Module Title **Cisco CCNA Course 2: Routing and Switching Essentials** **Keywords** Network, LAN, WAN, Protocols, Seven-Layer-Model, IP Addressing, Subnetting, Ethernet.	Reference CM3531
	SCQF Level SCQF 9
	SCQF Points 15
	ECTS Points 7.5
	Created May 2002
	Approved July 2016
	Amended October 2014
	Version No. 1

This Version is No Longer Current

The latest version of this module is available here

Prerequisites for Module

Introduction to Telecommunications (EN2520) or Introduction to Data Networks (EN2521) or equivalent.

Corequisite Modules

None.

Precluded Modules

None.

Aims of Module

This describes the use, function, and operation of routers and switches in a small campus network.
Students will learn how to further configure a router and a switch beyond its basic functionality.
Students will be able to configure

Routing Concepts (Inter-VLAN & Static): Describe primary functions and features of a router. Configure initial settings on a router. Configure devices and verify connectivity. Display router information. Configure routing between VLANs in a small-to-medium sized business network. Identify the topologies as either legacy, router-on-a-stick, or multilayer switch inter-VLAN routing types. Explain the benefits of using static routes. Configure a static route to other networks using next-hop addresses. Configure and verify a static route to a directly connected network using an exit interface.

Dynamic Routing and Single area OSPF: Explain the operation of dynamic routing protocols. Explain the process by which link-state routers learn about other networks.

and troubleshoot common issues with commonly used routing protocols such as RIPv1, RIPng, single OSPF in both IPv4 and IPv6 networks.

Students will be able to configure and troubleshoot common issues with virtual LANs, and inter-VLAN routing in both IPv4 and IPv6 networks.

Learning Outcomes for Module

On completion of this module, students are expected to be able to:

1. Evaluate basic switching concepts and the use of switches in a small campus network. The use of VLANs to create logically separate networks, and route between them.
2. Evaluate basic routing concepts and the use of routers in a small campus network. The use of routing tables and the route lookup process.
3. Analyse and assess the merits of static, default and dynamic routing protocols(distance vector and link-state).
4. Design, and implement access control lists (ACLs) for IPv4 and IPv6 networks.
5. Evaluate the use of DHCP and NAT in IPv4 & IPv6 networks.

Configure OSPFv2 routing. Verify configurations and network connectivity.

Access Control Lists: Explain the purpose and operation of ACLs. Plan an ACL implementation. Configure, apply, and verify standard/extended ACLs.

Networks Address Translation and DHCP: Describe NAT characteristics. Identify NAT terminology by placing the terms to their correct locations on a topology diagram representation. Configure dynamic NAT traffic, pools, associations, and interfaces. Verify NAT implementation by accessing Internet services and viewing NAT translations. Configure DHCP for IPv4 or IPv6.

Indicative Student Workload

Contact Hours	Full Time
Laboratory	36
Directed Study	
Student Centred Learning	72
Private Study	
Private Study	42

Mode of Delivery

The module is taught using a structured programme of web

Indicative Module Content

Switched Networks & VLANs: Identify switched network terminology. Identify switch hardware terminology as compared to switch selection criteria. Cable the network and verify the default switch configuration. Configure basic network device settings. Explain the purpose of VLANs in a switched network. Implement VLANs to segment a small-to-medium sized network.

structured programme of web based learning materials, web-based activities, practical exercises and student centred learning.

Assessment Plan

	Learning Outcomes Assessed
Component 1	1,2,3
Component 2	4,5

Component 1 is a closed book online examination worth 50% of the total module assessment.

Component 2 is coursework which consists of a practical laboratory element associated with the Cisco Course 2 material worth 50% of the total module assessment.

Indicative Bibliography

1. This module represents Course 2 of the four course CCNA (Cisco Certified Networking Associate) Routing and Switching Curriculum. The material for the course is provided by Cisco to the University in the form of web based learning and assessment mechanisms as well as lab equipment in the form of routers and switches for practical training.

2. STALLINGS, W., 2013. Data and Computer Communications,10th Ed, New Jersey: Prentice Hall.
3. Cisco Networking Academy, 2014. Routing and Switching Essentials Companion Guide. 1st Edition. Cisco Press.
4. Wendell Odom 2013. Cisco CCNA Routing and Switching 200-120 Official Cert Guide Library: Cisco Press