CSC -501 – COMPUTER NETWORKING

UNIT–I

Introduction to computer networks and Internet, overview Advantages - network, Types-server based, peer, hybrid, Server types, Network Topology: Bus, Star, Ring, Star bus, Star ring, Mesh, Network Protocols Hardware Protocols, Software Protocols, Selecting and design the network for an organization.

UNIT-II

Signal Transmission: Digital signaling, Analog Signaling, Bit synchronization, Baseband and Broadband transmission, Network Media types- properties & specialties, Network adapters– working principals, configuration and selection.

UNIT-III

Network Layer: Network Layer Design issues, Store and Forward Packet Switching, connection less and connection oriented networks, routing algorithm's, optimality principle, shortest path, flooding, Distance Vector Routing, Control to Infinity Problem, Hierarchical Routing, Congestion control algorithms, admission control.

UNIT-IV

Internetworking: Tunneling, Internetwork Routing, Packet fragmentation, IPv4, IPv6 Protocol, IP addresses, CIDR, IMCP, ARP, RARP, DHCP. Transport Layer: Services provided to the upper layers elements of transport protocol-addressing connection establishment, connection release, Crash Recovery.

UNIT-V

UDP, RPC, Real Time Transport Protocols, The Internet Transport Protocols- Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Connection Management Modeling, The TCP Sliding Window, The TCP Congestion Control, The future of TCP. Application Layer: Introduction, providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, TELNET, DNS, SSH.

REFERENCES:

1. Andrew & Tanenbaum, "Computer Network ".
2. Prakash C Gupta, "Data Communication.
3. William Stallings, "Data and Computer Communication".
4. Computer Networking and the Internet (5th edition),Fred Halsall, Addison Wesley.
5. TCP/IP Protocol Suite (3rd edition), Behrouz Forouzan, McGraw Hill.

LIST OF EXPERIMENTS:-

1. Establishment and configuration of LAN.
2. Study of WAN.
3. Case study of ARP AND RARP Protocols.
4. Study of basic networking commands like ping, ipconfig, etc.
5. Case study of various Routing Strategies.
6. Case studies of various Network Topologies.
7. Study of sliding window protocol.
8. Configuring routers, bridges and switches and gateways.
9. Case study of client-server application.
10. Study of IPv4, IPv6 Protocol.

CSC- 502 – DATABASE MANAGEMENT SYSTEMS

UNIT-I

Basic Concepts: Introduction to DBMS, File system vs DBMS, Advantages of database systems, Database System architecture, Data models, Schemas and instances, Data independence, Functions of DBA and designer, Entities and attributes, Entity types, Key attributes, Relationships, Defining the E-R diagram of database.

UNIT-II

Relational Model: Structure of relational databases, Domains, Relations, Relational algebra – fundamental operators and syntax, Relational algebra queries, **Entity-Relationship model:** Basic concepts, Design process, Constraints, Keys, Design issues, E-R diagrams, Weak entity sets, extended E-R features , Generalization, Specialization and Aggregation.

UNIT-III

SQL: Data definition in SQL, update statements and views in SQL, Data storage and definitions, Data retrieval queries and update statements, Query Processing & Query Optimization, measures of query cost, Selection operation, Sorting, Join, evaluation of expressions, Transformation of relational expressions.

UNIT-IV

Relational Database design: Functional Dependency, definition, Trivial And Non-Trivial FD, closure of FD set, closure of attributes, Irreducible Set Of FD, Normalization –1NF, 2NF, 3NF, Decomposition using FD-dependency preservation, lossless join, BCNF, Multi-valued dependency, 4NF, Join dependency and 5NF.

UNIT-V

Introduction of transaction, transaction processing and recovery, Concurrency control: Lock management, specialized locking techniques, concurrency control without locking, Protection and Security Introduction, Distributed databases, Basic concepts of Object Oriented Database System.

REFERENCES:

1. Elmasri, Navathe, “Fundamentals Of Database Systems”, Addision Wesley.
2. Korth, Silbertz, Sudarshan, “Database Concepts”, McGraw Hill.
3. Toledo; Data base management systems;TMH.
4. Ashutosh Kumar Dubey “Data Base Management Concepts” Katson Publication.

LIST OF EXPERIMENTS:-

1. Study of DBMS, RDBMS and ORDBMS.
2. To study Data Definition language Statements.
3. To study Data Manipulation Statements.
4. Study of SELECT command with different clauses.
5. Study of SINGLE ROW functions (character, numeric, Data functions).
6. Study of GROUP functions (avg, count, max, min, Sum).
7. Study of various type of SET OPERATORS (Union, Intersect, Minus).
8. Study of various type of Integrity Constraints.
9. Study of Various type of JOINS.
10. To study Views and Indices.

CSC- 503 JAVA PROGRAMMING

UNIT-I

Introduction to Java : Basics of Java programming, Data types, Variables, Operators, Control structure including selection, Looping, Java methods, Overloading, Math class, Arrays in java.

UNIT-II

Objects and Classes : Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, String Buffer, File, this reference.

UNIT-III

Inheritance and Polymorphism : Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTIL package.

UNIT-IV

Event and GUI programming: Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames. **Layout Managers:** Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing.

UNIT-V

Multithreading in java, Thread life cycle and methods, Runnable interface, Thread synchronization, Exception handling with try-catch-finally, Collections in java, Introduction to Java Beans and Network Programming.

REFERENCES:

1. Programming in Java, Sachin Malhotra & Saurabh Chaudhary, Oxford University Press.
2. The Complete Reference, Java.
3. (Fourth Edition), Herbert Schild, TMH.
4. Java Programming, D. S. Malik, Cengage Learning.
5. Naughton & Schildt "The Complete Reference Java 2", Tata McGraw Hill.

LIST OF EXPERIMENTS: -

1. Write a Java program that displays area of different (Rectangle, Square, Triangle) using the method overloading.
2. To write a java program to print the individual digits of a 3 digit number.
3. To write a java program to read an integer and find whether the number is odd or even.
4. To write a java program find the biggest of three integers.
5. To write a java program to find the first 15 terms of Fibonacci sequence.
6. To write a java program to work with the creation of objects for the class with overloaded constructor and user defined methods returning a value.
7. To write a java program to get and sort names by command line argument.
8. To write a java program to understand the concept of functionalities of different Bitwise operators.
9. To write a java program to understand the concept of Method Overriding.
10. To write a java program to understand the steps in the creation of packages.

CSC-504(A) ADVANCE COMPUTER ARCHITECTURE

UNIT-I

Flynn's Classification, System Attributes to Performance, Parallel computer models - Multiprocessors and Multicomputers, Multivector and SIMD Computers. Data and resource dependences, Hardware and Software Parallelism, Program partitioning and scheduling, Grain size and latency, Control flow, Data flow and Demand driven mechanisms. Static interconnection networks, Dynamic interconnection Networks, Bus Systems, Crossbar Switch, Multiport Memory, Multistage and Combining Networks.

UNIT- II

Instruction set Architecture, CISC Scalar Processors , RISC Scalar Processors, VLIW architecture, Memory Hierarchy, Inclusion, Coherence and Locality, Memory capacity planning. Interleaved memory organization, Memory interleaving, Pipelined memory access, Bandwidth and Fault Tolerance. Backplane Bus System, Backplane bus specification, Addressing and timing protocols, Arbitration transaction and interrupt.

UNIT-III

Linear Pipeline Processor, Nonlinear Pipeline Processor, Instruction Pipeline design, Mechanisms for instruction Pipelining, Pipeline Hazards, Dynamic instruction scheduling - score boarding and Tomosulo's algorithm, Branch handling techniques, Arithmetic Pipeline Design, Static arithmetic Pipeline, Multifunctional Arithmetic Pipelines. Superscaler Pipeline design, Super Pipeline Processor Design.

UNIT-IV

Cache Coherence, Snoopy protocols, Directory based protocols. Message routing schemes in multicomputer network, Deadlock and virtual channel. Vector Processing Principles, Vector instruction types, Vector-access memory schemes. Vector supercomputer architecture, SIMD organization, Distributed memory model and shared memory model. Principles of Multithreading, Multithreading Issues and Solutions, Multiple-Context Processors.

UNIT-V

Parallel Programming Models, Shared-Variable Model, Message-Passing Model, Data-Parallel Model, Object-Oriented Model, Functional and Logic Models, Parallel Languages and Compilers, Language Features for Parallelism, Parallel Programming Environment, Software Tools and Environments.

REFERENCES:

1. Kai Hwang, "Advanced computer architecture", TMH.
2. J.P.Hayes, "computer Architecture and organization"; MGH.
3.V.Rajaranam & C.S.R.Murthy, "Parallel computer"; PHI Learning.
4. Kain,"Advance Computer Architecture: - A System Design Approach", PHI Learning India.

CSC-504(B) ADVANCE DIGITAL SYSTEMS

UNIT-I

Sequential Circuit Design: Analysis of clocked synchronous sequential circuits and modeling-State diagram, statetable, state table assignment and reduction, Design of synchronous sequential circuitsdesignof iterative circuits ASM chart and realization using ASM.

UNIT-II

Asynchronous Sequential Circuit Design: Analysis of asynchronous sequential circuit, flow table reduction-races-stateassignment, transition table and problems in transition table- design of asynchronoussequential circuit-Static, dynamic and essential hazards, data synchronizers, mixedoperating mode asynchronous circuits, designing vending machine controller.

UNIT-III

Fault Diagnosis And Testability Algorithms: Fault table method-path sensitization method Boolean difference method, D algorithm, Tolerance techniques, The compact algorithm, Fault in PLA, Test generation DFT schemes, Built in self test.

UNIT-IV

Synchronous Design Using Programmable Devices: Programming logic device families– Designing a synchronous sequential circuit usingPLA/PAL, Realization of finite state machine using PLD-FPGA-Xilinx FPGA-Xilinx4000.

UNIT-V

System Design Using VHDL& VHDL: Operators Arrays concurrent and sequential statements packages,Data flow, Behavioral structural modeling, compilation and simulation of VHDL code Test bench, Realization of combinational and sequential circuits using HDL, Registers, counters sequential, machine serial, adder Multiplier, Divider Design of simplemicropr ocessor.

REFERENCES:

1. Advanced Digital Design with the Verilog HDL by D. Ciletti Micahel.
2. Design through Verilog HDL by B.Bala Tripura Sundari T.R. Padmanabhan.

CSC-504(C) ADVANCED DATA STRUCTURE

UNIT-I

Introduction: Common operations on data structures, Types of data structures, Data structures & Programming, Program Design, Complexities, Time Complexity, order of Growth, Asymptotic Notation.

UNIT-II

Advanced Data Structures: Hash tables, Heaps, Complexity, Analysis of Heap Operations, Application of Heap, AVL tress, Insertion & Deletion in AVL tree, Red Black Trees, Properties of Red Black trees, Insertion & Deletion in Red Black tree.

UNIT-III

Sorting: Need for sorting, Types of sorting algorithm, Stable sorting Algorithm, Internal & External sorting algorithm, Outline and offline algorithm, Sorting Techniques-Insertion, Shell, Selection, Merge, Quick sort, Radix sort, Bucket sort.

UNIT-IV

Augmenting Data structures: Augmenting a red black trees, Retrieving an element with a given rank, Determining the rank of element, Data structure Maintenance, An augmentation strategy, Interval Trees.

UNIT-V

File structures: Basic file operations, File organization, Sequential file organization, Indexed sequential file organization, Direct file organization. External merge sort, Multiway Merge sort, Tournament Tree, Replacement Selection.

REFERENCES:

1. Horowitz and Sahani, "Fundamentals of data Structures",University Press.
2. Trembley and Sorenson , "Data Structures", TMH Publications.
3..A. M. Tenenbaum, "Data Structures using C & C++", Pearson Pub.
4. Venkatesan , Rose, "Data Structures" Wiley India Pvt.Ltd.

CSC-505(A) SOFTWARE ENGINEERING

UNIT-I

Introduction Software: Problem and prospects Software development process, System Development Life Cycle, Waterfall Model, Spiral Model and other models, Unified processAgile development, Agile Process, Extreme Programming, Other agile Process models.

UNIT-II

Measures, Metrics and Indicators, Metrics in the Process and Project Domains, Software Measurement, Metrics of Software Quality, S/W reliability, Software estimation techniques, LOC and FP estimation. Empirical models like COCOMO, project tracking and scheduling, reverse engineering.

UNIT-III

Software requirements and specification: feasibility study, Informal/formal specifications, pre/post conditions, algebraic specification and requirement analysis models, Specification design tools. Software design and implementation: Software design objectives and techniques, User interface design, Modularity, Functional decomposition, DFD, Data Dictionary, Object oriented design, Design patterns implementation strategies like top- down, bottom-up.

UNIT-IV

Coding standard and guidelines, programming style, code sharing, code review, rapid prototyping, specialization, construction, class extensions, intelligent software agents, reuse performance improvement, debugging. Software Testing Strategies, Verification and Validation, Strategic Issues, test plan, white box, black-box testing, unit and integration testing, system testing test case design and acceptance testing, maintenance activities.

UNIT-V

Software Maintenance: Software Supportability, Reengineering, Business Process Reengineering, Reverse Engineering, Restructuring, Forward Engineering, Economics of Reengineering, project scheduling and tracking plan, project management plan, SQA and quality planning, SCM activities and plan, CMM, Software project management standards, Introduction to component based software engineering.

REFERENCES:

1. Pankaj Jalote ,"An Integrated Approach to Software Engineering", Narosa Pub, 2005.
2. Rajib Mall, "Fundamentals of Software Engineering" Second Edition, PHI Learning.
3. R S. Pressman ,"Software Engineering: A Practitioner's Approach", Sixth edition 2006, McGraw-Hill.
4. Sommerville,"Software Enginerring",Pearson Education.

CSC-505(B) DIGITAL IMAGE PROCESSING

UNIT-I

Digital Image Processing: Elements of a Digital Image Processing system, Structure of the Human eye, Image formation and contrast sensitivity, Sampling and Quantization, Neighbours of a pixel, Distance measures, Photographic file structure and exposure, Filem characteristics, Linear scanner, Video camera, Image processing applications.

UNIT-II

Image Transforms: Introduction to Fourier transform DFT, Properties of two dimensional FT, Separability, Translation, Periodicity, Rotation, Average value, FFT algorithm, Walsh transform, Hadamard transform, Discrete Cosine transform.

UNIT-III

Image Enhancement: Definition, Spatial domain methods, Frequency domain methods, Histogram modify technique, Neighborhood averaging, Media filtering, Lowpass filtering, Averaging of multiple images, Image sharpening by differentiation and high pass filtering.

UNIT-IV

Image Restoration: Definition, Degradation model, Discrete formulation, Circulant matrices, Block circulant matrices, Effect of diagnolization of circulant and block circulant matrices, Unconstrained and constrained restorations, Inverse filtering, Wiener filter, Restoration in spatial domain.

UNIT-V

Image Encoding: Objective and subjective fidelity criteria, Basic encoding process, The mapping, The quantizer, The coder, Differential encoding, Contour encoding, Run length encoding, Image encoding relative to fidelity criterion, Differential pulse code modulation.

REFERENCES:

1. Rafael, C. Gonzlez., and Paul, Wintz, "Digital Image Processing", Addison-Wesley Publishing Company.
2. Jain Anil K., "Fundamentals of Digital Image Processing", Prentice Hall.
3. Sosenfeld, and Kak, A.C., "Digital Image Processing", Academic Press.
4. William K. Pratt., "Digital Image Processing", John Wiley and Sons.

CSC-505(C) PHP TECHNOLOGY

UNIT-I

Introduction to PHP: Evaluation of Php, Basic Syntax, Defining variable and constant, Php Data type, Operator and Expression.

Handling HTML Form With PHP: Capturing Form Data, Dealing with Multi-value filed, Generating File uploaded form , Redirecting a form after submission.

UNIT-II

Decisions and loop: Making Decisions, Doing Repetitive task with looping, Mixing Decisions and looping with Html.

Function: What is a function, Define a function, Call by value and Call by reference, Recursive function.

UNIT-III

String: Creating and accessing String, Searching & Replacing String, Formatting String, String Related Library function.

Array: Anatomy of an Array, Creating index based and Associative array, Accessing array Element, Looping with Index based array, Looping with associative array using each() and foreach(), Some useful Library function.

UNIT-IV

Working with file and Directories: Understanding file& directory, Opening and closing a file, Coping, renaming and deleting a file, Working with directories, Building a text editor, File Uploading & Downloading.

State management: Using query string(URL rewriting), Using Hidden field, Using cookies, Using session.

UNIT-V

String matching with regular expression: What is regular expression, Pattern matching in Php, Replacing text, Splitting a string with a Regular Expression.

Generating Images with PHP: Basics of computer Graphics, Creating Image, Manipulating Image, Using text in Image.

REFERENCES:

1. Learning PHP, MySQL, books by ‘ O’ riley Press.
2. PHP & MySQL: Novice to Ninja by Kevin Yank.
3. PHP for the Web: Visual QuickStart Guide (4th Edition) by Larry Ullman.

CSC-506(A)- MULTIMEDIA

UNIT-I

Multimedia System Design: An Introduction Multimedia Elements, Multimedia Applications, Multimedia System Architecture, Evolving Technologies for Multimedia Systems, Multimedia Databases.

UNIT-II

Compression and Decompression Techniques: Types of Compression, Binary Image Compression Schemes, Color, Gray scale, Still-video image compression, Discrete Cosine Transform, Video Image compression, MPEG Coding methodology, Audio Compression, Data and File format standards- RTF, TIFF,RIFF, MIDI, JPEG, AVI, JPEG, TWAIN Architecture.

UNIT-III

Multimedia Input And Output Technologies: Key Technology Issues, Pen Input, Video and Image Display Systems, Print Output Technologies, Image Scanners, Digital Voice and Audio, Video Images and Animation, Full Motion Video.

UNIT-IV

Storage And Retrieval Technologies: Magnetic Media Technology, RAID-Level-0 To 5, Optical Media, WORM optical drives, Hierarchical Storage Management, Cache Management for storage systems.

UNIT-V

Multimedia Application Design: Types of Multimedia systems, Virtual Reality Design, Components of Multimedia syste, Distributed Application Design Issues, Multimedia Authoring and User Interface, Hypermedia Messaging, Distributed Multimedia Systems.

REFERENCES:

1. Andleigh PK and Thakrar K, "Multimedia Systems", Addison Wesley Longman, 1999.
2. Fred Halsall, "Multimedia Communications", Addison Wesley, 2000.
3. Ralf Steinmetz, Klara Nahrstedt, "Multimedia, computing, communications and applications", Prentice Hall, 1995.
4. Tay Vaughan, "Multimedia making It work", TMH 5th Edition 2001.
5. Weixel, Fulton, Barksdale.Morse, "Multimedia Basics", Easwar Press 2004.

CSC-506(B)- THEORY OF COMPUTATION

UNIT-I

Introduction of the theory of computation, Finite state automata– description of finite automata, properties of transition functions, Transition graph, designing finite automata, FSM, DFA, NFA, 2-way finite automata, equivalence of NFA and DFA, Mealy and Moore machines.

UNIT-II

Regular grammars, regular expressions, regular sets, closure properties of regular grammars, Arden's theorem, Myhill-Nerode theorem, pumping lemma for regular languages, Application of pumping lemma, applications of finite automata, minimization of FSA.

UNIT-III

Introduction of Context Free Grammar, derivation trees, ambiguity, simplification of CFGs, normal forms of CFGs, Chomsky Normal Form and Greibach Normal forms, Pumping lemma for CFLs, Decision algorithms for CFGs, Designing CFGs, Closure properties of CFL's.

UNIT-IV

Introduction of PDA, formal definition, closure property of PDA, examples of PDA, Deterministic Pushdown Automata, NPDA, conversion PDA to CFG, conversion CFG to PDA.

UNIT-V

Turing machines: basics and formal definition, language acceptability by TM, examples of TM, variants of TMs: multitape TM, NDTM, Universal Turing Machine, offline TMs, equivalence of single tape and multitape TMs. Recursive and recursively enumerable languages, decidable and undecidable problems – examples, halting problem, reducibility. Introduction of P, NP, NP complete, NP hard problems and Examples of these problems.

REFERENCES:

1. Daniel I.A. Cohen,"Introduction to Computer Theory",Wiley India.
2. John E. Hopcroft, Jeffrey D.Ullman and Rajeev Motwani, "Introduction to Automata Theory, Languages and Computation", Pearson Education.
3. K.L.P Mishra & N.Chandrasekaran,"Theory of Computer Science", PHI Learning.
4. Peter Linz, "Introduction to Automata Theory and Formal Languages", Narosa Publishing.
5. John C Martin, "Introduction to languages and the theory of computation", TATA McGraw Hill.

CSC-506(C)- INFORMATION THEORY & CODING

UNIT-I

Uncertainty, Information and Entropy Information Measures, Characteristics on information measure, Shannon's concept of information, Shannon's measure of information, Model for source coding theorem, Communication system, Source coding and line/channel coding, channel mutual information capacity (Bandwidth).

UNIT-II

Channel coding, Theorem for discrete memory less channel, Information capacity theorem: Error detecting and error correcting codes, Types of codes, Block codes, Tree codes, Hamming Codes, Description of linear block codes by matrices, Description of linear tree code by matrices, Parity check codes, Parity check polynomials.

UNIT-III

Compression: Lossless and lossy, Huffman codes, Binary Image compression schemes, Run length Encoding, CCITT group-3 1D compression, CCITT group-3 2D compression, CCITT group-4 2D compression.

UNIT-IV

Video Image Compression: Requirement of full motion video compression, CCITT H 261 video coding algorithm, MPEG compression methodology, MPEG-2 compression, Audio (Speech)compression.

UNIT-V

Cryptography: Encryption, Decryption, Cryptogram (cipher text), Concept of cipher, Cryptanalysis, Keys: Single key (Secret key), Cryptography, two-key (Public key) cryptography, Single key cryptography, Ciphers, Block Cipher code, Stream ciphers, Requirements for secrecy, The data Encryption Standard, Public Key Cryptography, Diffie- Hellmann public key distribution, The Rivest- Shamin Adelman(R-S-A) system for public key cryptography, Digital Signature.

REFERENCES:

1. Rajan Bose "Information Theory, Coding and Cryptography", TMH, 2002.
2. G A Jones J M Jones, "Information and Coding Theory", Springer Verlag, 2004.
3. Cole, "Network Security", Bible, Wiley INDIA, Second Addition.
4. K Sayood, "Introduction to Data Compression" 3/e, Elsevier 2006.