IT-AD08: ADD ON DIPLOMA IN COMPUTER NETWORK DESIGN AND INSTALLATION

Objective of the course: This course is designed to impart professional training to the students of computer Science, computer applications, computer engineering in design and installation of computer networks. The training is designed to meet the present industry standards so as to qualify the CISCO certifications.

Eligibility: 10+2 or higher . Regular students of undergraduate or post graduate courses in Computer Science, IT, Computer Engineering, Electronics Engineering, Electronics, Physics, Computer Applications will be eligible to offer this course as an add-on Diploma course.

Reservation: SC/ST/OBC as per university rules.

Duration: One year part time, 120 hrs of teaching

Fee: Regular students from Constituent colleges: Rs 3000/- for students of courses where add-on courses are compulsory, Rs 3500/- for others. Students from other institutions: Rs 4000/-

Seats: Thirty. The course will be offered only against admission of a minimum of 15 candidates

Course structure: There will be one theory and one practical papers. Theory papers will be of 60 hrs duration per year and practical will be of 60 hrs.Multimedia Projector based class room, Network Lab as per standard prescribed for CISCO Certification, broad band based Internet

connectivity, Webserver and a networked computer laboratory consisting minimum 15 computers for 30 students in two batches(One computer per student)

Examination: Examination will be conducted by a board consisting of an internal examiner and an external examiner on the basis of a MCQ on-line /off-line OMR based theory test of 2 hr duration (50 questions, 100 marks and a practical test of 3hrs (100 Marks). Total marks of the examination will be 200. RS 200/- will be collected by the University Computer Centre for conducting the MCQ/On-line examination in addition to the prescribed examination fee of the university.

In order to eligible for a Diploma, candidate is required to score 50% of the total marks. Those who fail to get 50% marks will be required to reappear in the examination as and when conducted by the university. A Certificate will be awarded instead of Diploma to the candidates who are allowed to take this course independently, not as an Add-on course

SYLLABUS

COMPUTER NETWORK DESIGN AND INSTALLATION

Networking fundamentals : communication model, communication tasks, categories of communication networks into lan,man,wan. Protocols: characteristics and functions, network models: layered models, using layers for data communication, the osi reference model, osi layers and functions, tcp/ip model, encapsulation process, overview of different protocols associated with each layers. Overview of network devices: repeaters, hubs, network interface cards, switches, bridges, routers. Voice, DSLl, Cable modem and optical devices, security devices, wireless devices.

Transmission terminology: frequency,spectrum,bandwidth, transmission impairments. Network topologies: bus,star and ring, hierarchical topology, full mesh and partial mesh topologies, logical topology

Networking Media :Copper Media: American Wire Gauge, Twisted pair cable,STP and UTP, Coaxial cable, Cable specification and Termination. Optical Media: The Electromagnetic Spectrum, Total Internal reflection, OFCs, Multimode and Single Mode cables, Cable Designs, Optical Networking components, Signals and Noises in OFC, Installation, care and Testing of Optical Fiber. Network Cabling and Testing: Analog and Digital bandwidth, Signals and Noises on Network media, Structured Cabling Systems, Standards and Codes, Tools, Installation process. Cabling the LANs: LAN physical layer, Ethernet Media and Connection Requirements, LAN connection Devices, Peer-peer Networks and Client Server Network installation., Cabling WAN:WAN physical layer, WAN serial connection, Routers and Serial, ISDN,DSL and Cable connections. Setting up Console connection

Ethernet fundamentals Introduction to Ethernet, Ethernet and OSI model,MAC addressing, Ethernet frame structure and fields. Ethernet Operation: Media Access control, Ethernet MAC, Simplex, Duplex operations, Ethernet timing, Interframe spacing, Error Handling, Types of collisions, Ethernet errors, Collision Domains and Broadcast Domains.

ethernet technologies and ethernet switching: 10 and 100 mbps ethernet, gigabits, 10gbps and future ethernet, ethernet switching:layer 2 and layer 3 switching, microsegmentation, swirching modes and brief overview of spanning tree protocol

TCP/IP Protcol and IP addressing   TCP/IP model and its comparison with OSI Model, Internet Architecture. IP address: IPV4 addressing, IP address classes, Reserved IP addresses, Public and Private addresses, Subnetting ,Fields in IPV4 Header, overview of IPV6 and its comparison with IPV4. Obtaining IP addresses, Static assignment, ARP and RARP, BOOTP and DHCP.

Routing Fundamentals and Subnets: Routed, Routable and Routing protocols. The mechanism of Subnetting , CIDR. TCP/IP Transport and Application Layer: TCP/IP transport layer :Flow control, Sessions. Windowing, TCP and UDP, port Numbers. Application layer: DNS, FTP, TFTP,HTTP,SMTP,SNMTP, Telnet

Routing & Routers

WANs and Routers: WAN characteristics, WAN routers. Router Fundamentals: Router Boot Sequences and setup mode, Establishing HyperTerminal session, CISCO IOS software fundamentals. Router Configuration.

Managing CISCO IOS software, Introduction to CDP, getting information about remote Devices. Routing and Routing protocols: Routing basics, Static routing, Dynamic routing, Identifying the class of routing protocols.

Distance Vector Routing protocols: Distance vector Routing, Examining Routing table, RIP features, IGRP.

TCP/IP Error and Control Messages: ICMP, TCP/IP suite Control Messages. Basic Router trouble shooting. Intermediate TCP: The TCP/IP protocol suite, Overview of Transport layer ports, TCP/IP and Internet Layer.

Access Control Lists: ACL overview, Creating and Using ACL, Working of ACL, Standard ACLs, Extended ACLs, Named ACLs, Firewall.

Switching Basics and Intermediate Routing

Introduction to classless Routing: CIDR, VLSM, Route summarisation, Route Flapping, RIP version 2, default routers. Single area OSPF: Concepts of OSPF, configuration of OSPF. Enhanced IGRP overview,EIGRP features and Technologies, EIGRP packet types, convergence, configuring EIGRP

Switching concepts and LAN design: Ethernet LANs, LAN switching, Basic operation of a switch LAN design. Switches: Overview, Starting switches, LAN switches and Hierarchical network design, Core layer Overview.

Switch configuration: Microsegmentation, Switch forwarding, Switches and Collison domains, Communication between switches and PCs. Configuration of a Catalyst switch. Managing MAC address Table. Spanning Tree protocol: redundant topology overview, Spanning Tree overview, STP and RSTP.
Virtual LANs: VLAN introduction, Broadcast Domain with VLAN and Routers, Operation and benefits of VLANs, VLAN configuration, VLAN

frame identification. VLAN trunking protocol: Trunking, VTP, Inter-VLAN routing.

Wireless Networking: Brief introduction to Protocols, Standards, Wireless Networking devices

Case studies of CISCO Routers and Switches.

Reference Books

CCNA Official Exam Certification Guide, Second Edition,CISCO Press 2007

CCNA Official Exam Certification Library, Third Edition 2007

CCNA Self-Study: Interconnecting Cisco Network Devices (ICND) 2007

CCNA Self-Study: Introduction to Cisco Networking Technologies 2007