## Routing and Switching Essentials

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| *SMS Code* | IN615005 | *Directed Learning hours* | 60 |
| *Level* | 6 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | IN515001 | *Total Learning Hours* | 150 |
| *This course partially replaces IT202001*  *Name of other Programme: Bachelor of Information Technology (version 2)* | | | |

***Aims***

To introduce students to the architecture, components, and operations of routers and switches in a small network.

***Learning Outcomes***

At the successful completion of this course, students will be able to:

1. Explain basic switching concepts and enhanced switching technologies.
2. Configure and troubleshoot basic operations of a small switched network.
3. Explain routing, virtual Local Area Networks (VLANs), Network Address Translation (NAT), and access control lists (ACLs).
4. Configure and troubleshoot routing, VLANs, NAT and access control lists (ACLs).
5. Explain Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS).
6. Plan and implement a switched network for a small organisation within a given scenario.

***Indicative Content***

* Basic switching concepts and the operation of Cisco switches
* Enhanced switching technologies such as VLANs, VLAN Trunking Protocol (VTP), Rapid
* Spanning Tree Protocol (RSTP), Per VLAN Spanning Tree Protocol (PVSTP), and 802.1q
* Basic operations of a small switched network
* The purpose, nature, and operations of a router, routing tables, and the route lookup process
* Static routing and default routing
* How VLANs create logically separate networks and how routing occurs between them
* Dynamic routing protocols, distance vector routing protocols, and link-state routing protocols
* Basic operations of routers in a small routed network:
* Routing Information Protocol (RIPv1 and RIPv2)
* Open Shortest Path First (OSPF) protocol (single-area OSPF)
* The purpose and types of access control lists (ACLs)
* The operations and benefits of Dynamic Host Configuration Protocol (DHCP) and Domain
* Name System (DNS) for IPv4 and IPv6
* The operations and benefits of Network Address Translation (NAT)

***Assessment***

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| **Assessment Activity** | **Weighting** | **Learning Outcomes** |
| Weekly tests | 20% | 1,2,3,4,5 |
| Skills based assessment | 20% | 2,4 |
| Assignment | 20% | 2,4,6 |
| Theory exam | 40% | 1,2,3,4,5 |

A single final result to be entered in SMS at completion.

***Resources***

**Required:**

Cisco Network Academy Routing and Switching Series “Routing and Switching Essentials”.

Student Lab Manual