



Diploma in Computer Hardware Maintenance & Networking

CCE offers many job oriented computer courses.”Diploma in Computer Hardware Maintenance & Networking” is one of the CCE approved course. The detailed contents of this course are in the attachment.

COURSE CODE: CCE-D6

ELIGIBILITY: 10th

DURATION: 1 Year

SYLLABUS

COMPUTER HARDWARE

- Computer Organizations and Operating Systems(Windows and Linux) , Basic Electrical Engineering and Electronics , Microprocessors , Computer Hardware , Internet and Viruses , Principles of Data Communication & Network Maintenance , Digital Fundamentals , Computer Assembling and Software Installations , Hardware Lab , Project

COMPUTER ORGANISATION & OPERATING SYSTEMS(WINDOWS AND LINUX)

TYPES OF COMPUTER

- Analog, Digital, and Hybrid type, Hardware, Software, System software, Application software, Stored Program Concept and Von Newman Architecture, Firmware, Humanware, Stored Program Concept, Evolution of computers, Generation of computer.

BACKGROUND AND NUMBER SYSTEM

- Information Representation and Codes, Data Types, Complements, Addition and Subtraction of Binary Numbers, Fixed Point and Floating Point Representation, Octal and Hexadecimal System , Conversion of Number Systems, Alpha Numeric Codes – ASCII & EBCDIC, Error Detection Codes, Building Blocks of Computers, Combinational Blocks (Gates, Multiplexes, Decoders, Encoders etc.), Sequential Building Blocks (Flip Flops, Registers, Counters, Random Access Memory, etc.)

REGISTER TRANSFER LANGUAGE AND MICRO-OPERATIONS

- Register Transfer Language, Concept of Bus, Bus and Memory Transfer, Arithmetic Micro Operations, Logical and Shift Micro Operations

ARCHITECTURE OF A SIMPLE PROCESSOR

- A Simple Computer Organization, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Program Interrupts, Design of Basic Computer

CPU ORGANIZATION

- Addressing Modes, Instruction Formats, CPU Organization with Large Registers, Stacks and Handling of Interrupts and Subroutines, Instruction Pipelining: Storage, Hazards and methods to Remove Hazards

PROGRAMMING LANGUAGES

- Machine language, Assembly language, High level language

ORGANISATION OF A DIGITAL COMPUTER

- Input unit, Output unit, Central Processing unit, Memory

DATA PROCESSING

- Data collection, Classifications, Sorting and Merging, Processing, Summarizing , Storing

DATA ORGANISATION

- Organization Data, Character, Field, Record, File, Database, Sequential Access, Random Access, Indexed Sequential Access

PROGRAMMING PROCESS

- Problem Definition, Algorithm, Flowchart and coding, Testing and debugging, Implementation, Documentation, Structured Programming

DATA COMMUNICATION

- Local Area Network, Wide Area Network, Satellite Communication, Internet

OPERATING SYSTEM

- Introduction, Different Operating Systems, Loading and Quitting the Operating Systems, Important DOS Commands

WINDOWS

WINDOWS INTRODUCTION

- Operating System

DESK TOP ICONS

- My Computer, Recycle Bin, Internet Explorer, Network Neighborhood, My Documents

WORKING WITH WINDOWS

- How to create a Folder, Copying and cutting files, Renaming

START ICON

- Programs, Favorites, Documents, Settings, Find, Run, Shut down

APPLICATION ICONS

LINUX

- History , Distributions , Devices and drives in Linux , File system hierarchy , Components: kernel, distribution, sawfish, gnome.

BASIC Fundamentals

ELECTRONICS

- Alternative Current – Wave forms – Frequency – Period – Average value – RMS value – form factor – Simple AC circuits – Resistance – Inductance – Capacitance – Power and Power factor – Three Phase Systems – Star and Delta connection – Phase and Line values.

Electronic Components

Passive Components

- Resistors – Capacitors – Inductors – Transformers

Active Components

- Introduction – Semi Conductors – Diodes – PN Junction – Characteristics

Transistors

- PNP – NPN – Configurations – Characteristics – LED – Zener Diode – Photo diode
SCR/FET – IC

Communication

- Introduction – Transmitters – Receivers – Modulation – Frequency bands – TV

MICRO PROCESSORS

Introduction

- Role – Building Blocks – Buses – Speed and Performance – Instruction sets – CPU Chips – Fabrication – Packaging – Processor Sockets – Processor Power – Chip characteristics – Processor Cooling – CPU Upgrade

Processor Generations

- First – Second – Third – Forth – Fifth – Pentium – AMD K5 – Cyrix – Sixth Generation – Pentium Pro – PII – Celeron – PIII – P4 – AMD K6 (K6-2, K6-3) – AMD Athlon K7 – Athlon K75 – AMD Duron – Athlon XP – Cyrix MII – VIA Cyrix III – AMD Opteron – Pentium II Xeon – Pentium III Xeon – Athlon MP – Selection of CPU – Troubleshooting

System Buses

- Introduction – 8 bit ISA Bus – 16 bit ISA Bus – MCA Bus – EISA Bus – Local Bus – VESA Local Bus – PCI Bus – Expansion Buses – Troubleshooting

Advance Chipsets

- Introduction – Evaluation – Functions – I/O controller – Bridges – Pentium Chipsets – Non Intel Chipsets – Pentium II and Pentium Pro Chipsets – 810 SiS and Ali-820 – 820E – 815E – AMD 750 and 760 – 850E – 845G – 845GL – VIA Chipsets Server Class Chipsets – Comparison Chipset Selection

COMPUTER HARDWARE

Motherboards

- Introduction – Functions – Types – Forms Factors – Modern Motherboards – Sockets – Slots – Motherboards 440BX-810, 810E, 815, 815E-820-Athlon – P4 – Dual PIII – Maintenance

Supporting chips

- Introduction – Types – Clocks Generator – Bus Conductor – PIC-DMAC-PIT-PPI-RTC

Memory

- Introduction – Organization – Primary – Secondary – DRAM – SRAM-Modules – SIMM – SIPP – DIMM – Asynchronous DRAM – Synchronous DRAM – Memory Requirement – Memory Upgrade – Errors – Parity Checking – Trouble shooting

Logical Memory

- Introduction – Real Mode Memory – Conventional Memory – UMA – Extended Memory – HMA – EMS – ROM – Shadowing – Optimization – Performance Improvement

Display Adapters

- Introduction – Display Subsystem – Evolution – Types – Components – Interfaces – Modes – MDA – CGA – EGA – VGA – PGA – XGA – SVGA – VESA – SVGA Standardization

Graphic Accelerators

- Introduction – Cards – Accelerated Graphic Ports – 3D Cards – Upgrading – Troubleshooting

INTERNET APPLICATIONS

INTRODUCTION TO INTERNET

- Understanding Networks, Getting to know web browsers, Getting to know the Internet Explorer Window

APPLICATIONS

- Internet Electronic Mail, Setting up E-mail, Creating Mail Messages, Editing Mail Messages, Attaching a file to a Mail message, Sending and receiving mail messages, Creating and using an Address Book

SEARCHING AND BROWSING ON THE INTERNET

- Internet Searching, Tools for Specialized Searches, Finding Specific Topics

PRINCIPLES OF DATA COMMUNICATION & NETWORK MAINTENANCE

Modems

- Introduction – Serial Communication – RS 232 – Flow Control – Cables – Analog Modems – Speed – Standards – Maintenance – Digital Technology – ISDN Services – Broad Band – Narrow Band – DSL – Wireless Connections – Port Problems – Modem Problems – Cable fault

Network

- Introduction – Uses – Concepts – Advantages – LAN – MAN – WAN – Components – Protocol – API – Setting up the Network – Installing Cables – Wireless Network – Installing and Configuring Network Cards – Hubs switches – Internet working – Intranet working – Repeaters – Routers – Networking security – Passwords – Firewall

IEEE Standards

- 802 – 802.3 – 802.4 – 802.5 – 802.6 Case study : NT/2000, NETWARE & LINUX

NETWORK MAINTANANCE

- Introduction to Computer Networks -Network Topology-LAN Technologies-Ethernet Standards-Network Troubleshooting Tools-Network Components-WAN Technologies-High-Speed Wan Media-Network Media (Cabling)-Media Access Methods-The OSI reference model-TCP/IP Suite-TCP/IP Utilities-Network Services-Remote Access & Security Protocols-Network Operating System (NOS)-Fault Tolerances-Internet-Network Support

DIGITAL FUNDAMENTALS

LOGIC CIRCUITS

Fundamentals of Binary System

- Logic Gate Operations – Logic Variables – Boolean Algebraic Theorems – Binary number Systems – POS Min term & Max term specifications – Karnaugh (K) Map representations – Simplifications – uses

FLIP FLOPS

- Introduction – Different types of flip-flops – Characteristics - Truth table – propagation delay – Manufacturer specifications – Applications – Latches

REGISTERS AND COUNTERS

Flip-flop as a shift register

- Serial-parallel data transfer – Typical circuits – Applications – Ripple counters – Methods to improve counter speed – design of counters – Types – Synchronous & Asynchronous, principles of operation, applications, IC versions.

LOGIC FUNCTIONS

- Address – Different types – Comparators – Decoders – Code converters – Multiplexer – De-multiplexer - Parity generator – Familiarization of popular IC versions – Typical circuits & applications.

SYSTEM INTERFACING

- Introduction – A/D Converters – D/A Converters – Types of converters – Applications

COMPUTER ASSEMBLING AND SOFTWARE INSTALLATIONS

PC Upgrading

- Introduction – Upgrade Essentials – Performance Upgrade – Capacity Upgrades – Features Upgrades – Repair Upgrades

Preventive Maintenance

- Introduction – Need – Tools – Materials – Procedures – Active Hardware Maintenance – Active Software Maintenance – Passive Maintenance Procedures – Heat and Temperature Control – Dust and Pollution control – Ventilation Control – EMI – Electrostatic Discharge Control – Humidity and Corrosion Control – Shock and Vibration Control – Preventive Maintenance Schedule

Troubleshooting

- Introduction – Types of PC Faults – Solid Faults – Intermittent Faults – Developing Strategy – Diagnostic and Repair Tools – Diagnostic Software Tools – Diagnostic Hardware Tools – Advanced Testing Tools – Hand Tools for Service Engineers – Disassembling PC

Computer Assembling

- Introduction – Overview of Parts of PC – Cabinet – Motherboards – Video Cards – Sound Cards – Modems – Hard Drive – Zip Drive – CD ROM Drive – Network Card – Interfaces – CPU – Main Memory – Power Supply

Setting up the Motherboard

- Installing CPU – Setting the Clock Speed – Installing the Memory

Installing Video Card

- Testing – Plug in the Video Card – Providing Power to the Motherboard – Testing

Installing Floppy Drives

- Installing Hard Disk Drives – Installing the CD ROM Drive – Installing Key Board and Mouse
Installing Sound Card
Installing Modem

Installing the Motherboard

- Installing the Power Supply – Attaching Add-on cards – Installing the Drives – Testing – Parallel and Serial Port Connection – Front Panel Indicators and Speakers – Troubleshooting

Operating System Installation

BIOS

- Introduction – Features – Developers – Identification – Interrupts – Disk Services – Serial Port Services – Video Services – Printer Screen Services – Flash Memory – BIOS Upgrade – Troubleshooting

CMOS setup

- Introduction – Standard CMOS Setup – Advanced CMOS Setup – Advanced Chipset Setup – Power Management Setup – PNP/PCI Setup – Peripheral Setup – Auto Detect IDE Device – CPU Frequency / Voltage Control – CPU PNP Setup – Password Settings – Auto Configuration – Exit Options – BIOS Optimization – Maintenance – Troubleshooting

Power On Self Test (POST)

Partitioning and Formatting

- Introduction – Low Level Formatting – IDE Drives – SCSI Drives – Partitioning - Options – Efficient Partitions – Clusters – FAT 16 – FAT 32 – NTFS – FDISK – Steps for Partitioning – Logical Drives – Primary Partition – Extended Partition – Partitioning Large Drives – Backing up Partition Information – Bad Sectors – Scan Disk – Third Party Partitioning and Formatting Tools – Troubleshooting