



**Level 5 Diploma in PC Engineering & Structured Cabling  
(108) 133 Credits**



<b>Unit:</b> Wireless Networking	<b>Guided Learning Hours:</b> 220
<b>Exam Paper No.:</b> 4	<b>Number of Credits:</b> 22
<b>Prerequisites:</b> Knowledge in Windows operating system.	<b>Corequisites:</b> A pass or better in Certificate in Networking or equivalence.
<p><b>Aim:</b> Discover the advantages and disadvantages of wireless networks and which technology and equipment are best. Learners will practice setting up wireless networks by configuring wireless network adapters and access points, finding wireless hot spots, determining communications distance, and sharing printers and hard drives on a Windows computer. This hands-on unit will educate learners how to protect communications and data through proper configuration of devices, added security measures, and special network design. Learners will be able to configure wireless routers with security in mind, set up a firewall to prevent access from the Internet, and use a wireless sniffer to learn about wireless networks in nearby areas. Learners also learn how to add password protection, disable the SSID broadcast, set up MAC address filters, and enable encryption using WEP and WPA. The unit also focuses on layers 2 and 3 of the OSI reference model, design, performance analysis and protocols. Other topics covered include: digital cellular, next generation PCS, wireless LANs, wireless ATM, mobile IP, System/Network Design, cellular concepts, resource management, radio management, radio channel propagation fundamentals, modulation, fading countermeasure, diversity, coding, spread spectrum and multiple access techniques.</p>	
<b>Required Materials:</b> Recommended Learning Resources.	<b>Supplementary Materials:</b> Lecture notes and tutor extra reading recommendations.
<b>Special Requirements:</b> The unit requires a combination of lectures, demonstrations, discussions, and hands-on labs.	
<p><b>Major Learning Outcomes:</b></p> <p>1 How wireless networks manage to transmit radio waves through solid objects and also how it manages to carry data onto those waves.</p> <p>2 Wireless technology; how it works; the wireless software interface and wireless transmission power.</p> <p>3 Overview of the 802.11 architecture and the different topologies incorporated to accommodate the unique characteristics of the IEEE 802.11 wireless LAN standard.</p>	<p><b>Assessment Criteria:</b></p> <p>1.1 Describe wireless networking standards</p> <p>1.2 Describe the different hardware needed to create a wireless network</p> <p>1.3 Examine other relevant wireless networking standards emerging; including Bluetooth and cellular data protocols</p> <p>1.4 Describe the basics of wireless networking</p> <p>2.1 Describe the recommended maximum distance between radio cards</p> <p>2.2 Describe the difference between wired and wireless networks</p> <p>2.3 Describe the requirements in setting up a wireless network</p> <p>2.4 Describe when wireless network is appropriate</p> <p>2.5 Describe wireless cards</p> <p>3.1 Describe physical layer specifications</p> <p>3.2 Describe the different types of configurations</p> <p>3.3 Describe the compatibility between different wireless cards</p> <p>3.4 Describe functions required for an 802.11 compliant device to operate either in a peer-to-peer fashion or integrated with an existing wired LAN</p>

<p>4 The necessary hardware and software required in setting up a wireless network and the wireless network setup process.</p>	<p>3.5 Describe how MAC level access control and data delivery services allow upper layers of the 802.11 network</p> <p>4.1 Define wireless network hardware requirements</p> <p>4.2 Define wireless network software requirements</p> <p>4.3 Identify how to use tools which identify hardware connections</p> <p>4.4 Be able to analyse data-link level settings</p> <p>4.5 Be able to configure the internet protocol setting</p> <p>4.6 Be able to configure a mixed network (wired and wireless)</p>
<p>5 How to connect a wireless network and how the 802.11 standard defines services for providing functions among stations.</p>	<p>5.1 Illustrate how to setup simple, intermediate and advanced connections using the Windows environment</p> <p>5.2 Be able to install wireless network adapters and configure the network settings</p> <p>5.3 Demonstrate how to set up Bluetooth connections on Windows</p> <p>5.4 Be able to setup printer and file sharing</p> <p>5.5 Be able to trouble-shoot connection related problems</p>
<p>6 The process of building/creating up a wireless network; how to troubleshoot setting and maintenance problems.</p>	<p>6.1 Demonstrate drawing a network diagram</p> <p>6.2 Examine features of wireless routers/gateways</p> <p>6.3 Be able to configure a wireless router/gateway</p> <p>6.4 Explain how to configure a PC as a wireless gateway</p> <p>6.5 Describe how to extend the range of the network using a wireless bridge</p> <p>6.6 Describe how an antenna can extend the range of a wireless network</p> <p>6.7 Be able to set up a secure wireless network</p>
<p>7 Different security wireless methods and how IEEE 802.11 defines authentication services.</p>	<p>7.1 Define security fears and the security aspects to be concerned about.</p> <p>7.2 Describe methods used to keep unwanted users from connecting to your network and sharing internet connection</p> <p>7.3 Describe how to protect valuable data from other legitimate users</p> <p>7.4 Describe how to protect network computers, servers, gateway etc from online intruders</p>
<p>8 Understand how to manage and monitor a wireless network; keep track of access points and their corresponding clients.</p>	<p>8.1 Describe tools for monitoring wireless network</p> <p>8.2 Be able to interpret access point event log</p> <p>8.3 Describe Simple Network Management Protocol (SNMP)</p> <p>8.4 Be able to check signal strength</p>

<p>9 Understand wireless network classificationcategories; technology and wireless environment.</p>	<p>8.5 Establish wireless security policy</p> <p>9.1 Describe wireless personal area network</p> <p>9.2 Describe wireless local area network</p> <p>9.3 Describe wireless metropolitan area network</p> <p>9.4 Describe wireless wide area network</p> <p>9.5 Explain digital cellular telephone networks</p> <p>9.6 Analyse satellite categories</p> <p>9.7 Describe different 802.11 wireless specifications</p>
<p><b>Methods of Evaluation:</b> A 2½-hour written examination paper with five essay questions, each carrying 20 marks. Candidates are required to answer all questions. Candidates also undertake project/coursework in Wireless Networking with a weighting of 100%.</p>	

### Recommended Learning Resources: Wireless Networking

<p><b>Text Books</b></p>	<ul style="list-style-type: none"> <li>• Wireless Networking Technology: From Principles to Successful Implementation by Steve Rackley. ISBN-10: 0750667885</li> <li>• Fundamentals of Wireless LANs Companion Guide (Cisco Networking Academy) by Inc. Cisco Systems. ISBN-10: 1587131196</li> <li>• Wireless Communications &amp; Networking, (The Morgan Kaufmann Series in Networking) (Hardcover) by Vijay Garg. ISBN-10: 0123735807</li> <li>• Wireless Communications by Andrea Goldsmith. ISBN-10: 0521837162</li> </ul>
<p><b>Study Manuals</b></p> 	<p>BCE produced study packs</p>
<p><b>CD ROM</b></p> 	<p>Power-point slides</p>
<p><b>Software</b></p> 	<p>Windows Operating System</p>