



Level 6 Advanced Diploma in Routing & Switching (112)
151 Credits



Unit: Switching	Guided Learning Hours: 220
Exam Paper No.: 2	Number of Credits: 22
Prerequisites: Networking knowledge.	Corequisites: A pass or higher in Diploma in IP Routing or equivalence.
<p>Aim: This unit covers an in-depth study of “campus networks” and multilayer switching technologies over high speed Ethernet. Subject areas such as VLANs, STP, MLS, HSRP, IGMP and multicasting are covered in detail. Upon completion of this unit, learners will be able to perform multilayer switching tasks including: Fast Ethernet, Gigabit Ethernet; VLAN basics, types, identification and trunking protocol; Spanning Tree Protocol; MLS processes and configuration; Multicasting protocols, Routing and minimising service loss and data theft in a Campus Network. The unit also focuses on the selection and implementation of the appropriate Cisco IOS services to build reliable, scalable multilayer-switched LANs.</p>	
Required Materials: Recommended Learning Resources.	Supplementary Materials: Lecture notes and tutor extra reading recommendations.
<p>Special Requirements: The unit requires a combination of lectures, demonstrations, discussions, and hands-on labs.</p>	
<p>Intended Learning Outcomes:</p> <ol style="list-style-type: none"> 1. The events and forces that shape the enterprise networks using the multilayer model. 2. The physical wiring, types of switching elements and the process of connecting the switch block. 3. The disadvantages of a flat networks architecture and analysing the implementation of VLANs. 4. The techniques and technologies used to increase and improve network reliability and fault tolerance. 5. Multi-Layer Switching (MLS) as the desired method of accelerating routing performance; configuring multilayer switch on both Cisco switch and router. 6. The ways of improving IP routing 	<p>Assessment Criteria:</p> <ol style="list-style-type: none"> 1.1 Describe a campus network 1.2 Describe multilayer switching functions 1.3 Identify different Cisco switches 1.4 Define a building block 2.1 Discuss cable media, switch block devices and the connectivity 2.2 Demonstrate how to assign IP addresses to switches 2.3 List the steps required to configure fast Ethernet connection 3.1 Define a VLAN 3.2 Describe VLAN Trunking Protocol (VTP) 3.3 Discuss VLAN membership 3.4 Define VTP modes of operation 3.5 Describe the use of VTP pruning 3.6 Demonstrate configuring VLANs 4.1 Describe spanning tree protocols 4.2 Describe STP port states 4.3 Identify problems caused by STP 4.4 Discuss the purpose of PBDUs 4.5 Identify the purpose of portfast 4.6 Explain the difference between backbone fast and uplink fast 5.1 Describe interVLAN routing 5.2 Describe inter-switch link protocol 5.3 Analyse communication problems between VLANs 5.4 Describe the steps in configuring interVLAN routing 5.5 Demonstrate configuring interVLAN routing 6.1 Define multilayer switching

performance using Multilayer switching through address integration of routing and switching technologies.	6.2 Discuss the configuration of multilayer switch route processor 6.3 Describe flow masks 6.4 Demonstrate how to configure multilayer switch switching engine
7. Fault tolerance vs high availability; the importance of router backup and the hardware and software tools that will allow high available and fault-tolerance.	7.1 Describe the advantages of redundant paths 7.2 Describe the tasks required to configure HSRP 7.3 Explain the purpose for active and standby routers 7.4 Describe the HSRP router states 7.5 Describe how Hot Standby Routing Protocol (HSRP) provide redundancy; HSRP deployment and configuration 7.6 Describe how HSRP operates and the deployment and implementation of HSRP 7.7 Demonstrate configuration of HSRP 7.8 Demonstrate configuration of tracking on the serial interface 7.9 Demonstrate configuration of asymmetric routing
8. Multicast routing protocols, algorithms and the IP multicast the implementation.	8.1 Describe the different methods of transmission and its effect on bandwidth 8.2 Analyse multicast addressing techniques 8.3 Define how routers and switches handle multicast routing 8.4 Describe the different multicast routing protocols
9. Configuring IP multicast routing and protocols supported by Cisco IOS software.	9.1 Discuss the tasks required to set up multicast session 9.2 Describe PIM modes 9.3 Describe the purpose of Redundancy Protocol (RP)
10. The requirements for controlling user access to network devices; user and device Network Access control authentication.	10.1 Define an access policy 10.2 List and define the different methods of login 10.3 Describe the policies at different levels 10.4 Describe port security
Methods of Evaluation: A 3-hour essay written paper with 5 questions, each carrying 20 marks. Candidates are required to answer all questions. Candidates also undertake project/coursework in Switching with a weighting of 100%.	

Recommended Learning Resources: Switching

Text Books	<ul style="list-style-type: none"> Cisco LAN Switching Fundamentals by David Barnes and Basir Sakandar. ISBN-10: 1587050897 Multilayer Switching Lab Companion. ISBN-10: 1587131447
Study Manuals 	BCE produced study packs
CD ROM 	Power-point slides
Software 	Cisco IOS