COURSE TITLE	**ROUTING & SWITCHING TECHNOLOGY**
COURSE CODE	**05CA0201**
COURSE CREDITS	**4**

Objective:

1 Student will understand Advance Network Fundamentals.
2 Student Will also understand conceptual knowledge about IP Addressing & Subnetting.
3 Student Will also have conceptual knowledge about Routing.
4 Student Will also have conceptual knowledge of Switching.
5 Understand function of Network Devices.

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

1 Computer Network & IP Addressing & Subnetting.
2 Fundamentals of Ethernet LANS & Cisco IOS
3 IPv4 Routing
4 LAN Switching
5 IPv4 Services & Implementations

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Computers Networks, Addressing & Subnetting** Types of Networks., Network Devices Protocols. CIDR & VLSM., Network Services. Types of Cables.	11
2	**Fundamentals of Ethernet LANs & Cisco IOS** Boot Process of Cisco IOS Router. Manage Cisco IOS Files., Password Policies of Cisco Devices. Manage Administrative & Erasing Configurations., Boot Process of Cisco IOS routers.	11
3	**IPv4 Routing & LAN Switching** Routing Process., Static Routing & Dynamic Routing. VTP Configuration., STP Configuration. VLAN Routing.	11
4	**IPv4 Services & Implementations** Managing ACLs. Backup Configuration in Router., Types of NAT. Configuration of Named & Numbered., Reset password of Router.	12
Total Hours		**45**

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Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Unit 1** • Set sail on a transformative journey into the world of network simulation with the introduction of Packet Tracer. • configure LAN networks to accommodate the diverse needs of your organization, laying the foundation for enhanced productivity and innovation. • With a keen eye for detail and a deep understanding of network principles, map out intricate topologies that optimize performance, resilience, and scalability. • Dive deep into router configurations, mastering the nuances of IPv4 addressing and routing protocols. With precision and expertise, configure routers to efficiently route data packets across networks, ensuring optimal performance and reliability in the transmission of information. • Unlock the transformative potential of Classless Inter-Domain Routing (CIDR) as you delve into the intricacies of IP address allocation and subnetting. • Engage in the art of subnetting as you carve out address spaces tailored to the unique requirements of your organization. • Embark on a journey through the intricate layers of the Cisco IOS router boot process, where each step unfolds with precision and purpose. Delve deep into the realms of bootstrap code execution, POST (Power-On Self-Test) diagnostics, and the loading of the IOS image from non-volatile memory. • Peer into the heartbeat of your network infrastructure as you decipher the operational status of serial interfaces on Cisco routers. • Ascend to mastery as you navigate the labyrinth of Cisco IOS file management, where efficiency and organization reign supreme. Explore the myriad commands and techniques for uploading, downloading, and organizing IOS images. • Immerse yourself in the foundational principles of network configuration as you embark on the journey of configuring routers and switches in Packet Tracer. • Fortify the defenses of your network infrastructure with robust password policies meticulously crafted for Cisco devices.	15
2	**Unit 2** • Delve deep into the intricacies of routing table management, carefully crafting default route entries to ensure efficient and reliable packet forwarding. • By harnessing the power of static routing, you'll exert precise control over network traffic, optimizing performance and reliability with surgical precision. • Dive into the world of dynamic routing protocols as you fine-tune configurations for Routing Information Protocol (RIP), a foundational protocol for routing in IP networks. Explore the nuances of RIP version 2, meticulously configuring route advertisements, metrics, and timers to optimize routing efficiency and convergence. • Elevate your network routing capabilities with optimized configurations for Enhanced Interior Gateway Routing Protocol (EIGRP), a sophisticated routing protocol renowned for its efficiency and scalability. • Embark on a journey through the expansive landscape of Open Shortest Path First (OSPF) configurations, a cornerstone of modern routing protocols. Dive deep into OSPF area design, router adjacencies, and link-state database synchronization. • Lay the	15

	foundation for seamless network connectivity as you construct resilient Ethernet switch networks, the cornerstone of modern LAN environments. • Delve into the world of Virtual LANs (VLANs) as you configure and validate their implementations across your network infrastructure. • Bridge the divide between VLANs as you enable inter-VLAN routing, facilitating seamless communication and collaboration across disparate network segments. • Embrace the versatility of VLAN trunking as you facilitate the seamless transmission of VLAN traffic across your network infrastructure. • Streamline network management and VLAN configuration tasks with the deployment of VLAN Trunking Protocol (VTP), a powerful mechanism for propagating VLAN information across your network infrastructure. • Safeguard network stability and prevent loops with meticulously configured Spanning Tree Protocol (STP) configurations, a cornerstone of Ethernet network resilience. • The art of network security as you meticulously craft configurations for Standard Access Control Lists (ACLs), fortifying your router against unauthorized access and malicious traffic. With precision and foresight, define access control entries (ACEs) based on source IP addresses, exerting granular control over network traffic and safeguarding critical resources from potential threats. • Ascend to the pinnacle of network security as you architect configurations for Extended Access Control Lists (ACLs), unleashing the full power of packet filtering and access control on your router. • Navigate the realm of access control with finesse as you implement Named and Numbered ACLs within the Standard ACL configuration paradigm. • Harness the versatility of Named and Numbered ACLs as you deploy them within the Extended ACL configuration framework., • The diverse landscape of Network Address Translation (NAT), where the boundaries between private and public IP addresses blur. Explore NAT variants such as Static NAT, Dynamic NAT, and PAT (Port Address Translation), each offering unique benefits and use cases. • Navigate the delicate balance between security and accessibility as you embark on the task of resetting router passwords with surgical precision. Employ proven methodologies and best practices to regain access to critical router resources while safeguarding against unauthorized intrusion. • By implementing robust backup strategies, you'll fortify the integrity and stability of your network, empowering seamless operations and rapid response to unforeseen challenges.	
Total Hours		**30**

Textbook :

1 CCNA Cisco Certified Network Associate Study Guide , Todd Lammle , Sybex, 2020

References:

1 CCNA 200-301 Official Cert Guide, CCNA 200-301 Official Cert Guide, Wendell Odom , Cisco Press , 2018

2 CCNA Cisco Certified Network Associate Study, CCNA Cisco Certified Network Associate Study, Todd Lammle , Sybex, 2016

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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					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
20.00	30.00	25.00	15.00	10.00	0.00

Instructional Method:

1 Board Work
2 Demo
3 PPT

Supplementary Resources:

1 https://www.9tut.com
2 https://www.freeccnastudyguide.com/study-guides/ccna/ch1/intro-to-networks/

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