B. Tech. (CSE)

Scheme and Syllabus

Department of Computer Science

AKS University, Satna (MP)

B. Tech. Syllabus

Semester: 3
(B. Tech. (CSE))

S.NO.	PAPER CODE	NAME OF PAPER	HOURS PER WEEK			TOTAL CREDIT
		THEORY	LECTURE	TUTORIAL	PRACTICAL	
1	12MS304	ENGINEERING MATHEMATICS-III (NUMERICAL ANALYSIS)	3	1	0	4
2	12CA301	ADVANCE C PROGRAMMING	4	0	0	4
3	12CA302	OPERATING SYSTEM	4	0	0	4
4	12CA307	COMPUTER NETWORK AND SECURITY	3	1	0	4
5	12CA308	PRINCIPLES AND PRACTICE OF MANAGEMENT	3	0	0	3
6	12EE303	DIGITAL ELECTRONICS	3	1	0	4
		LABORATORY				
1	12CA351	ADVANCE C PROGRAMMING LAB-1	0	0	2	1
2	12CA352	COMPUTER NETWORK AND SECURITY - LAB	0	0	2	1
3	12CA353	OPERATING SYSTEM LAB	0	0	2	1
		TOTAL CONTACT HOURS/CREDIT	**18**	**3**	**6**	**26**

ENGINEERING MATHEMATICS – III (NUMERICAL METHODS)

OBJECTIVE: The main objective of Math is to learn calculus concepts, techniques, and ideas that are useful in solving and understanding real life problems that arise in economics and business and Numerical methods for the solution of some of the main problems of the scientific computing are introduced (nonlinear systems, data approximation, numerical differentiation and integration, numerical solution of ODE); their implementation and analysis.

Unit-1
Floating point representation and computer arithmetic, Significant digits, Errors: Round-off error, Local truncation error, Global truncation error, Order of a method, Convergence and terminal conditions, efficient computations Bisection method, Secant method, Regula-Falsi method, Newton−Raphson method, Newton's method for solving nonlinear systems.

Unit-2
Simultaneous Linear Equation: Gauss elimination method (with row pivoting) and Gauss−Jordan method, Gauss Thomas method for tri-diagonal systems.
Iterative methods: Jacobi and Gauss-Seidel iterative methods.

Unit-3
Interpolation: Some Operators and their properties, Finite difference table, Newton forward and backward Difference formulae, gauss forward and backward formulae, Lagrange's Interpolation Formulae, Newton Divided difference Interpolation Formulae. Piecewise polynomial interpolation: Linear interpolation, Cubic spline interpolation (only method), Numerical differentiation: First derivatives and second order derivatives, Richardson extrapolation.

Unit-4
Numerical Integration: A general quadrature formula for equidistance ordinates, Trapezoidal rule, Simpson's one third rule, Simpson's three eight rule, Weddle's rule, Newton-Cote's formula, Extrapolation methods: Romberg integration.

Unit-5
Ordinary Differential Equations: Numerical solution of differential equations, Euler's method, Euler's modified method, Taylor's method, Picard's method, Milne's method, Range's method, Runge-Kutta method, Classical 4th order Runge-Kutta method, Finite difference method for linear ODE.

REFERNCE BOOKS:

1. Laurence V. Fausett, Applied Numerical Analysis, Using MATLAB, Pearson, 2/e (2012)

2. M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publisher, 6/e (2012)

3. Steven C Chapra, Applied Numerical Methods with MATLAB for Engineers and Scientists, Tata McGraw Hill, 2/e (2010)

ADVANCE C PROGRAMMING

OBJECTIVE: Advance C programming allows students improve their program's efficiency, and even allow them to handle unlimited amounts of data and files which are very important for storing information permanently. Students can use graphics programming for developing your own games, in making projects, for animation etc.

UNIT-1
Function: Need of Function, Declaring Function, Defining, Calling Function, Types of Function, Parameter Passing, Parameter Passing Techniques – call by value, call by address.
Introduction to Pointers: Definition and Declaration of Pointers, Initialization of Pointers, Basics of Pointers, Pointer Arithmetic, void Pointer, Dynamic Memory Allocation – malloc(), calloc(), realloc(), free(), Pointer to Functions.

UNIT-2
Array – Array, Types, Pointer to Array(1D/2D), Array of Pointers.
String Manipulations: String, NULL Pointer, Array of Character (1D and 2D), Pointer with String, Array of Pointers of Strings.
String Related Functions: String Functions- gets(), puts(), strlen(), strcpy(), strcat(), strcmp(), String Manipulation without String Functions, Palindrome of String, Header Files of String and Characters.

UNIT-3
File Handling: File, Text and Binary Files, Operations on Files fopen(), fclose(), Random Access of File, bof(), eof(), Functions of File: getc(), put(), fputs(), fgets(), fread(), fwrite(), fprintf(), fscanf(), fseek(), ftell(), rewind(),
Storage Class - Storage Class, Types of Storage Class.

UNIT-4
Structure and Union: Structure and its Use, Declaration of Structure, Accessing Structure Elements, How Structure Elements are Stored, Array of Structure, Declaration of Union, Accessing Union Elements, Structure Vs Union, Pointer to Structure.
Enumeration and typedef – enum, typedef,

UNIT-5
Preprocessor Directives: Preprocessor Directives, Initialization and use, MACROS, File Inclusion, Conditional Preprocessors, Miscellaneous Directives, #error, #line, #define, #include, #if, #else, #if-else, #end.
Advance Topics: Command Line Arguments, Computer Graphics, Discussion on Project Designing.

Reference Books:
1. E. Balagurusamy, Programming in ANSI C 5th Edition McGraw-Hill
2. The Complete Reference 'C', Tata MC Graw Hill Fourth Edition Herbert Schildt
3. Programming Language in 'C' Gotfried, Tata MC Graw Hill.
4. Brain W. Kernighan & Dennis Ritchie, C Programming Language, 2nd edition, PHI
5. Problem Solving and Program Design in C, 4th edition, by Jeri R. Hanly and Elli B.Koffman.

List of Practical Advance C Programming:

1. C Program to Create Your Own Header File in C
2. C Program to Read integers into an array and reversing them using Pointers
3. C Program to Count Number of words, digits, vowels using pointers
4. C Program to Swap Two Numbers / Variables using Pointer
5. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc() function.
6. Write a C program to access structure's member through pointer.
7. Find Largest Element Using Dynamic Memory Allocation
8. C Program to add two numbers using Command Line
9. Code for Program to sort a list in alphabetic order using pointers in C
10. Program to check whether a string is palindrome or not using pointer
11. C Program to Count No of Lines, Blank Lines, Comments in a given Program
12. Write a program to perform write and read operation on a binary file.
13. Write a program to copy the content of a text file into another file.
14. Write a program to check the number is even or odd using #if-#else statement.
15. Write a program to show the use of Miscellaneous Directives.

OPERATING SYSTEM

OBJECTIVE: The student will learn what operating systems are, what they do, and how they are designed and constructed. The student will be introduced to what the common features of an operating system are, what an operating system does for the user, and what it does for the computer-system operator.

Unit – 1
Introduction-What is operating system? System calls, types of system calls, Operating system architecture, Operating System service. Simple batch systems, multi-programmed batches Systems, Time sharing systems, Personal computer systems, Parallel systems, distributed Systems, Real time Systems, multitasking, Client-server system, peer-to-peer systems

Unit – 2
Process-Process concept, Process Scheduling, operation on processes, PCB, Inter-process Communication.
Thread-Concept of thread, multithreading, context switching, Scheduling criteria, types of Scheduling, long term, short term and medium-term scheduling, scheduling algorithms, multiple processor scheduling.

Unit – 3
Deadlock-definition, deadlock characterization, handling of deadlock, deadlock prevention, avoidance, detection and recovery. Process synchronization, Background, The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors

Unit – 4
Memory Management-Logical Vs. Physical Address Space, Swapping, contiguous allocation, Paging, Segmentation, Virtual Memory, demand Paging, Performance of demand paging, page replacement, Page replacement algorithm, thrashing.

Unit – 5
Secondary storage Structure-Disk structure, disk Scheduling, disk management, swap space management, disk reliability.
What is File? Attributes of file, types of file, Directory structure, and RAID structure, File System-Access control, Allocation Methods, Free Space Management

Advance Topics: Distributed Operating System

Text Books
1. Silberschatz and Galvin, Operating System Concepts 6/ed, Addison Wesley.
2. William Stalling, Operating Systems: Internals and Design Principles 5/ed, PHI.

List of Practical Operating System:

1. WRITE A PROGRAM (using *fork( )* and/or *exec( )* commands) where parent and child execute:
   - same program, same code.
   - same program, different code.
   - before terminating, the parent waits for the child to finish its task.
2. WRITE A PROGRAM to report behavior of Linux kernel including kernel version, CPU type and model. (CPU information)
3. WRITE A PROGRAM to report behavior of Linux kernel including information on configured memory, amount of free and used memory. (memory information)
4. WRITE A PROGRAM to print file details including owner access permissions, file access time, where file name is given as argument.
5. WRITE A PROGRAM to copy files using system calls.
6. Write program to implement FCFS scheduling algorithm.
7. Write program to implement Round Robin scheduling algorithm.
8. Write program to implement SJF scheduling algorithm.
9. Write program to implement non-preemptive priority-based scheduling algorithm.
10. Write program to implement preemptive priority-based scheduling algorithm.
11. Write program to implement SRJF scheduling algorithm.
12. Write a program to implement first-fit, best-fit and worst-fit allocation strategies.

COMPUTER NETWORK AND SECURITY

Objective: This module aims to provide a broad coverage of some new advanced topics in the field of computer networks.

Unit – 1
Introduction: Definition, Internetwork, Intra-network, Extra-network, Brief History, ARPANET, ISO-OSI reference model, TCP/IP Protocol Suite.
Physical Layer: Design Issues, Hub, Repeater, data, signals, bit-rate, baud-rate, bandwidth, Modulation, Multiplexing, Physical specification, Transmission modes, modes of transfer, Transmission Media, Multicasting, Broadcasting, Unicasting.

Unit – 2
Data Link Layer: Design issues, Bridge, Switch, LAN Topologies, Error Control, Error detection and correction, Flow Control, Access Control, ARQ, CSMA, CSMA/CD, CSMA/CA, IEEE 802 standard, MAC sub-layer, LLC sub-layer, MAC addressing, framing, Bit-oriented Protocol, Character-oriented Protocol, SDLC, HDLC, polling and selecting.

Unit – 3
Network Layer: Design Issues, Router, 3-way switch, Routing, Types of Routing, Link state routing, distance vector routing, Packets, IP packet, logical addressing, IPV4, IP addressing, CIDR, sub-netting, ARP, RARP, ICMP, Network Address Translation.

Unit – 4
Transport Layer: Design Issues, end-to-end delivery, Error control, flow control, TCP protocol, UDP protocol, TCP packet, UDP datagram, Congestion control, Quality of service, Port Addressing, Segments & reassembly, Gateway, Protocol Convertor, Port address translation

Unit – 5
Network Security: Introduction to Cryptography, Public Key Encryption, Message Authentication and Hash Function, Key Management & Distribution, Network & Internet Security.
E-Mail Security: Pretty Good Privacy, S/MIME.
IP Security: IP Security Overview, IP Security Policy, Encapsulating Security Payload, Combining Security Associations.

Textbooks:
1. Data Communications and Networking, BehrouzA.Forouzan,3rd Edition, Tata Mcgraw-Hill.
2. Computer Networks: A. S. Tannenbum, D. Wetherall, Prentice Hall, Imprint of Pearson 5th Ed
3. Understanding Data Communications and Networks, William A Shay, 2nd Edition, Vikas Publications

List of Practical:

1. Design and study of Straight-Through Cable.

2. Design and study of Cross-over Cable.

3. Design and study of Roll-over Cable.

4. Study of network command in Windows operating system.

5. Study of CISCO Packet Tracer Software.

6. Various Network Security Techniques

7. Working with ping command.

8. Working with Trace route command.

9. Numerical study of Sub-netting.

10. Numerical study of Super-netting.

Principles and Practice of Management

UNIT-1

Management: Features, Evolution of Thoughts, Functions, Management as an Art, Management as Profession, Management as Science, Objectives of Management, Levels of Management, Management Principles, Fayol's Principles of Management, Scientific Management.

UNIT-2

Planning: Process, Importance, Nature and Scope, Types and Steps, Objectives, Policies, Procedures, Strategy, Decision Making-Types of Decisions, Difficulties in Decision Making, MBO.

UNIT-3

Organizing: Features and Importance, Principles of Organizations, Types of Organization Structure, Delegation- Span of Control, Line and Staff Relationship, Use of Staff Units and Committees, Structure of Organisation, Nature of organizing, Authority and Responsibility.

UNIT-4

Staffing: Sources of Recruitment, Selection Process, Training -Importance, Methods of Training, Staffing Process Recruitment, Directing- Concept, Elements, Directing- Nature and Purpose, Communication and Types, Communication Process, Internal Sources of Recruitment, External Sources of Recruitment, Internal and External Method of Training.

UNIT-5

Controlling: Need for Coordination, Controlling -Concept and Process, Nature of Controlling, Controlling- Importance and Functions, Control Process, Budgetary Control, Non -Budgetary Control, Techniques of Controlling, Relationship Between Planning and Controlling.

BOOKS RECOMMENDED:
- Management Process   -   Rustom Davar
- Principles of Management   -   L.M. Prasad
- Business Management   -   Dinkar & Pagare
- Essentials of Management   -   Koontz & O Donnell
- Principles of Management   -   Sherlekar

DIGITAL ELECTRONICS

OBJECTIVE: This subject covers combinational and sequential logic circuits. Topics include number systems, Boolean algebra, logic families, and other related topics. Upon completion, students should be able to construct, analyze, verify and troubleshoot digital circuits using appropriate techniques.

UNIT-1
Number Systems and Binary Arithmetic: Different number systems and their inter conversions. Binary addition, subtraction, multiplication and division, overflow, underflow, Excess-3 codes, BCD codes, Gray codes and other codes, fixed point representation, floating point representation.

Boolean Algebra and Logic Gates: Complementation, commutative law, Associative law, Distributive law, Absorption laws, De Morgan's law, reducing Boolean expressions, Logic gates AND, OR, NOT, Ex-OR, EX-NOR, NAND and NOR as universal gates.

UNIT-2
Minimization Techniques: Introduction to SOP and POS minters, midterms, K-map, K-map for 2, 3, 4, 5 variables, don't care condition, Combinational Circuits Half Adder and full Adder Binary Parallel Adder Half Subtract or, full sub-tractor, multiplexer and de-multiplexer, decoder, encoder, seven-segment decoder.

UNIT-3
Introduction of Flip Flops: RS Flip Flops Clocked RS Flip Flops, D Flip Flops, and Triggering preset and clear JK Flip Flops, Race around condition, T Flip Flops, Master Slave Flip Flops.

UNIT-4
Counters: Asynchronous / Ripple Counter Modules counter, MOD -12 counter, Synchronous counter, Synchronous serial and synch, Parallel counter, BCD counter

Shift registers: Introduction, buffer register serial in serial out, serial in parallel out parallel in serial out, parallel in parallel out. Difference between combinational circuit and sequential circuit

UNIT-5
Memory Organization: Memory Hierarchy, main memory, types of ROM and RAM, auxiliary memory, associative memory, cache memory, virtual memory, memory mapping, replacement algorithm, principle of locality of reference, flash memory, BIOS.

Advanced Topics: Quinn-McClusky Method

Reference Books:
1. M. Morris Mano, Digital Design, 3.ed., Prentice Hall of India Pvt. Ltd., New Delhi, 2003/Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003
2. R.K. Gaur, Digital Electronics and Microprocessor, Dhanpat Rai Puplications.

Semester: 4
(B. Tech. (CSE))

S.NO.	PAPER CODE	NAME OF PAPER	HOURS PER WEEK			TOTAL CREDIT
		THEORY	**L**	**T**	**P**	
1	12CA401	OBJECT ORIENTED PROGRAMMING IN C++	3	0	0	3
2	12CA404	DATA STRUCTURE	3	0	0	3
3	12CA403	COMPUTER SYSTEM AND ITS ARCHITECTURE	3	1	0	4
4		**ELECTIVE -I**	3	1	0	4
	12MS407-A	THEORY OF COMPUTATION				
	12MS407-B	SYSTEM PROGRAM				
		Information Security Practitioner's Perspective (IS)- TCS iON				
5	12CA408	E-COMMERCE & E-GOVERNANCE	3	0	0	3
6	12CA409	DATA COMMUNICATION	3	1	0	4
		LABORATORY				
1	12CA451	OBJECT ORIENTED PROGRAMMING IN C++ LAB	0	0	2	1
3	12CA453	DATA STRUCTURE LAB	0	0	2	1
4	12CA454	PROJECT-II LAB/INDUSTRIAL VISIT	0	0	2	1
		TOTAL CONTACT HOURS/CREDIT	**18**	**3**	**6**	**24**

OBJECT ORIENTED PROGRAMMING IN C++

Objective: To present the syntax and semantics of the "C++" language as well as basic data types offered by the language. To discuss the principles of the object-oriented model and its implementation in the "C++" language

Unit – 1
OOPs - Evolution of Programming Methodologies, Procedural Approach Vs. Object Oriented Approach, Principles/Concepts of OOP. Comparison of C and C++, Introduction to C++, Structure of C++ Program. Added Features of C++, Reference Variables, inline Functions, cin, cout, Scope Resolution Operator, Default Arguments, Comparison of Class with Structure. Memory Management-new, delete Operator, Function Overloading.

Unit – 2
Introduction to Objects and Classes-Defining Class, Data Members and Member Functions, Creating Objects, Access Specifiers: Private, Public, Protected, Nested Classes, Local Classes, Empty Class, Friend Function and Friend Class, Passing Objects as Function Arguments, Returning Objects from Functions, Static Members, this Pointer, Pointer to Object, Pointer to Class Members, Wild Pointers, Dangling Pointers, Smart Pointers.

Unit – 3
Constructors and Destructors- Purpose of Constructors and Destructors, Default Constructors, Parameterized Parameters, Constructor Overloading, Copy Constructor, Deep and Shallow Copy. Dynamic Constructors, Constructors and Destructors with Static Members.
Operator Overloading - Operator Overloading, Unary and Binary Operator Overloading, Overloading New and Delete Operators, Overloading Special Operators.

Unit – 4
Inheritance-Basic Concepts, Reusability and Extensibility, Types of Inheritance, Private, Public and Protected Inheritance. Virtual Base Class. Virtual Destructor. Overriding Member Functions, Order of Execution of Constructors and Destructors.
Polymorphism-Method Polymorphism, Polymorphism by Parameter, Parametric Polymorphism, Early and Late Binding.

Unit – 5
Templates-Generic Functions, Generic Classes, Template Restrictions.
I/O Operations - Manipulators. Unformatted I/O Functions. Creating Insertors & Extractors.
Files-Opening, Reading, Writing, Appending and Closing Files.
Exceptions-Exceptions, Handling Exceptions, Defining Your Own Exceptions.

Reference Books:
1. Object Oriented Programming using C++, E. Balagurusamy
2. Object Oriented Programming in C++, Robert Lafore
3. UML in 21 Days, Tech Media

List of Practical

1. Write a C++ program that will ask for a temperature in Fahrenheit and display it in Celsius using a class called temp and member functions.
2. Create a class Distance, which accepts data in feet and inches, adds two distances and displays the members of the distance object in the appropriate form. Test the class in the main program by creating object d1 and d2 of type distance, accept data for each object and add them then display them.
3. Define a class to represent Bank account. Include the following members. Data members
   - (1)   Name of depositor
   - (2)   Account number
   - (3)   Type of account
   - (4)   Balance member functions
   - (a)   To assign initial values
   - (b)   To deposit an amount in a particular account
   - (c)   To withdraw an amount after checking the balance
   - (d)   To display name and balance
   Write a main program to test the class for handling 10 customers
4. Write a program that calculates the value of m raised to the power n for both int and double data types. (Use the concept of function overloading)
5. Write a function, which will take two objects of Distance Class as arguments and returns the largest one. Include a main () program to implement this function of the distance class.
6. Demonstrate the use of static variables and static function in a class by using it to count the number of objects created in the program, having a static function to display the count.
7. Write a class to represent a Matrix. Include member functions to perform the following tasks:
   Data Members: Integer array of 10X10 elements, Integer row, column //dimensions.
   Member Functions: create the Matrix, add a Matrix to another, multiply a Matrix to another, transpose a Matrix, display the Matrix.
8. Write a class to represent a vector (a linear array). Include member functions.
   - default constructor to create vector dynamically of the size 1 and initialize its element to zero.
   - parameterized constructor
   - Overload the + operator to add two vectors
   - Overload the >> operator to input a vector and the << operator to display the vector in the form (10,20....).
9. Write a menu driven program that can perform the following functions on strings. (Use overloaded operators where possible).
10. Compare two strings for equality (== operator)
13. Copy the string to another.
14. Concatenate two strings (+ operator).
15. Write a program that reads a file and creates another file which is identical to the first one except that the consecutive spaces are replaced by one space. Use command line arguments to supply the input and output filenames at runtime.

DATA STRUCTURE

Objective: Be familiar with basic techniques of algorithm analysis, writing recursive methods and master analyzing problems and writing program solutions to problems.

Unit – 1
Introduction to Data structures: Definition, Classification of Data Structure, Dynamic Memory Allocation, Big O notation.
Stack and Queue: Stack-Array and linked list representation of stack, operations on stack, PUSH and POP, Applications of stack, Conversion from infix to postfix and prefix, Evaluation of Prefix and Post Fix Expression using Stack, Recursion, Towers of Hanoi, Queue-Array and linked list representation of queue, Types of Queue, Various Operations on Queue, Applications of Queue.

Unit – 2
Linked List: Linked List, Types of linked list, singly linked list, doubly linked list, circular linked list, Circular doubly linked list, Application of linked list, Polynomial representation and addition.

Unit – 3
Graphs: Graphs-related definition, graph representation-adjacency matrix, adjacency list, adjacency multilist, traversal DFS, BFS, minimum spanning tree, shortest path algorithm, Kruskal and Prim's algorithm.

Unit – 4
Trees: Trees-Basic terminology, binary tree, binary tree representation, complete binary tree, Extended binary tree, Array and linked list representation of binary tree, Traversing binary trees, Threaded binary tree, B-tree, 2-3 tree, AVL tree, Insertion and deletion in binary search tree, forest, Conversion of forest into tree, Heap definition, Max heap and min heap.

Unit – 5
Sorting: Sorting, Types of Sorting, Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort, Shell Sort, Heap Sort, Radix Sort, Counting Sort.
Searching: Linear and Binary Search, Hashing Basics, Methods of Hashing, Collision Resolution, Chaining, Linear Probing, Rehashing.
Advance Topics: Memory Management and Garbage Collection

Text Books:
1. G.S. Baluja, Data Structure and Algorithms
2. Advanced Data structures, Peter Bras

List of practical:
1. STACKS DATA STRUCTURE PROGRAMS
2. QUEUES DATA STRUCTURES PROGRAMS
3. LINKED LISTS DATA STRUCTURE PROGRAMS
4. TREES DATA STRUCTURES PROGRAMS
5. GRAPHS DATA STRUCTURE PROGRAMS
6. SEARCH PROGRAMS
7. SORTING PROGRAMS

COMPUTER SYSTEM AND ITS ARCHITECTURE

Unit – 1
Introduction: Computer Organization, Architecture and Design, Von-Neumann model, Computer Registers, Computer System Bus, Register Transfer Language, Micro operations, Memory transfer, Bus transfer, Flynn's classification, Register Organization.

Unit – 2
Basic Computer organization: Instruction, types of instruction, instruction cycle, instruction format, PSW, ALU, subroutine, interrupt, interrupt cycle, Execution cycle/CPU cycle, control memory, design of control unit, types of control unit, RISC, CISC, addressing modes.

Unit – 3
I/O organization: I/O ports, I/O interface, Isolated I/O and Memory Mapped I/O, I/O Data Transfer, PIO, I/O Interfacing Chips, I/O controller, I/O characteristics, system bus, Direct Memory Access, Modes of Transfer, Strobe and Handshaking, Peripheral Devices, I/O Processor.

Unit – 4
Memory Organization: Memory Hierarchy, Main Memory, Types of ROM and RAM, BIOS, Auxiliary Memory, Associative Memory, Principle of Locality, Cache Memory, Virtual Memory, Memory Mapping, Page Replacement Algorithm, Flash Memory.

Unit – 5
Processor Organization: Parallel Processing, Types of Parallel Processing, Pipelining, Types of Pipelining, Array and Vector Processing, Amdahl's Law, Speedup Computation.
Computer Arithmetic: Booth Multiplication Algorithm, Floating-Point Representation and Arithmetic.

References:
1. William Stallings, "Computer Organization and Architecture – Designing for Performance", 6th Edition, Pearson Education, 2003.
2. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, 5th Edition "Computer Organization", McGraw-Hill, 2002.

THEORY OF COMPUTATION (ELECTIVE I-A)

Objective: The goal of this course is to provide students with an understanding of basic concepts in the Theory of computation. The course will cover various models of computation, including Turing machines, pushdown automata, and deterministic and nondeterministic finite automata. The relationships between these models and various classes of languages will be explored. These topics will be used as a basis for exploring computability, complexity, and more advanced areas of theory.

Unit – 1
Set and Relation: Definition, Types of set, operations on set, closure of relation.
Series and Progression: AP series, GP series, Principle of Mathematical Induction, Pigeon-hole principle.
Introduction to automata theory: Alphabets, String, Language, Grammar, Chomsky Hierarchy for Formal Languages and Grammar.

Unit – 2
Finite Automata (FA): Definition, transition function, transition diagram, transition table, String/Language acceptability by FA, Types of FA, NFA to DFA conversion, Ɛ-transition, Minimization of DFA, Application of FA, Myhill-Nerode Theorem. Mealy machine and Moore Machine.

Unit – 3
Regular Language (RL): Definition, closure properties, regular grammar (RG), regular expression, rules of expression, identities of regular expression, simplification of regular expression, transformation of regular expression to Finite automata, Arden's Theorem, DFA to regular expression transformation, Pumping Lemma for regular language.

Unit – 4
Pushdown Automata (PDA): Definition, representation of PDA, String/Language acceptability by PDA, Types of PDA, design of PDA, Application of PDA.
Context Free Language (CFL): Definition, closure properties, Context Free Grammars (CFG), parse tree, ambiguities in grammar, Pumping Lemma for CFL, normal forms, Chomsky normal form, Greibach normal form.

Unit – 5
Turing Machine: Definition, String/Language acceptability by TM, representation to TM, Types of TM, Universal Turing Machine (UTM), two-way infinite TM, multi-tape TM, design of TM, Application of TM, halting problems of TM, Post Correspondence problem, Decidability.
Recursive Enumerable Language (REL): Definition, closure properties, Recursive Enumerable Grammar.
Advanced Topics: LBA, CFG

Reference Book
1. Aho, Ullmann, Theory of computation
2. Peter Linz, An Introduction to Formal Languages and Automata, 4th Ed, Narosa Publication.
3. K.L.P Mishra, Theory of Computer Science

Systems Programming (Elective I-B)

Unit-1
Assemblers & Loaders, Linkers: One pass and two pass assembler, design of an assembler, Absolute loader, relocation and linking concepts, relocating loader and Dynamic Linking.

Unit-2
Introduction: Overview of compilation, Phases of a compiler.

Lexical Analysis: Role of a Lexical analyzer, Specification and recognition of tokens, Symbol table, Lex

Unit-3
Parsing: Bottom up parsing- LR parser, YACC**.**

Unit-4
Intermediate representations: Three address code generation, syntax directed translation, translation of types, control statements.

Unit-5
 Storage organization: Activation Records, Stack Allocation.
 Code Generation: Object code generation.

Reference Books:
 1. Santanu Chattopadhyaya, Systems Programming, PHI, 2011.
 2. Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, Compilers: Principles, Techniques, and Tools, 2nd edition, Prentice Hall, 2006.
 3. D. M. Dhamdhere, Systems Programming, Tata McGraw Hill, 2011.
 4. Leland Beck, D. Manjula, System Software: An Introduction to System Programming, 3rd
    edition, Pearson Education, 2008.
 5. Grune D, Van Reeuwijk. K, Bal H. E, Jacobs C J H, Langendoen K, Modern Compiler Design, 2nd edition, Springer, 2012

E-Commerce & E-Governance

Unit I

Introduction to e-commerce: History of e-commerce, e-business models B2B, B2C, C2C, C2B, legal; environment of e-commerce, ethical issues, electronic data interchange, value chain and supply chain, advantages and disadvantages of e-commerce.

Unit II

Electronic Payment Systems: Credit cards, debit cards, smart cards, e-credit accounts, e-money, Marketing on the web, marketing strategies, advertising on the web, customer service and support, introduction to m-commerce, case study: e-commerce in passenger air transport.

Unit III

E-Government, theoretical background of e-governance, issues in e-governance applications, evolution of e-governance, its scope and content, benefits and reasons for the introduction of e-governance, e-governance models- broadcasting, critical flow, comparative analysis, mobilization and lobbying, interactive services / G2C2G.

Unit IV

E-readiness, e-government readiness, E-Framework, step & issues, application of data warehousing and data mining in e-government,

Unit V:

E-Government systems security: Challenges and approach to e-government security, security concern in e-commerce, security for server computers, communication channel security, security for client computers. e-seva, E government Projects Study (Smart City projects)

References:

1. Gary P. Schneider, "E-commerce", Cengage Learning India.
2. C.S.R. Prabhu, "E-governance, concept and case study", PHI Learning Private Limited.
3. V. Rajaraman, "Essentials of E-Commerce Technology", PHI Learning Private Limited.
4. David Whiteley, "E-commerce study, technology and applications", TMH.
5. J. Satyanarayan, "E-government: The science of the possible", PHI Learning Private Limited.

DATA COMMUNICATION

UNIT-1
Introduction to data communication: Components, data representation, data flow and basic model, Serial & Parallel transmission, Modes of data transmission.
Encoding: Unipolar, Polar, Bipolar line & block codes, Data compression, Frequency dependant codes, Run length encoding, Relative encoding, LZ Compression, Image and multimedia compression. Review of analog & digital transmission methods, Nyquist Theorem.

UNIT-2
Multiplexing: FDM, TDM, WDM, Synchronous & Statistical TDM, North American digital multiplexing hierarchy, European TDM, Spread spectrum: Frequency Hopping & Direct Sequence spread spectrum, Terminal handling & polling. Switched Communication Networks, Circuit, Message, Packet & Hybrid Switching, Soft-switch Architecture with their comparative study, X.25, ISDN.

UNIT-3
Physical Layer: Introduction, Interface, Standards, EIA-232-D, RJ-45, RJ-11, BNC connector & EIA-449 digital Interface: Connection, specifications & configuration, X.21
Modem: Types, features, signal constellation, block schematic, limited distance, dial up, baseband, line driver, Group Band and Null modems etc., ITU-T V-series modem standards
Connecting Devices: Active and Passive Hubs, Repeaters, Bridges, Two & Three layer switches & Gateway. Study of various types of topology and their comparative study and introduction to queueing theory.

UNIT-4
Transmission Media: Transmission line characteristics, Distortions, Crosstalk
Guided Media: Twisted Pair, Baseband & Broadband Coaxial, Optical fibre, Physics and velocity of propagation of light, Advantages & Disadvantages, Nodes and classification, Comparison, losses, light source and detectors, Construction
Unguided media: Electromagnetic polarization, Rays and waves-front, electromagnetic spectrum and radiation, spherical wave front and inverse square law, wave attenuation and absorption, optical properties of Radio waves, Terestrial Propagation of electromagnetic waves, skip distance, free - space path loss, Radio waves, Microwave, Infrared & Satellite Communication system. **Telephone Network:** Components, LATAs, signaling and Services
Digital Subscriber Line: ADSL, HDSL, SDSL, VDSL, Cable TV network for data transfer.

UNIT-5
Transmission Errors: Content Error, flow integrity error, Methods of error control, Error detection, Error Correction, Bit Error Rate,
Error Detection Methods: Parity checking, Checksum Error Detection, Cyclic redundancy Check, Hamming code, Interleaved codes, Block- Parity, Convolution code, Hardware Implementation, Checksum.
Suggested Reading:
1. Gupta Prakash C.," Data communication", PHI Learning
2. Tomasi, "Introduction to Data Communication & Networking, Pearson Education
3. Forouzan, "Data communication", TATA McGraw
4. Godbole, "Data Communication & Network", TMH
5. Miller, "Data Network and Communication", Cengage Delmar Learning

SEMESTER 5

Sr	PAPER CODE	NAME OF PAPER	HOURS PER WEEK			TOTAL CREDIT
		THEORY	**L**	**T**	**P**	
1	12CA501	WEB ENGINEERING AND TECHNOLOGY	3	1	0	4
2	12CA502	DATABASE MANAGEMENT SYSTEM	3	1	0	4
3	12CA504	DESIGN AND ANALYSIS ALGORITHM	3	1	0	4
4	12CA507	SOFTWARE ENGINEERING	3	1	0	4
5	12CA508	**ELECTIVE -II** a. DATA WAREHOUSE AND DATA MINING b. MANAGEMENT INFORMATION SYSTEM c. ENTERPRISE RESOURCE PLANNING d. IoT and its Applications (IOT)- TCS iON	3	1	0	4
6	12CA503	MICROPROCESSOR AND INTERFACING CHIPS	3	1	0	4
		LABORATORY				
1	12CA551	WEB ENGINEERING AND TECHNOLOGY LAB	0	0	2	1
2	12CA552	DATABASE MANAGEMENT SYSTEM LAB	0	0	2	1
3	12CA553	MICROPROCESSOR AND INTERFACING CHIPS LAB	0	0	2	1
4	12CA554	PROJECT-III LAB	0	0	2	1
		TOTAL CONTACT HOURS/CREDIT	**18**	**6**	**8**	**28**

SUBJECT NAME: WEB ENGINEERING AND TECHNOLOGY

OBJECTIVE: This course enables students to know about web development using html and scripting languages.

Unit-I

HTML Concepts of Hypertext, Versions of HTML, Basic text formatting, Head & Body Sections, Inserting texts, Images, Hyperlinks, Backgrounds and Color controls. Different HTML tags, Table layout and presentation, Use of Fonts, List types and its tags, Use of Frames and Forms in Web Pages.

Unit-II

Cascading Style Sheet- Introduction, types of CSS: Inline, internal, external. classes, class and ID method, DIV and SPAN tags.
JavaScript- Introduction, Language Basics-Variables, operators, statements, functions, JavaScript Events, Such as onclick, mouse out, mouse-over etc, form validation. Session and state management

Unit-III

XML-Introduction, XML Fundamentals, XML Syntax, Accessing Data from XML Documents.
jQuery- Introduction, J query Syntax, J query selectors, Events.

Unit-IV

PHP – Introduction to Scripting Language PHP, Installation and Configuration of PHP, Data types in PHP, PHP Syntax, Comments, Variables and Constants, Embedding PHP in HTML. PHP Functions: user defined functions, Strings Concatenation, Strings functions. Arrays: Creating Array and Accessing Array Elements, Control statements, Loops, form validation.

Unit-V

Introduction to CRUD –Data-base Creation inserting deleting and updating records in database table.
PHP with MYSQL: Creating Connections, Selecting Database, Perform Database (Query).

Advance Topics: Object Oriented Programming with PHP- Introduction to OOPS, creating classes and objects, accessing Data through methods.

Reference Books:
1. Beginning PHP5, Apache, and MySQL Web Development 2005 Elizabeth Naramore, Jason Gerner, Yann Le Scouarnec, Jeremy Stolz, Michael K. Glass Wrox Publication

2. Beginning HTML, XHTML, CSS, and JavaScript 2010 Jon Duckett Wiley Publishing, 2010.

3. Web Technologies, Black Book, DreamTechPress 2010 Kogent Learning Solutions Inc DreamTechPress

List of Practical

1. Create a web page by making use of the following tags: Head, Body, Bgcolor.
2. Write code to implement Frame in HTML.
3. Write a HTML program to implement different types of CSS.
4. Write a JavaScript program to design a simple calculator.
5. Write a JavaScript program to find the factorial of given number by using function.
6. Write a JavaScript program to form validation in html.
7. Create a web form using php for login page.
8. Create a simple xml document with following details: Rollno, Sname, Contact, Email and Address.
9. Write a simple PHP script to perform crud operations.
10. Create a web form using php for enquiry details.

SUBJECT NAME: DATABASE MANAGEMENT SYSTEM

Objective: To understand the different issues involved in the design and implementation of database system, data manipulation language, to query update and manage a database and to develop an understanding of essential DBMS concepts such as database security, integrity, concurrency, distributed database.

Unit – 1
Purpose and advantages of DBMS, view of data, DBMS architecture and data independence, database languages. Classification of DBMS, schema. Database administrator and users, data dictionary, data modeling using ER model, Entities, attributes and relationships, different types of attributes, ER diagrams, specialization and generalization, relationship.

Unit – 2
Domains, relations, kinds of relations, various types of keys: candidate, primary, alternate and foreign keys, integrity constraints, entity integrity, referential integrity, Key constraints, Domain Constraints, Relational Algebra, Relational Calculus, Tuple Relational Calculus and Domain Relational Calculus.

Unit – 3
Relational Database Design: Pitfalls in relational database design, trivial and non-trivial dependencies, closure set of dependencies and of attributes. Introduction to normalization, lossless join decomposition, FD diagram, 1st,2nd,3rd BCNF, 4NF, 5NF, normalization using FD, MVD, and JDs. Basic SQL: - DDL, DML and DCL commands, specifying constraints in SQL, select statement, additional features of SQL, PL/SQL, cursor, trigger, view

Unit – 4
Transaction Management: Basic concepts, ACID properties, transaction states, implementation of atomicity and durability. Basic idea of serializability. Conflict & view serializable schedule. Recoverability: recovery from transaction failures, log-based recovery, checkpoints, deadlock handling.
Distributed Database: Introduction of Distributed Database, Data Fragmentation, Replication, 2PC Protocol.

Unit – 5
Concurrency Control, Locking Techniques for Concurrency Control, 2PL, Time Stamping Protocols for Concurrency Control, Validation Based Protocol, Multiple Granularity.
Advance topics in DBMS: Internet technology and its relevance to the DBMS, Use of B+ Tree is in the Database.

Reference books:
1. Leon & Leon, "Database Management Systems", Vikas Publishing House
2. O'Neil, Databases, Elsevier Pub.
3. Korth, Sudarshan, Database system concepts, McGraw hill
4. Elmasri, Navathe, "Fundamentals of Database Systems", Addision Wesley.

DBMS Lab

(1) EMP (EC, EN, DNO, DESIGNATION, BASIC)
DEPT (DNO, DNAME, DLOC)
WHERE EC CHAR (5) PRIMARY KEY | EMP TABLE
DNO NUMBER (2) FORGIEN KEY
AND DNO NUMBER (2) PRIMARY KEY | DEPT TABLE

  (i) Find the name of employees working in either computer dept or civil dept.

  (ii) Find the name & dept name who draws the second maximum salary.

  (iii) Update the employees record by increasing 10% of salary who is either working in computer or civil dept.

  (iv) Delete the mechanical dept from dept table.

  (v) Display the maximum salary drawn from each dept.

(2) CUSTOMER (S# <P.K>, CN, STREET, CITY)
BRANCH (BR_NAME<P.K>, ASSET, BR_CITY)
DEPOSIT (S#<F.K>, CN, BR_NAME, ANO, BALANCE)
BORROW (S#<F.K>, CN, BR_NAME, LNO, AMOUNT)

  (i) Find the customer name who has both deposit & taken loan from "UCO" branch.

  (ii) Find CN, street & city who has deposit but not taken loan from "UCO"

  (iii) The branches located in "ranchi" city.

  (iv) Remove all the records from branch table located in branch where city is "jamshedpur".

  (v) Find the name of the customer who has deposit in highest asset branch.

5. Comsider the following relational schema

employee(empno, name, office, age)
books(isbn, title, authors, publisher)
loan(empno, isbn, date)

Write the following queries in SQL

  a. print the names of employees who have borrowed any book published by McGraw-Hill.

  b. print the names of employees who have borrowed all books published by McGraw-Hill

  c. For each publisher, print the names of employees who have borrowed more than five books of that publisher.

6. Write down the following in Sql queries

Employee(employee_name,street,city)
Works(employee_name,company_name,salary)
Company(company_name,city)
Manages (Empyoyee_name,manager_name)

  a. Find the names and cities of residence of all employees who work for first bank corporation

  b. Find the names, street address and cities of residence of all employees who work for first bank corporation and earn more than $10000

c. Find all employees in the database who do not work for first bank corporation

d. Find all employees in database who earn more than each employees of small bank corporation

e. Assume that the companies may be located in several cities. Find all companies located in every city in which small bank corporation is located.

f. Find the company that has the most employees

g. Find those companies whose employees earn a higher salary,onaverage,than the average salary at first bank corporation.

7. Write a simple PL/SQL **script** that displays "Hello World".

8. Write a PL/SQL **stored procedure** to display "Hello World".

9. Write a PL/SQL script that performs simple arithmetic like Addition, Subtraction, Multiplication & Division of input numbers.

10. Create two tables as shown below:
    Table 1 : product (product_id, product_name, supplier_name, unit_price)
    Table 2: product_price_history(product_id, product_name, supplier_name, unit_price)

    Insert appropriate data into Table 1 i.e. the "product" table.

    Now write a **PL/SQL trigger** that automatically copies a row from product table to product_price_history table whenever the unit price of a product is changed in the product table.

    Note: "product" table contains new updated value of unit price while "product_price_history" table contains the old value.

11. Write a PL-SQL script to compare three given numbers and display them in ascending order.

12. Create the following table:
    Emp(E_ID, E_Name, E_Dept, E_Salary)

    Insert appropriate data into Emp table.
    The attribute E_Dept contains values like (I.T., Accounts, Sales)..
    Write a **PL-SQL cursor** that increments the salary of employees of I.T. Dept. by 20%.

<h1 style="text-align:center">SUBJECT NAME: DESIGN AND ANALYSIS OF ALGORITHMS</h1>

OBJECTIVE: This course is to teach the students the basics of algorithm and the different techniques to solve problems.

Unit-I
Introduction to Algorithms, Analyzing Algorithms, Complexity of Algorithms, Asymptotic notation: Big Oh, Omega and Theta, Worst, Average and Best-case Analysis; Recurrence relation: Master Method, Substitution Method, Recursive-tree Method. RAM/PRAM

Unit-II
Brute-Force Approach: Insertion Sort; Travelling Salesman Problem
Divide and Conquer approach: Quick-sort, Merge Sort, Binary Search, Matrix Multiplication using Strassen's Method.

Unit-III
Dynamic Programming: Elements of Dynamic Programming, Matrix-Chain Multiplication, Longest Common Subsequence, Single-Source Shortest Path, 0/1 Knapsack Problem, Travelling Salesman Problem.

Unit-IV
Greedy Algorithm: Elements of Greedy Strategy, Fractional Knapsack Problem, Job Sequencing with Deadlines, Minimum Spanning Tree (Prim's and Kruskal's Algorithms), Huffman Coding.
Backtracking-Branch and Bound strategy: Travelling Salesman Problem, 0/1 Knapsack Problem, Graph Coloring, n-Queen Problem, Sum of subsets.

Unit-V
Difference Among Algorithm Strategies, String Matching: Naïve Algorithm, KMP Algorithm, Finite Automaton Based Searching Techniques.
Complexity Classes: P, NP, NP-Hard, NP-Complete.

Advance Topics: I/O Complexity Computation.

Reference Books -

1. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, Prentice Hall Publication
2. The Algorithm Design Manual by Steven Skiena, Springer Publication
3. Design and Analysis of Algorithms by Amrinder Arora, Cognella, Inc
4. Fundamentals of Computer Algorithms by Ellis Horowitz and Sartaj Sahni, W. H. Freeman Silicaon Press
5. Algorithms: Design and Analysis by Harsh Bhasin, Oxford University Press

SOFTWARE ENGINEERING

OBJECTIVE: It aims to develop a broad understanding of the discipline of software engineering. It seeks to complement a familiarity with analysis and design with knowledge of the full range of techniques and processes associated with the development of complex software intensive systems. It aims to set these in an appropriate engineering and management context.

Unit – 1

Software Concepts: The Evolving role of software, software myths, system concepts, characteristics of system, Elements of System, SDLC, The role of System Analyst, Software Application domains, Legacy Software, The Software Crisis, principles of software engineering. Requirement Analysis: Requirement analysis tasks, Analysis principles. Software prototyping and finite state machine (FSM) models.

Unit – 2

Process Models: Perspective model: The process of software development, waterfall, Incremental, spiral, COCOMO. Agile process models- what is Agility, Agile Process models, XP, ASD, DSDM, SCRUM, CRYSTAL, FOD AM. Capability Maturity Model, Software Project Management: Objectives, Resources and their estimation, LOC and FP estimation, effort estimation, COCOMO estimation model.

Unit – 3

Designing: Software Design: principles, Abstraction, Modularity, Software architecture, Cohesion and Coupling, Architectural design and procedural design, Refactoring, Structured Analysis, UML: an Introduction, Views and Diagrams**,** User Interface Design and Computer interface design, Interface standards. Programming languages and coding, Code documentation, Code efficiency, Software configuration management.

Unit – 4

TESTING: Testing Techniques: software testing, functional and non- functional testing: white box, black box testing, different types of testing: static, structural, desk checking, code walk through, code inspection, unit/code functional, code coverage, code complexity, statement, path, condition, function coverage, Cyclomatic complexity, requirements based, compatibility, domain, integration, system integration pair, acceptability, scenarios, defect bash, deployment, beta, stress, interoperability, acceptance, performance/load, regression, ad-hoc, Software maintenance. Trends in Software Engineering: Reverse Engineering and Re-engineering,

Unit – 5

Software Quality Assurance: Quality Concepts, software quality Assurance, Garvin's Quality Dimensions, McCall's Quality factors, Software Reviews, formal technical reviews, formal approaches to SQA, Statistical Software Quality Assurance, Software reliability, Information to ISO – Standard.

Text Books:

1. "An Integrated Approach to Software Engineering", PankajJalote, IIIrd Edition, Narosa Publishing House.
2. "Software Engineering: Principles and Practices", Waman S. Jawadekar, Tata McGraw-Hill.
3. "Software Engineering: A Practitioner's approach", Roger S. Pressman, McGraw-Hill.
4. "Software Engineering: Ian Somerville, Pearson Education.
5. "Fundamentals of Software Engineering", Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, PHI.
6. S. L. Pfleeger, Software Engineering: Theory and Practice, Pearson Education.

Data Warehousing and Data Mining (Elective-II)

Objective: This subject makes you aware of need of data warehouses that involves data cleaning and data integration, preprocessing step for data mining which will make you aware of different data mining techniques.

Unit – 1

Overview and Concepts: Need for data warehousing, Basic elements of data warehousing, Differences between database systems and data warehouse, Planning and Requirements: Project planning and management, Collecting the requirements.

Unit -2

Architecture and Infrastructure: Data warehouse architecture and its components, Infrastructure and metadata, Data design and data representation, Principles of dimensional modeling, Data extraction, Transformation and loading, Data quality. Information access and delivery: OLAP in data warehouse, Data warehousing and the web.

Unit – 3

Data Mining Introduction: Basics of data mining, Different definitions of data mining and related concepts, Data mining process, Data preparation, Data cleaning and Data visualization, KDD process.

Unit – 4

Data Mining Techniques: Clustering, Association rules and Decision trees, SVM, KNN.

Unit – 5

Web Mining: Web content Mining, Web Usage Mining.

Advance Topics: Spatial Mining, Temporal Mining, Trends in Data Mining

Text Books:
1. A.K. Puzari, Data Mining Techniques, University Press.

Reference Books:
1. J. Han and M. Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann.

ENTERPRISE RESOURCE PLANNING (ELECTIVE-II)

Objective: This course is taught to know about resource planning in organization and how it works.

UNIT I
Enterprise Resource Planning Introduction What Is ERP?   Need of ERP. Advantage of ERP Growth of ERP.

UNIT II
ERP Modules and Vendors Finance   Production Planning, Control and Management, Sales and Distribution Human Resource Management Inventory Control System, Quality Management, ERP market, Comparison of Current ERP Packages and Vendors, like; SAP, Oracle, PeopleSoft, BAAN etc.   Disadvantages of non-ERP sys. Importance of ERP vice versa In-house applications Benefits of integration Standardization of data code.

UNIT III
ERP Implementation Life Cycle Evaluation and selection of ERP package Project planning, Implementation, Team Training and Testing End User Training and Going Live Post Evaluation and Maintenance Role of organization management & vendor

UNIT IV
ERP Case Studies Post Implementation review of ERP packages   in manufacturing, Services and Others Organizations, Customization of ERP for different types of Industries.

UNIT V
Security and Ethical Challenges Ethical responsibilities of Business Professionals – Business, technology; Computer crime – Hacking, cyber theft, unauthorized use at work; Piracy – software and intellectual property; Privacy – Issues and the Internet Privacy; Challenges – working condition, individuals; Health and Social Issues, Ergonomics and cyber terrorism.

Text books
1. ERP, Leon Alexis, TMH

Reference book
1. Enterprise Resource Planning & Mgment. of Information System, CSV Murthy, HPH

MANAGEMENT INFORMATION SYSTEM (ELECTIVE-II)

Objectives: The course provides students a fundamental understanding of management information systems concepts and their role in contemporary business. At the end of this course students should be able to participate in information systems development as an informed person

Unit – 1
Management Information Systems - Need, Purpose and Objectives -Contemporary Approaches to MIS - Information as a strategic resource - Use of information for competitive advantage - MIS as an instrument for the organizational change Information, Management and Decision Making - Models of Decision Making -Classical, Administrative and Herbert Simon's Models - Attributes of information and its relevance to Decision Making - Types of information

Unit – 2
Information Technology - Definition, IT Capabilities and their organizational impact - Telecommunication and Networks - Types and Topologies of Networks -IT enabled services such as Call Centers, Geographical Information Systems etc. FIS, Mis, HRIC, HRA

Unit – 3
Systems Analysis and Design - Systems Development Life Cycle – Alternative System Building Approaches - Prototyping - Rapid Development Tools – CASE Tools – Object Oriented Systems (Only introduction to these tools & techniques)

Unit – 4
Decision Support Systems - Group Decision Support Systems – Executive Information Systems - Executive Support Systems - Expert Systems and Knowledge Based Expert Systems - Artificial Intelligence

Unit – 5
Management Issues in MIS - Information Security and Control – Quality Assurance -Ethical and Social Dimensions, Corporate Social Responsibility, - Intellectual Property Rights as related to IT Services / IT Products - Managing Global Information Systems.

Text Books:
    1. Management information system, Pearson Publication

Reference book
    1. Management information system, TMH publications

MICROPROCESSOR AND INTERFACING CHIPS

Objective: The purpose of this course is to impart knowledge of microprocessor architecture and programming, interfacing and coprocessors which gives foundation to advanced microprocessor architecture and microcontrollers.

UNIT - 1
INTEL 8086/8088 ARCHITECTURE: Evolution of microprocessors, Introduction to 8086/8088-8086/8088 Architecture - Pin Details - Segmented Memory - Maximum-Mode and Minimum-Mode Operation - Addressing Modes - Basic Peripherals and their interfacing with 8086/8088.

UNIT -2
Assembly Language Programming with 8086/8088: Instruction Set and Timing Diagrams, Programming techniques: Logical Processing, Arithmetic processing, Time Delay, Loops, Procedures, Data tables, Modular programming and Macros.

UNIT - 3
I/O and MEMORY INTERFACING USING 8086: Interrupt of 8086/8087 Microprocessor, Programmable Interrupt Controller 8259A Architecture - Command Words of 8259 - Operating modes, Interfacing I/O Ports - PIO 8255 Architecture - Modes of Operation, Programmable Interval Timer 8253 Architecture - Operating modes.

UNIT - 4
COMMUNICATION AND BUS INTERFACING WITH 8086: Introduction - Serial Communication Interface 8251, DMA Controller 8237 - Architecture-Register organization - DMA Operation, Keyboard and Display I/O Interface 8279 - Architecture - Modes of Operation - Command Words of 8279 - CRT Controller 8275 - Analog to Digital Interfacing Architecture - Bus Interface - UART 8250.

UNIT – 5
MICROCONTROLLERS 8051: Introduction - Architecture of 8051 Microcontroller - Memory organization - Pin diagram of 8051 Microcontroller - Addressing Modes - Instruction set - Timers/counters - serial Communication- assembly Language programs - Applications of Microcontrollers.

Advance Topics: Brief overview of some other microprocessors (eg. 6800 Microprocessor).

TEXT BOOK:
1. 1. Ray A K, K M Bhurchandi, "Advanced Microprocessor & Peripherals", Tata McGraw, Hill, Second Edition, 2012.

REFERENCES:
1. Soumitra Kumar Mandal, "Microprocessor & Microcontrollers", Tata McGraw Hill, Second Edition, 2012.
2. Barry B. Brey, "The Intel Microprocessor8086/8088, 80186", Pearson Education, Eighth Edition, 2009.

List of Practical

1. Study of the 8085/8086 architecture.

2. Write an 8085/8086 assembly language program for exchanging two 8 - bit numbers stored in memory locations 2050h and 2051h

3. Write an 8085/8086 assembly language program to add two 8 - bit numbers stored in memory locations 2050h and 2051h. Store result in location 2052h

SEMESTER 6

S.NO.	PAPER CODE	NAME OF PAPER	HOURS PER WEEK			TOTAL CREDIT
		THEORY	L	T	P	
1	12CA605	COMPUTER GRAPHICS AND MULTIMEDIA SYSTEMS	3	1	0	4
2	12CA606	COMPILER DESIGN AND ANALYSIS	3	1	0	4
3	12CA607	.NET TECHNOLOGIES	3	1	0	4
4		**ELECTIVE -I**	3	1	0	4
	12CA608-A	ARTIFICIAL INTELLIGENCY				
	12CA608-B	SOFT COMPUTING				
	12CA608-C	DIGITAL IMAGE PROCESSING				
		Artificial Intelligence for Real World Application (AI)-TCS iON				
5	12CA609	UNIX & SHELL PROGRAMMING	3	1	0	4
6	12CA610	DISCRETE STRUCTURE	3	1	0	4
		LABORATORY				
1	12CA655	.NET TECHNOLOGIES LAB	0	0	2	1
2	12CA653	COMPUTER GRAPHICS AND MULTIMEDIA SYSTEMS LAB	0	0	2	1
3	12CA654	PROJECT-IV LAB	0	0	2	1
4	12CA656	LINUX/UNIX LAB	0	0	2	1
		TOTAL CONTACT HOURS/CREDIT	**18**	**4**	**6**	**28**

.NET Technologies

Unit-1
Introduction to .Net - .Net Framework Features & Architecture, CLR, Common Type System, MSIL, Assemblies and Class Libraries, .NET languages and Benefits of .NET Application. Garbage Collection, Metadata and Intermediate Language, Name spaces Different types of .Net applications.

Unit-2
Introduction to VB.Net: Language Features forms and controls, creating .NET Projects Creating Classes in VB.NET
Introduction to Windows Forms: Benefits of Windows Forms, .NET Events, The Windows Forms Model, Creating Windows Forms, Windows Forms Properties and Events, Dialogs, ToolTips, windows controls, MDI Form

Unit-3
C#.Net: Overview of C#, Visual C#.NET .Net Development Environment, C# and windows application, C# and console application, Use Console Applications, Generating Console Output, Processing Console Input, Creating Classes, Overloading, Constructors, Inheritance, Controlling scope and visibility

Unit-4
Web based Software Development: Introduction to Web servers, IIS configuration, ASP.NET Controls, ASP.NET Web Form Controls, accessing controls Buttons, Text Box, Labels, Checkbox, Radio Buttons, List Box, calendar etc.
Validation Controls: RequiredFieldValidator, Range validator, RegularExpressionValidator, CompareValidator.Session and state management.

Unit-5
ADO.Net: Architecture of ADO.Net-connected and disconnected, .Net Data provider, Working with Command and DataReader, Working with DataAdapter and DataSet, Binding data in data grid view.
XML: Accessing data from XML document, Introduction to Web Service, Creating Web service in .Net.

References:
1. ASP.Net 3.5 Black Book (Covers C# and VB 2008 Codes) - DreamTech Publication
2. The Complete Reference ASP.Net By Mathew Macdonald - TMH
3. Professional ASP.Net- Wrox Publication
4. Kothari Nikhil and Datye Vandana, Developing ASP .NET Server Controls and Components, Tata McGraw Hill, 2003.
5. Esposito Dino, Applied XML Programming for Microsoft .NET, Tata McGraw Hill, 2003.

List of Practical

1. Write a VB.Net program for calculator.
2. Write a VB.Net program for implementation of class.
3. Write a program to implement MDI.
4. Implementation of dialog boxes.
5. Write C# code to implement inheritance.
6. Write C# program to implement operator overloading.
7. Create a web page with use of different validation controls.
8. Write code for ADO implementation.
9. Write a program to access data from XML file.
10. Program for use of XML web service.

LINUX AND SHELL PROGRAMMING

OBJECTIVE: An introduction to shell programming in a Linux environment, this course is designed for system administrators or technical users with little or no programming background. Understanding shell programming gives a user full power of the LINUX environment. Topics include use of a text editor, the features of the Bash shell, variables, control structures, functions, file access and basic programming style.

Unit-I
Introduction: What is LINUX, Basic Architecture of Unix, Different flavor, CUI and GUI, LINUX vs Windows **File System:** Boot Block, Data Block, Super Block, Inode block & inode table, kernel .login to Linux. Linux File Access, Basic Utilities.

Unit-II
File Commands: cat, cp, wc, ls, rm, mv, cmp, comn, diff, head, tail etc.
Directory Commands: pwd, cd, mkdir, rmdir ,etc.File permision: chmode command, setting initial permission with umask editing with vi, pipe, back grpund jobs, mounting and un mounting, link and unlink, **Mathematical Commands:** bc, expr. more and less command

Unit-III
Text Manipulation: grep, egrep, sed, cut, paste, sort, split User to user communication: write, mail, mesg, wall
Process: structure of process and process control, process states and transition, process context. **Process Command:** ps, kill, nice etc, scheduling commands: at and crontab, sleep, wait

Unit-IV
Shell programming: shell, different types of shell, default assigned shell. Shell variable, key words, environment variable, shell script, Parameter passing, positional parameter & shifting, for loop, while loop, until loop, if statement, case statement.

Unit-V
AWK: AWK pattern scanning, BEGIN and END pattern, awk arithmetic, variables, and operations and function.
Advance Topics: Resolving IP addressing, TELNET, FTP, ping, tracerout. IPC & socket programming, Introduction to perl.

Reference Books
1. MJ Bach "Design of Unix OS".
2. Meeta Gandhi, Tilak Shetty and Rajiv Shah – The 'C' Odyssey Unix –The open Boundless C ,1st Edition, BPB Publications 1992.
3. Y Kanetkar "Unix shell programming" BPB Pub.
4. Rachel Morgan. Henry McGilton "Introducing UNIX System V".

List of Practical

1. Study of requirement and Linux installation.

2. Working with File related commands.

3. Working with Directory related commands.

4. Mounting of file system and command.

5. Editing a file with Vi.

6. Working with Linux Filter.

7. Implementation of Job scheduling.

8. Shell script to add two number.

9. Shell script to print the greatest of three numbers.

10. Shell script to print the factorial of a given number.

11. Program to add two numbers using parameter passing.

12. Program to implement AWK.

13. Program to implement IPC.

14. Telnet server configuration.

15. Working with PING and Trace route command.

COMPUTER GRAPHICS AND MULTIMEDIA

UNIT - 1

Fundamental of Computer Graphics: Definition, classification and application, Development of hardware and software for computer graphics, Display Devices, hardcopy devices, Interactive input devices, display processor, line drawing, various algorithms and their comparisons, Bresenham's mid-point circle drawing algorithm, midpoint ellipse drawing algorithm.

I/O Devices: Random and Raster scan display, frame buffer, persistence, resolution, character generation

UNIT - 2

Scan Conversion: Scan Conversion Line, Circle, Ellipse, Arcs, Sectors, Polygon, Region Filling, Area Filling, Scan Line Algorithm, Boundary Fill, Flood Fill Algorithms, Aliasing Effects and Ant Aliasing.

Transformations: 2D and 3D Transformation, Scaling, Rotation, Shearing, Reflection, Homogeneous Coordinate System, Composite Transformation, Rotation About Arbitrary Point(2D), Rotation about Arbitrary Axis(3D)

UNIT - 3

2D Viewing and Clipping: concept of window, viewport, window to viewport transformation, graphic pipeline, panning, zooming, Line clipping algorithms, Cohen Sutherland polygon clipping, Sutherland Hodgeman algorithm, Weiler Atherton

3D Clipping: Normalized view volumes, viewport clipping, clipping in homogeneous coordinate. Liang Barsky algorithm.

Projection: Parallel and perspective projection and different types of projections, 1, 2 vanishing points.

UNIT - 4

Hidden surface: depth buffer (Z buffer, A buffer) back face, Painters algorithm, area sub division, depth sorting method, BSP trees, Shading and Illumination Model-Light Sources, Diffuses, Peculiar Reflection, Reflected Light Intensity Level, Surface Shading, Phong Shading, Gourard Shading, Color Model. RGB, CYMK, YIQ, HSV.

Curves and Fractals: Generation, classification and dimension, basic fractal images, Koch curve, spearpinski triangle, mandelbort and Julia set, applications of fractals.

UNIT - 5

Multimedia: Introduction, Multimedia System, Components and Applications, Text And Font, Audio and Audio File Format, Video and Video File Format, Image and Image File Format, Animation, Multimedia Authoring Tools, Compression, Lossy Compression, Lossless Compression.

Text Book:
1. Rogers, "Procedural Elements of Computer Graphics", McGraw Hill
2. Donald D Hearn, M. Pauline Baker, Computer Graphics, Pearson Education, 2nd edition.

List of Practical

1. Implement the DDA algorithms: (i) Symmetrical & (ii) Simple for line drawing and write your comment on relative performance of two algorithms based on experimental data.

2. Implement the Bresenham's algorithms for line drawing and compare it with DDA to write your comments on its relative performance based on experimental data.

3. Implement using the DDA for circle generation. Show that the true DDA will generate spiral rather than a circle. Discuss the reasons for the same and do the necessary corrections to get a circle. The circle thus obtained will not be a true circle but an ellipse. Discuss the reasons for the same and write your suggestion to get a true circle generated with its effect on the performance of the DDA.

4. Implement the midpoint circle generating algorithm and compare it with DDA (circle) to write your comments on its relative performance based on experimental data.

5. Implement the algorithms for 2D transformations (translation, rotation, scaling) and illustrate the importance of concatenation of transformations.

6. Implement the algorithms for 2D windowing and viewing transformations.

7. Implement the midpoint subdivisions algorithm for clipping a polygon.

8. Implement the Sutherland Hodgeman algorithm for clipping a polygon.

9. Implement the Weiler and Atherton algorithm for clipping a polygon.

10. Implement an algorithm for clipping a curve.

11. Implementation of text compression.

12. Working with Sound forge.

13. Working with Adobe Photoshop studio.

14. Working with Adobe Flash.

15. Animation in Adobe Flash.

COMPILER DESIGN AND ANALYSIS

UNIT - 1
Introduction to Compiling: Compilers – Analysis of the source program – Phases of a compiler – Cousins of the Compiler – Grouping of Phases – Compiler construction tools - Lexical Analysis -Role of Lexical Analyzer – Input Buffering – Specification of Tokens, Symbol Table, LEX.

UNIT - 2
Syntax Analysis: Role of the parser –Context-Free Grammars – Top Down parsing - Recursive Descent Parsing - Predictive Parsing – Bottom-up parsing - Shift Reduce Parsing – Operator Precedent Parsing – LR Parsers - SLR Parser - Canonical LR Parser - LALR Parser, FIRST-and –FOLLOW, YACC.

UNIT - 3
Intermediate Code Generation: Intermediate languages – Declarations – Assignment Statements – Case Statements – Back patching – Procedure calls, Three Address Code Generation.

UNIT - 4
Code Optimization: Introduction– Principal Sources of Optimization – Optimization of basic Blocks – Introduction to Global Data Flow Analysis – Runtime Environments – Source Language issues – Storage Organization – Storage Allocation strategies – Access to non-local names – Parameter Passing.

UNIT - 5
Code Generation: Issues in the design of code generator – The target machine – Runtime Storage management – Basic Blocks and Flow Graphs – Next-use Information – A simple Code generator – DAG representation of Basic Blocks – Peephole Optimization.

Text Book:
1. A. V. Aho, R. Sethi, and J. D. Ullman. Compilers: Principles, Techniques and Tools, Pearson Education, 2007, 2nd edition

Reference Book:
1. A.A. Puntambekar, Compiler Design, Technical Publications, 2010

2. D. M. Dhamdhere, Compiler Construction--Principles and Practice, Second edition,

   Macmillan India, 1997

ARTIFICIAL INTELLIGENCE

UNIT-1

Introduction to AI: Definitions, Goals of AI, AI Approaches, AI Techniques, Branches of AI, Applications of AI.

Intelligent Agents: Definition of a rational agent, reflex model based, utility-based agents, The environment in which particular agent operates.

UNIT-2

Problem Solving, Search and Control Strategies: General problem solving, Search and control strategies, Exhaustive searches, Heuristic search techniques, Constraint satisfaction problems (CSPs), models

Knowledge Representation, Predicate Logic, Rules: Knowledge representation, KR using predicate logic, KR using rules, Resolution, Unification Algorithm, First order predicate Calculus, Skolemization, Horn's Calculus, Semantic network, frame system and value inheritance, scripts and conceptual dependency.

UNIT-3

Reasoning System - Symbolic, Statistical: Reasoning, Symbolic reasoning, Statistical reasoning, Uncertainty: Types, degree of belief, degree of truth, probability, conditional probability, Baye's theorem, Dampster-Shafer Theory.

UNIT-4

Heuristic Search Techniques: Hill climbing, branch and bound techniques, A* algorithm, AO* algorithms, AND/OR graphs, Problem reduction, Constraint satisfaction problem, Uniform Cost search.

Game Playing: Overview, Mini-Max search procedure, Game playing with Mini-Max, Alpha-Beta pruning.

UNIT-5

Learning: What is learning, Rote learning, Learning from example: Induction, Explanation Based Learning (EBL), Discovery, Clustering, Analogy, Neural net and genetic learning, Reinforcement learning.

Expert System: Introduction, Knowledge acquisition, Knowledge base, working memory, Inference engine, Expert system shells, Explanation, Application of expert systems.

Text Books:
1. Artificial intelligence, Elaine Rich, Kevin Knight, Mc Graw Hill, 3rd edition

Reference Books:
2. Artificial Intelligence: A Modern Approach, Stuart J. Russell and Peter Norvig, Prentice Hall, 3rd edition

SOFT-COMPUTING

UNIT-I

Introduction to Soft Computing: Introduction, Fuzzy Computing, Neural Computing, Genetic Algorithms, Associative Memory, Adaptive Resonance Theory, Applications.

Fundamentals of Neural Network: Introduction, Model of Artificial Neuron, Architectures, Learning Methods, Taxonomy of NN System, Single Layer NN System, Applications.

UNIT-II

Back Propagation Network: Background, Back Propagation Learning, Back Propagation Algorithm.

Associative Memory: Description, Auto Associative Memory, Bidirectional Hetero-Associative Memory.

UNIT-III

Adoptive Resonance Theory: Recap-Supervised, Unsupervised, Back Propagation Algorithm, Competitive Learning, Stability Plasticity Dilemma (SPD), ART Networks, Iterative Clustering, Unsupervised ART Clustering.

UNIT-IV

Fuzzy Set Theory: Introduction, Fuzzy Set: Membership, Operations, Properties, Fuzzy Relation. **Fuzzy Systems**: Introduction, Fuzzy Logic, Fuzzification, Fuzzy Inference, Fuzzy Rule Based System, Defuzzification.

UNIT-V

Fundamentals of Genetic Algorithms: Introduction, Encoding, Operators of Genetic Algorithms, Basic Genetic Algorithm.

Hybrid System: Integration of Neural Network, Fuzzy Logic and Genetic Algorithms, GA Based Back Propagation Networks, Fuzzy Back Propagation Networks, Fuzzy Associative Memories, Simplified Fuzzy ARTMAP.

Reference books

1. S, Rajasekaran & G.A. Vijayalakshmi Pai, Neural Networks, Fuzzy Logic & Genetic Algorithms, Synthesis & applications, PHI Publication.
2. S.N. Sivanandam & S.N. Deepa, Principles of Soft Computing, Wiley Publications
3. Rich E and Knight K, Artificial Intelligence, TMH, New Delhi.
4. Bose, Neural Network fundamental with Graph, Algo. & Appl, TMH

Digital Image Processing

Objective: The primary objective of this course is to introduce students to basic principles of digital images, image data structures, and image processing algorithms.

Unit 1
Digital Image Fundamental – Introduction, components of image processing systems, image sensing and acquisition, image sampling and quantization, pixel operation, Light, Brightness adaption and discrimination, Imaging Geometry, Perspective Projection, Spatial Domain Filtering.

Unit 2
Image Enhancement Techniques: Spatial Domain methods: Basic grey level transformation – Histogram equalization – Image subtraction – Image averaging –Spatial filtering: Smoothing, sharpening filters – Laplacian filters – Frequency domain filters: Smoothing – Sharpening filters – Homomorphic filtering, Color Image Enhancement.

Unit 3
Image Transformation – Discrete fourier transformation, Walsh Transformation, Hadamard Transformation, Cosing transformation, HAAR transformation, Wavelet transformation, Slant – Karhunen – Loeve transforms.

Unit 4
Image Compression-Encoder-Decoder model, Types of redundancies, Lossy and Lossless compression, Entropy of an information source, Shannon's 1st Theorem, Huffman Coding, Arithmetic Coding, Golomb Coding, LZW coding, Transform Coding.

Unit 5
Image Segmentation and Representation: Edge detection – Thresholding - Region Based segmentation – Boundary representation: chair codes- Polygonal approximation – Boundary segments – boundary descriptors: Simple descriptors-Fourier descriptors - Regional descriptors –Simple descriptors- Texture.

Text Books

1. Fundamental of Image processing, Anil K. Jain, Prentice Hall
2. Digital Image processing, 3rd edition, Rafael C. Gonzalez and Richard E. Woods

SUBJECT NAME: DISCRETE STRUCTURE

Unit-1
Set Theory: Element of set, Types of set, Operation on Sets, Union, Intersection and Complement of Sets, Cartesian product, Venn diagram, Different Laws on sets.
Relation and Function: Types and Composition of relation, transitive composition, Symmetric-Transitive Composition, Reflexive-Transitive composition, Partial Order Relation, Equivalence Relation, Domain and Range, Onto, Into and One-One Function, Composite and Inverse Function.

Unit-2
Combinatorics: Mathematical inductions, Strong induction and well ordering, The basics of counting, The pigeonhole principle, Permutations and combinations, inclusion and exclusion and applications.

Unit-3
Preposition: Preposition, First Order Logic, Basic Logic Operation, Logical Equivalence, Truth Table, Normal Forms, Predicates and Quantifiers, POSET, Hasse Diagram, Well Ordered Set, Complete Order.
Lattices and Boolean algebra: Properties of lattices, Complete Lattice, Distributive Lattice, Bounded Lattice, Lattice Homomorphism, Lattices Isomorphism, Least Upper Bound, Greatest Lower Bound.

Unit-4
Dimensional Geometry: Graph Theory, Concepts Graph, Sub graph, Isomorphic Graph, Homomorphic Graphs, Weighted Graphs, Shortest Paths in weighed graphs (Dijikstra's algo), Operations on Graphs, Directed Graph, Matrix Representation On Graphs, Cyclic Graphs, Tree, Rooted Tree, Labeled Graph, Weighted Graph, Decision trees or Sorting Tree, Spanning Tree, Binary Trees, Algorithms- Prim's, Kruskal.
Unit-5

Algebraic Structures: Properties, Binary operation, groupoid, semi group, monoid, Group, abelian group, Subgroup, cyclic group, homeomorphism and isomorphism of group, Definition and examples of rings and field.

Text Books:
1. Elementary Abstract Algebra 1996, B. R. Thakur   Ram Prasad And Sons
2. Discrete Mathematics Aug-2006, Dr. D. C. Agrawal Shree Sai Prakeshan

Reference Books:
1. Naive Set Theory   1960   Paul Richard Halmos

B. Tech. (CSE)

SEMESTER 7

S.NO.	PAPER CODE	NAME OF PAPER	HOURS PER WEEK			TOTAL CREDIT
			LECTURE	TUTORIAL	PRACTICAL	
		THEORY				
1	12CA707	JAVA PROGRAMMING	4	1	0	5
2	12CA704	**ELECTIVE IV** CLOUD COMPUTING DISTRIBUTED OPERATING SYSTEM WIRELESS AND MOBILE COMMUNICATION Applied Cloud Computing (CC)- TCS iON	4	0	0	4
3	12EN701	ENTREPRENEURSHIP DEVELOPMENT	**3**	**1**	**0**	**4**
4	12CA708	CURRENT TRENDS AND TECHNOLOGIES	**4**	**1**	**0**	**5**
		LABORATORY				
1	12CA753	JAVA PROGRAMMING – LAB	0	0	2	1
2	12CA754	CURRENT TRENDS AND TECHNOLOGIES-LAB	0	0	2	1
3	12CA751	MAJOR PROJECT-I LAB	0	0	4	2
		TOTAL CONTACT HOURS/CREDIT	**15**	**3**	**8**	**22**

WIRELESS AND MOBILE COMMUNICATION

UNIT-1
WIRELESS NETWORK OVERVIEW: Wireless Network, Wireless Network Architecture, Wireless Switching Technology, Wireless Communication Problem, Wireless Network Reference Model, Wireless Networking Issues & Standards, WLANs (Wireless LANs), IEEE 802.11 standard.

UNIT-2
MOBILE COMPUTING: Mobile Computing Architecture, Mobile Computing Applications, Mobile Devices, Mobile System Networks, Mobility Management, Cellular Overview: Cellular networks, Cellular concept, Location Management, Handoffs, Foliage loss.

UNIT-3
GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS (GSM): Mobile Services, System Architecture, Mobility management, Network signaling. GPRS: GPRS System, Architecture, UMTS: UMTS System Architecture.
Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, Wireless Mark-up Languages (WML), Wireless Local Loop (WLL): Introduction to WLL Architecture, Wireless Local Loop Technologies.

UNIT-4
MOBILE NETWORK LAYER: Mobile IP: Goals, Assumptions, Entities and Terminology, IP Packet Delivery, Agent Discovery, Registration, Tunneling and Encapsulation, Optimizations, Dynamic Host Configuration Protocol (DHCP).

UNIT-5
MOBILE TRANSPORT LAYER: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast Retransmit /Fast Recovery, Transmission/Time-out Freezing, Selective Retransmission, Transaction oriented TCP, TCP over 2.5G/3G Wireless Networks, Mobile ad-hoc networks (MANET), introduction to 4G.
Introduction to Mobile Operating Systems: Palm OS, Windows CE, Embedded Linux, J2ME, Android, Blackberry operating system, Symbian.

TEXT BOOKS:
1. Jochen Schiller, "Mobile Communications", Pearson Education, Second Edition, 2008.
2. P.K. Patra and S.K. Dash, "Mobile Computing", Scitech Publications, Second Edition 2011.
3. Rajib Mall, P. K. Pattanaik, "Fundamentals of Mobile Computing", PHI, First Edition, 2012.

REFERENCE BOOKS:
1. Raj Kamal, "Mobile Computing", Oxford University Press.
2. Mobile Computing: Ashok K. Talukdar, Roopa R. Yavagal, Tata McGraw Hill.

SUBJECT NAME: JAVA PROGRAMMING

Unit – 1
Overview of Java: History and Evolution of Java, Java Byte Code, JDK, JRE, and JVM (Java Virtual Machine) Difference between Java and C++, Java Program Structure, Implementing Java program, Java Tokens, Data types, Variables, Constants, Primitive and Non-primitive Data Type, Type conversion and Casting, Operators, Static Keyword, String.

Unit – 2
Control Statements: Selection statements, Iteration Statements, Jump statements.
Methods: Methods overview, Call by value, Call by reference, Recursion.
Arrays: One dimensional, two dimensional, multidimensional.
Object-Oriented Programming: Class, Objects, Constructors, Method Overloading, Method Overriding, Inheritance, Final, Super, this keyword, Abstract method and Classes, Visibility Control.

Unit – 3
Interfaces: Introduction, Defining Interfaces, Implementing Interfaces.
Packages: Java API Packages, Adding classes to package.
Exception Handling: Exception classes in Java, Type of errors, Compile time errors, run time errors, try and catch.

Unit – 4
Multithreading: Basic idea of multithreaded programming, the life cycle of a thread, Creating thread with the thread class and runnable interface, Thread synchronization, Thread scheduling.
IO package: Inputstreams, Outputstreams, Objectserialization, Deserialization.

Unit – 5
GUI-Introduction to AWT programming, Layout and component managers, Event handling, Applet class, Applet life-cycle, passing parameters embedding in HTML
AWT- Overview of AWT, AWT Components, Menu and Dialogs, Layout Manager.
Advance Java: Introduction to Spring and Hibernate, JDBC.

Reference Book:
6. E. Balagurusamy, Fundamental of Java programming.
7. Herbert Scheldt, The Complete Reference for Java, TMH publication

LIST OF PRACTICAL

1. To find the sum of any number of integers entered as command line arguments

2. To find the factorial of a given number

3. To learn use of single dimensional array by defining the array dynamically.

4. To learn use of length in case of a two-dimensional array

5. To convert a decimal to binary number

6. To check if a number is prime or not, by taking the number as input from the keyboard

7. To find the sum of any number of integers interactively, i.e., entering every number from the keyboard, whereas the total number of integers is given as a command line argument

8. Write a program that show working of different functions of String and StringBufferclasss like setCharAt(setLength(), append(), insert(), concat()and equals().

9. Write a program to create a —distance‖ class with methods where distance is computed in terms of feet and inches, how to create objects of a class and to see the use of this pointer

10. Modify the —distance‖ class by creating constructor for assigning values (feet and inches) to the distance object. Create another object and assign second object as reference variable to another object reference variable. Further create a third object which is a clone of the first object.

11. Write a program to show that during function overloading, if no matching argument is found, then java will apply automatic type conversions (from lower to higher data type)

12. Write a program to show the difference between public and private access specifiers. The program should also show that primitive data types are passed by value and objects are passed by reference and to learn use of final keyword.

13. Write a program to show the use of static functions and to pass variable length arguments in a function.

14. Write a program to demonstrate the concept of boxing and unboxing.

15. Create a multi-file program where in one file a string message is taken as input from the user and the function to display the message on the screen is given in another file (make use of Scanner package in this program).

16. Write a program to create a multilevel package and also creates a reusable class to generate Fibonacci series, where the function to generate Fibonacci series is given in a different file belonging to the same package.

17. Write a program that creates illustrates different levels of protection in

classes/subclasses belonging to same package or different packages

18. Write a program ―DivideByZero‖ that takes two numbers a and b as input, computes a/b, and invokes Arithmetic Exception to generate a message when the denominator is zero.

19. Write a program to show the use of nested try statements that emphasizes the sequence of checking for catch handler statements.

20. Write a program to create your own exception types to handle situation specific to your application (Hint: Define a subclass of Exception which itself is a subclass of Throwable).

21. Write a program to demonstrate priorities among multiple threads.

22. Write a program to demonstrate multithread communication by implementing synchronization among threads (Hint: you can implement a simple producer and consumer problem).

23. Write a program to create URL object, create a URL Connection using the openConnection() method and then use it examine the different components of the URL and content.

24. Write a program to implement a simple datagram client and server in which a message that is typed into the server window is sent to the client side where it is displayed.

25. Write a program that creates a Banner and then creates a thread to scrolls the message in the banner from left to right across the applet's window.

26. Write a program to get the URL/location of code (i.e. java code) and document (i.e. html file).

27. Write a program to demonstrate different mouse handling events like mouseClicked(), mouseEntered(), mouseExited(), mousePressed, mouseReleased() and mouseDragged().

28. Write a program to demonstrate different keyboard handling events.

29. Write a program to generate a window without an applet window using main() function.

30. Write a program to demonstrate the use of push buttons.

CLOUD COMPUTING

Objectives: The objective and goal of this course is to provide students fundamental demonstration Cloud Computing which is one of the immersing trends in the field of Computer Science and Engineering.

Unit-1
Introduction to Cloud Computing: Definition, Characteristics, Components, Cloud provider, SAAS, PAAS, IAAS and Others, Organizational scenarios of clouds, Administering & Monitoring cloud services, benefits and limitations, Deploy application over cloud, Comparison among SAAS, PAAS, IAAS, Cloud computing platforms: Infrastructure as service: Amazon EC2,Platform as Service: Google App Engine, Microsoft Azure, Utility Computing, Elastic Computing.

Unit-2
Introduction to Cloud Technologies: Study of Hypervisors, Compare SOAP and REST, Web-services, AJAX and mashups-Web services: SOAP and REST, SOAP versus REST, AJAX: asynchronous 'rich' interfaces, Mashups: user interface services Virtualization Technology: Virtual machine technology, virtualization applications in enterprises, Pitfalls of virtualization, Multitenant software: Multi-entity support, Multi-schema approach, Multi-tenancy using cloud data stores, Data access control for enterprise applications.

Unit-3
Data in the Cloud: Relational databases Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo. Map-Reduce and extensions: Parallel computing, The map-Reduce model, Parallel efficiency of Map-Reduce, Relational operations using Map-Reduce, Enterprise batch processing using Map-Reduce, Introduction to cloud development, Example/Application of Map-reduce, Features and comparisons among GFS, HDFS etc, Map-Reduce Model.

Unit-4
Administrating the Clouds: Cloud Management Products, Emerging Cloud Management Standards, Securing the Cloud, Securing Data, Establishing Identity and Presence.

Unit-5
Issues in Cloud Computing: Implementing real time application over cloud platform, Issues in Intercloud environments, Quality of Service (QOS) Issues in Cloud, Dependability, data migration, streaming in Cloud, QoS monitoring in a Cloud computing environment, Cloud Middleware. Mobile Cloud Computing. Inter Cloud issues. A grid of clouds, Sky computing, Load Balancing, Resource Optimization, Resource Dynamic Reconfiguration, Monitoring in Cloud.

Text Books:
1. Rajkumar Buyya, Christian Vecchiola, and S. Thamarai Selvi, "Mastering Cloud Computing", McGraw Hill Education Pvt Ltd.

Reference Books:
2. Gautam Shroff, "Enterprise Cloud Computing", Cambridge University Press.

DISTRIBUTED OPERATING SYSTEM (ELECTIVE -1)

Objective: This course is taught to students to aware about the computing in distributed system and how it operates.

Unit-1
Introduction: Distributed Computing System Models, Advantages of Distributed Systems, Distributed Operating Systems, Issues in Designing Distributed Operating Systems.
Message Passing: Introduction, Features of Message Passing, Issues in IPC by Message Passing, Synchronization, Failure Handling, Group Communication.

Unit-2
Remote Procedure Calls: The RPC Model, Transparency of RPC, Implementation of RPC Mechanism, STUB Generation, RPC Messages, Communication Protocol.
Distributed Shared Memory: Distributed Shared Memory Systems (DSM), DSM – Design and Implementation Issues, Granularity – Block Size, Structure of Shared Memory Space in a DSM System, Memory Coherence (Consistency) Models.

Unit-3
Synchronization: Clock Synchronization, Clock Synchronization Algorithms, Distributed Algorithms, Event Ordering, Mutual Exclusion, Deadlock, Election Algorithms.
Resource Management: Introduction and Features of a Good Global Scheduling Algorithm, Task Assignment Approach, Load – Balancing Approach, Load – Sharing Approach.

Unit-4
Process Management: Introduction, Process Migration, Threads.
Distributed File Systems: Key Challenges, File Services, File Access Semantics, Stateful Versus Stateless Servers, Replication, Caching.
Distributed Deadlock Detection- Introduction, Issues, Deadlock Handling Strategies.

Unit-5
Naming: Desirable Features of a Good Naming System, System Oriented Names, Object – Locating Mechanisms, Human – Oriented Names, Name Caches, Naming and Security.
Security in DS: Design Principles, Authentication, Access Control, Digital Signatures.
Case Study for Students - Java RMI, Sun Network File System, Ceph, Google Case Study.

Reference Books:
1. Distributed Operating System by William Stalling.
2. Distributed Operating Systems Concepts and Design, Pradeep K. Sinha, PHI.
3. Distributed Systems: Concepts and Design by George Coulouris, Jean Dollimore, Tim Kindberg, Pearson 3. Distributed Operating Systems by Andrew S Tanenbaum, Pearson.
4. Distributed Computing by Sunita Mahajan & Seema Shah OXFORD.
5. Distributed Systems: Principles and Paradigms by Andrew S Tanenbaum, Maarten Van Steen, PHI.

ENTREPRENEURSHIP DEVELOPMENT

UNIT 1

Introduction Entrepreneurship, and Theories of Entrepreneurship: Theory of Achievement Motivation, Theory of Entrepreneur as a risk taker, Theory of Creative destruction; Entrepreneurship Categories: by chance, need, choice, force; Myths, challenges and process of Entrepreneurship, Definition of Startups and types of Internet based startups.

UNIT 2

Difference between Scientist, Entrepreneur, and Manager; Characteristics of Entrepreneur; Entrepreneurial Mindset and its enablers, difference between idea and opportunity, Link between creativity and innovation, character of creative climate with cases of world most creative companies, types of innovation, link between technology and innovation.

UNIT 3

Opportunity Analysis: Opportunity sighting: Market Driven, People Driven; Opportunity Evaluation Process, Approaches to ideation, Ideation techniques, Idea to Opportunity Mapping. Business Model – Functions and Factors of Business Model

UNIT 4

Introduction to Pitching, types of pitch, Aspects of funds, types of capital, concept of break-even, sources of funds, types and nature of investors, understanding of the three financial statements: profit and loss account, balance sheet, cash flow statement, Introduction to Business Plan its types and different sections.

UNIT 5

Collaboration: Why Collaborate, types and approaches of collaboration; Networking: Why Network: places of networking, stages of networking, good networking practices; Distinction between data, information, intelligence and knowledge, Components of Knowledge; Intellectual Property: Its life cycle, its types and IP Rights

Text Book:

Entrepreneurship Theory and Practice by Raj Shankar, ISBN: 978-81-8209-269-3

Current Trends and Technologies

Unit-I

IoT: Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs. Challenges in IoT, Domain specific applications of IoT, Overview of Arduino platform, Raspberry Pi (RPi).

Case Study: Open source IoT platform, Amazon IoT cloud

Unit-II

Android: History and Evolution, Introduction to Smartphone Features, Installing the SDK, Creating Android Emulator, Installing Eclipse. Installing Android development tools. Android Life cycle. Android applications structure, Android controls, Option Menu. Database (SQLite database). Creation of .apk file.

Unit-III

AngularJS: Introduction to AngularJS, AngularJS MVC Architecture, First app in AngularJS, Data Binding Expressions: Numbers, Strings, Objects and Arrays, AngularJS Scopes, AngularJS Events, AngularJS Controls, AngularJS Form Validation. TypeScript, Architect development of Angular Framework, Single page Application, MySQL CRUD Operation, Integration.

Unit-IV

Python: Introduction, Data types and Operators, Python Statements and Conditionals, Functions, Strings, Object oriented programming with Python, Errors and Exception Handling, File handing, Regular expression, Modules and Package. MySQL Database Access in Python.

Unit-V

Search Engine Optimization: Search Engines and Basics, Popular Search Engines, Crawlers/Spiders/robots, Visibility on Search Engines.
Keyword research and analysis: Keyword, Keyword Density, Various types of Keywords, Keyword Proximity
Case study: Google Analytics

Books:
1. Search Engine Optimization Bible, Second Edition, by Jerri L. Ledford, Publisher: John Wiley & Sons
2. Search Engine Optimization (SEO) Secrets, Book by Danny Dover and Erik Dafforn
6. Pro AngularJS -By Adam Freeman
7. AngularJS Web Application Development Cookbook - By Matt Frisbie
8. AngularJS Programming by Example - By Agus Kurniawan
9. Angular JS: Up and Running - O'Riley Media

SEMESTER 8

S.NO.	PAPER CODE	NAME OF PAPER	HOURS PER WEEK			TOTAL CREDIT
		LABORATORY	**L**	**T**	**P**	
1	12CA851	MAJOR PROJECT-II LAB	0	0	24	12
2	12CA852	SEMINAR AND PRESENTATION	0	0	2	2
		TOTAL CONTACT HOURS/CREDIT	**0**	**0**	**26**	**14**