Marwadi University
Faculty of Diploma studies
Information and Communication Technology

Diploma Year – III (Semester V)

Subject Name: Network Routing and Switching

Subject Code - 09CT0507

Objectives: By the end of the course, students will be able to understand different network types and layers for the communication. Students will also get knowledge of devices like routers and switch in detail with command line configuration and operation using them for various scenarios. Students will be able to understand different routing topology, access list control with different routing protocols.

Credits Earned: 04 Credits

Course Outcomes: After completion of this course, student will be able to:

1. Describe the function of Network layers and types of networks. (Understanding)
2. Interpret different types of IP Address and sub-netting for different scenarios (Applyy)
3. Classify types of routing and characteristics of routing protocols(Analyze)
4. Demonstrate the use of line commands for different operation and configuration of router and switch. (Understanding).
5. Built, modify and test various network topology, access list control with different routing protocol (Applying)

Pre-requisite of course: Data Communication and Networking

Teaching and Examination Scheme:

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial / Practical Marks		Total Marks
				E	I		V	T	
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term Work	
3	0	2	4	50	30	20	25	25	150

Contents:

Unit	Topics	Contact Hours
1	**Networks and their Building Blocks** Introduction to Networks, Networking history and Types, OSI Reference Model, TCP/IP Model, Ethernet Technologies and Cabling, Cisco 3 Layer Model	04
2	**IP Addressing and Subnets** IP Addresses – Composition, Types and Classes, Private and Public IP addresses, Subnetting, Variable Length Subnet Masks (VLSM), Route Summarization, Troubleshooting IP Addressing	10
3	**Routers, Switches and IOS** Introduction to Cisco Routers, Switches, IOS & the Boot Process, Using the Command-Line Interface (CLI), Basic Configuration of Router and Switches, Configuring Router Interfaces, Gathering Information and Verifying Configuration, Configuring DNS, Telnet & DHCP, Saving, Erasing, Restoring and Backing up Configuration & IOS File, Password Recovery on a Cisco Router, Cisco Discovery Protocol (CDP)	12
4	**IP Routing** Understanding IP Routing, Static, Default and Dynamic Routing, Administrative Distance and Routing Metrics, Classes of Routing Protocols, Routing Loops, Route Redistribution	08
5	**Routing Protocols** Understanding of Enhanced Interior Gateway Routing Protocol (EIGRP), Open Shortest Path First (OSPF), RIPv1 & RIPv2, Configuring EIGRP, OSPF, RIPv1 & RIPv2, Verifying and Troubleshooting EIGRP, OSPF, RIP	10
6	**Access Lists, VLANs and VTP** Introduction to Access Lists, Standard Access Lists, Extended Access Lists, Access Lists - Remote Access, Switch Port, Modifying & Helpful Hints, MAC Address Table, Virtual LANs (VLANs),	5
	Total Hours	49 Hrs

Suggested Text books / Reference books:

1. CCNA INTRO (Introduction to Cisco Networking Technologies) by Todd Lammle, Sybwx , WILEY (http://www.innos.in/downloads/CISCO%20-%20640-802-ccna.pdf)
2. Computer Networks by Andrew S Tannebaum, Pearson
3. Data Communication and Networking by Forouzen, Tata McGraw Hill
4. Data and Computer Communication by Williams Stallings, Prentice Hall of India

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process.

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
30%	30%	25%	10%	5%	--

Suggested List of Experiments:

1. Basic Exercises using CLI
2. Routing IOS Fundamental Exercises
3. Exercises on Routing Fundamentals
4. Exercises on RIP/EIGRP Routing Scenarios
5. Exercises on OSPF
6. Exercises on Access-Lists
7. Exercises on DHCP
8. Exercises on Switch Configuration and VLAN
9. Exercises on Route Redistribution
10. Exercises on Network Address Translation

Instructional Method:

1. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
2. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
3. Practical examination will be conducted at the end of semester for evaluation of performance of students in the laboratory.
4. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

Supplementary Resources:

1. https://www.tutorialspoint.com/data_communication_computer_network/index.htm
2. https://nptel.ac.in/courses/106/105/106105183/
3. https://www.lammle.com/courses/cisco-ccna/
4. https://www.youtube.com/channel/UCcpFFuABMD9s1HuqQCt6kiQ
5. http://www.innos.in/downloads/CISCO%20-%20640-802-ccna.pdf (online pdf book)
6. https://www.freeccnaworkbook.com/workbooks/ccna/configuring-static-routing
7. https://www.netacad.com/
8. https://www.freeccnastudyguide.com/study-guides/ccna/
9. https://www.packettracerlab.com/