describe the technologies used to secure wireless networks and demonstrate their configuration
- C 7. Describe the key components of a wireless network design in relation to a number of widely used applications
- A 8. Prepare for and conduct a site survey including the provision of appropriate documentation
- P 9. Manage, monitor and troubleshoot a typical wireless network installation
- C 10. Describe the various emerging wireless technologies their uses and applications
- C 11. Describe and explain the various wireless certifications, specifications and equipment typically used in wireless networks and describe how they may be sourced

CONTENT

Networked Operation Systems

1. Wireless Networks, Standards And Network Interface Cards (NICs)

- A description of the key features and components of wireless networks, 802.11 standards will include:
 - Basic Wireless LAN function:
 - Networking Media
 - Wireless technologies
 - Components of a wireless network

- WLANs
- 802.11 Standards
- 802.11 MAC Layer
- Physical Layer
- Configuring client adaptors and utilities will involve:
 - Client Adaptors
 - Client Utility
 - Conducting diagnostics on a wireless network

2. Wireless Radio Technology

- Mathematics for studying radio
- Electromagnetic waves
- Signals in time
- Signals in frequency
- Radio systems
- Multiple access
- Radio wave propagation

3. Wireless Topologies

- Components
- WLAN topologies
- Channel set up
- Bridge topologies
- Sample topologies:

4. Access Points and Bridges

- Access point connection
- Basic configuration
- Management navigation
- Ethernet port configuration
- Wireless bridges
- Basic bridge configuration
- Configuring the radio and Ethernet ports
- Configuring services
- Managing configuration files
- Statistics

5. Antennas

- Describing antenna performance
- 2.4 Ghz Omni-directional Antennas
- 2.4 Ghz Directional Antennas
- 5 Ghz Antenna
- Cable and accessories
- Link engineering
- Antenna installation

6. Security

- Security fundamentals
- WLAN security technologies
- Configuring users and WEP
- Configuring associations and filters
- Scalable WLAN Security

7. Wireless Network Design

- Scalable enterprise WLAN security
- Wireless network applications
- WLAN design
- Building to building design
- Site survey equipment and utilities:

8. Site Surveys

- Infrastructure awareness
- Conducting surveys
- Mounting and installation
- Accessories
- Documentation
- Surveying WLANs and project management

9. Wireless Network Management

- Troubleshooting methodology
- OSI Troubleshooting
- TCP/IP troubleshooting
- Diagnostic tools
- WLAN problems and single point failures
- LAN troubleshooting
- Wireless network monitoring and management

10. Emerging Technologies

- Ultra wideband wireless
- VoIP and Voice over WLANS
- Mobile Wireless
- Unified communications and integrated solutions
- Wireless network installation case studies

11. Wireless Certification And Product Families

- Wireless organisations and certifications
- Bluetooth and Home RF specifications
- Adaptor product vendors and specifications
- Bridge product vendors and specifications
- Antenna product vendors and specifications
- Other relevant organisations

NOTES FOR TUTORS

A typical assessment strategy should include:

- practical skills tests
- laboratory exercises
- group activities
- progressive on-line tests (CISCO Web Portal)
- summative (final) on-line test (CISCO Web Portal)
- kinaesthetic activities