ITC-601 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.

ITC-602 DOT NET TECHNOLOGY

UNIT-I
Introduction to .NET Technology, Introduction to VB.NET, Software development and Visual Basic .NET, Visual Basic .NET and .NET frame.

UNIT-II
Visual Basic fundamentals: The Visual Basic .NET Development Environment, The element of VB.NET, VB.NET operators, Software design, Conditional structure and control flow, Methods.

UNIT-III
Classes and Objects: Types, Structure and Enumeration, Classes, Interfaces, Exception handling and Classes, Collections, Arrays and other Data Structure.

UNIT-IV
Advance design concepts, Patterns, Roles and Relationships, Advanced Interface Patterns, Adapters and Delegates and Events Data Processing and I/O.

UNIT-V
Writing Software with Visual Basic .NET, Interfacing with the End User, Introduction to ASP.NET and C#.NET and their features.

REFERENCES:

1. Jeffrey R. Shapiro "The Complete Reference Visual Basic .NET" Tata Mcgraw Hill (2002

Edition).
2. Rox "Beginner and Professional Edition VB.NET" Tata Mcgraw Hill.
3. Steven Holzner "Visual Basic .NET Black Book" Wiley Dreamtech Publication.
4. Alex Homer, Dave Sussman "Professional ASP.NET1.1" Wiley Dreamtech.

LIST OF EXPERIMENTS:
1. Working with call backs and delegates in C#.

2. Code access security with C#.

3. Creating a Windows Service with C#.

4. Interacting with a Windows Service with C#.

5. Using Reflection in C#.

6. Perform String Manipulation with the String Builder and String Classes and C#:

7. Using the System .Net Web Client to Retrieve or Upload Data with C#.

8. Working with Page and forms using ASP .Net.

9. Data Sources access through ADO.Net.

10. Working with Data readers, Transactions.

ITC-603 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: Overview, 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 to Distributed databases, Basic concepts of object oriented data base 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.

ITC-604(A) – DISTRIBUTED SYSTEM

UNIT-I

Introduction to distributed systems Architecture: for Distributed System, Goals of Distributed system, Hardware and Software concepts, Distributed Computing Model, Advantages & Disadvantage distributed system, Issues in designing Distributed System.

UNIT-II

Distributed Share Memory And Distributed File System: Basic Concept of Distributed Share Memory (DSM), DSM Architecture & its Types, Design & Implementations issues In DSM System, Structure of Share Memory Space, Consistency Model, and Thrashing, Desirable features of good Distributed File System, File Model, File Service Architecture, File Accessing Model, File Sharing Semantics, File Catching Scheme, File Application & Fault tolerance, **Naming:** Features, System Oriented Names, Object Locating Mechanism, Human Oriented Name.

UNIT-III

Inter Process Communication And Synchronization API for Internet Protocol: Data Representation & Marshaling, Group Communication, Client Server Communication, RPC-Implementing RPC Mechanism, Stub Generation, RPC Messages, **Synchronization:** Clock Synchronization, Mutual Exclusion, **Election Algorithms:** Bully & Ring Algorithms.

UNIT-IV

Distributed Scheduling And Deadlock Distributed Scheduling: Issues in Load Distributing, Components for Load Distributing Algorithms, Different Types of Load Distributing Algorithms, Task Migration and its issues, Deadlock-Issues in deadlock detection & Resolutions, Deadlock Handling Strategy, Distributed Deadlock Algorithms.

UNIT-V

Distributed Multimedia & Database system: Distributed Data Base Management System(DDBMS), Types of Distributed Database, **Distributed Multimedia:** Characteristics of multimedia Data, Quality of Service Managements.

REFERENCES:

1. Sinha, Distributed Operating System Concept & Design, PHI.
2. Coulouris & Dollimore, Distributed System Concepts and Design, Pearson Pub.
3. Singhal & Shivratari, Advance Concept in Operating System, McGraw Hill.
4. Attiya & Welch, Distributed Computing, Wiley Pub.

ITC-604(B) DIGITAL IMAGE PROCESSING

UNIT-I

Digital Image Processing: Elements of a Digital Image Processing system, Structure of the Human eye, Image formation and contrastsensitivity, 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, Frequencydomain 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.

ITC-604(C) HUMAN COMPUTER INTERFACE

UNIT-I

Introduction, Human Computer Interaction (HCI) concepts and definitions, Nature of - interaction human and Machine, interaction design, Understanding and conceptualizing interaction, Understanding users, interfaces and interactions, Data gathering.

UNIT-II

Introduction to User Centered System Design (UCSD), Natural computing, user centered system design, core concepts, interactive design and its strength and weakness, types of user model, user model and evaluation, Heuristic evaluation.

UNIT-III

Psychological user models, Black box models of human performance, including perception, motor control, memory and problem solving, Quantitative analysis of performance, Human processor, keystroke level model, and GOMS descriptions of user performance.

UNIT-IV

Modeling of system understanding, Mental models and metaphor, use of design prototypes, controlled experiments, Cognitive walkthrough, Evaluation from the perspective of a novice learning to use the system.

UNIT-V

Task analysis and design, Contextual and qualitative studies, use-case driven design, Research techniques, Cognitive dimensions of notations, CSCW, ubiquitous-computing, programmability. new interaction techniques.

REFERENCES:

1.Alan Dix, Janet E. Finlay, "Human-Computer interaction", Pearson Education.
2.Olsen, "Human-Computer Interaction", Cengage Learning.
3.Preece, J. Sharp, H. & Rogers, "Interaction design: beyond human-computer interaction", Y. Wiley.
4.Smith Atakan Serengal, "Human-Computer Interaction", Cengage Learning.

ITC-605(A) 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.

ITC-605(B) NETWORK ANALYSIS AND SYNTHESIS

UNIT I
Introduction to circuit elements R,L,C and their characteristics in terms of linearity & time dependant nature, voltage & current sources controlled & uncontrolled sources KCL and KVL analysis, Nodal & mesh analysis, analysis of magnetically coupled circuits, Transient analysis, Transients in RL, RC&RLC Circuits, initial conditions, time constants, Steady state analysis, Concept of phasor & vector, impedance & admittance, Network topology, concept of Network graph, Tree, Tree branch & link, Incidence matrix, cut set and tie set matrices, dual networks, Dot convention, coupling coefficient, tuned circuits, Series & parallel resonance.

UNIT II
Network Theorems for AC & DC circuits, Thevenins & Norton's, Superpositions, Reciprocity, Compensation, Substitution, Maximum power transfer, and Millman's theorem, Tellegen's theorem, Problems with dependent & independent sources.

UNIT III
Frequency domain analysis, Laplace transform solution of Integro differential equations, transform of waveform synthesized with step ramp, Gate and sinusoidal functions, Initial & final value theorem, Network Theorems in transform domain.

UNIT IV
Concept of signal spectra, Fourier series co-efficient of a periodic waveform, Symmetries as related to Fourier coefficients, Trigonometric & Exponential form of Fourier series.

UNIT V
Network function & Two port networks, Concept of complex frequency, Network & Transfer functions for one port & two ports, Poles and zeros, Necessary condition for driving point & transfer function, Two port parameters –Z,Y, ABCD, Hybrid parameters, their inverse & image parameters, relationship between parameters, Interconnection of two ports networks, Terminated two port network.

REFERENCES:

1. M.E. Van Valkenburg, Network Analysis, (PHI).
2. F.F.Kuo, Network Analysis.
3. Mittal GK; Network Analysis; Khanna Publisher.
4. Mesereau and Jackson; Circuit Analysis- A system Approach; Pearson.
5. Sudhakar & Pillai; Circuit & Networks- Analysis and Synthesis; TMH.
6. Hayt W.H. & J.E. Kemmerly; Engineering Circuit Analysis; TMH.
7. Decarlo lin; Linear circuit Analysis; Oxford.
8. William D Stanley : Network Analysis with Applications, Pearson Education.

ITC-605(C) CYBER CRIME & INFORMATION WARFARE

UNIT-I

Introduction of Cyber Crime, Challenges of cyber crime, Classifications of Cybercrimes: E-Mail Spoofing, Spamming, Internet Time Theft, Salami attack/Salami Technique.

UNIT-II

Web jacking, Online Frauds, Software Piracy, Computer Network Intrusions, Password Sniffing, Identity Theft, cyber terrorism, Virtual Crime, Perception of cyber criminals: hackers, insurgents and extremist group etc. Web servers were hacking, session hijacking.

UNIT-III

Cyber Crime and Criminal justice**:** Concept of Cyber Crime and the IT Act, 2000, Hacking, Teenage Web Vandals, Cyber Fraud and Cheating, Defamation, Harassment and E-mail Abuse, Other IT Act Offences, Monetary Penalties, jurisdiction and Cyber Crimes, Nature of Criminality, Strategies to tackle Cyber Crime and Trends.

UNIT-IV

The Indian Evidence Act of 1872 v, Information Technology Act 2000: Status of Electronic Records as Evidence, Proof and Management of Electronic Records, Relevancy, Admissibility and Probative Value of EEvidence, Proving Digital Signatures, Proof of Electronic Agreements, Proving Electronic Messages.

UNIT-V

Tools and Methods in Cybercrime: Proxy Servers and Anonymizers, Password Cracking, Key loggers and Spyware, virus and worms, Trojan Horses, Backdoors, DoS and DDoS Attacks, Buffer and Overflow, Attack on Wireless Networks, Phishing**:** Method of Phishing, Phishing Techniques.

REFERENCES:

1. Principles of Cyber crime, Jonathan Clough Cambridge University Press.

2. John R. Vacca, Computer Forensics:Computer Crime Scene Investigation, 2nd Edition, Charles River Media, 2005.

3. Cyber Law Simplified, VivekSood, Pub: TMH.

4. Cyber Security by Nina Godbole, SunitBelapure Pub: Wiley-India.

ITC-606(A) UNIX & SHELL PROGRAMMING

UNIT–I

General Overview of the System: System structure, user perspective, O/S services assumption about Hardware The Kernel and buffer cache architecture of Unix O/S, System concepts, Kernel data Structure, System administration, Buffer headers, Structure of the buffer pool, Scenarios for retrieval of the buffer, Reading and writing disk block, Advantage and disadvantage of buffer cache.

UNIT–II

Internal Representation of Files: Inodes, Structure of regular, Directories conversions of a path name to an inode, Super block, Inode assignment to a new file, Allocation of disk blocks, Open read write file and record close, File creation, Operation of special files change directory and change root, change owner and change mode, STAT and FSTAT, PIPES mounting and unmounting files system, Link Unlink.

UNIT–III

Structures of Processes and process control: Process states and transitions layout of system memory, The context of a process, manipulation of process address space, Sleep process creation/termination. The user Id of a process, changing the size of a process, Killing process with signals, job control, **Scheduling commands:** AT and BATCH,TIME,CORN.

UNIT-IV

Introduction to shell scripts: Shell Bourne shell, C shell, Unix commands, permissions, editors, grep family, shell variables, scripts, metacharacters and environment, if and case statements, for while and until loops, Shell programming.

UNIT-V

Introduction of Awk and perl Programming: Awk pattern scanning, BEGIN and END patterns, Awk arithmetic and variables, and operators, functions, perl, The chop() function, variable and operators, **Networking tools:** Resolving IP addressing, TELNET, FTP, Socket programming, introduction of Linux structure .

REFERENCES:

1. M.J. Bach "Design of UNIX O.S. ", PHI Learning.
2. Y.Kanetkar "Unix shell programming", BPB Pub.
3. B.W. Kernighan & R. Pike, "The UNIX Programming Environment", PHI Learning.

ITC-606(B) 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.

ITC- 606(C) STATISTICAL METHOD

UNIT-I

Interpolation: Forward, Backward, central (Striplings) and divided difference formulas, lagrangie's interpolation, Inverse interpolation for equal and unequal intervals.
Numerical Integration: Newton Cote's formula, Simpson's 1/3rd and 3/8th rule, Gauss Legendre (two and three points) integration formula.

UNIT –II

Introduction of operation research, LP Formulations, Graphical method for solving LP's with 2 variables, Simplex method, Duality, Transportation problem.

UNIT-III

Numerical Solutions of Ordinary Different Equations: Linear Second– order Equations with variable coefficients, Correlation and Regression, Curve Fitting, Numerical solution by Runge Kutta Method, Its application to higher order equations.

UNIT-IV

Second Order linear differential equation with variable coefficients: Methods one integral is known, removal of first derivative, changing of independent variable and variation of parameter, Solution by Series Method.

UNIT-V

Linear partial differential equation of second and higher order: Linear homogeneous and Non homogeneous partial diff, equation of nth order with constant coefficients, Separation of variable method for the solution of wave and heat equations.

REFERENCES:
1. Iyengyr M.K. Jain & R.K. Jain "Numerical Methods for scientific and engineering computation", Wiley Eastern (New Age), 1995.
2. E.V. Krishnamurthy & S.K. Sen "Computer Based Numerical Algorithms".
3. Miller & Freund's "Probability and Statistics for Engineers".
4. Dr. D.K. Jain Engineering Mathematics volume III & II.