

Course Code MNC361 **Course Name** Routing Protocols and Concepts

**Pre-Requisite** MN571

Year of Study 3<sup>rd</sup> / 6<sup>th</sup> Major Elective

Level of Course BSc/1st Cycle

**Course Type** 

ECTS Credit 7.5

**Language of Instruction** English

Mode of Delivery On Campus

# **Course Objectives:**

This course describes the architecture, components, and operations of routers and switches in a small network. Students learn how to configure a router and a switch for basic functionality. By the end of this course, students will be able to configure and troubleshoot routers and switches and resolve common issues with RIPv1, RIPng, singlearea OSPF, virtual LANs, and inter-VLAN routing in both IPv4 and IPv6 networks.

## Learning Outcomes:

Upon successful completion of this course students should be able to;

- Explain basic switching concepts and the operation of Cisco switches
- Define the purpose, nature, and operations of a router, routing tables, and the route lookup process
- Demonstrate how VLANs create logically separate networks and how routing occurs between them
- Describe dynamic routing protocols, distance vector routing protocols, and link-state routing protocols
- Configure and troubleshoot static routing and default routing (RIP AND RIPng)
- Configure and troubleshoot an Open Shortest Path First (OSPF) network
- Define, configure, and troubleshoot access control lists (ACLs) for IPv4 and IPv6 networks
- Configure, and troubleshoot Dynamic Host Configuration Protocol (DHCP) FOR IPv4 and IPv6 networks
- Configure, and troubleshoot Network Address Translation (NAT) operations

## **Teaching Methodology:**

Lectures 42 Hours

Labs 30 Hours

## **Course Content**

Introduction to Switched Networks: LAN Design, The Switched Environment

Basic Switching Concepts and Configuration: Basic Switch Configuration, Switch Security: Management and Implementation

VLANs: VLAN Segmentation, VLAN Implementations, VLAN Security and Design

Routing Concepts: Initial Configuration of a Router, Routing Decisions, Router Operation

Inter-VLAN Routing: Inter-VLAN Routing Configuration, Troubleshoot Inter-VLAN Routing, Layer 3 Switching

Static Routing: Static Routing Implementation, Configure Static and Default Routes, Review of CIDR and VLSM, Configure Summary and Floating Static Routes, Troubleshoot Static and Default Route Issues

Routing Dynamically: Dynamic Routing Protocols, Distance Vector Routing Protocols, RIP and RIPng Routing, Link-State Dynamic Routing, The Routing Table

Single-Area OSPF: Characteristics of OSPF, Configuring Single-Area OSPFv2, Configuring Single-Area OSPFv3

Access Control Lists: IP ACL Operation, Standard IPv4 ACLs, Extended IPv4 ACLs, Troubleshoot ACLs, IPv6 ACLs

DHCP: Dynamic Host Configuration Protocol v4, Dynamic Host Configuration Protocol v6

Network Address Translation for IPv4: NAT Operation, Configuring NAT, Troubleshooting NAT

## Assessment Method

Final Exams

Labs/Assignment

Mid term

# **Required Textbooks/Reading:**

Title	Author(s)	Publisher	Year
Routing Protocols and Concepts, CCNA	Rizk Graziani, Allan		
Exploration Companion Guide	Johnson		
Routing Protocols and Concepts, CCNA	Allan Johnson		
Exploration Labs and Study Guide			
CCNA Cisco Certified Network	Todd Lammle		
Associate Study Guide			