**DATA COMMUNICATION 2**

**Course Name: Data Communication 2**

**Course Code: CNA 1201**

**Course Level: Year One Semester Two**

**Credit Units: 3**

**Contact Hours: 45**

**Course description**

This course builds on data communication 1. The course provides a foundation to a learner to be able to configure routers and switches using command line interface.

**Course Objectives**

The aims of this course are:

* To perform basic CLI configurations for routers and switches
* To make comparison between static and dynamic routing
* To configure VLANS and access control lists
* To prepare and configure a router for DHCP services
* To implement NAT services
* To enable students implement Device Discovery, Management, and Maintenance
* To prepare students for industrial certifications like CCNA and CCNP

**Learning outcomes:**

By the end of the course, students will be able to;

* Perform basic CLI configurations for routers and switches
* Make comparison between static and dynamic routing
* Configure VLANS and access control lists
* Prepare and configure a router for DHCP services
* Implement NAT services
* Enable students implement Device Discovery, Management, and Maintenance
* Prepare students for industrial certifications like CCNA and CCNP

**COURSE OUTLINE**

|  |  |  |
| --- | --- | --- |
| **No** | **Topics** | **Hours** |
| 1 | Introduction to routing   * How routers work and choose best path, administrative distance * Analyse the routing table focus on directly connected vs Dynamic vs static routes * Configuring router settings, IPv4 and IPv6 * Verify connectivity | 4 |
| 2 | Dynamic vs Static routes   * Why use static routing * Types of static routes * Configure Static and Default Routes * Troubleshoot Static and Default Route * Dynamic Routing Protocols specifically RIPv2 | 4 |
| 3 | Switched Networks   * Role of a switched network * How switches forward frames * Switch Forwarding Methods * Store-and-Forward Switching * Cut-Through Switching * Switching Domains i.e. Collision vs broadcast domain | 4 |
| 4 | Switch Configuration   * Switch boot sequence * Configure switch ports * Secure Remote Access i.e. remote access SSH, Telnet * Switch Port Security i.e. Secure Unused Ports, operations, violation modes * Port Security Verification and * Ports in Error-Disabled State | 4 |
| 5 | VLANs   * Overview of VLANs i.e. VLAN Definitions, Benefits of VLANs, Types of VLANs, Voice VLANs * VLANs in a Multiswitched Environment * VLAN Implementations * Troubleshoot VLANs and Trunks * Inter-VLAN Routing Using Routers | 4 |
| 6 | Access Control Lists   * What’s an ACL, its purpose * Guidelines for ACL Creation * Guidelines for ACL Placement * Standard IPv4 ACLs * Verifying ACLs * Securing VTY Ports with a Standard IPv4 ACL | 8 |
| 7 | DHCP   * How DHCP works * Configuring router on a stick for DHCP services * Introduction to DHCPv6 | 4 |
| 8 | NAT   * What Is NAT? * How NAT Works * Types of NAT * Configure NAT i.e. static vs dynamic | 4 |
| 9 | Device Discovery, Management, and Maintenance   * Device Discovery with CDP * Configure and Verify CDP * Device Discovery with LLDP * Configure and Verify LLDP * Discover Devices Using LLDP * NTP * Setting the System Clock * NTP Operation * Configure and Verify NTP * Syslog Operation * Syslog Configuration * Router and Switch File Maintenance * IOS Image Management | 6 |
| 10 | All in one practical   * Packet tracer activities | 3 |
|  | **Total** | **45** |

**Mode of delivery**

* Straight lectures
* Practical
* Tutorial

***Mode of assessment***

Course work tests, assignments and online CCNA level 2 Exam 30%

End of semester examination 70%

**Reading List**

* Kurose, J. F. & Ross, K. W. (2013). Computer Networking (6. ed), Harlow: Pearson Education
* Cisco Press 2017: Scaling Networks v6 Companion Guide
* Odom, W., & Wilkins, S. (2017). CCNA Routing and Switching 200-125 Official Cert Guide and Network Simulator Library (1. ed), Cisco Press.
* Wallace, K. (2017). CCNP Routing and Switching ROUTE 300-101 Official Cert Guide (1. ed), Cisco Press
* Hucaby, D. (2015). CCNP Routing and Switching SWITCH 300-115 Official Cert Guide from Cisco Press
* Lacoste, R., & Wallace, K. (2017). CCNP Routing and Switching TSHOOT 300-135 Official Cert Guide (1. ed), Cisco Press.