

BHARATHIAR UNIVERSITY::COIMBATORE 641 046
B.Sc. HARDWARE SYSTEMS & NETWORKING
SCHEME OF EXAMINATION-CBCS PATTERN
(FOR STUDENTS ADMITTED FROM THE ACADEMIC YEAR 2019-2020 ONWARDS)

Part	Study components	Course Title	Ins.hrs/Week	Examination				Credit
				Dur.Hr	CIA	Marks	Total Marks	
Semester I								
I	Language – I		6	3	25	75	100	4
II	English – I		6	3	25	75	100	4
III	Core 1: Computing Fundamentals and C Programming		4	3	25	75	100	4
III	Core 2: Computer Architecture		4	3	25	75	100	4
III	Core Lab 1: Programming Lab – C		3	3	40	60	100	4
III	Allied 1: Mathematical Structures for Computer Science		5	3	25	75	100	4
IV	Environmental Studies #		2	3	-	50	50	2
Semester II								
I	Language – II		6	3	25	75	100	4
II	English – II		6	3	25	75	100	4
III	Core 3: C++ Programming		5	3	25	75	100	4
III	Core Lab 2: Programming Lab – C++		4	3	40	60	100	4
III	Core Lab 3: Internet Basics		2	3	20	30	50	2
III	Allied 2: Discrete Mathematics		5	3	25	75	100	4
IV	Value Education – Human Rights #		2	3	-	50	50	2
Semester-III								
III	Core-4: Data Structures		6	3	25	75	100	4
III	Core-5 : Fundamentals of microprocessor		6	3	25	75	100	4
III	Core Lab 4 : PC Assembling Lab		5	3	40	60	100	4
III	Allied 3: Computer Based Optimization Techniques		6	3	25	75	100	4

IV	Skill based subject 1: Software Engineering	5	3	20	55	75	3
IV	Tamil @ / Advanced Tamil# (OR) Non-major elective - I (Yoga for Human Excellence)# / Women's Rights#	2	3	50		50	2
	<u>Semester IV</u>						
III	Core 6: System Software and Operating System	6	3	25	75	100	4
III	Core 7: Computer Storage Devices	6	3	25	75	100	4
III	Core Lab 5: Fundamentals of microprocessor	6	3	40	60	100	4
III	Allied 4 : Embedded Systems	6	3	25	75	100	4
IV	Skill based Subject Lab 1: Software project Management Lab	4	3	30	45	75	3
IV	Tamil@/Advanced Tamil# (OR) Non-major elective (General Awareness #)	2	3	50		50	2
	<u>Semester V</u>						
III	Core 8: Network Security & Cryptography	6	3	25	75	100	4
III	Core 9: Software Testing	6	3	25	75	100	4
III	Elective: I - Computer Networks	6	3	25	75	100	4
III	Core Lab 6: Computer Hardware Maintenance	6	3	40	60	100	4
IV	Skill based Subject 2 : Server Administration	6	3	20	55	75	3
	<u>Semester- VI</u>						
III	Core 10 : Web Technology	5	3	25	75	100	4
III	Core 11 : Mastering LAN & Troubleshooting	5	3	25	75	100	4
III	Core Lab 7: Web Technology Lab	5	3	40	60	100	4
III	Elective: II – Graphics & Multimedia	5	3	40	60	100	4
	Industrial Project	6	3			200	8
IV	Skill based subject Lab 2: Server Administration Lab	4	3	30	45	75	3
V	Extension Activities @	-	-	50	-	50	2
	Total					3500	140

\$For Viva: 20% External Marks & report: 80 %.

@ No University Examinations. Only Continuous Internal Assessment (CIA)

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CORE 1 : COMPUTING FUNDAMENTALS AND C PROGRAMMING

UNIT I: Fundamentals of Computers : Introduction – History of Computers-Generations of Computers- Classification of Computers-Basic Anatomy of a Computer System-Input Devices-Processor-Output Devices-Memory Management – Types of Software- Overview of Operating System- Programming Languages-Translator Programs-Problem Solving Techniques - Overview of C.

UNIT II: Overview of C - Introduction - Character set - C tokens - keyword & Identifiers - Constants - Variables - Data types - Declaration of variables - Assigning values to variables - Defining Symbolic Constants - Arithmetic, Relational, Logical, Assignment, Conditional, Bitwise, Special, Increment and Decrement operators - Arithmetic Expressions - Evaluation of expression - precedence of arithmetic operators - Type conversion in expression – operator precedence & associativity - Mathematical functions - Reading & Writing a character - Formatted input and output.

UNIT III: Decision Making and Branching: Introduction – if, if...else, nesting of if ...else statements- else if ladder – The switch statement, The ?: Operator – The goto Statement. Decision Making and Looping: Introduction- The while statement- the do statement – the for statement-jumps in loops. Arrays – Character Arrays and Strings

UNIT IV: User-Defined Functions: Introduction – Need and Elements of User-Defined Functions- Definition-Return Values and their types - Function Calls – Declarations – Category of Functions- Nesting of Functions - Recursion – Passing Arrays and Strings to Functions - The Scope, Visibility and Lifetime of Variables- Multi file Programs. Structures and Unions.

UNIT V: Pointers: Introduction-Understanding pointers-Accessing the address of a variable- Declaration and Initialization of pointer Variable – Accessing a variable through its pointer- Chain of pointers- Pointer Expressions – Pointer Increments and Scale factor- Pointers and Arrays- Pointers and Strings – Array of pointers – Pointers as Function Arguments- Functions returning pointers – Pointers to Functions – Pointers and Structures. File Management in C.

TEXT BOOK:

1. E Balagurusamy: Computing Fundamentals & C Programming – Tata McGraw-Hill, Second Reprint 2008.

REFERENCE BOOK:

1. Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson, 2002.
2. Henry Mullish & Hubert L.Cooper: The Sprit of C, Jaico, 1996.

CORE-2: COMPUTER ARCHITECTURE

UNIT-I

Microcomputer System: Introduction-Hardware and Software-Memory-ALU-Control Unit-Input and Output Techniques-Advanced System Concepts-Micro Computer Types-Multitasking and Multiprogramming

UNIT-II

Peripheral Devices: Keyboard and Mouse-CRT-Printer-Printer Types-Magnetic Storage Devices-Hard disk drive-DVD-CDROM-Scanner-Modem-Speakers.

UNIT-III

Micro programmed Control: Control Memory-Addressing Sequence-Design of Control Unit. CPU: General Register Organization-Stack Organization-Instruction Format-Addressing Modes-RISC-Program Control.

UNIT-IV

PC Hardware Overview: BIOS-Power Connector-Inside the System Box-SMPS-Motherboard-PC Expansion Boards-Front Panel Indicator-Serial Interface-Floppy Disk Controller-Hard Disk Controller-Post Sequence

UNIT-V

Microprocessor: Types-Processor Modes-Features-Manufacturing-Sockets-Heat and Cooling Problems-Math Coprocessors-Processor Bugs-Processor Upgrades.

Text Books:

1. **Govinda Rajulu B, “PC IBM and Clones – Hardware, Troubleshooting and Maintenance”**, Tata McGraw Hill Publishing Company Ltd., New Delhi, 1991(UNIT I & II)
2. **Computer System Architecture-M. Morris Mano**, Third Edition(UNIT III)
3. **Upgrading and Repairing PC’s**, 17th Edition By „Scott Mueller”; Publisher: Que ;Pub Date: March 24, 2006 ; Print ISBN-10: 0-7897-3404-4(UNIT IV & V)

CORE LAB 1: PROGRAMMING LAB – C

1. Write a C program to find the sum, average, standard deviation for a given set of numbers.
2. Write a C program to generate n prime numbers.
3. Write a C program to generate Fibonacci series.
4. Write a C program to print magic square of order n where $n > 3$ and n is odd.
5. Write a C program to sort the given set of numbers in ascending order.
6. Write a C program to check whether the given string is a palindrome or not using pointers.
7. Write a C program to count the number of Vowels in the given sentence.
8. Write a C program to find the factorial of a given number using recursive function.
9. Write a C program to print the student's Mark sheet assuming roll no, name, and marks in 5 subjects in a structure. Create an array of structures and print the mark sheet in the university pattern.
10. Write a function using pointers to add two matrices and to return the resultant matrix to the calling function.
11. Write a C program which receives two filenames as arguments and check whether the file contents are same or not. If same delete the second file.
12. Write a program which takes a file as command line argument and copy it to another file. At the end of the second file write the total i)no of chars ii) no. of words and iii) no. of lines.

ALLIED 1 : MATHEMATICAL STRUCTURES FOR COMPUTER SCIENCE

UNIT I: Matrices – Introduction – Determination – Inverse of a matrix – Rank of a Matrix – Eigen value Problems

UNIT II: System of Simultaneous Linear algebraic Equation – Gauss elimination, Gauss Jordan, Gauss Seidal methods.

UNIT III: Numerical Differentiations – Newton’s forward Difference - Backward Difference – Starling formula Numerical Integration – Trapezoidal Rule & Simpson’s rule.

UNIT IV: Measures of central tendency – Mean Median and Mode – Relationship among mean media and mode. Measures of dispersion – Range, quartile deviation and Standard deviation.

UNIT V: Regression and Correlation – Types of relationship – Linear regression – Correlation – Coefficient of correlation – Regression equation of variables.

TEXT BOOKS:

1. Engineering Mathematics, Volume II, Dr M.K. Venkataraman, National Publishing Company, Chennai. (Unit I)
2. Numerical Methods in Science & Engineering, M.K. Venkataraman, National Publishing Company, Chennai, Revised Edition -2005 (Unit II & III)
3. Business Statistics, S.P. Gupta & M.P. Gupta, Sultan Chand and Sons (Unit IV & V)

REFERENCE BOOKS:

1. Numerical Methods, E. Balagurusamy, Tata McGraw Hill.
2. Fundamental of Mathematical Statistics, S. C. Gupta, V. K. Kapoor, Sultan Chand & Sons

CORE 3: C++ PROGRAMMING

UNIT I: Introduction to C++ - key concepts of Object-Oriented Programming – Advantages – Object Oriented Languages – I/O in C++ - C++ Declarations. Control Structures : - Decision Making and Statements : If .. else ,jump, goto, break, continue, Switch case statements - Loops in C++ : for, while, do - functions in C++ - inline functions – Function Overloading.

UNIT II: Classes and Objects: Declaring Objects – Defining Member Functions – Static Member variables and functions – array of objects –friend functions – Overloading member functions – Bit fields and classes – Constructor and destructor with static members.

UNIT III: Operator Overloading: Overloading unary, binary operators – Overloading Friend functions – type conversion – Inheritance: Types of Inheritance – Single, Multilevel, Multiple, Hierarchal, Hybrid, Multi path inheritance – Virtual base Classes – Abstract Classes.

UNIT IV: Pointers – Declaration – Pointer to Class , Object – this pointer – Pointers to derived classes and Base classes – Arrays – Characteristics – array of classes – Memory models – new and delete operators – dynamic object – Binding, Polymorphism and Virtual Functions.

UNIT V: Files – File stream classes – file modes – Sequential Read / Write operations – Binary and ASCII Files – Random Access Operation – Templates – Exception Handling - String – Declaring and Initializing string objects – String Attributes – Miscellaneous functions .

TEXT BOOK:

1. Ashok N Kamthane, Object-Oriented Programming with Ansi And Turbo C++, Pearson Education, 2003.

REFERENCE BOOKS:

1. E. Balagurusamy, Object-Oriented Programming with C++, TMH, 1998.
2. Maria Litvin & Gray Litvin, C++ for you, Vikas publication, 2002.
3. John R Hubbard, Programming with C, 2nd Edition, TMH publication, 2002.

CORE LAB 2: PROGRAMMING LAB – C++

1. Write a C++ Program to create a class to implement the data structure STACK. Write a constructor to initialize the TOP of the STACK. Write a member function PUSH() to insert an element and member function POP() to delete an element check for overflow and underflow conditions..
2. Write a C++ Program to create a class ARITHMETIC which consists of a FLOAT and an INTEGER variable. Write member functions ADD (),SUB(), MUL(), DIV() to perform addition, subtraction, multiplication, division respectively. Write a member function to get and display values.
3. Write a C++ Program to read an integer number and find the sum of all the digits until it reduces to a single digit using constructors, destructors and inline member functions.
4. Write a C++ Program to create a class FLOAT that contains one float data member. Overload all the four Arithmetic operators so that they operate on the object FLOAT.
5. Write a C++ Program to create a class STRING. Write a Member Function to initialize, get and display strings. Overload the operators ++ and == to concatenate two Strings and to compare two strings respectively.
6. Write a C++ Program to create class, which consists of EMPLOYEE Detail like E_Number, E_Name, Department, Basic, Salary, Grade. Write a member function to get and display them. Derive a class PAY from the above class and write a member function to calculate DA, HRA and PF depending on the grade.
7. Write a C++ Program to create a class SHAPE which consists of two VIRTUAL FUNCTIONS Calculate_Area() and Calculate_Perimeter() to calculate area and perimeter of various figures. Derive three classes SQUARE, RECTANGLE, TRIANGLE from class Shape and Calculate Area and Perimeter of each class separately and display the result.
8. Write a C++ Program to create two classes each class consists of two private variables, a integer and a float variable. Write member functions to get and display them. Write a FRIEND Function common to both classes, which takes the object of above two classes as arguments and the integer and float values of both objects separately and display the result.

9. Write a C++ Program using Function Overloading to read two Matrices of different Data Types such as integers and floating point numbers. Find out the sum of the above two matrices separately and display the sum of these arrays individually.
10. Write a C++ Program to check whether the given string is a palindrome or not using Pointers.
11. Write a C++ Program to create a File and to display the contents of that file with line numbers.
12. Write a C++ Program to merge two files into a single file.

CORE LAB 3: PROGRAMMING LAB – INTERNET BASICS

1. To create an email-id.
2. To compose and send a mail.
3. To forward a mail and to reply for a mail.
4. To send a mail with an attachment.
5. To download the attached document of a mail received.
6. To send a mail to a large number of recipients using cc and bcc options.
7. To search a thing using a search engine.
8. To open and read newspaper sites, TV program schedules using Internet.
9. To verify a university /college details by opening their websites.
10. To upload your resume with any one job portal.

ALLIED:2 DISCRETE MATHEMATICS

UNIT I: Set theory-Introduction-Set & its Elements-Set Description-Types of sets-Venn- Euler Diagrams- Set operations & Laws of set theory-Fundamental products-partitions of sets-minsets- Algebra of sets and Duality-Inclusion and Exclusion principle

UNIT II: Mathematical logic – Introduction- propositional calculus –Basic logical operations- Tautologies-Contradiction-Argument-Method of proof- Predicate calculus.

UNIT III: Relations – Binary Relations – Set operation on relations-Types of Relations – Partial order relation – Equivalence relation – Composition of relations – Functions – Types of functions – Invertible functions – Composition of functions.

UNIT IV: Languages – Operations on languages – Regular Expressions and regular languages – Grammar – Types of grammars – Finite state machine – Finite – State automata

UNIT V: Graph Theory – Basic terminology – paths, cycle & Connectivity – Sub graphs – Graphs Types – Representation of graphs in computer memory - Trees – Properties of trees - Binary trees – traversing Binary trees – Computer Representation of general trees.

TEXT BOOKS:

1. Discrete Mathematics, J.K. Sharma, 2nd edition, 2005, Macmillan India Ltd. (UNIT I TO V)

REFERENCE BOOKS:

1. Discrete Mathematics Structures with Applications to Computer Science, J. P. Tremblay, R Manohar, McGraw Hill International Edition
2. Discrete Mathematics, M. K. Venkataraman, N.Sridharan, N.Chandarasekaran, National Publishing Company, Chennai

CORE 4: DATA STRUCTURES

UNIT I Introduction: Introduction of Algorithms, Analysing Algorithms. Arrays: Sparse Matrices - Representation of Arrays. Stacks and Queues. Fundamentals - Evaluation of Expression Infix to Postfix Conversion - Multiple Stacks and Queues

UNIT II Linked List: Singly Linked List - Linked Stacks and Queues - Polynomial Addition - More on Linked Lists - Sparse Matrices - Doubly Linked List and Dynamic - Storage Management - Garbage Collection and Compaction.

UNIT III Trees: Basic Terminology - Binary Trees - Binary Tree Representations - Binary Trees -Traversal - More on Binary Trees - Threaded Binary Trees - Binary Tree Representation of Trees - Counting Binary Trees. Graphs: Terminology and Representations - Traversals, Connected Components and Spanning Trees, Shortest Paths and Transitive Closure

UNIT IV External Sorting: Storage Devices -Sorting with Disks: K-Way Merging - Sorting with Tapes Symbol Tables: Static Tree Tables - Dynamic Tree Tables - Hash

Tables: Hashing Functions - Overflow Handling.

UNIT V Internal Sorting: Insertion Sort - Quick Sort - 2 Way Merge Sort - Heap Sort - Shell Sort - Sorting on Several Keys. Files: Files, Queries and Sequential organizations - Index Techniques -File Organizations.

TEXT BOOKS

1. Ellis Horowitz, Sartaj Shani, Data Structures, Galgotia Publication.
2. Ellis Horowitz, Sartaj Shani, Sanguthevar Rajasekaran, Computer Algorithms, Galgotia Publication.

CORE 5: FUNDAMENTALS OF MICROPROCESSOR

UNIT-I:

MICROPROCESSOR: Introduction of Microprocessor , Block Diagram of Micro Computer , Block Diagram of CPU with system Bus -Architecture–Bus Organization–Bus Organization in Microprocessor , Pin Detail , Diagram of Microprocessor , Data & Address deviation , Generate Control Signal in Microprocessor , Detail of Microprocessor- Functional diagram and pin out diagram of 8085

UNIT-II:

Addressing modes of 8085 – Direct addressing Mode-Indirect Addressing Mode-Data Transfer -Instruction set of 8085 – simple programs

UNIT-III:

I/O Schemes – Peripherals and Interfaces .Input – Output Organization: Input – output interface – I/O Bus and Interface – I/O Bus Versus Memory Bus – Isolated Versus Memory – Mapped I/O – Example of I/O Interface. Asynchronous data transfer: Strobe Control and Handshaking – Priority Interrupt: Daisy-Chaining Priority, Parallel Priority Interrupt. Direct Memory Access: DMA Controller, DMA Transfer. Input – Output Processor: CPU-IOP Communication.

UNIT-IV:

Memory Organization: Memory Hierarchy – Main Memory- Associative memory: Hardware Organization, Match Logic, Read Operation, Write Operation. Cache Memory: Associative, Direct, Set associative Mapping – Writing Into Cache Initialization. Virtual Memory: Address Space and Memory Space, Address Mapping Using Pages, Associative Memory Page Table, Page Replacement.

UNIT-V:

Introduction to 8086: Pin out diagram -Functional Block diagram of 8086 – Architecture- instruction set-comparison with 8085 & 8086 :Interfacing IC –RISC & CISC

TEXT BOOKS:

1. Microprocessor Architecture programming & application with 8085 & 8080 – by Ramesh.s.Gaonkar –Wiley eastern.

2. Introduction to microprocessors – Adithya.P.Mathus – TMH Publication.

3. Microprocessor interfaces – Douglas Hall – MC Graw Hill.

4. 8086/8088 family Design, programming and interfacing by John Utter Bery - PHI.

5. 8086/8088 microprocessors - Brey - PHI.

6. Microprocessors PC Hardware and interfacing –N.Mathivanan –PHI

CORE LAB-4 : PC ASSEMBLING LAB

1. Start Up, Navigate, and Shut Down a Windows System
2. Use Files and Folders
3. CMOS Setup
4. Safely Open the Case to Identify Components
5. Collect Resource Information – Windows 98,XP,Windows 2000
6. Replace s Floppy Drive
7. Replace the Hard Drive
8. Add a Slave Drive
9. Install a Windows Mouse
10. Partition a Hard Drive – FAT32
11. Partition a Hard Drive – Two Partitions-using FDISK
12. Partition HDD-NTFS(Win XP)
13. Disk Management (Hard Disk)
14. Replace a Power Supply
15. Remove and Insert Memory
16. Remove and Replace a Motherboard
17. Troubleshoot Hardware Problems
18. Dual boot Windows XP and Windows 2000

ALLIED : 3 COMPUTER BASED OPTIMIZATION TECHNIQUES

UNIT I: Linear Programming - Mathematical Model assumption of linear Programming – Graphical method - Principles of Simplex method, Big-M Method, Duality, Dual simplex method.

UNIT II: Transportation and Assignment problem - Integer Programming Branch and Round Techniques - Assignment and Traveling Salesman Problem.

UNIT III: Game Theory - Concept of Pure and Mixed Strategies – Solving 2 x 2 matrix with and without saddle point - n x 2 - 2 x m games. Replacement models - Elementary replacement models - present value - rate of return - depreciation - Individual replacement – Group replacement.

UNIT IV: (*Derivations not included*) Queuing Theory - definition of waiting line model - Queue discipline - traffic intensity - poisson arrival – Birth death process - Problem from single server: finite and infinite population model – Problems from multi server: finite and infinite population model.

UNIT V: PERT & CPM - Network representation - backward pass - Forward pass - computation - Pert Network - Probability factor – updating and Crashing.

TEXT BOOK:

1. Operations Research, Manmohan, P.K. Gupta, Kanthiswarup, S. Chand & Sons - 1997.

REFERENCE BOOKS:

1. Operations Research, Hamdy A Taha, Pearson Education, 7th edition, 2002
2. Problems in Operations Research, P.K. Gupta, D.S. Hira, S. Chand Publishers.

Skill Based Subject: : SOFTWARE ENGINEERING

UNIT I: Software Engineering: A Layered Technology – Software Process – Software Process Models – The Prototyping. Requirement Engineering– Software prototyping - Elements of analysis model – Data modeling – Functional modeling and information flow.

UNIT II: Software design and Software engineering – The Design process – Design principles – Design concepts – Effective modular design –Software Architecture.

UNIT III: Software testing fundamentals – Test Case Design - White box testing – Basis path testing – Control structure testing – Black box testing. Unit testing – Validation testing – System testing.

UNIT IV: Software Configuration Management: Definitions and terminology – processes and activities. Software Quality assurance: Definitions – Quality control and Quality assurance – Organization of Structures. Risk Management: Risk Identification – quantification - Monitoring - Mitigation. Software requirements gathering: Steps to be followed – Outputs and Quality Records - Skill sets required – Challenges.

UNIT V: Estimation: What is Estimation? – When and Why? – Three phases of Estimation – Estimation methodology – Formal models of Size Estimation. Design and Development phases: Reusability - Technology choices – Standards – Portability -User interface issues – Testability - The Effect of Internet on Project Management.

TEXT BOOKS:

1. Roger S. Pressman: Software Engineering, Tata McGraw Hill, V Edition.
2. Gopalswamy Ramesh, Managing Global Software Projects, Tata McGraw Hill,

REFERENCE BOOKS:

1. Watts S Humphrey: A Discipline for Software Engineering, Pearson Education, 2001.
2. Bob Hughes and Mike Cotterell, Software Project Management, 2nd Edition, Tata McGraw Hill, 2002.

CORE 6 : SYSTEM SOFTWARE & OPERATING SYSTEM

UNIT I: Introduction –System Software and machine architecture. Loader and Linkers:
Basic Loader Functions - Machine dependent loader features –Machine independent loader features
- Loader design options.

UNIT II: Machine dependent compiler features - Intermediate form of the program - Machine dependent code optimization - Machine independent compiler features - Compiler design options - Division into passes – Interpreters – p-code compilers - Compiler-compilers. **(OPERATING SYSTEMS: UNIT III, IV & V)**

UNIT III: What is an Operating System? – Process Concepts: Definition of Process - Process States - Process States Transition – Interrupt Processing – Interrupt Classes - Storage Management: Real Storage: Real Storage Management Strategies – Contiguous versus Non- contiguous storage allocation – Single User Contiguous Storage allocation- Fixed partition multiprogramming – Variable partition multiprogramming.

UNIT IV: Virtual Storage: Virtual Storage Management Strategies – Page Replacement Strategies – Working Sets – Demand Paging – Page Size. Processor Management: Job and Processor Scheduling: Preemptive Vs Non-preemptive scheduling – Priorities – Deadline scheduling.

UNIT V: Device and Information Management Disk Performance Optimization: Operation of moving head disk storage – Need for disk scheduling – Seek Optimization – File and Database Systems: File System – Functions – Organization – Allocating and freeing space – File descriptor – Access control matrix.

TEXT BOOKS:

1. Leland L.Beck, System Software: An Introduction to Systems Programming, Pearson, Third Edition.
2. H.M. Deitel, Operating Systems, 2nd Edition, Perason, 2003.

REFERENCE BOOKS:

1. Achyut S. Godbole, Operating Systems, TMH, 2002.
2. John J. Donovan, Systems Programming, TMH, 1991.
3. D.M. Dhamdhere, Systems Programming and Operating Systems, 2nd Revised Edition, TMH.

CORE-7: COMPUTER STORAGE DEVICES

Unit-I

Magnetic Storage- History of Magnetic Storage- How Magnetic Fields Are Used to Store Data- Read/Write Head Designs- Ferrite- Metal-In-Gap- Thin Film- Magneto-Resistive Heads- Giant Magneto-Resistive Heads- Head Sliders- Data Encoding Schemes- RLL Encoding- Encoding Scheme Comparisons- Partial-Response, Maximum-Likelihood Decoders- Capacity Measurements- Areal Density- Increasing Areal Density with Pixie Dust- Perpendicular Magnetic Recording

Unit-II

Definition of a Hard Disk- Hard Drive Advancements- Form Factors- 5 1/4" Drive- 1" Drives- Hard Disk Drive Operation- The Ultimate Hard Disk Drive Analogy- Tracks and Sectors- Disk Formatting- Partitioning- High-Level Formatting- Basic Hard Disk Drive Components- Hard Disk Platters (Disks- Recording Media- Oxide Media- AFC Media- Read/Write Heads- Read/Write Head Designs- Stepper Motor Actuators- Voice Coil Actuators- Linear Actuators- Servo Mechanisms- Wedge Servo- Embedded Servo- Automatic Head Parking- Air Filters- Hard Disk Temperature Acclimation- The Faceplate or Bezel- Hard Disk Features- Capacity BIOS Limitations- Operating System Limitations- Performance- Transfer Rate- Average Seek Time- Average Access Time- Cache Programs and Caching Controllers- Interleave Selection- Reliability- SMART- Cost.

Unit-III

The Role of Removable-Media Drives-The Importance of Data Backups-Data Transfer Between Systems-Floppy-based Driver Installation for Removable-Media Devices-Comparing Disk, Tape, and Flash Memory Technologies-Magnetic Disk Media-Magnetic Tape Media-Flash Memory Media-Interfaces for Removable-Media Drives-Floppy Disk Drives, Past and Present-Alternatives to Floppy Drives-Floppy Drive Interfaces-Drive Components-Power and Data Connectors-The Floppy Disk Controller Cable-How the Operating System Uses a Floppy Disk-Analyzing 3 1/2" Floppy Disk Media Construction- Floppy Disk Media Types and Specifications-Floppy Drive Installation Procedures

Unit-IV

High-Capacity Magnetic Storage Devices-Iomega Zip-Iomega REV-Iomega REV Drives- Magneto-Optical Drives-Comparing MO to "Pure" Magnetic Media-Flash Memory Devices- Types of Flash Memory Devices-Comparing Flash Memory Devices-Moving Data in Flash Memory Devices to Your Computer-Key Factors in Selecting a Removable-Media Drive- Microdrive Technology-Tape Drives-Hard-Tape Backup Technologies-Choosing a Tape Backup Drive-Tape Standards and Compatibility-Tape Drive Backup Software-Backup and Restoration Troubleshooting-Motherboard BIOS-ROM Hardware-ROM Chip Types-PROM- EPROM-EEPROM/Flash ROM-ROM BIOS Manufacturers-Flash BIOS -CMOS Setup Specifications

Unit-V

Optical Technology-CD-Based Optical Technology-Data Encoding on the Disc-DVD-Data Encoding on the Disc-Blu-ray Disc-HD-DVD-Optical Disc Formats-CD-ROM XA- Multisession Recording Overview-Photo CD Disc Types-CD-ROM File Systems-DVD Formats and Standards-CD/DVD Read-Only Drives and Specifications-Direct Memory Access and Ultra-DMA-Interface-Loading Mechanism-Internal Versus External Drives- Writable CDs-Recording Software-CD Copy Protection-CD/DVD Drive and Software Installation and Support-Bootling from a Floppy Disk with CD/DVD Drive Support- Troubleshooting Optical Drives

TEXT-BOOKS

1. **Upgrading and Repairing PC's**, 17th Edition By „Scott Mueller“ ;Publisher: Que ;Pub Date: March 24, 2006 ; Print ISBN-10: 0-7897-3404-4
2. **Govinda Rajulu B, “PC IBM and Clones – Hardware, Troubleshooting and Maintenance”**, Tata McGraw Hill Publishing Company Ltd., New Delhi, 1991
3. **Hardware bible By : Winn L Rosch**, Techmedia publications
4. **Trouble shooting, maintaining and repairing PCs By :Stephon J Bigelow** Tata McGraw Hill Publication
5. **Modern All about printers By: Manohar Lotia, Pradeep Nair, Bijal Lotia** BPB publications.
6. **The complete PC upgrade and maintenance guide By:Mark Minasi**, BPB Publications

CORE LAB 5: FUNDAMENTALS OF MICROPROCESSOR

1. Addition – 8 bit, 16 bit
2. Subtraction – 8 bit, 16 bit
3. Multiplication
4. Array addition (multibyte)
5. Logical operators – AND, OR NOT
6. Decimal to ASCII and ASCII to Decimal.
7. Decimal to Hexa and Hexa to Decimal.
8. Ascending Order
9. Descending Order
10. Up/down Counter
11. Block data transfer
12. Rotating display – Flashing display
13. Interfacing with LED's.
14. Square wave Generators
15. Interfacing with ADC.
16. Interfacing with DAC.

ALLIED 4 : EMBEDDED SYSTEMS

UNIT I: Introduction to Embedded System: An Embedded System – Processor in the System – Other Hardware units – Software embedded into a system – Exemplary embedded system – Embedded system on chip and in VLSI circuit. Processor and Memory organization: Structural units in a processor – Processor selection – Memory devices – Memory selection - Allocation of memory – DMA – Interfacing processor, memories and I/O devices

UNIT II: Devices and buses for device networks: I/O devices – Timer and counting devices – Serial communication – Host system. Device drivers and Interrupts servicing mechanism: Device drivers – Parallel port device drivers – Serial port device drivers – Device drivers for IPTD – Interrupt servicing mechanism – Context and the periods for context-switching, dead- line and interrupt latency

UNIT III: Programming concepts and embedded programming in C and C++: Software programming in ALP and C – C program elements – Header and source files and processor directives – Macros and functions – Data types – Data structures – Modifiers – Statements – Loops and pointers – Queues – Stacks – Lists and ordered lists – Embedded programming in C++ - Java – C program compiler and cross compiler – Source code for engineering tools for embedded C / C++ - Optimization of memory needs

UNIT IV: Program modeling concepts in single and multi processor systems: Modeling process for software analysis before software implementation – Programming models for event controlled or response time constrained real time programs – Modeling of multiprocessor systems. Software engineering practices: Software algorithm complexity – Software development process life cycle and its models – Software analysis – Software design – Implementation – Testing, Validation and debugging – Software maintenance

UNIT V: Inter-process communication and synchronization of processes, tasks and threads: Multiple processor – Problem of sharing data by multiple tasks and routines – Inter process communication. Real time operating systems: Operating system services – I/O subsystem – Network operating systems – Real time and embedded operating

systems – Interrupt routine in RTOS environment – RTOS task scheduling –
Performance metric in scheduling

TEXT BOOK:

1. Raj Kamal, — Embedded Systems – Architecture, Programming and Design, TMH, 2007

SKILL BASED SUBJECT LAB 1 : SPM LAB

1. Preparation of Project Management Plan.
2. Using any of the CASE tools, Practice requirement analysis and specification for different firms.
3. Case study of cost estimation models.
4. Practice object oriented design principles for implementation.
5. Practice function oriented design.
6. Practice creating software documentation for the Analysis phase of software development life cycle for a real time application.
7. Practice creating software documentation for the Development phase of software development life cycle for a real time application.
8. Practice creating software documentation for the Implementation phase of software development life cycle for a real time application.
9. Practice creating software documentation for the Testing phase of software development life cycle for a real time application.
10. Simulate a tool for path testing principles.
11. Simulate a tool for testing based on control structures.
12. Simulate a tool that reflects black box testing concepts

CORE 8: NETWORK SECURITY & CRYPTOGRAPHY

UNIT-I:

Service mechanism and attacks – The OSI security architecture – A model for network security – symmetric Cipher model – Substitution techniques – transposition techniques – simplified des – block chipper principles – the strength of des – block chipper design principles and modes of operation.

UNIT-II:

Triple des-blow fish – RCS Advanced Symmetric Block Ciphers –RC4 stream Cipher confidentially using symmetric encryption – introduction to number theory – public – key cryptography and RSA.

UNIT-III:

Key management – Diffle Hellman key exchange – message authentication and hash function – hash algorithm – digital signature and authentication protocols – digital signature standard.

UNIT-IV:

Authentication application – pretty good privacy – S/MIME – ip security – web security considerations –secure socket layer transport layer security –secure electronic transaction.

UNIT-V:

Intruders –intrusion detection – password management –viruses and related threats –virus countermeasures – fire wall design principles – trusted systems

TEXT BOOK:

1. William Stallings, “Cryptography and Network Security Principles and Practices”. Fourth edition, phi Education Asia.
2. Atul kahate “Cryptography and Network Security” second edition. TMH.
3. Behrouz A.forouzan” Cryptography and Network Security “ TMH.

CORE 9 : SOFTWARE TESTING

UNIT-I:

Software Development Life Cycle models: Phases of Software project – Quality, Quality Assurance, Quality control – Testing, Verification and Validation – Process Model to represent Different Phases - Life Cycle models. **White-Box Testing:** Static Testing – Structural Testing – Challenges in White-Box Testing.

UNIT-II:

Black-Box Testing: What is Black-Box Testing? - Why Black-Box Testing? – When to do Black-Box Testing? – How to do Black-Box Testing? – Challenges in White Box Testing -**Integration Testing:** Integration Testing as Type of Testing – Integration Testing as a Phase for Testing – Scenario Testing – Defect Bash.

UNIT-III:

System and Acceptance Testing: system Testing Overview – Why System testing is done? – Functional versus Non-functional Testing - Functional testing - Non-functional Testing– Acceptance Testing – Summary of Testing Phases.

UNIT-IV:

Performance Testing: Factors governing Performance Testing – Methodology of performance Testing – tools for Performance Testing – Process for Performance Testing – Challenges. **Regression Testing:** What is Regression Testing? – Types of Regression Testing – When to do Regression Testing – How to do Regression Testing – Best Practices in Regression Testing.

UNIT-V:

Test Planning, Management, Execution and Reporting: Test Planning – Test Management – Test Process – Test Reporting – Best Practices. **Test Metrics and Measurements:** Project Metrics – Progress Metrics – Productivity Metrics – Release Metrics.

TEXTBOOKS:

1. **SOFTWARE TESTING Principles and Practices – Srinivasan Desikan & Gopalswamy Ramesh**, 2006, Pearson Education.

(UNIT-I: 2.1-2.5, 3.1-3.4 UNIT-II: 4.1-4.4, 5.1-5.5 UNIT III: 6.1-6.7

(UNIT IV: 7.1-7.6, 8.1-8.5 UNIT-V: 15.1-15.6, 17.4-17.7)

2. **EFFECTIVE METHODS OF SOFTWARE TESTING**–William E.Perry,
3rd ed, Wiley India.
3. **SOFTWARE TESTING** – Renu Rajani, Pradeep Oak, 2007, TMH

ELECTIVE I : COMPUER NETWORKS

UNIT-I:

Network Hardware: LAN – WAN – MAN – Wireless – Home Networks. Network Software: Protocol Hierarchies – Design Issues for the Layers – Connection-oriented and connectionless services – Service Primitives – The Relationship of services to Protocols. Reference Models: OSI Reference Model – TCP/IP reference Model – Comparison of OSI and TCP/IP -Critique of OSI and protocols – Critique of the TCP/IP Reference model.

UNIT-II:

PHYSICAL LAYER - Guided Transmission Media: Magnetic Media – Twisted Pair – Coaxial Cable – Fiber Optics. Wireless Transmission: Electromagnetic Spectrum – Radio Transmission – Microwave Transmission – Infrared and Millimeter Waves – Light Waves.Communication Satellites: Geostationary, Medium-Earth Orbit, Low Earth-orbit Satellites –Satellites versus Fiber.

UNIT-III:

DATA-LINK LAYER: Error Detection and correction – Elementary Data-link Protocols – Sliding Window Protocols. MEDIUM-ACCESS CONTROL SUB LAYER: Multiple Access Protocols – Ethernet – Wireless LANs - Broadband Wireless – Bluetooth.

UNIT-IV:

NETWORK LAYER: Routing algorithms – Congestion Control Algorithms. TRANSPORT LAYER: Elements of Transport Protocols – Internet Transport Protocols: TCP.

UNIT-V:

APPLICATION LAYER: DNS – E-mail. NETWORK SECURITY: Cryptography – Symmetric Key Algorithms – Public Key Algorithms – Digital Signatures.

TEXT BOOKS:

1. **COMPUTER NETWORKS** – Andrew S. Tanenbaum, 4th edition, PHI.
(UNIT-I:1.2-1.4 UNIT-II:2.2-2.4 UNIT-III:4.2-4.6 UNIT-IV:5.2,5.3,6.2,6.5
UNIT- V:7.1,7.2,8.1-8.4)
2. **DATA COMMUNICATION AND NETWORKS** – Achyut Godbole, 2007, TMH.
3. **COMPUTER NETWORKS Protocols, Standards, and Interfaces** – Uyles
Black, 2nd ed, PHI.

CORE-LAB 6: COMPUTER HARDWARE MAINTENANCE

1. Install an Operating System – Windows XP
2. Install an Operation System – Windows 98
3. Install an Operation System – Windows 2000
4. Repairing OS
5. Configuration Antivirus & Firewalls
6. Enabling Disk quota
7. Customize the Windows Desktop
8. Image and Replace a Windows 98 Hard Drive
9. Install and Launch Windows Applications
10. Install a CD-and DVD
11. Install a CD-ROM Drive – Windows
12. Install a Sound Card – Windows
13. Install a printer & Creating Network Printer
14. System restoration
15. Fixing SMPS & its Complains
16. Use scan disk and defrag -Windows
17. Create an ERD and Startup Disk – Windows 2000
18. Configure and Connect Dial-Up Networking
19. Expansion Bus Cables
20. Adding MODEM & Internet
21. Configure a Peer-to-Peer Network
22. Driver Signing
23. Troubleshoot Software
24. Scanner installation
25. Remote Desktop

SKILL BASED SUBJECT 2 : SERVER ADMINISTRATION

UNIT - I

Introducing Windows Server 2003 -Windows Server 2003 Editions- Standard Edition- Enterprise Edition- Datacenter Edition -Web Edition- Brand New in Windows Server 2003- New Remote Administration Tools -New Active Directory Features -Availability and Reliability Improvements-Resultant Set of Policies

Unit-II

Installation. Hardware Requirements. Hardware Compatibility List. Symmetric Multiprocessing Hardware . Clustering Hardware. Plug and Play Support -ACPI Issues - Developing a Deployment Plan -Document the Hardware Document the Network- Document the Software Document the Legacy Components- Prepare for Problems -Complete the Pre-installation Tasks .-Understanding Installation Models -Winnt.exe vs. Winnt32.exe -Installing

from CD-Booting to the Windows Server 2003 CD . . Running Setup.exe from CD -Installing from an MS-DOS Boot Disk .-Using Network Share points Using Logon Scripts and Batch Files . Automated Installations-Choosing an Automated Installation Type-Unattended Installation-SYSPREP .

Unit-III

System Basics for Servers . Manage Your Server . Configure Your Server Wizards Removing Server Roles Configure Your Server Log . Set Up Server Roles Manually . Remote Desktop - Enable Remote Desktop on the Server -Client Remote Connection Software . Starting a Remote Desktop Session- Running a Remote Desktop Session -Leaving a Remote Desktop Session- Managing the Connections from the Server -Joining the Console Session-Using a Snap-in for Remote Desktop . - Changes in IIS -Use Web Edition for IIS . Installing IIS -Set Compatibility Options Manually

Unit-IV

The Windows Server 2003 Registry . Overview of the Registry . Registry structure . Hives and Hive Files . . Registry Data Items . HKEY_CLASSES_ROOT . HKEY_CURRENT_USER . Regedit.exe . Prevent Regedit from Displaying the Last Accessed Key . Accessing Remote Registries . Searching the Registry- Creating Favorites - Tweak and Troubleshoot with the Registry . Exporting Keys -Adding Items to the Registry - Registry Security -Auditing the Registry . Reg.exe . General Guidelines for Reg.exe .

Unit-V

Booting Hardware Bootup. -Memory Errors. Drive Errors. SCSI Errors. Operating System Boot. MBR Code Executes. Windows Server 2003 Startup Files Execute. Boot Selection Menu Displays. Ntdetect Launches. Ntoskrnl Runs and HAL Is Loaded Drivers and Services Load - Operating System Loads -The computer Logs On Logon Services Load. About Booting. Enable Boot Logging. Enable VGA Mode.

Text-Books

1) Windows® Server 2003:The Complete Reference: By Kathy Ivens with Rich Benack, Christian Branson, John Green, David Heinz, Tim Kelly, John Linkous, Christopher McKettrick, Patrick J. Santry, Mitch Tulloch; Publications McGraw-Hill/Osborne

CORE 10 : WEB TECHNOLOGY

UNIT I: Fundamentals of Electronic Mail: Introduction - Email :Advantages and Disadvantages - Userids, Passwords and Email addresses - Message Components - Message Composition - Mailer Features - E mail Inner Workings - Email Management - MIME Types.

Browsing and Publishing: Introduction – Browser bare bones – Coast – to – Coast surfing – Hyber Text Markup Languages – Web page installation – Web page set up – HTML formatting and hyper link creation

UNIT II: The internet: Introduction – internet defined – internet history – the way the internet works – internet congestion – Internet culture – Business culture and the internet – collaborative computing and the internet . **World Wide Web:** introduction the web defined – web browser details – web writing styles – web presentation outline, design, and management registering web pages

UNIT III: Searching the world wide web: introduction – directories , search engines and metasearch engines – search fundamentals – search strategies – how does a search engine works. **Telnet and FTP:** introduction – telnet and remote login – File transfer – Computer Viruses

UNIT IV: Basic HTML: introduction – semantic versus syntactic – based style types – headers and footers – lists – tables – debugging. **Advanced HTML:** introduction – frames – html forms – CGI scripts – dynamic documents – html tools – next generation html – cascading style sheets

UNIT V: News groups, Mailing Lists, Chat rooms and MUDs: introduction – news groups and mailing lists history – mailing list fundamentals – newsgroups and mailing lists availability – chat-rooms – MUDs. **Electronic Publishing:** introduction – electronic publishing advantages and disadvantages – copy right issues – project Gutenberg and on-line books – electronic journals , magazines and news papers – miscellaneous publishing issues.

TEXT BOOK:

1. Raymond Greenlaw, Ellen Hepp, Fundamentals of the INTERNET and the World Wide Web, Second Edition , Tata McGraw Hill, 2005

CORE 11 : MASTERING LAN AND TROUBLESHOOTING

UNIT I: PC- Hardware overview Introduction to computer organization-Memory-PC family- PC hardware-interconnections between Boxes-Inside the boxes:-motherboard, daughter boards, floppy disk drive, HDD, speaker, mode switch, front panel indicators & Control- mother board logic-memory space-I/O port address-wait state-interrupts -I/O data transfer- DMA channels-POST sequence.

UNIT II: PERIPHERAL DEVICES Floppy drive controller-Overview-Disk format-FDC system interface-FDD interface Hard Disk controller-overview-Disk Drives and interface- controller post description Hard disk card-Hard disk format. **Display Adapter:**-CRT display- CRT controller principle -CRT controller 6845 **Printer controller:**-Centronics interface- programming sequence -Hardware overview-printer-sub assemblers.

UNIT III: MOTHERBOARD CIRCUITS Mother board functions-functional units and inter communications:-Reset logic -CPU nucleus logic-DMA logic-Wait state logic-NM logic- speaker logic-keyboard interface-SMPS.

UNIT IV: INSTALLATION AND MAINTENANCE Introduction-pre installation planning - installation practice-routine checks-special configuration memory up gradation - HD up gradation - DOS command(Internal and external).Preventive maintenance-system usage.

UNIT V: TROUBLESHOOTING Computer faults-nature of faults -types of faults - diagnostic programs and tools-fault elimination-systematic trouble shooting procedure mother board problem-serial port problems-FDC, HDC, display problems- display adapter- printer problem -monitor problems, HDC,FDC problems.

REFERENCE BOOKS:

1. B.Govindarajulu, "IBM PC and Clones", Tata McGraw Hill Co.1995.
2. Robert C Brenner, "IBM PC Troubleshooting and Repair Guide", BPB publications.

3. Winn & Rosch, "Hardware Bible", TechMedia.
4. Ray Duncan, "DOS Programming".
5. Zacker, Upgrading & Troubleshooting Networks – The Complete Reference, Tata McGraw Hill edition.
6. Meyers, Introduction to PC Hardware and Troubleshooting, Tata McGraw Hill edition.

CORE LAB – 7 : WEB TECHNOLOGY LAB

1. Design a personal web page using HTML.
2. Design a data entry form in HTML.
3. Write a Program in ASP to get data using a form, validate the data and returns the same data for correction if any using the same form.
4. Write a program in ASP to display the Session properties.
5. Write a program in ASP that makes use of Ad Rotator component.
6. Write a program in ASP that makes use of Browser Capabilities component.
7. Write a program in ASP that makes use of Content Rotator component.
8. Write a program in ASP that makes use of page counter component.
9. Write a program in ASP to get the data of students using forms and stores them in database.
10. Write a program in ASP to perform record navigation using a form.

ELECTIVE II : GRAPHICS AND MULTIMEDIA

(GRAPHICS – UNITS I & II)

UNIT I: Output Primitives: Points and Lines – Line-Drawing algorithms – Loading frame Buffer – Line function – Circle-Generating algorithms – Ellipse-generating algorithms. Attributes of Output Primitives: Line Attributes – Curve attributes – Color and Grayscale Levels – Area-fill attributes – Character Attributes.

UNIT II: 2D Geometric Transformations: Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations. 2D Viewing: The Viewing Pipeline – Viewing Co-ordinate Reference Frame – Window-to-Viewport Co-ordinate Transformation - 2D Viewing Functions – Clipping Operations.

(MULTIMEDIA – UNITS III, IV &V)

UNIT III: Text: Types of Text – Unicode Standard – Font – Insertion of Text – Text compression – File formats. Image: Image Types – Seeing Color – Color Models – Basic Steps for Image Processing – Scanner – Digital Camera – Interface Standards – Specification of Digital Images – CMS – Device Independent Color Models – Image Processing software – File Formats – Image Output on Monitor and Printer.

UNIT IV: Audio: Introduction – Acoustics – Nature of Sound Waves – Fundamental Characteristics of Sound – Microphone – Amplifier – Loudspeaker – Audio Mixer – Digital Audio – Synthesizers – MIDI – Basics of Staff Notation – Sound Card – Audio Transmission – Audio File formats and CODECs – Audio Recording Systems – Audio and Multimedia – Voice Recognition and Response - Audio Processing Software.

UNIT V: Video: Analog Video Camera – Transmission of Video Signals – Video Signal Formats – Television Broadcasting Standards – PC Video – Video File Formats and CODECs – Video Editing – Video Editing Software. Animation: Types of Animation – Computer Assisted Animation – Creating Movement – Principles of Animation – Some Techniques of Animation – Animation on the Web – Special Effects – Rendering Algorithms. Compression: MPEG-1 Audio – MPEG-1 Video - MPEG-2Audio – MPEG-2 Video.

TEXT BOOKS:

1. Computer Graphics, Donald Hearn, M.Pauline Baker, 2nd edition, PHI. (*UNIT-I: 3.1-3.6,4.1-4.5 & UNIT-II: 5.1-5.4,6.1-6.5*)
2. Principles of Multimedia, Ranjan Parekh, 2007, TMH. (*UNIT III: 4.1-4.7,5.1-5.16*
UNIT- IV: 7.1-7.3,7.8-7.14,7.18-7.20,7.22,7.24,7.26-28 *UNIT-V: 9.5-9.10,9.13,9.15,10.10- 10.13*)

REFERENCE BOOKS:

1. Computer Graphics, Amarendra N Sinha, Arun D Udai, TMH.Multimedia: Making it Work, Tay Vaughan, 7th edition, TMH

SKILL BASED SUBJECT LAB 2 : SERVER ADMINISTRATION

1. identify the functions needed for a network environment.
(subtasks: understand reasons for Windows server 2003, understand components of Windows server 2003)
2. decide whether to migrate to Windows server 2003.
(subtasks: evaluate the size, hardware/software, networking environment, security demand of the organization to decide whether to migrate.)
3. complete an installation checklist
(subtasks: check system requirements, consider installation choices, prepare for installation, plan migration to Windows server 2003)
4. install Windows server 2003
(subtasks: choose setup method, run setup, configure the server)
5. install WINDOWS XP PROFESSIONAL
(subtasks: clean install from new version, character based setup, GUI based setup, run upgrade, automate installation, create/use images)
6. install, configure, test trouble shoot RIS
7. plan network
(subtasks: define network, hardware, topologies, implement protocols)
8. ensure that the network is properly set up
(subtasks: set up network interface card, configure protocols, test network, setup DHCP, DNS and WINS, group permissions, user accounts)
9. implement Active Directory
(subtasks: install AD, replicate Ad among sites)
10. use communication among the computers
(subtasks: LAN) and connect to internet (subtasks: connect PCs with LAN, telephony connections, install/maintain Windows server 2003 router, internet connection, send/receive internet mail)
11. use IIS 6
(subtasks: install IIS 6, customize/maintain IIS 6)

12. install VPN

(subtasks: use PPTP, layer two tunneling protocol, setup VPN server/client)

13. use terminal services and Remote Desktop

(subtasks: setup terminal service, activate/install client licenses, use remote desktop for administration)

14. plan and use storage and file systems

(subtasks: Use disk management, dynamic volume management, distributed file system, distributed file system, backup/restore)

15. set up print services

(subtasks: set up network printing, control que, manage fonts, set up fax service)

16. use control panel, task manager, MMC, registry, group policy, local user profiles and update Windows server 2003.