DEPARTMENT OF COMPUTER TECHNOLOGY

Semester Plan

Course Title: Network Administration & Services

Course Code: 66672

Semester: 7ᵗʰ

Course Instructor: Afifa Hoque

Jr.Instructor

Department of Computer Technology

Daffodil Institute of IT

Email : afifa@diit.info

Objective:

- To preserve the integrity of data
- To protect the confidentiality of data
- To promote the availability of data for authorized users.

SL No.	Subject code	Name of Subject	T	P	C	Marks				
						Theory		Practical		TOTAL
						Cont. Assess	Final Exam	Cont. Assess	Final Exam	
1	66672	Network Administration & Services	2	6	4					

AIMS

• To be able to design computer network system

• To be able to acquire the knowledge on Network Administration.

• To be able to provide the knowledge and to develop skill on Different routing protocol.

• To be able to acquire the knowledge on learning, forwarding and filtering decision.

• To be able to provide the knowledge and to develop skill on network Security.

 • To be able to provide the knowledge and to develop skill on Router, Switch, NIC and Cabling.

 • To be able to establish and implement Link Redundancy.

SHORT DESCRIPTION

Network Basics; Sub-netting, VLSM, Summarization; Internet Routing Protocol, Open Shortest Path First (OSPF), Enhanced Interior Gateway Routing Protocol (EIGRP), Spanning Tree Protocol (STP), VLANs and Inter-VLAN routing, network address translator (NAT), network security, Internet Protocol Version 6 (IPv6), Link and Gateway Redundancy.

DETAILS DESCRIPTION

Theory:

1.Review the network theories.

1.1.Describe OSI, TCP/IP model

1.2.Identify collision and broadcast domain.

1.3.Describe Ethernet cabling straight-through, crossover, and console.

1.4.Data encapsulation of TCP/IP layer

1.5.Understand three layer's Hierarchical model.

2.Understand Sub-netting, VLSMs, and Summarization.

2.1.Define Sub-netting Basics.

2.2.Define Classless inter domain routing (CIDR), including class A, class B, class C.

2.3.Define Variable length subnet mask (VLSMs)

2.4.Describe VLSM design and implementing VLSM Network

2.5.Define Summarization

3.Understand Internet Protocol Routing.

3.1.Define Routing basics

3.2.Configure IP Routing in network.

3.3.Define Static routing

3.4.Define default routing.

3.5.Define dynamic routing

3.6.Describe Routing information protocol.

4.Open Shortest Path First (OSPF).

4.1.Define OSPF basics.

4.2.Describe OSPF terminology.

4.3.Define OSPF operation

4.4.Describe Loopback interface

4.5.Describe OSPF areas

4.6.Describe virtual link

5.Enhanced Interior Gateway Routing Protocol (EIGRP)

5.1.Define Introduction to EIGRP

5.2.State the configuration of EIGRP

5.3.State EIGRP Neighbor Adjacency

5.4.Describe EIGRP Neighbor and topology table

5.5.Describe EIGRP Unequal Cost Load Balancing

5.6.State EIGRP K values.

6.Understand Spanning Tree Protocol (STP).

6.1. Define Spanning Tree.

6.2. Describe Spanning Tree cost calculation.

6.3. Define Spanning Tree port states.

6.4. Define Spanning Tree portfast. 6.5. Define Rapid Spanning Tree.

6.6. Define Spanning Tree BPDU Guard.

6.7. Define Spanning Tree BPDU Filter.

6.8. Define Spanning Tree Root guard.

6.9. Define Ether-channel.

7.Understand VLANs and Inter-VLAN routing.

7.1. Define VLANs

7.2. State 802.1Q and ISL Encapsulation.

7.3. Define Trunk link

7.4. Describe Router on a Stick.

7.5. Describe Inter-VLAN routing by multilayer switch

7.6. State the configuration of VLAN Trunking protocol (VTP)

8.Understand the network address translator (NAT).

8.1. State Network Address Translator (NAT).

8.2. Distinguish static and Dynamic NAT.

8.3. Demonstrate PAT (overloading).

9.Understand the network security

9.1. Define User security level, login security (SSH, Telnet).

9.2. Demonstrate standard Access list.

9.3. Define Extended Access list.

9.4. State Port Security.

9.5. State Protected port.

9.6. Demonstrate DHCP Snooping.

9.7. State Cyber Security.

10. Understand Internet Protocol Version 6 (IPv6).

10.1 Describe the benefits and uses of IPv6

10.2 Define IPv6 addressing and expression

10.3 State how IPv6 works in an Inter-network.

10.4 Define IPv6 Routing protocol (RIP, EIGRP,OSPF).

6. Perform the Design, Develop and Simulation of Default Routing

6.1. Design network diagram using packet tracer

6.2. Design proper IP address with network devices.

6.3. Configure Default Routing as per requirement.

6.4. Ensure reachability

7. Perform the Design, Develop and Simulation of Hot Standard Router

Protocol (HSRP)

7.1 Design network diagram using packet tracer

7.2 Design proper IP address with network devices.

7.3 Configure HSRP as per requirement.

7.4 Ensure reachability

8. Perform the Design, Develop and Simulation of Virtual Router

Redundancy Protocol (VRRP)

8.1 Design network diagram using packet tracer

8.2 Design proper IP address with network devices.

8.3 Configure VRRP as per requirement.

8.4 Ensure reachability

9. Perform the Design, Develop and Simulation of Network Address

Translator (NAT)

9.1 Design network diagram using packet tracer

9.2 Design proper IP address with network devices.

9.3 Configure NAT as per requirement.

9.4 Ensure reachability

10. Perform the Design, Develop and Simulation of Standard Access List

(ACL)

10.1 Design network diagram using packet tracer

10.2 Design proper IP address with network devices.

10.3 Configure ACL as per requirement.

10.4 Ensure reachability

11. Perform the Design, Develop and Simulation of Extended Access List

(ACL)

11.1 Design network diagram using packet tracer

11.2 Design proper IP address with network devices.

11.3 Configure ACL as per requirement.

11.4 Ensure reachability

12. Perform the Design, Develop and Simulation of Login using Telnet

12.1 Design network diagram using packet tracer

12.2 Design proper IP address with network devices.

12.3 Configure Telnet as per requirement.

12.4 Ensure Login operation by username and password.

13. Perform the Design, Develop and Simulation of Ether-channel

13.1 Design network diagram using packet tracer

13.2 Design proper IP address with network devices.

13.3 Configure Ether-channel as per requirement.

13.4 Ensure reachability by single link and group link

14. Perform the Design, Develop and Simulation of Portfast properties of Spanning Tree 14.1 Design network diagram using packet tracer 14.2 Design proper IP address with network devices. 14.3

Configure Portfast as per requirement. 14.4 Ensure reachability 15.Perform the Design, Develop and Simulation of Port Security properties of Spanning Tree 15.1 Design network diagram using packet tracer 15.2 Design proper IP address with network devices. 15.3 Configure Port Security as per requirement. 15.4 Ensure reachability 16.Perform the Design, Develop and Simulation of Router on a Stick of Inter-VLAN Routing 16.1 Design network diagram using packet tracer 16.2 Design proper IP address with network devices. 16.3 Configure Router on a Stick as per requirement. 16.4 Ensure reachability 17.Perform the Design, Develop and Simulation of Inter-VLAN Routing using Multilayer Switch 17.1 Design network diagram using packet tracer 17.2 Design proper IP address with network devices. 17.3 Configure Inter- VLAN routing as per requirement. 17.4 Ensure reachability 18.Perform EIGRP Load Balancing 18.1 Design network diagram using packet tracer 18.2 Design proper IP address with network devices. 18.3 Configure Load Balance as per requirement. 18.4 Ensure reachability

 Project: 19.Establish a Computer Physical Network and Demonstrate Administrative Operation and Services (EIGRP, OSPF, NAT, Inter- VLAN Routing, Portfast).

REFERENCE BOOKS

1. Data communications and Networking – Behrouz A. Forouzan. 2. Fundamentals of Communication-M. Shamim Kaiser and associates 3. Data and Computer Communications-William Stallings 4. Local Area Networking – S. K Basandra. 5. MCSE Windows & Networking Essential – Joe Casad 6. CCNA Routing and Switching – Todd Lammle. 7. How to Master CCNA- Rene Molenaar 8. Principles of Networkand System Administration - Mark Burgess