**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.