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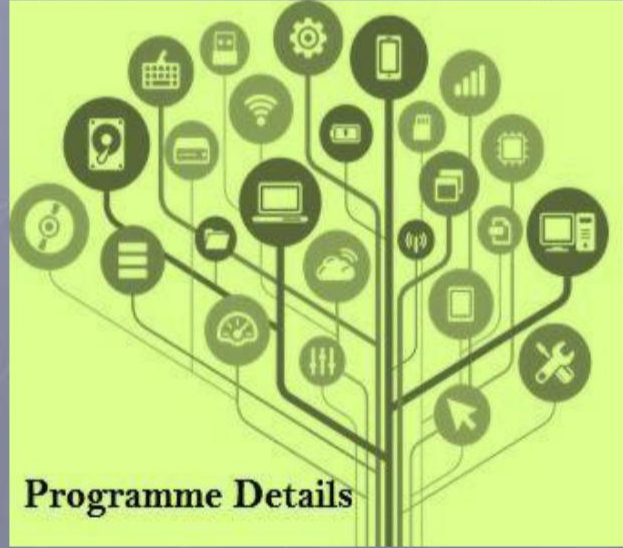


University of Mysore

(Estd.1916)

M.Sc. INFORMATION TECHNOLOGY

**Choice Based
Credit System
(CBCS)**



UNIVERSITY OF MYSORE
Centre for Information Science and Technology
Manasagangotri, Mysuru-570006

Regulations and Syllabus

Master of Science in Information Technology
(M.Sc. IT)

(Two-Year Programme)

Under

Choice Based Credit System (CBCS)


CHAIRMAN
BOS OF CIST COURSES
UNIVERSITY OF MYSORE
MGM - 6

UNIVERSITY OF MYSORE
GUIDELINES AND REGULATIONS
LEADING TO
MASTER OF SCIENCE IN INFORMATION TECHNOLOGY
(M.Sc. IT. PROGRAMME UNDER CBCS SCHEME)

PROGRAMME DETAILS

Name of the Department : Centre for Information Science and Technology

Subject : Information Technology

Faculty : Science and Technology

Name of the Programme : Master of Science in Information Technology(M. Sc IT)

Duration of the Programme : 2 years divided into 4 semesters

PROGRAMME OUTCOMES (PSO)

1. Graduates will acquire the knowledge about current technology, trends, designing, developing, implementing, support or management of computer based information systems particularly software applications and computer hardware.
2. Graduates will able to demonstrate basic knowledge in the areas such as, Software Engineering, Data communication and Networking, Database management, Web Technology and Operating Systems for building IT applications.
3. Graduates will be able to deploy application software through mini-projects and will inculcate the skills of communication proficiently.



PEDAGOGIES EMPLOYED IN THE M.SC. IT., PROGRAMME

The pedagogy of teaching-learning involves three components.

1. Lectures with intellectual inputs form the first component. This method provides Receptive Instructions to students.
2. The second component is the tutorials. This method provides Directive Instructions to students.
3. The third major component is the practical orientation with skills and participatory learning works. This method involves Exploratory Instructions.

M.Sc. DEGREE COURSE STRUCTURE AND SYLLABUS

FIRST SEMESTER

Sl. No.	Code	Paper Name	HC/SC	L	T	P	Credits
1	M. Sc IT 101	Computer Organization and Architecture	HC	2	1	0	3
2	M. Sc IT 102	Problem Solving and Programming in C	HC	2	1	1	4
3	M. Sc IT 103	Data Structures and Algorithms	HC	2	1	1	4
4	M. Sc IT 104	Discrete Mathematics	HC	2	0	2	4
5	M. Sc IT 105	Computer Graphics	SC	2	0	1	3
6	M. Sc IT 106	Internet Technologies	SC	2	0	1	3
7	M. Sc IT 107	E-Commerce	SC	2	1	0	3

SECOND SEMESTER

Sl. No.	Code	Paper Name	HC/SC	L	T	P	Credits
1	M. Sc IT 201	RDBMS and Query Languages	HC	2	0	1	3
2	M. Sc IT 202	Data Communication and Computer Networking	HC	2	1	1	4
3	M. Sc IT 203	Current Operating System and Their Application	HC	2	0	1	3
4	M. Sc IT 204	Object Oriented Programming in C++ and JAVA	HC	2	1	1	4
5	M. Sc IT 205	Probability and Statistics	SC	2	1	0	3
6	M. Sc IT 206	Multimedia Technologies	SC	2	0	1	3
7	M. Sc IT 207	Enterprise Resource Planning	SC	2	1	0	3
8	M. Sc IT 208	Web Designing	OE	2	0	1	3

THIRD SEMESTER

Sl. No.	Code	Paper Name	HC/SC	L	T	P	Credits
1	M. Sc IT 301	Web Technologies	HC	2	1	1	4
2	M. Sc IT 302	Software Engineering and testing	SC	2	1	0	3
3	M. Sc IT 303	Mobile Computing and Application	SC	2	0	1	3
4	M. Sc IT 304	Advanced JAVA	HC	2	0	2	4
5	M. Sc IT 305	Data Mining and Warehousing	HC	2	1	0	3

6	M. Sc IT 306	Software Project Management	SC	2	1	0	3
7	M. Sc IT 307	Cyber Laws and Network Security	SC	2	1	0	3
8	M. Sc IT 308	Mobile Technology	OE	2	1	0	3

FOURTH SEMESTER

Sl. No.	Code	Paper Name	HC/SC	L	T	P	Credits
1	M. Sc IT 401	Cloud Computing	HC	2	0	1	3
2	M. Sc IT 402	Programming with C Sharp (C#)	SC	2	0	1	3
3	M. Sc IT 403	Software Communication & Documentation	SC	2	1	0	3
4	M. Sc IT 404	Geographic Information Systems	SC	3	0	0	3
5	M. Sc IT 405	Project	HC	0	2	6	8
6	M. Sc IT 406	Multimedia Applications	OE	2	1	1	4

FIRST SEMESTER

HARD CORE: COMPUTER ORGANISATION AND ARCHITECTURE

COURSE OUTCOME:

- ✓ To give a comprehensive understanding about basic architecture of processing, memory and I/O organization in a computer system.
- ✓ To understand the basics involved in data representation and digital logic circuits used in the computer system.
- ✓ To gain knowledge on general concepts in digital logic design, including logic elements, and their use in combinational and sequential logic circuit design.

COURSE CONTENT:

UNIT I:

Basic of Computer, Generation of Computer, Classification of Computers, data types, Von Neumann Architecture, Instruction Execution, Register Transfer, Bus and Memory Transfers, Tree-State Bus Buffers, Memory Transfer, Micro-Operations, Register Transfer Micro-Operations, Arithmetic Micro-Operations, Logic Micro-Operations, Shift Micro-Operations.

UNIT II:

Addition And Subtraction With Signed-Magnitude, Multiplication Algorithm, Division Algorithm, Floating-Point Arithmetic Operations, ALU, Input and Output Devices, Punched Tape, Computer registers, computer instructions, Timing and Control, Instruction cycle, Central Processing Unit, Processor bus organization, stack organization, instruction formats- three address, two address, single address and zero address instruction formats, addressing modes, data transfer and manipulation, RISC and CISC machine characteristics.

UNIT III:

Memory Hierarchy, Main Memory, Auxiliary Memory, Cache Memory, Virtual Memory. Address Space and Memory Space, Associative Memory, Page Table, Page Replacement. Characteristics of Multiprocessors, Interconnection Structure Time-Shared Common Bus, Multi-Port Memory, Crossbar Switch, Derivation of a Boolean Expression - Sum Products, Product of Sums".

UNIT IV:

Parallel organization: Types of Parallel processor systems, Pipelining, Clusters: Cluster configurations, mainframe and mini computers, wearable computers, handheld computers. I pod, Configuration and features of Laptops. The future of computer architecture.

REFERENCE BOOKS:

1. Bartee, T. C. (2011). *Digital computer fundamentals*. New Delhi: Tata Mcgraw Hill Education Private
2. Hamacher, V. C., Vranesic, Z. G., & Zaky, S. G. (2002). *Computer organization*. Boston, MA: McGraw-Hill.
3. Hayes, J. P. (2002). *Computer architecture and organization*. New York: McGraw-Hill Primis Custom Pub.
4. Heuring, V. P., & Jordan, H. F. (2008). *Computer systems design and architecture*. Delhi, India: Dorling Kindersley (India).
5. Mano, M. M. (2008). *Computer system architecture*. New Delhi: Prentice-Hall of India.
6. Patterson, D. A., & Hennessy, J. L. (2019). *Computer organization and design: The hardware/software interface*. Brantford, Ontario: W. Ross MacDonald School Resource Services Library.
7. Rafiquzzaman, M., & Chandra, R. (1988). *Modern computer architecture*. New Delhi: Galgotia Publications Pvt.Ltd,
8. Stallings, W. (2019). *Computer organization and architecture: Designing for performance*. Hoboken, NJ: Pearson.

HARD CORE: PROBLEM SOLVING AND PROGRAMMING IN C

COURSE OUTCOME:

- ✓ To give an idea on programming and about writing the instructions that computer follows to enable it to store knowledge, process knowledge, and communicate knowledge with the outside world.
- ✓ To know the general-purpose programming language and can efficiently work on enterprise

applications, games, graphics, and applications requiring calculations.



To know the techniques for solving problems, basic computational concepts and elementary data structures, the edit-compile-link-run cycle from a user point of view.

COURSE CONTENT:

UNIT-I:

Introduction, History, Structure of C, Compiling a C program, Compiler & interpreters, Program Execution of C Program, Variables and Keywords: Character Set, Identifier, Variable, Keywords, Escape Sequence Characters, Constants: Real Constant, Integer Constant, Character Constant, String Constant, Data Types: Data Types, Qualifier, Enum, Typedef, Operators: Assignment Operator, Arithmetic Operators, Logical Operators, Relational Operators, Shorthand Operators, Unary Operators, Conditional / Ternary Operator, Bitwise Operators, Operator Precedence and Associativity, If Statement, If-Else Statement, Nested If-Else, Switch Case.

UNIT II:

Looping / Iterative Statements, while, do while, for loop, Break Statement, Continue Statement Goto, Functions: Function call by passing value, Function call by returning value, Function call by passing and returning value, Recursion, Storage Classes, Automatic Storage Class (auto), Register Storage Class (register), Static Storage Class (static), External Storage Class (extern).

UNIT III:

One dimensional arrays: array manipulation; searching, insertion, deletion of an element from an array; finding the largest/smallest element in an array; two dimensional arrays, addition/multiplication of two matrices, pointers, pointer declaration, structure, union, difference between structure and union, strings, header files: header file: assert.h, ctype, math.h, process.h, string.h, time.h, namespaces and exceptions namespaces exceptions.

UNIT IV:

Functions: Top-down approach of problem solving, modular programming and functions, standard library of c functions, prototype of a function: return type, function call, block structure, passing arguments to a function: call by reference, call by value, recursive functions, arrays as function arguments, concept of files, file opening in various modes and closing of a file, reading from a file, writing onto a file.

REFERENCE BOOKS:

1. Kernighan, B. W., & Ritchie, D. M. (2010). *The C programming language*. Englewood Cliffs, NJ: Prentice Hall.
2. Prata, S., & Martin, D. (1989). *C Primer Plus*. Macmillan.
3. Linden, P. V. (1994). *Expert C programming: Deep c secrets*. Englewood Cliffs: Prentice Hall.
4. Bryon, Gottfried. (2004). *Programming in C*. New Delhi. McGraw- Hill Publishing Company Limited.
5. Gottfried, B. S. (2011). *Programming with C*. New Delhi: Tata Mcgraw Hill Publishing Company.
6. King, K. N. (2008). *C programming: A modern approach*. New York: W. W. Norton.
7. Ravichandran, D. (2001). *Programming in C*. New Delhi: New Age International (P) Limited, Publishers

HARD CORE: DATA STRUCTURES AND ALGORITHMS

COURSE OUTCOME:

- ✓ To assess how the choice of data structures and algorithm design methods impacts the performance of programs.
- ✓ To solve problems using data structures such as linear lists, stacks, queues, hash tables, binary trees, heaps, binary search trees, and graphs and writing programs for these solutions.
- ✓ To learn mathematical background for analysis of algorithm, understand the concept of designing an algorithm.

COURSE CONTENT:

UNIT I:

Data Structures: Introduction to Data Structures, Arrays and Strings, Data types, Identifiers, Keywords, constants: String constants Numeric constants Character constants, Pre and post Condition, primitive and non primitive, Declaring and initializing pointers, Meaning of static and dynamic memory allocation. Memory allocation functions: malloc, calloc, free and realloc.

UNIT II:

Linked Lists: Operation, Creations, insertion, Deletion, Singly lists, Circular Lists, Doubly Linked List, Sorting: Insertion Sort, Merge Sort, Quick Sort. Searching: Binary Search, Selection, Graphs I:



Representation, Depth First Search, Breadth First Search, Minimum Spanning Tree, Shortest Path. Tree: Binary tree, Complete binary tree, Binary search tree, Heap Tree terminology : Root, Node, Degree of a node and tree, Terminal nodes, Non terminal nodes, Siblings, Level, Edge, Path, depth, Parent node, ancestors of a node. Binary tree: Array representation of tree, Creation of binary tree. Traversal of Binary Tree: Preorder, Inorder and postorder.

UNIT III:

Stacks: Operations on Stacks: Push & Pop, Array Representation of Stack, Operations Associated with Stacks, Applications of stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack, Queues: Operations and Applications, Double Ended Queues: Operations and Applications, Circular Queues: Operations and Applications. Basic Search Techniques: Search algorithm searching techniques: sequential search, Binary search.

UNIT IV:

Algorithm, Flowchart, Complexity analysis Compilation Algorithms in Computing, Analyzing algorithms, Designing algorithms, divide and conquer, The greedy method, Kruskal's algorithm, 'Tower of Hanoi', back tracking, Applications of algorithms in scientific and engineering computations.

REFERENCE BOOKS:

- Drozdek, A. (2013). *Data structures and algorithms in C++*. Singapore : Thomson Asia Pvt. Ltd.
- Horowitz, E., & Sahni, S. (1987). *Fundamentals of data structures*. Taipei: Sung Kung Computer Book.
- Kruse, R. L., Tondo, C. L., & Leung, B. P. (2002). *Data structures and program design in C*. New Delhi: Pearson Education Asia.
- Loudon, K. (1999). *Mastering algorithms with C*. Sebastopol, CA: O'Reilly.
- Preiss, B. R. (1999). *Data structures and algorithms: With object-oriented design patterns in C*. New York: J. Wiley.
- Tenenbaum, A. M. (1989) *Data Structures using C & C++*. New Delhi: Prentice-Hall of India Pvt. Ltd



HARD CORE: DISCRETE MATHEMATICS

COURSE OUTCOME:

- ✓ To know the mathematical structures, evaluate basic logic statements including compound statements, implications, inverses, converses, and contra positives using truth tables and the properties of logic.
- ✓ To express logic sentence in terms of predicates, quantifiers, and logical connectives. Apply rules of inference, tests for validity, and methods of proof, mathematical induction and write proofs using symbolic logic and Boolean Algebra.
- ✓ Solving problems using recurrence relations and recursion to analyze algorithms and program, determine the connectivity of a graph.

COURSE CONTENT:

UNIT I:

Set Theory: Definition of Sets, Venn Diagrams, complements, Cartesian products, power sets, counting principle, cardinality and countability (Countable and Uncountable sets), proofs of some general identities on sets, pigeonhole principle. Relation: Definition, types of relation, composition of relations, domain and range of a relation, pictorial representation of relation, properties of relation, partial ordering relation. Function: Definition and types of function, composition of functions, recursively defined functions.

UNIT II:

Combinatorics: Mathematical induction, recursive mathematical definitions, basics of counting, permutations, combinations, inclusion-exclusion, recurrence relations (nth order recurrence relation with constant coefficients, Homogeneous recurrence relations, Inhomogeneous recurrence relation), generating function (closed form expression, properties of G.F., solution of recurrence relation using G.F, solution of combinatorial problem using G.F.)

UNIT III:

Permutations and Combinations: Permutations, Combinations, Repetitions. Definitions of functions - Classification of functions - Type of functions - Examples - Composition of functions - Inverse functions - Binary and unary operations. - Characteristic function of a set: Hashing functions - Recursive functions - Permutation functions. Functions-Plain and One-to-One, Onto Functions,



Stirling Numbers and the Second Kind, Special functions, Function composition and inverse functions.

UNIT IV:

Graph, graph models, Graph terminology and special types of graphs-Matrix representation of graph and graph isomorphism- connectivity-Euler and Hamilton paths. Algebraic systems: Semi groups and monoids-Groups-Subgroups and homomorphisms-Cosets and Lagrange's theorem- Ring & Fields (Definitions and examples).

REFERENCE BOOKS:

1. Rosen, K. H. (2002). *Discrete mathematics and its applications*. New York, NY: McGraw-Hill Education.
2. Tremblay, J., & Manohar, R. (1975). *Discrete mathematical structures with applications to computer science*. New Delhi, India: Tata McGraw-Hill.
3. Krishnamurthy, V. (1986). *Combinatorics: Theory and applications*. Chichester: Ellis Horwood.
4. Kolman, B., Busby, R. C., & Ross, S. C. (2018). *Discrete mathematical structures*. New York, NY: Pearson.
5. Rosen, K. H. (2019). *Discrete mathematics and its applications*. New York, NY: McGraw-Hill Education.
6. Johnsonbaugh, R. (2019). *Discrete mathematics*. New York, NY: Pearson.
7. Grimaldi, R. P. (2002). *Discrete and combinatorial mathematics: An applied introduction*. Delhi: Pearson Education Asia.
8. Koshy, T. (2008). *Discrete mathematics with applications*. Amsterdam: Elsevier Academic Press.
9. Lipschutz, S., & Lipson, M. (2007). *Discrete mathematics*. New York: McGraw-Hill.

HARD CORE: COMPUTER GRAPHICS

COURSE OUTCOME:

- ✓ To study the aspects of creating images with a computer - Hardware - Software applications and products.
- ✓ To give the basic understanding of the core concepts of computer graphics, capable of using OpenGL to create Interactive computer graphics.
- ✓ To give an interactive idea of computer graphics, this allows the physician to interpret large volume of data in the new and useful ways also in boundaries of art and entertainment.

COURSE CONTENT

UNIT-I

Introduction: computer Graphics, Area of Computer Graphics, Design and Drawing, Overview of graphic systems- Video display devices, Raster scans systems, Graphic monitors and workstations output primitives – Line, Circle and Ellipse drawing algorithms - Attributes of output primitives – Two dimensional Geometric transformation - Two dimensional viewing – Line, Polygon, Curve and Text clipping algorithms.

UNIT-II

Simple line drawing methods: point plotting techniques, qualities of good line drawing algorithms, bresenham's algorithm, and generation of circles: two dimensional transformations and clipping and windowing. Matrix representation of points, basic transformation, need for clipping and windowing, line clipping algorithms, the midpoint subdivision method, other clipping methods, sutherland – hodgeman algorithm, viewing transformations. Basic Graphics Pipeline, Bitmap and Vector- Based Graphics.

UNIT-III

Scan-Conversion of a Lines (Digital differential analyzer algorithm), scan- conversion of circle and ellipse (bresenham's method of circle drawing, midpoint circle algorithm), Drawing ellipses and other conics. Curves and surfaces: shape description requirements, parametric functions, bezier methods, bezier curves, bezier surfaces, b-spline methods solid area scan conversion.

UNIT-IV

Three Dimensional Transformations Solid Area Scan Conversion, Scan Conversion of Polygons, Algorithm Singularity, Translations, Scaling, Rotation, Viewing Transformation, The Perspective, Algorithms, Three Dimensional Clipping, Perspective view of Cube. Hidden surface removal: Need for hidden surface removal, The Depth - Buffer Algorithm, Properties that help in reducing efforts, Scan Line coherence algorithm, span – Coherence algorithm, Area-Coherence Algorithms, Warnock's Algorithm, Priority Algorithms.

REFERENCE BOOKS:

1. Zeid, I. A., Zeid, I., & Sivasubramanian, R. (2010). *CAD/CAM: Theory and Practice*. New Delhi: Tata McGraw Hill Education Private.
2. Hughes, J. F. (2014). *Computer graphics: Principles and practice*. Upper Saddle River, NJ: Addison-Wesley.
3. Hearn, D., & Baker, M. P. (1997). *Computer graphics: C version*. Upper Saddle River (New Jersey): Prentice Hall.
4. Angel, E. (2000). *Interactive computer graphics: A top-down approach with OpenGL*. Reading, MA: Addison-Wesley.
5. Newman, W. M., & Sproull, R. F. (1989). *Principles of interactive computer graphics*. New York: McGraw-Hill.8
6. Maurya, Rajesh K. (2011). *Computer Graphics*. Wiley
7. Rogers, D. F. (2001). *Procedural Elements for Computer Graphics*. New Delhi: Tata McGraw-Hill.
8. Dam, A. V., Feiner, S. K., Foley, J. D., & Hughes, J. F. (1990). *Computer graphics: Principles and practice*. Reading, MA: Addison-Wesley.

SOFTCORE PAPER: INTERNET TECHNOLOGY

COURSE OUTCOME:

- ✓ To get familiar with basics of the Internet programming and to acquire knowledge and skills for creation of website considering both client and server side
- ✓ To identify how to plan and use the internet to support or achieve some of the specific communication goals and marketing efforts that have been identified
- ✓ To explore different web extensions, web services standards and internet the most useful technology of modern times.

COURSE CONTENT

UNIT-I

Introduction: History of data networking, evolution of the Internet, terminology, circuit vs. packet switching, delays OSI Model, TCP/IP Protocol Suite, Network Layer, IPV 4 and IPV6 Addresses and Protocol. Network protocol stack, sockets, network programming, threads & concurrency, mutual exclusion HTML 5.0, PHP, AJAX and RSS, Working principle of search engine.

UNIT-II

Understanding IPv6, CIDR, Hierarchical Routing, Routing Protocol over internet. Multimedia over Internet, Voice over IP, Virtual Private network Transport Layer, User Datagram Protocol (UDP), Transmission Control Protocol(TCP), Stream Control Transmission Protocol (SCTP).

UNIT-III

Host Configuration: DHCP, Domain Name System (DNS), Remote Login: TELNET and SSH, File Transfer: FTP and TFTP. Architecture of the web, Networking fundamentals, Dynamic web sites: Client Side: Java Script, Server Side: CGI, Perl, Java Servlets and Server Pages.

UNIT-IV

World Wide Web and HTTP, Electronic Mail: SMTP, POP, IMAP and MIME, Network Management: SNMP, Multimedia. Client Server Programming: Concurrent Connection Oriented (TCP) and Connectionless programming (UDP), Iterative connectionless (TCP) and CONNECTION ORIENTED SERVERS (UDP).

REFERENCE BOOKS:

1. Greenlaw, R., & Hepp, E. (2002). *In-line/on-line: Fundamentals of the Internet and the World Wide Web*. Boston: McGraw-Hill.
2. Bayross, I. (2001). *Web enabled commercial applications development using: HTML, DHTML, JavaScript, Perl CGI*. Singapore: Tech Publications.
3. Comer, D. E. (2009). *The internet book*. New Delhi: Pearson Education.
4. Forouzan, B. A. (2009). *TCP/IP protocol suite* (4th ed.). McGraw-Hill Education.
5. Comer, D. (2009). *Computer networks and Internets: With Internet applications* (3rd ed.). Upper Saddle River, NJ: Pearson/Prentice Hall.

SOFT CORE PAPER: E-COMMERCE

COURSE OUTCOME:

- ✓ Understand the fundamentals of E-commerce, types and applications.

- ✓ Evaluate the role of the major types of information systems in a business environment and their relationship to each other.
- ✓ Assess the impact of internet and internet technology in a business electronic commerce and electronic business.

COURSE CONTENT

UNIT 1

Introduction to E-commerce, Evolution of E-commerce: Introduction, History of Electronic Commerce, Advantages and Disadvantage of E-commerce, E-commerce Infrastructure, An Overview, Hardware, Server Operating System, Software, Network Website.

UNIT 2

E-Commerce Process Models: Introduction, Business Models, E-business Models Based on the Relationship of Transaction Parties, e-commerce Sales Life Cycle (ESLC) Model. Designing web sites, The Life Cycle of Site Building-From Page to Stage, Building a Web Site, Web-Based Business-to-Business, E-Commerce, B2B Models, B2B Tools.

UNIT 3

Payment system: From Barter to Money, Requirements for Internet-Based Payments, Electronic Payment Media, Credit cards, Debit cards, Smart cards, Digital Signature. E-Marketing: The scope of E-Marketing, Internet Marketing Techniques.

UNIT 4

Security in cyberspace, designing for security, How Much Risk Can You Afford, The Virus: Computer enemy Number one, security Protection and Recovery. Marketing on the Internet, Online Shopping, Internet Marketing Techniques. The E-Cycle of Internet Marketing, attracting customers to your site.

REFERENCE BOOKS:

1. Lawrence, E. (2003). *Internet commerce: Digital models for business*. Milton, Qld.: John Wiley & Sons Australia.
2. Kalakota, R., & Whinston, A. B. (2000). *Electronic commerce: A managers guide*. Reading, MA: Addison-Wesley.
3. Kalakota, R., & Whinston, A. B. (1999). *Frontiers of electronic commerce*. Singapore: Addison Wesley Longman.

4. Minoli, D., & Minoli, E. (1998). *Web commerce technology handbook*. New York: McGraw-Hill.
5. Soo-young, C., Stahl, D. O., & Whinston, A. B. (1997). *The economics of electronic commerce*. Indianapolis, IN.: Macmillan Technical Publishing.
6. Treese, G. W., & Stewart, L. C. (2003). *Designing systems for Internet commerce*. Boston, MA: Addison-Wesley.

SECOND SEMESTER

HARD CORE PAPER: RDBMS AND QUERY LANGUAGES

COURSE OUTCOME:

- ✓ To describe sound introduction to the discipline of database management systems. Design conceptual models of a database using ER modeling.
- ✓ To provide an overview of physical design of a database system, database indexing techniques, storage techniques for real life applications.
- ✓ To analyze the existing design of a database schema and apply concepts of normalization to design an optimal database

COURSE CONTENT:

UNIT-I:

DBMS an overview, Advantages of DBMS, Network, Hierarchical and Relational Model, Entity Relationship Model, Entities, Attributes and Entity Sets, Features of E-R Model, An Overview of DBMS: Introduction to Database Management systems; Data Models; Database System Architecture; Relational Database Management systems, Integrity constraint, Enforcing Data Integrity, Introduction to views; Partial Dependencies. Entity Relationship Model, Entities and Attributes.

UNIT-II:

SQL commands, Data Definition Language Commands, Data Manipulation Language Commands, Data types, modifying the structure of the table. Viewing The Data, Computations on Table Data, Arithmetic Operators; Logical Operators, Comparison Operators, Aggregate operator, Oracle functions.

UNIT-III:

Joins: Equi Joins, Non Equi Joins, Self Joins, Outer Joins. Using Set Operators- Union, Intersect;



Minus. Views and Indexes: Definition and Advantages Views, Creating and Altering Views, Using Views, Indexed Views, Definition and Advantages of Indexes. Database Objects: Sequences, Creating Sequences; Referencing Sequences; Altering a Sequence; Dropping a Sequence

UNIT-IV:

Introduction to PL/SQL.: Advantage of PL/SQL; The Generic PL/SQL Block; The Declaration Section; The Begin Section; The End Section; PL/SQL Data types. Logical Comparison; Conditional Control in PL/SQL; Iterative Control; Advanced PL/SQL : Types of Cursors; Implicit Cursor; Explicit Cursor; Explicit Cursor attributes; Cursor For Loop; Parameterized Cursor; Error Handling in PL/SQL.

REFERENCE BOOKS:

1. Desai, C Bipin. (2012). An introduction to Database Systems. New Delhi: Galgotia Publications Pvt. Ltd
2. Bayross, I. (2010). Sql, pl/sql the programming language of oracle (3 rev ed.). Place of publication not identified: Bpb Publications.
3. Loney, K., & Koch, G. (2002). Oracle9i: The complete reference. New York: McGraw-Hill/Osborne.
4. Deshpande, P. S. (2009). SQL/PLSQL for Oracle9i. dreamtech press.
5. Feuerstein, S., & Pribyl, B. (1999). Oracle PL/SQL programming. Calcutta: Shroff & Distributors Pvt.
6. Vaswani, V. (2004). MySQL the complete reference. New York: McGraw-Hill/Osborne.
7. Majumdar, A. K., & Bhattacharyya, P. (2003). Database management systems. New Delhi: McGraw-Hill.
8. Prakash, N. (2001). Introduction to data base management. New Delhi: McGraw-Hill.

HARD CORE: DATA COMMUNICATION AND COMPUTER NETWORKING

COURSE OUTCOME:

- ✓ To study data link layer concepts, design issues, and protocols. Read the fundamentals and basics of Physical layer, able to describe the functions of each layer in OSI and TCP/IP model.
- ✓ Gain core knowledge of Network layer routing protocols and IP addressing and data design issues and protocols.
- ✓ To acquire the knowledge of resource sharing, and to make all programs, data and equipment available to anyone on the network.

COURSE CONTENT:

UNIT-I:

Introduction to networking, OSI Model for Networking, Internet, ATM Network Components (Cables, Hubs, Bridges, Switches, Routers), Network Topologies, Shared Medium, Peer to Peer, Hybrid Technology. Multiplexing, Signaling, Encoding & Decoding, Error Detection & Recovery, Flow Control, Sliding Window, Congestion Management.

UNIT-II:

Network technologies: Local Area Network Technologies, Ethernet Technologies, Ethernet Versions, Token Ring Technologies, Wide Area Network Technologies, Wireless Networks, Radio Frequencies, Microwave Frequencies, Infrared Waves. Web Security, Email. Bridges and switches. Hierarchical naming, Addressing, Telephone networks

UNIT-III:

Design Issues, Distributed & Centralized Design, Circuit Mode & Packet Mode Design, Implementation Issues, Performance Considerations, Base Technology. Distributed Access, decentralized polling, CSMA/CA, CSMA/CD, Busy Tone Multiple Access & Multiple Access Collision Avoidance. Principles of inter networking, architectures, addressing and protocols. Particular reference to IPv4, IPv6, TCP and UDP.

UNIT-IV:

Internet IPv4, IPv6, subnetting, Private Networks, Asynchronous transfer mode, Name resolution, Address resolution protocol, Routing Information, Routing Protocols, Hierarchical Routing. SWITCHING: Circuit Switching (Time division switching Space division switching, Time space switching, time space time switching) packet switching, port Mappers Blocking, ATM Switching.

REFERENCE BOOKS:

- 1) Forouzan, B. A. (2013). *Data communications and networking* (4th ed). New York, NY: McGraw-Hill.
- 2) Tanenbaum, A. S., & Feamster, N. (2019). *Computer networks* (4th ed.). Boston, MA: Pearson Education.
- 3) Tomasi, W. (2005). *Introduction to data communications and networking*. New Delhi: Dorling Kindersley (India).

- 4) HURA, G. S. (2019). *Data and computer communications*. S.I.: CRC PRESS.
- Keshav, S. (1997). *Engineering approach to computer networks* (2nd ed.). Pearson Education.
- 5) Shay, W A. (2008). *Understanding Data Communications and Networks* (3rd ed.). Cengage Learning
- 6) Stalling, W. (1997). *Data and computer communications*. New Delhi: Prentice Hall.
- 7) Jain, V. K., & Bajaj, N. (2001). *Computer networks and communication*. New Delhi: Cyber Tech Publications.
- 8) Stephen.Pjvl, Bridges. (1996). *Local Area Network*. New Delhi: Galgotia Publications Pvt. Ltd
- 9) Anthony, Jones & Jim, Ohlund. (2000). *Networking Programme for Windows*. Bangalore: Wp Publishers & Distributors (P) Ltd
- 10) Bennett, G. (1998). *Designing TCP/IP internetworks*. New Delhi: Galgotia Publications Pvt.Ltd.
- 11) Stallings, W. (2004). *Computer networking with internet protocols and technology*. Pearson Education Asia, New Delhi: Pearson/Prentice Hall.

HARD CORE: CURRENT OPERATING SYSTEM AND THEIR APPLICATION COURSE OUTCOME:

- ✓ To learn how to manage the computer's resources, central processing unit, disk drives, and printers, establish a user interface and provide services for applications software.
- ✓ To acquire knowledge how to provide users a convenient interface to use the computer system to act as an intermediary between the hardware and its users.
- ✓ Study operating system which is the program that, after being initially loaded into the computer by a boot program, manages all the other programs in a computer.

COURSE CONTENT:

UNIT-I

Overview of operating systems, functionalities and characteristics of OS, Hardware concepts related to OS, CPU states, I/O channels, memory hierarchy, microprogramming, The concept of a process, operations on processes, process states, concurrent processes, process control block, process context, Time-sharing, multiprocessing, real time, distributed and modern operating systems, Desktop Systems, Handheld Systems, Clustered Systems, Assemblers, Compilers and Interpreters, Linkers

UNIT-II

Job and processor scheduling, scheduling algorithms, process hierarchies. Mutual exclusion, process co-operation, producer and consumer processes. Semaphores: definition, init, wait, signal operations. Use of semaphores to implement mutex, process synchronisation etc., implementation of semaphores. Operating-System Services, User Operating-System, Interface, System Calls, Types of System Calls, System Programs.

UNIT-III

Processes and Process Synchronization: Process Concept, Process Scheduling, Scheduling Criteria, Scheduling Algorithms, Operations on Processes, Interprocess Communication, Multithreading Models, Threading Issues, Thread Scheduling, Communication in Client-Server Systems, The Critical-Section Problem, Peterson's Solution, Semaphores.

UNIT-IV

Memory Management: Operating-System Design and Implementation, Operating-System Structure, Virtual Machines, Operating-System Generation, System Boot.

Memory management without swapping or paging; Swapping, Virtual Memory, Page replacement algorithms, Modeling paging, algorithms, Design issues for paging systems, segmentation.

REFERENCE BOOKS:

1. Tanenbaum, A., & Boschung, H. T. (2018). *Modern operating systems*. Etats-Unis: Pearson.
2. Sumitra Devi, K. A. & Banashree, N. P. (n. d.). *Operating Systems (2nd ed.)*. SPD
3. Silberschatz, A., Galvin, P. B., & Gagne, G. (2019). *Operating system concepts (8th ed.)*. Hoboken, NJ: Wiley.
4. Dhamdhere, D. M. (2012). *Operating systems: A concept-based approach (2nd ed.)*. New Delhi: Tata McGraw-Hill Pub.
5. Godabole, A., & Kahate, A. (2011). *Operating systems (3rd ed.)*. New Delhi: Tata McGraw-Hill.
6. Silberschatz, A., Galvin, P. B., & Gagne, G. (2019). *Operating system concepts*. Hoboken, NJ: Wiley.

HARD CORE: OBJECT ORIENTED PROGRAMMING IN C & JAVA

COURSE OUTCOME:



- ✓ To understand how C++ improves C with object-oriented features, to write inline functions for efficiency and performance, the syntax and semantics of the C++ programming language.
- ✓ To learn how to design C++ classes for code reuse, how to implement copy constructors and class member functions, the concept of data abstraction and encapsulation.
- ✓ To learn how to overload functions and operators in C++, inheritance and virtual functions implement dynamic binding with polymorphism and how to use exception handling in C++ programs.

COURSE CONTENT:

UNIT-I:

Introduction, need of object oriented Programming characteristics of object-oriented languages C and C++. Data abstraction and encapsulation, Inheritance, Polymorphism, Dynamic binding, Message communication); Benefits of OOP; Applications of OOP, Output using cout, Directives, Input with cin, Type bool. Type conversions, Writing a Program in C⁺⁺: Declaration of variables, Statement Simple Programs, Features of I/O stream. Keyboard and screen, Manipulator Functions, Predefined manipulators, Input and Output (I/O) Stream Flags.

UNIT-II:

Returning values from functions, Reference arguments, Overloaded function. Inline function, Default arguments, returning by reference. core object concepts (Encapsulation, Abstraction, Polymorphism, Classes, Messages Association, Interfaces) Implementation of class in C++, C++ Objects as physical object, C++ object as data types constructor. Object as function arguments. The default copy constructor, returning object from function, Structures and classes, Classes objects and memory static class data.

UNIT-III:

Overloading unary operations, Overloading binary operators, data conversion, pitfalls of operators, overloading and conversion keywords. Explicit and Mutable, Concept of inheritance. Derived class and based class. Derived class constructors, member function, Virtual Function, friend function, Static function, Assignment and copy initialization, this pointer, dynamic type information. Function templates, Class templates Exceptions. JAVA EVOLUTION:- Java History; Java Features, The Java

Virtual Machine, Variables and data types, Conditional and looping constructs, Arrays, operators and expression.

UNIT-IV:

Fields and Methods, Constructors, Overloading methods, Garbage collection, Nested classes, Overriding methods, Polymorphism, Making methods and classes final, Abstract classes and methods, Interfaces, The Object class: Cloning objects, The JDK Linked List class, Strings, String conversions, Packages, Applets.

REFERENCE BOOKS:

1. Lafore, R. (2005). *Object-oriented programming in C*. Indianapolis, Ind: Sams.
2. Schildt, H. (n.d.). *C: The complete reference*. Berkeley, CA: Osborne, McGraw-Hill.
3. Balagurusamy, E. (2013). *Object oriented programming with C* (3rd ed.). New Delhi: Tata McGraw-Hill.
4. Afzal, A. (2002). *Pure C programming*. Upper Saddle River, NJ: Prentice Hall.
5. Arnold, K., Gosling, J., & Holmes, D. (2012). *The Java programming language*. Upper Saddle River, NJ: Addison-Wesley.
6. Sierra, K. (2006). *Head first java*. Place of publication not identified: OReilly Media.

SOFT CORE: PROBABILITY AND STATISTICS

COURSE OUTCOME:

- ✓ Learn basic probability axioms and rules and the moments of discrete and continuous random variables as well as be familiar with common named discrete and continuous random variables.
- ✓ Learn how to derive the probability density function of transformations of random variables and use these techniques to generate data from various distributions, how to calculate probabilities, and derive the marginal and conditional distributions of bivariate random variables.

COURSE CONTENT:

UNIT I:



Sample space and events – Probability – The axioms of probability – Some Elementary theorems - Conditional probability – Baye's theorem, Random variables – Discrete and continuous. Binomial, Poisson & normal distributions related properties. Sampling distributions –Sampling distribution of means (known and Unknown)

UNIT II:

Probability distributions- Binomial, Poisson, geometric, uniform, exponential, normal, gamma, beta, Correlation - Regression - multiple and partial correlation and regression (only problems). Probability density function and properties of 1, t - chi-square distributions. Large sample tests - test" for means, variances and proportions. Analysis of variance: One-Way and two-way classifications, completely randomized blocks, randomized block design and Latin square design (only problems).

UNIT-III:

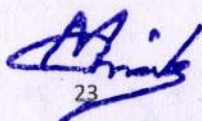
Tests of hypothesis point estimations – interval estimations Bayesian estimation. Bayesian inference with known priors, probability intervals, Bayesian inference with unknown priors, Large samples, Null hypothesis – Alternate hypothesis type I, & type II errors – critical region confidential interval for mean testing of single variance.

UNIT-IV:

Coefficient of correlation – Regression Coefficient – The lines of regression – The rank correlation. Cluster, PCA, Factor analysis, Discriminate analysis, statistics for decision making- algorithms Statistical Modelling.

REFERENCE BOOKS:

1. Kandasamy, P., Thilagavathy, K., & Gunavathy, K. (1987). *Engineering Mathematics* (vol. ii). New Delhi. S.Chand and Co.
2. Venkataraman, N. K. (1986). *Numerical methods in science and Engineering*. Chennai: The National Publishing Co.
3. Gerald, C. F., & Wheatley, P. O. (1970). *Applied numerical analysis*. Boston, MA: Pearson, Addison Wesley.
4. Sastry, S. (1979). *Introductory methods of numerical analysis*. New Delhi: Prentice-Hall of India.
5. Milton, J. S., & Arnold, J. C. (2007). *Introduction to probability and statistics*. New Delhi: Tata McGraw-Hill.



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6. Johnson, R. A., Miller, I., & Freund, J. E. (2019). *Miller & Freund's probability and statistics for engineers*. Boston: Pearson Education.
7. Agarwal, B. (2020). *Programmed statistics (Questions-Answers)*. London: New Age International (P) Limited.
8. Agarwal, B. L. (2013). *Basic Statistics* (6th ed.). London: New age international publishers.
9. Casella, G., & Berger, R. L. (2002). *Statistical inference* (2nd ed.). Belmont, CA: Brooks/COLE Cengage Learning.
10. Gupta, S., & Kapoor, V. (2000). *Fundamentals of mathematical statistics: A modern approach* (3 rev ed.). New Delhi: Sultan Chand & Sons.

SOFT CORE: MULTIMEDIA TECHNOLOGIES

COURSE OUTCOME

- ✓ To learn and understand technical aspect of multimedia systems, standards available for different audio, technical aspect of multimedia systems and various file formats for audio, video and text media.
- ✓ To learn various multimedia authoring systems, various networking aspects used for multimedia applications.
- ✓ To provide an understanding of the fundamental elements in multimedia. The emphasis will be on learning the representations, perceptions and applications of multimedia.


COURSE CONTENT

UNIT-I:

Introduction to Multimedia, Hardware & Software Components of multimedia, Multimedia Authoring and tools. Multimedia Communication Systems, Database Systems, Synchronization issues, Presentation requirements, Applications, Video Conferencing, Virtual reality, Interactive Video-Media on Demand, Multimedia applications, evolving systems of multimedia-HDTV, UDTV Digital signal processing.

UNIT-II:

Instructional Design, Objectives - Content (print, graphics, sounds, etc.), Interaction, Assessment, Closure, Internet Resources, Graphics, Integrating Web documents, Graphics



Devices: Monitor display configuration, Basics of Graphics Accelerator Card and its importance, Basic concepts of Images: Digital Images and Digital Image Representation Image Formats :TIFF, BMP, JPG/JPEG, GIF, PIC. PDF, PSD: Theory of design, form, line, space, texture, color , typography, layout, color harmony, unity, balance, proportion , rhythm, repetition, variety, economy, still life, light and shade, Poster Design.

UNIT-III:

Multimedia elements - text, sound, Images Animation and video Digitalization of audio and video, Different algorithms to text audio, video and images. Input and Output Transducers• Human Vision and Audio Systems and their Limitations - Sampling, Quantization, Coding, Comp anding.

UNIT-IV:

Multimedia file formats, standards, communication protocols, conversions, Data compression and decompression. Types and methods of compression and decompression. Architecture of Internet Multimedia Communication- Protocol Stack-Requirements and Design challenges of multimedia communications- Multimedia distribution models• Unicasting, Broadcasting and Multicasting.

REFERENCE BOOKS:

1. Subrahmanian, V. (2007). *Principles of multimedia database systems*. San Francisco, CA: Morgan Kaufmann.
2. Vaughan, T. (2014). *Multimedia: Making it work*. McGraw-Hill Osborne Media.
3. Rao, K. R., Bojkovic, Z. S., & Milovanovic, D. A. (2006). *Introduction to multimedia communications: Applications, middleware, networking*. Hoboken, NJ: Wiley.
4. Walrand, J., & Varaiya, P. P. (2002). *High-performance communication networks*. San Francisco: Morgan Kaufmann.
5. Stallings, W. (2002). *High-speed networks and internets: Performance and quality of service* (2nd ed.). New Delhi: Pearson Education.
6. Ganz, A. (2003). *Multimedia wireless networks: Technologies, Standards, and QoS*. New Jersey: Pearson Education.
7. Hassan, M., & Jain, R. (2004). *High performance TCP/IP networking: Concepts, issues, and solutions*. Upper Saddle River, NJ: Pearson/Prentice Hall.

SOFT CORE: ENTERPRISE RESOURCE PLANNING

COURSE OUTCOME:



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- ✓ To understand the basic structure of ERP.
- ✓ To apply design principles for various business modules in ERP.
- ✓ To analyze security issues in ERP and to acquire ERP concepts for real world applications.

COURSE CONTENT:

UNIT I

Introduction - Related Technologies - Business Intelligence - E-commerce and EBusiness- Business Process Re-engineering, E-Commerce and E-Business, Implementation Challenges. Strategies - Life Cycle - Pre-implementation Tasks - Requirements Definition•Methodologies- Package selection- Project Teams - Process Definitions - Vendors and Consultants Data Migration - Project management- Post Implementation Activities. Role of ERP in Purchasing, Purchase Module: Features of purchase module; Benefits of purchase module, ERP Purchase System.

UNIT II

Finance, Sales and Distribution, Manufacturing and Production Planning-Material and Capacity Planning; Shop Floor Control; Quality Management; JIT/Repetitive Manufacturing; Cost Management; Engineering Data Management; Engineering Change-Control. Configuration Management, Role of ERP in Finance, Accounting and Finance Processes: Cash management; Capital budgeting, Features of ERP Financial Module, Benefits of ERP Financial Module.

UNIT III

ERP IN ACTION & BUSINESS M ODULES: Operation and Maintenance - Performance Maximizing the ERP. Quality Management - Functions of Quality Management; CAQ and CIQ; Materials Management- Pre-purchasing; Purchasing; Vendor Evaluation; inventory management and Invoice Verification and Material Inspection.

UNIT IV

ERP MARKET: Market place-Dynamics - SAPAG - Oracle - People Soft- JD Edwards- QAD Inc, SSA Global - Lawson Software - Epicor - Intuitive. New Trends in ERP, ERP to ERP II- Implementation of Organisation-Wide ERP, Development of New Markets and

Channels, Latest ERP Implementation Methodologies, ERP and E-business, Market Snapshot, The SOA Factor.

REFERENCE BOOKS:

1. Leon, A. (2014). *ERP demystified*. New Delhi: McGraw-Hill Education (India).
 2. Sumner, M. (2007). *Enterprise resource planning*. Upper Saddle River, NJ: Pearson.
 3. Garg, V. K., & Venkitakrishnan, N. K. (2008). *Enterprise resource planning: Concepts and practice*. New Delhi: Prentice-Hall of India.
 4. Antonio, H. M., Keogh, J., & Martínez, F. F. (2006). *SAP R/3 handbook*. New York: McGraw-Hill.
- Fu, B., & Fu, H. (2003). *SAP BW: A step-by-step guide (1st ed.)*. Boston, MA: Addison-Wesley.

OPEN ELECTIVE: WEB DESIGNING

COURSE OUTCOME:

- ✓ To understand the standards and structure of HTML.
- ✓ To create web documents.
- ✓ To understand XML structure.

COURSE CONTENT:

UNIT-I:

Introduction to Multimedia, Hardware & Software Components of multimedia, Multimedia Authoring and tools. Multimedia Communication Systems, Database Systems , Synchronization issues, Presentation requirements, Applications, Video conferencing, Virtual reality, Interactive Video-Media on Demand. Multimedia applications, evolving systems of multimedia-HDTV, UDTV Digital signal processing.

UNIT-II:

Instructional Design, Objectives - Content (print, graphics, sounds, etc.), Interaction , Assessment, Closure, Internet Resources, Graphics, Integrating Web documents, Graphics Devices: Monitor display configuration, Basics of Graphics Accelerator Card and its importance, Basic concepts of Images: Digital Images and Digital Image Representation Image Formats :TIFF, BMP, JPG/JPEG, GIF, PIC. PDF, PSD: Theory of design, form, line, space, texture, color, typography, layout, color

harmony, unity, balance, proportion, rhythm, repetition, variety, economy, still life, light and shade, Poster Design.

UNIT-III:

Multimedia elements – text, sound, Images Animation and video Digitalization of audio and video, Different algorithms to text audio, video and images. Input and Output Transducers-Human Vision and Audio Systems and their Limitations - Sampling, Quantization, Coding, Companding.

UNIT-IV:

Multimedia file formats, standards, communication protocols, conversions, Data compression and decompression. Types and methods of compression and decompression. Architecture of Internet Multimedia Communication- Protocol Stack-Requirements and Design challenges of multimedia communications- Multimedia distribution models- Unicasting, Broadcasting and Multicasting.

REFERENCE BOOKS:

1. V.S. Subrahmanian, "Principles of Multimedia Database Systems", Morgan Kauffman, 2nd Edition, 2013. Tay V Vaughan "Multimedia: making it work", TMH.
2. K. R. Rao, Zoran S. Bojkovic, Dragorad A. Milovanovic, "Introduction to Multimedia Communications Applications, Middleware, Networking", John Wiley and Sons, 2006.
3. Jean Warland, Pravin Vareya, "High Performance Networks", Morgan Kauffman Publishers, 2002.
4. William Stallings, "High Speed Networks and Internets Performance and Quality of Service", 2nd Edition, Pearson Education, 2002.
5. Aura Ganz, Zvi Ganz, Kitti Wongthawaravat, 'Multimedia Wireless Networks Technologies, Standards and QoS', Prentice Hall, 2003.
6. Mahbub Hassan and Raj Jain, "High Performance TCP/IP Networking", Pearson Education, 2004.



THIRD SEMESTER

HARD CORE PAPER: WEB

TECHNOLOGIES COURSE OUTCOME

- ✓ Learn the history and development of the World Wide Web and associated technologies, client-server architecture of World Wide Web and its communication protocol HTTP/HTTPS.
- ✓ Gain knowledge about formats and languages used in modern webpages like HTML, XHTML, CSS, XML, JavaScript.
- ✓ Learn to design multi-platform web applications, develop a dynamic webpage by the use of HTML, CSS and XML.

COURSE CONTENT:

UNIT-I:

Fundamental of Web ,History of Web, Web development overview, Domain Name System (DNS), DHCP and SMTP and other servers ,Internet service provider (ISP), Concept of IP Address, Internet Protocol, TCP/IP Architecture and protocol (IP) ,Web Browser and Web Server. Web Server, Web Client/Browser. Hyper Text Markup Language, Lists: Types of Lists Ordered Lists Adding Graphics to HTML Documents .Using the Border attribute; the Width and Height Attribute; Using the Align Attribute; Using the ALT Attribute.

UNIT-II:

HTML Tag, Rules of HTML, Text Formatting & Style, List, Adding Graphics to Html Document, Tables and Layout , Linking Documents, Frame, Forms, Introduction to DHTML, CSS, Class & DIV, External Style Sheet. Tables: Introduction (Header, Data rows, The Caption Tag); Using the Width and Border Attribute; Using the Cell padding Attribute; Using the Cellspacing Attribute; Using the bgcolor Attribute; Using the COLSPAN and ROWSPAN Attributes. Image Mapping, Frames, Forms.

UNIT-III:

Java Script in Web Page, Advantage of Java Script, JS object model and hierarchy, Handling event ,Operators and syntax of JS, Function, Client side JS Vs Server side JS ,JS security Introduction to VB Script, Operator & Syntax of VB Script, Dialog Boxes, Control & Loop, Function in VBS.

UNIT-IV:

Introduction to XML, XML in Action, Commercial Benefits of XML, Gaining Competitive advantage with XML, Programming in XML, XML Schema, Browser Objects (The Web Page HTML, Object Hierarchy, Access to Elements of a Web Page, How a Web Page Element is Manipulated); Handling

(WEB PAGE) Events Using JavaScript (Named JavaScript Event handlers). Cookies: What are Cookies; Setting a Cookie.

REFERENCE BOOKS:

1. Robertson, G., & Altom, T. (1999). *Hands on HTML*. New Delhi: Bpb Publications.
2. Ray, D. S., & Ray, E. J. (1999). *Mastering HTML 4:*. San Francisco: Sybex.
3. Powell, T. A. (2000). *Web design: The complete reference*. New Delhi: McGraw-Hill/Osborne.
4. Holzschlag, M. E. (1997). *Professional web design: Theory and technique on the cutting edge*. New Delhi: Galgotia Publications Pvt. Ltd.
5. Mohler, J. L., & Duff, J. M. (1999). *Designing interactive Web sites*. Africa: Delmar/Thomson Learning.
6. Warner, Jauine. (n. d.). *Web Designing & Dreamweaver*. New Delhi: Idg Books India (P) Ltd.
7. McGrath, S. (1998). *XML by example: Building E-commerce applications*. Upper Saddle River, NJ: Prentice Hall PTR.
8. Herst, D. (2001). *Introduction to XML*. South Kingstown, RI.: SkillBuilders.
9. Eaves, J., Jones, R., & Godfrey, W. (2003). *Apache Tomcat bible*. Indianapolis: Wiley.

HARD CORE PAPER: SOFTWARE ENGINEERING & TESTING

COURSE OUTCOME:

- ✓ To understand the nature of software development, software life cycle process models, methods of capturing, specifying, visualizing and analyzing software requirements.
- ✓ To know basics of testing, software quality assurance and software configuration management process.
- ✓ To know the basic of software engineering develop methods and procedures for software development.

COURSE CONTENT:

UNIT-I:

Software processes, desired characteristics of software process, the software life cycle, software development process models, comparison of process models. Software processes, desired characteristics of software process, the software life cycle, software development process models, comparison of process models. Requirement analysis and specification, need for SRS, characteristics of SRS, organization of SRS document.

UNIT-II:

Structured coding Techniques, Coding Styles-Standards and Guidelines, Documentation Guidelines, Modern Programming Language Features: Type checking-User defined data types, Data Abstraction, Exception Handling and Concurrency Mechanism. Requirements Engineering: Establishing the Groundwork-Eliciting Requirements- Developing use cases-Building the requirements model-Negotiating, validating Requirements-Requirements Analysis-Requirements Modeling Strategies.

UNIT-III:

TESTING - Software Quality- Software Quality Dilemma- Achieving Software Quality- Testing: Strategic Approach to software Testing- Strategic Issues- Testing: Strategies for Conventional Software, Object oriented software, Web Apps-Validating Testing- System Testing- Art of Debugging.

UNIT-IV:

Maintenance - Software Maintenance-Software Supportability- Reengineering- Business Process Reengineering- Software Reengineering- Reverse Engineering-Restructuring- Forward Engineering- Economics of Reengineering.

REFERENCE BOOKS:

1. Mall, R. (2004). *Fundamentals of Software Engineering*. New Delhi: Prentice-Hall of India.
2. Rajani, Renu, and Pradeep Oak (2004). *Software testing: effective methods, tools and techniques*. New Delhi: Tata McGraw-Hill.
3. Pressman, R. S. (1992). *Software engineering a practitioners approach*. New York: McGraw-Hill.
4. Sommerville, I. (2004). *Software engineering*. New Delhi: Pearson/Addison-Wesley.
5. Cotterell, M., & Hughes, B. (1995). *Software project management*. London: International Thomson Computer Press.
6. Aggarwal, K. K. & S, Yogesh. (2008). *Software Engineering*. New Delhi : New Age International Publishers.

HARD CORE PAPER: MOBILE COMPUTING AND APPLICATION COURSE OUTCOME:

- ✓ To learn how to introduce Android platform in information technology architecture.
- ✓ To know the activity creation and Android UI designing and be familiarized with intent, broadcast receivers and Internet services.



To gain basic knowledge about transmission of data, voice and video via a computer or any other wireless enabled device without having to be connected to a fixed physical link.

UNIT – I

Introduction: Current Wireless Systems: Overview of Paging Systems, Cordless Phones, Cellular Telephone Systems, Satellite Communication, Wireless LANs, Blue tooth. Medium access control, Telecommunication Systems – SDMA, TDMA, CDMA, GSM

UNIT - II

Mobile computing through Internet- Mobile-enabled Applications , Mobile Applications – Multichannel and Multi modal user interfaces – Synchronization and replication of Mobile Data - SMS architecture , GPRS – Mobile Computing through Telephony - Synchronization protocol .

UNIT - III

Wireless LAN – IEEE 802.11 – Infrared vs Radio Transmission, Infrastructure Networks, Ad-hoc Networks, Bluetooth Wireless ATM, Radio Access Layer, Handover, Location Management, Addressing Mobile Quality of Service, Access Point, Control Protocol. Mobile Communication: Wireless Transmission – Medium Access Control – Telecommunication Systems – Satellite Systems – Broadcast system – Wireless LAN .

UNIT - IV

MAC protocol – Routing protocols - Transport Layer Protocol - QOS – Energy Management. Overview of Cellular IP – Options of Cellular IP – Key, Mechanism in Cellular IP – route Optimization. Overview of TCP/IP – Structure of TCP/IP. Advert-Hoc Primary Ideas – Traits Purposes.

REFERENCE BOOKS:

1. Schiller, J. H. (2009). *Mobile communications*. United Kingdom: Pearson Education Limited.
2. *Mobile communication design fundamentals*. (2017). New Delhi, India: Random Publications.
3. Stallings, W. (2009). *Wireless communications & networks*. Delhi, India: Pearson.
4. Singhal, Sandeep. (2001). *WAP-the Wireless Application Protocol: Writing Applications for the Mobile Internet*. Addison Wesley Longman.
5. Horst Henn, Klaus Rintdoff & Thomas Schack. (2009). *Pervasive Computing*. New Delhi: Pearson.
6. Hu, F., & Cao, X. (2010). *Wireless sensor networks: Principles and practice*. Boca Raton, FL: CRC Press.

HARD CORE PAPER: ADVANCED JAVA

COURSE OUTCOME:

- ✓ To understand two tier architecture, client and server, swings, socket, awt, thread concept as well as collection object and classes.
- ✓ To gain the basic knowledge web based application and enterprise application.
- ✓ Learn to develop web application using Java Servlet and to work with JavaBeans and know about constructors.

COURSE CONTENT

UNIT-I

Exception and Multithreads: Exception-type, Uncaught Exception, Using trycatch, throw, throws, finally, Throwable class and object, Exception classes, Create own exception subclass. Creating multiple threads, isAlive(), join(), Thread priorities, synchronization, - Deadlock, wait(), notify(), notify All() methods, Inter-Thread Communication, suspend, resume & stop the threads. Swing: Event Handling, JFrames, Lists , Tables, Trees, Text Components, Progress Indicators, Component Organizers.

UNIT – II

Enterprise Java Bean: Preparing a Class to be a JavaBean, Creating a JavaBean, JavaBean Properties, Types of beans, Stateful Session bean, Stateless Session bean, Entity bean, Servlet API and Lifecycle, Working with servlets: organization of a web application, creating a web application (using netbeans)creating a servlet, compiling and building the web application.

UNIT-III

JDBC: Design of JDBC, JDBC configuration, Executing SQL statement, Query Execution, Scrollable and updatable result sets, row sets, metadata, Transaction. **JSP:** Introduction, disadvantages, JSP v/s Servlets, Lifecycle of JSP, Comments, JSP documents, JSP elements, Action elements, implicit objects, scope, character quoting conventions, unified expression language. **Java server Faces :**Need of MVC , what is JSF?, components of JSF, JSF as an application, JSF lifecycle, JSF configuration, JSF web applications (login form, JSF pages) **EJB:** Enterprise bean architecture, Benefits of enterprise bean, types of beans, Accessing beans , packaging beans, creating web applications, creating enterprise bean, creating web client, creating JSP file, building and running web application.



UNIT-IV

HIBERNATE: Introduction, Writing the application, application development approach, creating database and tables in MySQL, creating a web application, Adding the required library files, creating

a java bean class, creating hibernate configuration and mapping file, adding a mapping resource, creating JSPs. **WEB Services:** SOAP, Building a web services using JAX-WS, Building web service. **JAVAMAIL:** Mail Protocols, Components of the Javamail API, JAVAMAIL API, Starting with API.

REFERENCE BOOKS:

1. Shah, Sharanam, and Vaishali Shah. (2010). *Java EE 6 Server Programming for Professionals*. New Delhi: SPD.
2. Horstmann, C. S. (2019). *Core Java* (8th ed., Vol. II). Boston: Pearson.
3. Schildt, H. (2005). *Java: The complete reference*, (7th ed.). New York: McGraw-Hill/Osborne.
4. Shah, S., & Shah, V. (2009). *Java EE project using EJB3 JPA and Struts2 for beginners*. Mumbai: Shroff & Distributors.
5. Xavier, C. (2011). *Java programming: A practical approach*. New Delhi: Tata McGraw Hill.
6. Harwani, B. M. (2009). *Java Server Faces: A Practical Approach For Beginners*. New Delhi: PHI Learning Pvt. Ltd.
7. Savaliya, M. T. (2012). *Advance Java Technology*. New Delhi: Dreamtech Press.

SOFT CORE: DATA WAREHOUSING AND DATAMINING

- ✓ To know the concept of data Mining tool enterprise data and effectively identify sources of data and process it for data mining.
- ✓ To impart knowledge of tools used for data mining, provide knowledge, to gather and analyze large sets of data to gain useful business understanding, impart skills that approach business problems analytically by identifying opportunities to derive business.
- ✓ To know the analysis of the data to be used for mining, implement the appropriate data mining methods like classification, clustering or frequent pattern mining on large data sets.



COURSE OUTCOME:

UNIT-1

Introduction: Need for data warehousing: Data warehousing Components –Building a Data warehouse – Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools – Metadata. Dimensional analysis, Multidimensional analysis.

UNIT-II

Principles of dimensional modelling: Objectives, From Requirements to data design, the STAR

schema, STAR Scheme Keys, Advantages of the STAR Scheme, Dimensional Modelling: Updates to

the Dimension tables, miscellaneous, the snowflake scheme, aggregate fact tables, and families of STARS.

UNIT-III


OLAP in the Data Warehouse: Demand for online analytical processing, OLAP: definitions and rules, OLAP characteristics, major features and functions, general features, dimensional analysis, Hyper cubes, Drill-down and roll-up, slice-and-dice or rotation, OLAP models, overview of variations, the MOLAP model, the ROLAP model, ROLAP versus MOLAP.

UNIT-IV

Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse – Issues –Data Preprocessing. The knowledge discovery process, OLAP versus data mining, data mining and the data warehouse, Major Data Mining Techniques, Cluster detection, decision trees, neural networks, genetic algorithms, Benefits of data mining, applications in retail industry.

REFERENCE BOOKS:

1. Tan, P., Steinbach, M., Karpatne, A., & Kumar, V. (2020). *Introduction to data mining*. Harlow: Pearson Education.
2. Soman, K. P., Diwakar, S., & Ajay, V. (2006). *Insight into data mining theory and practice*. Delhi: PHI Learning.



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3. Gupta, G. K. (2006). *Introduction to data mining with case studies*. Delhi: PHI Learning Private Limited.
4. Larose, D. T. (2006). *Data mining methods and models*. Hoboken, NJ: Wiley-Interscience.
5. Han, J., Kamber, M., & Pei, J. (2012). *Data mining: Concepts and techniques*. New Delhi: Hartcourt India P. Ltd.
6. Reeves, L. L. (2009). *A managers guide to data warehousing*. Indianapolis, IN: Wiley Pub.
7. Anahory, S., & Murray, D. (2003). *Data warehousing in the real world: A practical guide for building decision support systems*. Delhi, India: Pearson Education.
8. Adriaans, P., & Zantinge, D. (2009). *Data mining*. New Delhi: Pearson Education.

SOFT CORE: SOFTWARE PROJECT

MANAGEMENT COURSE OUTCOME:

- ✓ To gain the knowledge about project management objectives for the successful development of the project's procedures of initiation, planning, execution, regulation and closure.
- ✓ Guidance of the project team's operations towards achieving all the agreed upon goals within the set scope, time, quality and budget standards.
- ✓ To describe the desired results of a project, is specific and measurable, must meet time, budget, and quality constraints.

COURSE CONTENT

UNIT-I

Project Definition – Contract Management – Activities Covered By

Software Project Management – Overview Of Project Planning – Stepwise Project Planning.

Evolution of Software Economics : Software Economics, pragmatic software cost estimation, Improving Software Economics : Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality.

UNIT-II

Objectives – Project Schedule – Sequencing and Scheduling Activities –Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration –

Activity on Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control.

UNIT-III

Work Flows of the process: Software process workflows, Iteration workflows, Checkpoints of the

process: Major mile stones, Minor Milestones, Periodic status assessments. Iterative Process Planning:

Work breakdown structures, planning guidelines, cost and schedule estimating.

UNIT-IV

Project Organizations, evolution of Organizations. Process Automation: Automation Building blocks, The Project Environment. Understanding Behaviour, Organizational Behaviour, A Background – Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation, The Oldman

– Hackman Job Characteristics Model – Working In Groups – Becoming A Team – Decision Making

– Leadership – Organizational Structures – Stress – Health And Safety – Case Studies. Future Software Project Management: Modern Project Profiles, Next generation Software economics, modern process transitions.

REFERENCE BOOKS:

1. Royce, W. (2005). *Software Project Management*. New Jersey: Pearson.
2. Schwalbe, K. (2019). *Information technology project management (4th ed.)*. Australia: Cengage.
3. Mantel, Samuel, Jack Meredith, and Scott Shafer. (2006). *Project management core textbook*. New Delhi: John Wiley & Sons.
4. Kelkar, S. A. (2011). *Information technology project management (3rd ed.): A concise study*. New Delhi: Prentice-Hall of India.
5. Kerzner, H. (2017). *Project management: A systems approach to planning, scheduling, and controlling*. Hoboken, NJ. Wiley.
6. *A guide to the project management body of knowledge: (PMBOK guide)*. (2017). Newtown Square, PA: Project Management Institute.
7. Ramesh, G. (2003). *Managing global software projects: How to lead geographically*

- distributed teams, manage processes and use quality models.* New Delhi: Tata McGraw-Hill Publ.
8. Royce, W. (2010). *Software Project Management: A Unified Framework.* New Jersey: Pearson.
 9. Jalote, P. (2002). *Software project management in practice.* Boston: Addison-Wesley.
 10. Hughes, B., & Cotterell, M. (2009). *Software project management.* London: McGraw-Hill Higher Education.

SOFT CORE: CYBER LAWS & NETWORK

SECURITY COURSE OUTCOME:

- ✓ Develop the understanding of relationship between commerce and cyberspace and Give learners in depth knowledge of information technology act and legal frame work of Right to Privacy, Data Security and Data Protection.
- ✓ Identify some of the factors driving the need for network security, Identify and classify particular examples of attacks .
- ✓ Compare and contrast symmetric and asymmetric encryption systems and their vulnerability to attack, and explain the characteristics of hybrid systems.

COURSE CONTENT

UNIT-I

Cyber Law: Basic Concepts of Technology and Law : Scope of Cyber Laws, Cyber Jurisprudence.

Law of Digital Contracts : The Essence of Digital Contracts, The System of Digital Signatures, The Role and Function of Certifying Authorities, Information Technology Act 2000 : Information Technology Act-2000-1 (Sec 1 to 13), Information Technology Act-2000-2 (Sec 14 to 42 and Certifying authority Rules), Information Technology Act-2000-3 (Sec 43 to 45 and Sec 65 to 78), Information Technology Act-2000-4(Sec 46 to Sec 64 and CRAT Rules), Information Technology

Act-2000-5 (Sec 79 to 90), Information Technology Act- 2000-6 (Sec 91-94) Amendments in 2008.

UNIT - II

Conventional Encryption : Classical Technique – Modern technique – Algorithms; Public Key Cryptography : Public Key Cryptography – Introduction to Number Theory – Message Authentication and Hash Function – HASH and MAC Algorithm – Digital Signature and Authentication protocol.

UNIT – III

Network Security Practice: Authentication Application – Electronic Mail Security – IP Security Program Security and System Security: Secure programs – Nonmalicious program errors – viruses and Worms – Memory and address protection – control access to general objects – File protection mechanism – user authentication – Trusted operating system design and assurance – Intrusion Detection system.

UNIT – IV

System Security and Web Security: Intruders,– Firewall - Managing Access – Password management

- Web Security requirements – SSL and TLS – SET; Client Side Security : Using SSL – Active Content – Web Privacy. Database Security: The Database as a Networked Server, Securing database-to-database communication, Reliability and Integrity of database, sensitive data – inference – multilevel databases

REFERENCE BOOKS:

1. Sharma, S. (2011). *Information security and cyber laws*. New Delhi: Vikas Pub. House.
2. Pfleeger, C. P., Pfleeger, S. L., & Margulies, J. (2018). *Security in computing*. India: Pearson India Education Services.
3. Stallings, W. (1999). *Cryptography and network security: Principles and practice*. Upper Saddle River, NJ: Prentice Hall.
4. Rittinghouse, J. W., & Ransome, J. F. (2004). *Wireless operational security*. Amsterdam: Elsevier Digital Press.
5. Ben-Natan, R. (2009). *Implementing database security and auditing: A guide for DBAs, information security administrators and auditors*. Burlington, MA: Elsevier Digital Press.
6. Stein, L. D. (1998). *Web security: A step-by-step reference guide*. Reading, Mass: Addison-Wesley.
7. Cox, I. J. (2008). *Digital watermarking and steganography*. Amsterdam: Morgan Kaufmann.
8. Tewari, R. K., Sastry, P. K., & V., R. K. (2002). *Computer crime and computer forensics*. Delhi: Selected.



FOURTH SEMESTER

HARD CORE PAPER: CLOUD COMPUTING

COURSE OUTCOME:

- ✓ Develop foundation for using a network of remote servers to store, manage and process online data.
- ✓ Gain the skill knowledge about the components typically consist of a front end platform, back end platforms, a cloud based delivery and network.
- ✓ To understand Procuring and maintaining a wide range of hardware and software require ample, ongoing investment and the skills to support them.

COURSE CONTENT

UNIT - I

Cloud Computing definition, private, public and hybrid cloud. Cloud types: IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, public vs private clouds, role of virtualization in enabling the cloud; Business Agility: Benefits and challenges to Cloud architecture. Application availability, performance, security and disaster recovery, next generation Cloud Applications.

UNIT - II

Cloud Services Management: Reliability, availability and security of services deployed from the cloud. Performance and scalability of services, tools and technologies used to manage cloud services deployment; Cloud Economics: Cloud Computing infrastructures available for implementing cloud based services. Economics of choosing a Cloud platform for an organization, based on application

UNIT - III

Technologies and the processes required when deploying web services; Deploying a web service from inside and outside a cloud architecture, advantages and disadvantages.

UNIT-IV

Analysis of Case Studies when deciding to adopt cloud computing architecture. How to decide if the cloud is right for your requirements. Cloud based service.



REFERENCE BOOKS

- 1) Velte, Anthony T., et al. *Cloud Computing a Practical Approach*. McGraw-Hill, 2010.
- 2) Miller, Michael. *Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online*. Que, 2009.
- 3) Beard, Haley. *Cloud Computing Best Practices: for Managing and Measuring Processes for on-Demand Computing, Applications and Data Centers in the Cloud with SLAs*. The Art of Service, 2009.
- 4) Polze, Andreas. (2009). *A Comparative Analysis of Cloud Computing Environments*. Germany.

ELECTIVE PAPERS- SELECT ANY ONE

PAPER SOFT CORE: PROGRAMMING

WITH C SHARP (C#) COURSE OUTCOME:

- ✓ To understand the C# Programming language along with the .NET framework which allows to build applications on the Windows platform.
- ✓ To gain the knowledge of building applications on the mobile phone for both IOS and Android using .NET framework.
- ✓ To understand core of the C# language, including variables, arrays, control structures and other core features and by using command line compilers to build applications.

COURSE CONTENT

UNIT-I

Introduction to C # : Evaluation of C#, characteristics of C#, application of C#, difference between

C++ and C#, difference between Java and C#. Introduction to C# environment : The origins of the .NET technology, the .NET framework, the common language runtime, framework base classes, user and programs interface, visual studio .NET, .NET languages, benefits of the .NET approach, C# and .NET.

UNIT-II

Overview of C# Programming structure of C#, editing, compiling and executing C# programs, namespace, comments, using aliases for namespace classes, using command line argument, maths function. Literals, variables and data types : literals, variables, data types, value types, reference type, declaration of variables, initialization of variables, default values, constant variables, scope of variables, boxing and unboxing.

UNIT III

Operators and expression : arithmetic operators, relational operators, logical operators, assignment operators, increment and decrement operators, conditional operators, Bitwise operators, special operators, arithmetic expressions, evaluation of expression.

UNIT IV

Decision making and branching: if statement, ifelse statement, nesting of ifelse statement, the elseif

ladder, switch statement. Decision making and looping: while statement, do statement, for statement,

for each statement, jumps in loops. Methods in C# : declaring methods, the main method, invoking

methods, nesting of methods, methods parameters, pass by value, pass by reference, the output

parameters, variable arguments list, method overloading.

REFERENCE BOOKS:

1. Shapiro, Jeffrey R. (2002). *Visual Basic .NET: the Complete Reference*. New Delhi: McGraw-Hill.
2. MacDonald, Matthew. (2016). *ASP.NET: the Complete Reference*. New Delhi: McGraw-Hill.
3. Balagurusamy, E. (2017). *Programming in C#*. New Delhi: McGraw-Hill.
4. Skeet, J., & Lippert, E. (2019). *C# in depth*. Shelter Island, NY: Manning Publications.
5. Wagner, B. (2017). *Effective C#: 50 specific ways to improve your C#*. Boston: Addison-Wesley.
6. Schildt, Herbert. (2010). *C# 4.0: the complete reference*. New Delhi: Tata McGraw-Hill Education.
7. Watson, Karli, et al. (2010). *Beginning Visual C# 2010*. New Delhi: John Wiley & Sons, 2010.
8. Michaelis, M. (2010). *Essential C# 4.0*. Upper Saddle River, NJ: Addison-Wesley.

SOFT CORE PAPER: SOFTWARE COMMUNICATION & DOCUMENTATION COURSE OUTCOME:



The learning outcomes provide guidelines for teachers and guardians, to help them find the necessary means for helping students develop the indispensable skills and knowledge, which will in turn allow them to pursue further studies and respond to modern society's needs

COURSE CONTENT:

UNIT-I

The Seven Cs of Effective Communication, Completeness, Conciseness, Consideration, Concreteness, Clarity, Courtesy, Correctness Communication: Its interpretation, Basics, Nonverbal Communication, Barriers to Communication

UNIT-II

Business Communication at Work Place: Letter Components and Layout, Planning a letter, Process of Letter, writing, E-mail Communication, Memo and Memo reports, Employment Communication, Notice agenda and Minutes of meeting, Brochures

UNIT-III

Report Writing, Effective writing, types of business reports, structure of reports, gathering information, organization of the material, writing abstracts, and summaries, writing definitions, visual aids, user instruction manual.

UNIT-IV

Required Skills: Reading skills, listening skills, note-making, précis writing, audiovisual aids, oral communication, Mechanics of Writing, Transitions, Spelling rules, hyphenation, transcribing numbers, Abbreviating technical and non-technical terms, Proof reading.

REFERENCE BOOKS:

1. Professional Communication by Aruna Koneru, McGrawHill
2. Effective Business Communication by Herta A Murphy, Herbert W Hildebrandt, Jane P Thomas, McGrawHill
3. Business Communication, Lesikar and Petit, McGrawHill
4. Communication Skills Handbook, Summers, Wiley, India
5. Business Communication (Revised Edition), Rai and Rai, Himalaya Publishing House
6. Business Correspondence and Report Writing by R. C. Sharma and Krishna Mohan, TMH.



SOFT CORE PAPER: GEOGRAPHIC INFORMATION

SYSTEMS COURSE OUTCOME:

- ✓ An ability to apply knowledge of mathematics, science, and applied sciences.
- ✓ An ability to design and conduct experiments, as well as to analyze and interpret data.
- ✓ An ability to formulate or design a **system**, process or program to meet desired needs.

COURSE CONTENT

UNIT I

Spatial Data Concepts: Introduction to GIS, Geographically referenced data, Geographic, projected and planer coordinate system, Map projections, Plane coordinate systems, Vector data model, Raster data model

UNIT II

Data Input and Geometric transformation: Existing GIS data, Metadata, Conversion of existing data, Creating new data, Geometric transformation, RMS error and its interpretation, Resampling of pixel values.

UNIT III

Attribute data input and data display : Attribute data in GIS, Relational model, Data entry, Manipulation of fields and attribute data, cartographic symbolization, types of maps, typography, map design, map production Data exploration: Exploration, attribute data query, spatial data query, raster data query, geographic visualization

UNIT IV

Vector data analysis: Introduction, buffering, map overlay, Distance measurement and map manipulation.

Raster data analysis: Data analysis environment, local operations, neighbourhood operations, zonal operations, Distance measure operations Spatial

Interpolation: Elements, Global methods, local methods, Kriging, Comparisons of different methods

REFERENCE BOOKS AND WEBSITES:

1. Chang, K. (2019). *Introduction to geographic information systems*. New York, NY: McGraw-Hill Education.
2. Lo, C. P., & Yeung, A. K. (2007). *Concepts and techniques in geographic information systems*. Upper Saddle River, N.J: Pearson/Prentice Hall.
3. <http://www.ncgia.ucsb.edu/giscc/>

PROJECT

The project should be undertaken preferably individually or by the group of maximum 3 students who will jointly work and implement the project. The candidate/group will select a project with the approval of the Guide (staff member) and submit the name of the project with a synopsis of the proposed work of not more than 02 to 08 pages within one month of the starting of the semester. The candidate/ group is expected to complete detailed system design, analysis, data flow design, procurement of hardware and/or software, implementation of a few modules of the proposed work during the semester IV as a part of the term work submission in the form of a joint report. Candidate/group will submit the completed project work to the department at the end of semester IV as mentioned below.

1) The workable project.

2) The project report in the bound journal complete in all respect with the following :-

- a) Problem specifications.
- b) System definition – requirement analysis.
- c) System design – dataflow diagrams, database design
- d) System implementation – algorithm, code documentation
- e) Test results and test report.
- f) In case of object oriented approach – appropriate process be followed.

The project report should contain a full and coherent account of your work. Although there will be an opportunity to present the work verbally, and demonstrate the software, the major part of the assessment will be based on the written material in the project report. One can expect help and feedback from the project guide, but ultimately it's the candidates own responsibility. The suggestive structure of a project report should be guided by your guide in selecting the most appropriate format for your project. The term work assessment will be done jointly by teachers appointed by Head of the Institution. The oral examination will be conducted by an internal and external examiner as appointed by the University.



Note:

- 1) Project work should be continually evaluated based on the contributions of the candidate/group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.
- 2) Two mid-term evaluations should be done, which includes presentations and demos of the work done.

OPEN ELECTIVE-MULTIMEDIA

APPLICATIONS COURSE OUTCOME:

- ✓ Describe the types of media and define **multimedia** system.
- ✓ Describe the process of digitizing (quantization) of different analog signals (text, graphics, sound and video).
- ✓ Use and apply tools for image processing, video, sound and animation.

COURSE CONTENT

UNIT-I

Introduction, scope of multimedia. Applications of multimedia, hardware and software requirements, Digital representation: Introduction, Analog representation, waves, digital representation, need for digital representation, A to D conversion, D to A conversion, relation between sampling rate and bit depth, Quantization error, Fourier representation, pulse modulation. Importance and drawback of digital representation.

UNIT-II

Text and Image: Introduction, Types of text, Font, insertion, compression, File formats. Types of images, colour models, Basic steps for image processing, principle and working of scanner and digital camera, Gamma and gamma correction.

UNIT-III

Audio and Video technology: Fundamental characteristics of sound, psycho- acoustics, Raster scanning principles, sensors for TV camcras, color fundamentals, additive and subtractive color mixing, Liquid crystal display (LCD), Plasma Display Panel (PDP), file formats.

Compression and coding: What is compression? Need for compression, Types of compression, basic compression techniques-run length, Huffman's coding, JPEG, zip coding. Overview of Image and Video compression techniques.



REFERENCE BOOKS:

1. Multimedia Systems Design by Prabhat K. Andleigh and Kiran Thakrar-PHI publication
2. Multimedia systems by John F. Koegal Buford-Pearson Education.
3. Principles of Multimedia by Ranjan Parekh. Tata McGraw-Hill
4. Fundamentals of multimedia by Ze-Nian Li and MS Drew. PHI
EEE edition. Term Work.



REFERENCE BOOKS

1. Multi-media Systems Design by Prabha K. Anand and K. Vinod Kumar
Publication
2. Multimedia Systems by John F. Koegel, Richard P. Taylor, and
Principles of Multimedia by Kagan Paulk, John F. Koegel
3. Fundamentals of Multimedia by Kevin L. and S. Drew, 2011
The edition John Work