Title of papers and scheme of study & examination for BCA (Bachelor of Computer Applications) w.e.f 2014-2015.

<table>
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<tr>
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<th>Paper</th>
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**FIRST SEMESTER**

**BCA1110: COMPUTER FUNDAMENTAL (ESE-70+CIA-30:F.M:-100)**


**UNIT-II**: Basic organization of digital computer (CPU, CU, ALU, Register set, Communication Pathway, Input / Output Devices, Memory Unit). **CPU**: Basic explanation about CU, ALU & Register set as well as all over CPU. **Communication Pathway**: Definition of Bus, Internal & External Bus, Control, Address & Data Bus. **Input devices**: Keyboard, Pointing device, handheld device, Optical device, Audio visual device. **Output device**: Soft copy devices & hard copy devices. **Memory Hierarchy (Definition, function, classification, Advantages & Disadvantages)**: Primary Memory, Secondary Memory, Cache Memory, Virtual Memory.

**UNIT-III**: **Number System**: Definition, Positional & non-positional number system, Binary, Decimal, Octal & Hexadecimal number system, Conversion between them, Binary-Decimal-Octal-Hexadecimal arithmetic, Signed & Unsigned number, **Complement notation** (r’s & (r-1)’s complement), Addition & Subtraction operation using complement notation, Floating point representation of number, **Computer codes** (Weighted binary codes (BCD 8421/2421, Reflective, sequential), Non-weighted binary codes (Excess-3, Gray), Error detecting & correcting codes, Alphanumeric codes (ASCII, EBCDIC, Hollerith), BCD addition, Gray to Binary & Binary to Gray conversion.

**UNIT-IV**: **Data communication and Computer network**: Definition of data communication, Characteristics of data communication, Component of data communication, mode of data communication, Media of data communication (guided & unguided), Channel capacity. **Computer Network**: Definition, Network topology (Bus, Ring, Star, Mesh, Tree, Hybrid), Types of network (LAN, MAN, WAN, CCAN, PAN), Network devices (Hub, Repeater, Switch, Bridge, Router, Gateway), Basic idea about e-mail, Chatting, Internet conferencing, Intranet.

**UNIT-V**: **Operating System**: Definition of OS, Function of OS, Need of OS, Classification of OS (CUI & GUI, Single user, Multi User).

**Reference Books:**

1. Fundamentals of Computer: Raja Raman: PHI.
FIRST SEMESTER

BCA1111: PROGRAMMING CONCEPT USING “C” (ESE-70+CIA-30::F.M::100)

UNIT-I: Introduction to Programming: Procedure for problem solving, Design methods (Top down, Bottom up, Modular Approach), Algorithm (Definition, Characteristics, Developing & writing the algorithm) and Flowcharts (Definition, Flowchart symbols, Flowcharting rules, Advantages & limitations), Programming Languages: Generation of computer languages (1st, 2nd, 3rd, 4th, 5th GL) Machine Languages, Assembly Languages, Low & High level languages, Source & Object languages, Testing & Debugging: Definition, Different type of errors (Syntax, Linking, Runtime, Logical), Difference between testing & debugging.

UNIT-II: Fundamentals of C language: History of C, Characteristics of C, Structure of C Program (Comment, The runtime library, Functions, Delimiters, Program statements), Application area, Character set, Identifiers, Variables, Keywords, Data types, Constant (String, Numeric & Character), Symbolic constant, Operators, Operators Precedence, Expression, Type conversion, Basic I/O statements, Unformatted console I/O (Character input, Character output), Unformatted string input & output, Formatted Console I/O (printf(), scanf(), Escape sequence or Execution Characters).

UNIT-III: Control Statements: Basic need, Classification (Conditional branching & Looping), Decision making within a program (If statement & Switch statement), Loop control structure (entry control loop & exit control loop), The break statement, The continue statement, The goto statement (Conditional goto & Unconditional goto), exit() function.

UNIT-IV: Array & String: Array: Definition, Basic needs, Classification (One dimensional & Multi dimensional) of arrays, 1D array: Declaration, Accessing values, initializing values, 2D array: Declaration & accessing individual values, initializing values, Matrix representation (Addition, Multiplication & Transpose), Multi dimensional array: 3D array, simple concept about 3D array. String Manipulation: String variables, initializing a string of characters, Array of string, String Manipulation (strlen(), strcpy(), strcat(), strcmp(), strupr(), strlwr(), strrev(), strncmp(), strcmpi(), strncat()), Reading & writing strings.

UNIT-V: Function: Basic concept (Module specification & Modular programming approach), What is function?, Advantages of using functions, Classification (library function & User-defined function), Function definition, call & declaration, Return statements, Function arguments (Actual & Formal), Types of functions, Local, Global & Static variables. Recursion: Basic concept, Definition, Use of recursive function, Example (Tower of Hanoi). Storages classes: Storage specification of variables (auto, static, extern, register), Characteristics of storage class specifiers (Lifetime & visibility).

UNIT-VI: Structures & Union: Structure definition, Giving values to members, Structure initialization, Dot(.) operator, Comparison of structure variables, Array as structure, Array within structure, sizeof() of a structure, Union, Difference between Structure & Union, Enumerated data type, Bit fields, Typedef declaration.


Reference Books:

1. C in Depth: Srivastav Srivastav: BPB.
2. A first course in Programming with C: T Jeyapoovan:
4. The ultimate C: Dr. R. Nageswara Rao: CareerMonk.
FIRST SEMESTER

BCA1112: DIGITAL ELECTRONICS (ESE-70+CIA-30:F.M.:100)

UNIT-I: Introduction, Logic Gate & Boolean Algebra: Basic concept about analog & digital system, Logic level (Positive, Negative & Mixed), Logic gate (AND, OR, NOT), Derived logic gate (NAND, NOR, EX-OR, EX-NOR), Universal gate (NAND, NOR), NAND-NOR implementation, Implementation of logic function using gates. Logic families: Classification, Characteristics, RTL, DTL, TTL. Complementary MOS logic: CMOS inverter, CMOS NAND, CMOS NOR. Boolean Algebra: Definition, Axioms & laws, Boolean expression, SOP/Minterm, POS/Maxterm, Canonical or Standard form, Duality & Complement, Simplification of Boolean expression, Algebraic simplification & K-map method.

UNIT-II: Combinational Circuit: Adder (Half, Full, Parallel & Serial adder), Subtractor (Half & Full), 4-bit parallel Adder-Subtractor circuit, Magnitude Comparator (1-bit, 2-bit, 4-bit, N-bit), Decoder (2 to 4 binary decoder, 3 to 8 octal decoder, Decimal & hexadecimal decoder, Expanding decoder, BCD to Seven segment decoder), Application, Encoder (Octal to Binary, Decimal to BCD, & Priority encoder), Application, Multiplexer (4 to 1 MUX, 8 to 1 MUX), Boolean function implementation using MUX, Application of MUX, Demultiplexer (1 to 4 DeMUX, 1 to 8 DeMUX), Application of DeMUX, Parity generation & checking (Even parity & Odd parity).

UNIT-III: Sequential Circuit: Basic concept about sequential circuit, Types of sequential circuit, Comparison between Combinational & Sequential Circuit, Asynchronous & Synchronous sequential circuit, LATCH, Flip Flop: (S-R, D, J-K, Master-Slave J-K, T), Conversion between Each F/F, Triggering of F/F (Level & Edge), Register: Shift Register (Left / Right), SISO, SIPO, PIPO, PISO, Bidirectional shift Register, Universal Register. Counter: Ripple, Ring, MOD (Regular & Irregular), Asynchronous & Synchronous Counter.

UNIT-IV: Memory Circuits: RAM, ROM, S-RAM, D-RAM, PROM, EPROM, EEPROM, Digital components, Seven segment Display.

Reference Books:

**FIRST SEMESTER**

**BCA1113:- MATHEMATICS-I (ESE-70+CIA-30:F.M:-100)**

**UNIT-I:** Set theory. Relations and functions: Set notations and description, subsets, basic set operations. Venn diagrams, laws of set theory, partition of sets, basic definitions of relations and functions, properties of relations; injective, subjective and bijective functions, composition.

**UNIT-II:** Combinations: Rule of products, permutations, combinations. Algebra of Logic: Propositions and logic operations, truth tables and propositions generated by set, equivalence and implication laws of logic, mathematical system, and propositions over a universe, mathematical induction. Recursion and recurrence: The many faces of recursion, recurrence, relations, and some common recurrence relations, generating functions.

**UNIT-III:** Graph theory: Various types of graphics, simple and multi graphs, directed and undirected graphs, Aurelian and Hamiltonian graph, graph connectivity, traversals, trees, spanning trees, rooted trees, binary trees.

**Reference Books:**
1. Discrete Mathematics and Graph Theory, Satyanarayana & Prasad
2. Discrete Mathematics with Graph Theory, 3rd ed., Goodaire & Parmenter
3. Discrete Mathematics and Graph Theory, 2nd ed., Biswal
4. Discrete Mathematics, Rajendra Akerkar and Rupali Akerkar

**BCA1114(Gr.-A):- COMMUNICATION ENGLISH (ESE-35+CIA-15:F.M:-50)**

**Grammar (15)**
Article, preposition, Tense, Phrasal verbs, Narration change

**Writing (25)**
Business letter, personal latter, CV writing, essay, e-mail

**Practical (50)**
Group discussion, Speech, conversational Skill, FAQ in Interviews, Role playing, Extempore

**PPT presentation (10)**

**Reading**
Role of Communication skill, Body Language, Verbal & Non Verbal Communication, How to Improve Personality, Motivational Stories

**Writing**
Business letter, Personal letter, CV writing, Essay, E-mail

**Speaking**
Conversational English, Group discussion, Speech, Presentation, Extempore, Role Playing

**Listening**
British Accent, American Accent, Motivational Speech, Video Clips with subtitle
FIRST SEMESTER

BCA1190: C-PROGRAMMING LAB (ESE-70+CIA-30:F.M.:100)

4. Search and sorting problem.
5. String manipulation.
7. List of Lab Assignments – Session wise.

Reference Books:

1. C in Depth: Srivastav Srivastav: BPB.
2. A first course in Programming with C: T Jeyapoovan:
4. The ultimate C: Dr. R. Nageswara Rao: CareerMonk.

1191: DIGITAL ELECTRONICS (ESE-70+CIA-30:F.M.:100)

List of experiments - (At least 10 experiments to be conducted)

1. Study of Logic Gates- AND, OR, NOT, NAND, NOR, XOR. (Using respective ICs)
2. Realization of AND, OR and NOT gates using Universal Gates.
4. Design and Realization of Full Adder using NAND (7400) and NOR (7402) Gates.
5. Design and Realization of 4 bit Adder/Subtractor using IC 7483.
7. Implementation of Encoder circuit ( Octal to Binary) using NAND gate & Basic gate.
8. Implementation of Multiplexer circuit (4 : 1 & 8 : 1) using NAND gate & Basic gate.
12. Realization of T and D flip flop using IC 7400 & 7410.

Reference Books:

SECOND SEMESTER

1210:-DATA STRUCTURE USING “C” (ESE-70+CIA-30:-F.M.-100)

UNIT-I: Basic concepts of data representation: abstract and system defined data types, Primitive & Non-Primitive data structures, Definition, Classification of Data Structure (Linear & Non Linear).


UNIT-III: Non-Linear Data structure: Tree: Definition, Basic terminology of Tree, Binary Tree: Definition, Implementation of Binary Tree, Memory representation of Binary tree, Operation on a Binary tree (Traversal, Insertion, Deletion, Marge), Creation of binary tree from Preorder & Inorder, Creation of Binary tree from Postorder & Inorder traversal, Types of Binary tree (Expression tree, Binary search tree, Heap tree, Height balanced tree, Splay tree, Red-Black tree) & their operation, Basic concept of B-tree & B+ tree.

UNIT-IV: Graph: Definitions, Basic terminology, Matrix representation of graph, Shortest Path Algorithms, Dijkstra’s Algorithm, Minimum Spanning Trees (Kruskal’s Algorithm & Prims’s Algorithm), Graph traversal (Breadth First Search, Depth First Search).


Reference Books:

1. Data Structure & Algorithm : Arup kr Bhauamik, Santanu Halder, S,S.Roy : S.Chand
2. Data Structure using C : B. Bahuja Dhanpatrai.
3. Classic Data Structures : D. Samanta : PHI
SECOND SEMESTER

1211:-COMPUTER ARCHITECTURE & ORGANIZATION (ESE-70+CIA-30::F.M::100)

UNIT-I: Introduction to Computer architecture & Organization: Concept, Definition, & Difference of Computer Architecture & Organization, Components of Digital Computer, The Von-Neumann architecture, Functions, Difference from other architecture, Bus organizations, Bus types, Data, Address & Control lines, Data/Address multiplexing, Synchronous & Asynchronous Bus transfer, Bus system using MUX & Tri state buffer.

UNIT-II:- Computer arithmetic, micro operation & ALU design: Binary data representation(Integer, fixed & floating point representation), Binary arithmetic with signed numbers, Guard bits & Truncation, Multiplication of unsigned & singed integers, Division of unsigned integers, Micro operation, Register transfer micro operation, Arithmetic micro operation, Design of some arithmetic units, Logic units, Shifter units, ALU design.

UNIT-III: Memory Organization: Transistor basic concept, Metal Oxide Semiconductor, Classification of Computer Memory, Main memory, RAM & ROM, Access method (Read & Write operation), Auxiliary Memory, Cache Memory(type, function, read & Write operation), Virtual Memory, Memory mapping technique.

UNIT-IV: Computer instruction set: CPU organization, Different instruction format, Instruction length, Instruction set categories, Instruction cycle, Data ordering & Addressing standards, CISC Vs RISC

UNIT-V: Control unit design: Primary concepts of CU, Micro operation, Hardwired & Microprogrammed CU, Types of micro instruction, Micro instruction format.

UNIT-VI: Interrupt & I/O organization: I/O organization & interface units, Isolated I/O and memory mapped I/O, Different mode of data transfer between memory and peripherals, Interrupts, Classification of interrupts, Sub-routines, DMA.

UNIT-VII: Pipeline and Vector processing: Classification of computer having multiple processors, Parallel processing, Pipelining, Arithmetic & Instruction Pipeline, Pipelines hazards, Flynn's classifications, Primary concept of vectored & array Processor.

Reference Books:
2. Computer Architecture & Organization, Rajiv Chopra, S.Chand
SECOND SEMESTER

1212:- DESIGN ANALYSIS OF ALGORITHM (ESE-70+CIA-30:-F.M:-100)

UNIT-I: Basic of an algorithm and Asymptotic Bound: Definition and example of an algorithm, Characteristics of an algorithm, Steps in designing of an algorithm, Growth of functions, Recurrence, Problem formulation(Tower of Hanoi), Substitution method, Iteration method. Time and space complexity, Asymptotic Notation, Big-O, Omega(Ω), Theta etc., Concept of efficiency of analysis of an algorithm, Comparative efficiencies of an algorithm (Linear, Quadratic, Polynomial and Exponential)


UNIT-IX: Different types of algorithms and solution of simultaneous equations, DFT & FFT algorithm, Integer multiplication schemes Notion of NP-completeness. P class, NP-hard class, NP-complete class, Circuit satisfiability problem, Clique Decision Problem, Approximation algorithms.

Reference Books:

1. The Design and Analysis of algorithms: A.Aho, J.Hopcroft and J.Ullman
3. Introduction to Design and Analysis Of Algorithms: Goodman: TMH
4. Algorithm Analysis & Design: V.K.Pallow: Vikas
SECOND SEMESTER

1213: MATHEMATICS-II (ESE-70+CIA-30:-F.M:-100)

UNIT-I: Classical Algebra-Fundamental theorem of classical Algebra, Desearls rule of sign and their application. Relation between roots and co-efficient up to 4th degree polynomial Eqn.
Linear Algebra-Vector space (Def.), Linear independence and dependence of vectors basis & dimension. Eigen vector and Eigen value, characteristic polynomial and characteristic equation, cayley- Hamilton theorem on . Solution of system of equation of three variables by matrix method, crammers rule. Higher Algebra-different type of mapping and their simple example.

UNIT-II: Differential Calculus-Successive differentiation. Leibnitz’s theorem, mean value theorem. Rolle’s theorem (Statement only),Cauchy mean value theorem(statement only), Lagrange mean value theorem(statement only), Taylors and Maclaurin’s theorem with Lagrange form of remainder (statement only),Taylor’s Series example, Partial derivatives(concept) and simple example, Homogenous function ,Euler’s theorem on homogeneous function (for two variables) and its verification with example .Integral Calculus: Definite Integral (Limit of a sum) and their elementary properties,


Reference Books:

SECOND SEMESTER

1214:- FINANCIAL ACCOUNTING (ESE-70+CIA-30::F.M.-100)


UNIT-IV: Preparation of Final accounts for non-trading concerns and Accounting from incomplete records.

UNIT-V: Preparation of Cost Sheet showing Prime Costs, Works Costs, Cost of production, Cost of goods sold and Selling Price.

Reference Books:


1290:- DATA STRUCTURE LAB (ESE-70+CIA-30::F.M.-100)

1. Implementation of Arrays, Sparse Matrix, Linked lists, Stacks, Queues, and trees with static and dynamic structure. (Using arrays and pointers).
2. Sorting technique: - Internal and external – Insertion, Heap, Merge, Quick and Bubble sorts of arrays and linked lists.
3. Searching technique: Interpolation Search, Linear Search (Sequential search with array and linked list) and Binary Search.
4. Tree:- Creation, Deletion & Display, Traversal of binary trees(Pre-order, In-order & Post-order) and Finding the depth of a tree
5. Implementation of Hash table of fixed sizes.

Reference Books:

1. Data Structure using C: B. Baluja: Dhanpatrai Publication
2. Classic Data Structures, 2nd ed.: D. Samanta: PHI Publication

1291:- FINANCIAL ACCOUNTING LAB (ESE-70+CIA-30::F.M.-100)

Accounting using:

1. Tally-9
2. FACT

Reference Books:-

1. Tally 9.0-Dinesh Maidasani
THIRD SEMESTER

2110: OBJECT ORIENTED PROGRAMMING USING C++ (ESE-70+CIA-30:F.M.:100)

UNIT-I: Introduction: Procedural Languages, definition of OOP, Basic concept of OOP, Object, Class, Data Abstraction, Data Encapsulation, Data Hiding member functions, Reusability, Inheritance, Creating new Data Types, Polymorphism, Overloading, Dynamic binding, and Message passing.


UNIT-III: Functions: Simple Functions: Function declaration, calling the function, function definition; Passing argument to, returning value from function; passing constants, Variables, pass by value, passing structure variables, pass by reference, Default arguments, return statements, return by reference, overloaded functions; Different number of arguments, Different Kinds of arguments, inline function.

UNIT-IV: Objects & Classes: Classes & Objects, Class Declaration, Class members; Data Constructors, Destructors, Member functions, Class member visibility; private, public, protected. The scope of the class object constructors; Default Constructor, Constructor with argument, constructor with default arguments, Dynamic constructor, copy constructor, Overloaded constructor, Objects as function arguments; member functions defined outside the class, Objects as arguments, returning objects from functions, class conversion, manipulating private Data members, Destructors, classes, objects & memory, array as class member data, Array of objects, string as class member.

UNIT-V: Operator Overloading: Overloading unary operator: Operator Keyword, Operator Arguments, Operator return value, Nameless temporary objects, limitations of increment operator, overloading binary operator, arithmetic operators, comparison operator, arithmetic assignment operator, Data conversion; conversion between Basic types, Conversion between objects & Basic types, conversion between objects of different classes.

UNIT-VI: Inheritance: Derived Class & Base Class: Specifying the Derived class accessing Base class members, the protected access specifier, Derived class constructor, Overriding member functions, public and private inheritance; Access Combinations, Classes & Structures, Access Specifiers, Level of inheritance; Multilevel inheritance, Hybrid inheritance, Multiple inheritance; member functions in multiple inheritance, constructors in multiple inheritance, Containership; Classes within classes, Inheritance & Program Development.
UNIT-VII: Virtual Functions: Normal member function accessed with pointers, Virtual member functions accessed with pointers, Dynamic binding, pure virtual functions, Friend function; Friends for functional notation, friend classes, the this pointer; Accessing Member Data with this, using this for returning values.

UNIT-VIII: Templates & Exception Handling: Introduction, Templates, Class Templates, function templates, Member function templates, Template arguments, Exception Handling.

UNIT-IX: Streams : The Stream class Hierarchy, Stream classes Header file, string I/O : Writing strings, reading strings, character I/O, Detecting End – of – file. Object I/O; writing an object to disk, reading an object from disk, I/O with multiple objects; the f stream class, The open function, File Pointers; Specifying the position, Specifying the offset. The tell Function, Disk I/O with Memory Functions, Closing Files, Error Handling, Command Line Arguments.

Reference Books:
1. C++ Primer, Lippman: 3/e Pearson Education
5. Object Oriented Programming Using C++, Bhave: Pearson Education
6. Programming in C++: D. Ravichandran: Publication
THIRD SEMESTER

2111: SYSTEMS PROGRAMMING (ESE-70+CIA-30:-F.M:-100)

UNIT I: Introduction to system programming, Components of system software, Semantic Gap, General machine structure, machine languages, Assembly languages.


UNIT-VI: SOFTWARE TOOLS: Introduction to software/system tools. TEXT EDITOR: Design of text editors, DEBUGGERS: Types of errors, Debugging procedures, Classification of Debuggers, INTERPRETERS, PROGRAM GENERATORS.

Reference Books:

3. System Software: Santanu Chattopadhyay, PHI.
THIRD SEMESTER

2112:- MICROPROCESSOR (ESE-70+CIA-30:-F.M.-100)

UNIT-I: Introduction to Microprocessors: Features, Programmers model, external & internal organization.

UNIT-II : 8085 Architecture: 8085 Architecture & organization, Instruction cycles, machine cycles and T-states, address decoding Techniques, minimum system design, Memory interfacing with timing considerations, clock, reset & buffering circuits, 8085 Instruction set: Instruction format, addressing modes, classification of instruction set.,8085 Programming: Assembly language programming:- basic structure, data transfer, arithmetical, logical, transfer of control & Miscellaneous instruction types.

UNIT-III: Stack & subroutines: Stack operations, limitations, subroutine concepts, parameter passing techniques, subroutine design, delay subroutine design & applications, Re-entrant & recursive subroutines, concept of counters and timers.

UNIT-IV: Data transfer techniques: I/O interface concepts, speed considerations, program controlled I/O, asynchronous & synchronous I/O techniques interrupt driven program controlled I/O, direct memory access data control techniques, handshake signals, concepts of serial communication, matrix keyboard & multiplexed display interface.

UNIT-V: Interrupts: Requirements, single level interrupt; multilevel interrupt & vector interrupt system, 8085 interrupt structure and its operation, 8259A interrupt controller.

UNIT-VI: I/O controllers: Features, organization & operating modes of 8155 multifunction device, 8255 programmable peripheral interface, 8254 programmable timer, 8237 programmable DMA controller..

UNIT-VII: 16 bit processors: 8086 and architecture, segmented memory, read/write cycle in min/max mode. Reset operation, Wait state, Halt state, Hold state, Lock operation, Interrupt processing, Addressing modes and their features. Software instruction set (including specific instructions like string instructions, repeat, segment override, lock preferences and their use) and Assembly Language programming using 8086.

Reference Books:

1. Microprocessor system Liu & Gibson
2. 8085 Microprocessor: Programming and Interfacing- N K. Srinath
3. Microprocessor 8085 and its interfacing- Sunil Mathur
5. Advanced Microprocessors by Ray and Bhurchandi – TMH
THIRD SEMESTER

2113: SYSTEM ANALYSIS AND DESIGN (ESE-70+CIA-30:-F.M.-100)


Reference Books:
1. Award Elias M. – Systems Analysis & Design.
2. Sen James A. – Analysis & Design of Information Systems
3. Lee-Introductory Systems Analysis and Design
4. Wetherbe James C. Systems Analysis & Design
THIRD SEMESTER

2114: NUMERICAL METHODS & ANALYSIS (ESE-70+CIA-30:F.M.:100)

UNIT-I: Floating-point representation and Errors in Normalized floating-point forms, Errors in representing numbers, Floating point machine number and machine epsilon, Loss of significance and its avoidance.

UNIT-II: Roots of equations-locating roots of f(x)=0 Bisection method and convergence analysis, Newton Raphson method and convergence analysis, Iteration method, Regula Falsi method.

UNIT-III: Interpolation and numerical differentiation, Polynomial interpolation and its existence, Lagrange and Newton form of Interpolating Polynomial, Divided difference and recursive property, Inverse interpolation, Error in Polynomial interpolation, First and Second derivative formulae via Interpolation Polynomials.

UNIT-IV: Numerical Integration methods-Trapezoidal, Simpson’s and Error analysis.

UNIT-V: System of linear equations-Gaussian elimination and back substitution-partial and complete pivoting, Jacobi and Gauss-Seidel iterative methods and convergence theorems, Power (and inverse power) method of obtaining largest (smallest) Eigen value and corresponding Eigen vector.


Reference Books

3. C language and Numerical Methods (By C.Xacier)
4. Numerical Analysis (By S. Ali Mollah)
5. Introductory Numerical Analysis(By Dutta & Jana)
6. Numerical Methods (Problems and Solution) (By Jain , Iyengar & Jain), New Age International

2190: (ESE-70+CIA-30:F.M.:100)

GROUP-A: C++ LAB

Assignments:
1. Basics of C++, data type, I/O, Control Structures etc.,
2. Class and Objects, function calling,
3. Constructor and Destructor,
4. Inheritance,
5. Operator Overloading,
6. Polymorphism,
7. Template class and function,
8. I/O and streaming,
9. Exception Handling,
GROUP-B: NUMERICAL ANALYSIS LAB USING “C”

1. Solving various numerical problems using C.
5. Assignments on Algebraic Equation: Bisection, Secant, Regula-falsi, Newton Raphson

Reference - Book:
1. Numerical Methods (Problems and Solution) (By Jain, Iyengar & Jain), New Age International
2. C language and Numerical Methods (By C. Xavier)
3. Projects using C++, PVN Varalakshmi, Scitech

2191: MICROPROCESSOR LAB 8085 & 8086 (ESE-70+CIA-30:-F.M:-100)

1. Familiarization with 8085 register level architecture and 8085 trainer kit and TASM simulator, including the memory map, Familiarization with the process of storing and viewing the contents of memory as well as registers.
2. Study of prewritten programs on trainer kit using the basic instruction set (data transfer, Load/Store, Arithmetic, Logical) Assignments based on above.
3. Familiarization with 8085 simulator on PC. Study of prewritten programs using basic instruction set (Data transfer, Load/Store, Arithmetic, Logical) on the simulator. Assignments based on above.
4. Programming using kit/simulator for i) table look up ii) Copying a block of memory iii) Shifting a block of memory. iv) Packing and unpacking of BCD numbers, v) Addition of BCD numbers, vi) Binary to ASCII conversion, vii) String Matching, viii) Multiplication using Booth’s Algorithm,
5. Program using subroutine calls and IN/OUT instructions using 8255 PPI on the trainer kit e.g. subroutine for delay, reading switch state & glowing LEDs accordingly, finding out the frequency of a pulse train etc.

Reference Books:
1. Microprocessor system Liu & Gibson
2. 8085 microprocessor : programming and interfacing - N K. Srinath
3. Microprocessor 8085 and its interfacing - Sunil Mathur
5. Advanced Microprocessors by Ray and Bhurchandi – TMH
FOURTH SEMESTER

2210:- OPERATING SYSTEM (ESE-70+CIA-30:-F.M:-100)

UNIT-I: Introduction: Introduction to OS, Goal of OS, Functions of OS, Evaluation of O.S., Different types of O.S. (Batch, Multi-programmed, Time-sharing, Real-time, Distributed, Parallel), Computer system operation, I/O structure, storage structure, Storage hierarchy, Different types of protections, Operating system structure (Simple, Layered, Virtual machine), O/S services and System calls.


UNIT-V: Deadlocks: System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock.

UNIT-VI: Storage Management: Memory management background, Logical vs. Physical addresses space, Swapping, Contiguous memory allocation, Paging, Segmentation, Segmentation with paging.

Virtual Memory: Background, Demand paging, Page replacement algorithms (FCFS, LRU, Optimal page replacement), Allocation of frames, Thrashing.

UNIT-VII: I/O Management: I/O hardware, Polling, Interrupts, DMA, Application I/O interface (block and character devices, network devices, clocks and timers, blocking and non-blocking I/O), Kernel I/O, Subsystem (Scheduling, Buffering, Caching, Spooling and Device reservation, Error handling).

UNIT-VIII: Disk Management: Disk structure, disk scheduling (FCFS, SSTF, SCAN, C-SCAN), disk reliability, disk formatting, boot block, bad blocks.

References Books:

1. Operating System Design & Implementation: Tanenbaum A.S: Practice Hall NJ.
5. An Introduction to Operating Systems: H. N Dietel., Wesley Addison:
FOURTH SEMESTER

2211:- DATA BASE MANAGEMENT SYSTEM (ESE-70+ CIA-30:- F.M:-100)

UNIT-I: Introduction: What is data & database, Management of data, File processing system, Disadvantage of file processing system, Database system versus File system, Disadvantage of database, Application of database, What is DBMS, Functions of DBMS, Data abstraction, The three schema approach, Data independence, Benefits of three schema architecture, Database Users, Database administrator, Responsibilities of DBA, DBMS languages & interfaces, Logical & Physical database structure, Data model (Object based, Record based, Hierarchical based, Network based), Instances, Schema & Sub-schema.

UNIT-II: Entity-Relationship-Model: Entity, Entity Sets, Entity types, Identifiers, Attributes, Keys in E-R model, Type of keys, Relationships, Relationship Sets & Relationship type, Mapping Cardinality, Degree of Relationship, Participation, Strong & Weak Entity set. ER Diagram: Components of E-R diagram, Methodology, Advantage & Disadvantages of ER model, Database design process with ER model, Extended ER model (Specialization, Generalization, and Aggregation).

UNIT-III: Relational Data Model: Kinds of relations, Difference between DBMS & RDBMS, Advantages, Relational Algebra, Operations in relational Algebra (UNION, INTERSECTION, DIFFERENCE, CARTISIAN PRODUCT, SELECTION, PROJECTION, JOIN (Theta Join, Eque Join, Natural Join, Outer Join) & DIVISION.


UNIT-V: Structure Query Language: Create Simple Queries Using (Create, Drop, Alter, Select, Where, Like, Group By, Having, Order By), View table Structure, Temporary Tables.

Reference Books:

1. Database System-Elmasri and Navathe
4. Database management system: Er. Rajiv Chopra: S.Chand
FOURTH SEMESTER

2212: SOFTWARE ENGINEERING (ESE-70+CIA-30:F.M:-100)


4. **Software Prototyping**: Prototyping in software process, Prototyping techniques, User interface prototyping.

5. **Software Design**: Design types, Design principles – Problem partitioning, Abstraction, Modularity, Top-Down and Bottom-up, Design process, Design Strategies, Design quality, Coupling and Cohesion, Design notation and specification, Design methodologies, Domain Specific architecture.

6. **Object oriented design and function oriented design**: Object oriented concepts-Classes and objects, inheritance, polymorphism, Object identification, Object oriented analysis and design example, Design models, object interface specification, Data flow design, Structural decomposition, Detailed design.

7. **User Interface Design**: Design Issues, User interaction, Information presentation, User interface design process, user analysis, user interface prototyping, Interface evaluation.

8. **Reliability and reusability**: Software reliability metrics, software reliability specifications, statistical testing, reliability growth modeling, fault avoidance, fault tolerance, exception handling and defensive programming, software development with reuse, reuse landscape, design patterns, Generator based reuse, Application system reuse – COTS product reuse, software product lines.

9. **Testing**: Testing fundamentals – error, fault and failure, Test cases and test criteria, process, test plan and strategies, Types of testing – Black box, White box, structural and interface testing, Program inspection, Levels of testing, mathematically based verification, Static analysis tool, Metrics.

10. **Software Management**: Project management, quality management, cost estimation, cost estimation models, Risk management, software maintenance.

**Reference Books:**

1. **Software Engineering**, Rajib Mal.
2. **Software Engineering**, A Practitioner’s approach, Roger S. Pressman, TMH
3. **Software Engineering**, Sujan Methew, S. Chand
FOURTH SEMESTER

2213: FUZZY & OPTIMIZATION TECHNIQUE (ESE-70+CIA-30:-F.M:-100)


UNIT-II: Fuzzy logic system components, Fuzzy logic applications, Fuzzy logic control & Fuzzy Classification, Fuzzyfication, Membership value assignment, Development of rule base & decision making system, Defuzzification to crisp sets, Defuzzification methods.


UNIT-IV: Linear Programming Problem, LPP formulation and Graphical Solution, Simplex method, Dual Simplex method, Duality, Solution of Dual (Primal) from the Simplex problem of primal(Dual);

UNIT-V: Transportation problem, Assignment problem, revised simplex, Integer Programming, Game Theory.

Reference Books:
1. Fuzzy Set Theory, Fuzzy logic & their applications: Dr. A. K Bhargave: S.Chand
2. Introduction to Fuzzy logic: Rajjan Shinghal
3. Introduction to Fuzzy sets & Fuzzy logic-1e: M. Ganesh
4. LPP: Ghosh & Chakraborty.
FOURTH SEMESTER

2214:- ERP & EVS (ESE-70+CIA-30:-F.M.-100)

ERP:

ERP Related Technologies
Business Process Reengineering (BPR), Data Ware–housing, Data mining, Online Analytical Processing (OLAP), Supply Chain Management(SCM), Customer Relationship Management(CRM) , Management Information System(MIS), Decision Support System (DSS), Executive Information System (EIS).

ERP Manufacturing Prospect

Benefits of ERP

ERP Implementation Life cycle
Pre-evaluation Screening Package Evaluation, Project Planning Phase, Gap Analysis, Reengineering, Configuration, Implementation Team Training, Testing, Going Life, End-user Training, Post Implementation (maintenance mode)

EVS:

UNIT 1: ENVIRONMENT, ECOSYSTEM AND BIODIVERSITY
Definition, Scope and importance of risk and hazard; chemical hazard, physical hazard, biological hazard in the environment-concept of an ecosystem-structure and function of an ecosystem, producers, consumers and decomposers-Oxygen cycle and Nitrogen cycle, energy flow in the ecosystem- ecological suggestion processes-introduction, types, characteristics, features, structures and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystem (ponds, lakes, rivers, etc.)-introduction to bio diversity, definition, genetics, species and ecosystem diversity.

UNIT 2: ENVIRONMENTAL POLLUTION
Definition-causes, effects and control measures of the (a) Air pollution atmospheric chemistry-chemical composition of the atmosphere: chemical and photo chemical reaction in the atmosphere-formation of smog, PAN, acid rain, oxygen and ozone chemistry, (b) water pollution: physical and chemical properties of terrestrial and marine water and their environmental significance, (c) soil pollution soil waste management cost-causes, effects and control measures of municipal solid wastes (d) marine pollution (e) noise pollution (f) thermal pollution (g) nuclear hazards-role of an individuals in prevention of pollution.

UNIT 3: NATURAL RESOURCES
Forest resources :use and over exploitation, deforestation ,water resources—use and over utilization of surface and ground water dams waters- benefits and problems, mineral resources -use and exploitation ,environmental effect of extracting and using mineral resources, energy resources-growing energy needs, renewable and non-renewable energy resources, use of alternative energy resources.

UNIT 4: SOCIAL ISSUES AND THE ENVIRONMENT
From unsustainable to sustainable development —urban problems related to energy- water conservation, rain water harvesting, water shade management—resettlement and rehabilitations of people its problem and concerns.
FOURTH SEMESTER

UNIT 5: HUMAN POPULATION AND THE ENVIRONMENT

Reference Books


2290:- OPERATING SYSTEM LAB (ESE-70+CIA-30:-F.M:-100)

GROUP A:

Shell programming: creating a script, making a script executable, shell syntax. Process: starting a new process, replacing a process image, duplicating a process image, waiting for a process.

GROUP B:

Signal: signal handling, sending signals, signal interface, signal sets. Semaphore: programming with semaphores (use functions semctl, semget, semop, set_semvalue, del_semvalue, semaphore_p, semaphore_v). POSIX Threads : programming with pthread functions(viz. pthread_create, pthread_join, pthread_exit, pthread_attr_init, pthread_cancel) Inter-process communication: pipes (use functions pipe, popen, pclose), named pipes (FIFOs, accessing FIFO).

2291:- DBMS LAB (ESE-70+CIA-30:-F.M:-100)

UNIT-I: Creating Database: Creating a Database, Creating a Table, Specifying Relational Data Types, Specifying Constraints, Creating Indexes.

UNIT-II: Table and Record Handling: INSERT statement, Using SELECT and INSERT together, DELETE, UPDATE, TRUNCATE statements, DROP, ALTER statements.

UNIT-III: Retrieving Data from a Database: The SELECT statement, Using the WHERE clause, Using Logical Operators in the WHERE clause Using IN, BETWEEN, LIKE , ORDER BY, GROUP BY and HAVING Clause Using Aggregate Functions, Combining Tables Using JOINS, Sub-queries.


Reference Books:

1. Database Management & Oracle Programming : Dr. S.S. Khandare : S.Chand
2. SQL, PL/SQL The programming language of Oracle: Ivan Bayross : BPB
3. Database management system (A Practical Approach) : Er. Rajiv Chopra : S.Chand
FIFTH SEMESTER

3110: DATA COMMUNICATION & COMPUTER NETWORK (ESE-70+CIA-30:-F.M:-100)

UNIT I: BASIC OF DATA COMMUNICATION: Concept of communication system, Analog and Digital Communication, Data communication modes, Synchronous and asynchronous transmission, Simplex, half-duplex, full duplex communication, Networking Protocols and Standards, Layering, OSI reference model.

UNIT II: MODULATION & ENCODING: Analog Modulation (AM, FM, PM), AM Demodulation (one technique only), Advantages and Disadvantages of each, Analog to Digital (Digitization), Sampling, Quantization, Digital to Analog, Digital Modulation (ASK, FSK, PSK, QPSK).

UNIT III: MULTIPLEXING & SWITCHING CONCEPT: FDM, TDM, SDM, Multiplexing Applications, Circuit and Packet Switching.

UNIT IV: COMMUNICATION MEDIUMS: Digital data transmission, Serial and Parallel Transmission, Guided and Unguided mediums, Wireless Communication, Coaxial Cables, Twisted Pair Cables, Fiber Optic Cables.

UNIT V: NETWORK CLASSIFICATION & TOPOLOGIES: Network Concept, LAN overview, LAN Topologies, LAN access methods, Network Types based on size like PAN, LAN, MAN, WAN, Functional Classification of Networks, Peer to Peer, Client Server, Wide Area Network, WAN Topologies, WAN Access Methods.

UNIT VI: OSI and TCP/IP MODELS: Introduction of OSI Model, Need of such Models, Basic functions of each OSI layer, Introduction to TCP/IP, Comparisons with TCP/IP layers. (At the beginner’s level)

UNIT VII: PHYSICAL & DATA LINK LAYER: Medium Access Control, Error detection and correction, CRC, Framing, Retransmission strategies, Multi-access communication, CSMA/CD, Ethernet, Physical Addressing, ARP and RARP.

UNIT VIII: INTERNET WORKING DEVICES: Network Interface Cards, Modems, Repeaters, Hubs, Bridges, Switch (L2 and L3 differences) and gateways.


UNIT X: TRANSPORT LAYER: Addressing and multiplexing, Flow control, congestion control, data transport, Port numbers, service models, Introduction to reliability.

UNIT XI APPLICATION LAYER: DNS, Remote Logging, File transfer, Network Management, client-server applications, WWW, E-mail, MIME.

UNIT XII: NETWORK APPLICATION: Internet Applications like emails, chatting, social networking, Rail Reservations, Information Sharing, e-governance, Online Processing and Collaborations, etc., Mobile Applications.

UNIT XIII: INTRODUCTION TO NETWORK ARCHITECTURE: Frame relay, Telephone network, ATM network, ISP, IPv4 and IPv6 overview.

Reference Books:

1. Data Communication & Networking – Behouz A. Forouzan, TMH
2. Computer Networks - Kundu – PHI
4. Data Communication and Computer Networks - Ajit Pal, PHI
FIFTH SEMESTER

3111: JAVA PROGRAMMING & DYNAMIC WEB PAGE DESIGNING (ESE-70+CIA-30:-F.M.:100)

UNIT I: Introduction to JAVA. Introduction to Java, Java Virtual Machine, Byte Code Object Oriented Principle, Object and Classes, Java Keywords, Variable, Data types and Literals in Java, String, Operators and Casting, Control of Flow, (Selection Statements, Iteration, Statements), Command Line Argument.

UNIT II: Introduction to Class and Object, Method, Overloading Method, Method Overriding, Constructor, Constructor Overloading, this Keyword, Introduction to Inheritance, Using Super, Multilevel Hierarchy, Abstract class, Using Final.


UNIT IV: Exception Handling and Threads. Exception Handling, Type of Exception, Try, Catch, and Finally, Multiple Catch blocks, Nested Try Statements, throw, throws, Thread Model, Multithreading.

UNIT V: Applet, AWT, Input Output Stream. Introduction to Applet, Applet Methods, Introduction to AWT, GUI Components.

UNIT VI: HTML –using comments, headers, text styling, formatting text, tags- <META>, <FRAMESET>, file formats including image formats.

UNIT VII: Java Servlets- introduction- Servlet life cycles, retrieving information, sending HTML information, Session tracking, Data connectivity-JDBC

UNIT VIII: Java Server Page, Introduction, Overview, Setting of JSP Environment, generating Dynamic content, using custom, tag, libraries and JSP standard tag library, processing input and output.

Reference Books:
1. Complete Reference (Java 2) – Herbert Schildt - Tata McGraw Hill
2. Java in a nut shell – Flanagan – Orielly Publication
4. Bruce, Foundations of Object Oriented Languages, PHI
5. Patrick Naughton, Herbert Schldt-“The complete reference+Java2” TMH
6. Java Servlet Programming-Jason Hunter,O'Reilly
7. Dynamic web Publishing-2E-Shelley Powers,Techmedia
FIFTH SEMESTER

3112: OOAD USING UML (ESE-70+ CIA-30:F.M:-100)


UNIT-II: Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams. Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.


UNIT-V: Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams.

UNIT-VI: Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.


UNIT-VIII: Case Study: The Unified Library application.

Reference Books


2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY Dreamtech India Pvt. Ltd.


6. Mark Priestley: Practical Object-Oriented Design with UML, TATA
FIFTH SEMESTER

3113: COMPILER DESIGN (ESE-70+CIA-30:F.M:-100)


UNIT-II: LEXICAL ANALYSIS: The Role Of The Lexical Analyzer, Tokens, Patterns, Lexemes, Input Buffering, Specifications Of A Token, Recognition Of A Tokens, Conversion From A Regular Expression To FA, Basic Idea About LEX.


UNIT-V: Type checking, Symbol Table-Introduction, Usage, Features, Types of symbol table.

UNIT-VI: INTERMEDIATE CODE GENERATION: Three address code, Implementation of Three address code


Reference Books:
2. K.L.P Mishra & N. Chandrasekharan, Theory of Computer Science, PHI
8. Linz Peter, “An Introduction to Formal Languages and Automata”, Narosa
11. O.G. Kakde, “Compiler Design”
12. S. Chattopadhyay, Compiler Design, PHI publication

3190: SEMINAR (ESE-70+CIA-30:F.M:-100)

Individual Seminar topics must be given to each student by the department. Students have to present their seminars during CIA and to the external examiners during ESE.
FIFTH SEMESTER

3191: JAVA PROGRAMMING & DYNAMIC WEB PAGE DESIGNING LAB (ESE-70+CIA-30:F.M:-100)

1. Simple JAVA program and program for inheritance, overloading, polymorphism, constructors, destructors, loop, private, protected, friend, public etc.
2. Wrapper class, vectors, arrays
3. Developing interfaces- multiple inheritance, extending interfaces
4. Creating and accessing packages
5. Multithreaded programming, handling errors and exceptions, applet programming and graphics programming
6. Dynamic Web page Designing- based on paper-311

3192: DOT NET TECHNOLOGY LAB (ESE-70+CIA-30:F.M:-100)

Program structure, Basic I/O including output to the console and messages boxes, Data types, Arithmetic operations and expressions, Relational and logical operations, Control structures, These include "if", "while", "do-while", "for", and "switch", Namespaces and methods supplied by the FCL. This section will only identify math methods, Writing methods, Recursion and overloading, Scoping rules, Arrays and data representation, Class definitions, Properties, indexers, and access control, Inheritance and polymorphism, Exception handling, GUI Programming. Different tools and their uses from .net framework. This section will involve the use of forms to build GUI applications. The concept of event, The creation of various dialog boxes and menus will be discussed, Files. This is an important topic beyond its obvious purpose, The same tools that allow us to access file data also allow use to read data from internet sites and databases, Webpage design.

Reference Books:

1. Understanding .NET: a tutorial and analysis By David Chappell
2. ASP.NET 2.0 : a developer’s notebook, Author :Lee WeiMeng
3. Beginning ASP.NET 2.0 with C#, Author:Hart Chris
4. C# and the .NET platform, Author: Troelsen Andrew
5. Core C# and .NET,Author: Perry Stephen C
3210: COMPUTER GRAPHICS & MULTIMEDIA APPLICATIONS (ESE-70+CIA-30:-F.M:-100):


UNIT-III: Two-Dimensional Geometric Transformations: Basic Transformations Translation, Scaling, Rotation, Reflection, Shearing, Composite Transformations, Homogeneous Coordinate Systems

UNIT-IV: Two Dimensional Viewing :World coordinate system, Window to Viewport Coordinate Transformation, Clipping-Point Clipping, Line clipping algorithm – Cohen-Sutherland , Polygon Clipping algorithm- Sutherland-Hodgman, Area Filling- Seed filling & Boundary filling.

UNIT-V: 3D Transformations- Translation, Scaling ,Rotation, Reflection, Shearing, Projection-Parallel, Orthographic, Multi-view Orthographic, Isometric, Oblique, Perspective, Graphics coordinate system & viewing pipeline.


Reference Books:
4. Chattopadhyay&Mukhopadhyay, Introduction to Computer graphics & Multimedia, PHI
5. Rajib Chopra, Computer Graphics, S.Chand

3211: GRAND VIVA (ESE-50+CIA-50:-FM:-100):
Grand Viva will be based on all the subjects throughout the course. Grand Viva will be conducted in presence of department teachers during CIA and also will be conducted in presence of External teachers during ESE.

3212: ELECTIVE PAPER (ESE-70+CIA-30:-FM:-100):
Each student must choose any one of the following topics-

I. PHP & MySQL

UNIT I: INTRODUCTION TO PHP: History of PHP, Apache Web Server, MySQL and Open Source Relationship between Apache, MySQL and PHP (AMP Module) PHP configuration in IIS Apache Web server.

UNIT II: BASICS OF PHP: PHP structure and syntax, Creating the PHP pages, Rules of PHP syntax, Integrating HTML with PHP, Constants, Variables: static and global variable, Conditional
Structure & Looping, PHP Operators, Arrays, foreach constructs, User defined function, argument function, Variable function, Return Function, default argument, variable length argument.

UNIT III: INTRODUCTION TO MYSQL: MySQL structure and syntax, Types of MySQL tables and storages engines, MySQL commands, Integration of PHP with MySQL, Connection to the MySQL server, Working with PHP and arrays of data, Referencing two tables, Joining two tables.

UNIT IV: WORKING WITH DATA and PHP FUNCTION: FORM element, INPUT elements, Processing the form User Input, INPUT checkbox type, one form, multiple processing, Radio INPUT element Multiple submit buttons, Basic input testing, Dynamic page title, Manipulating the string as an array, Adding items, Validating the user input. Basic PHP Function like Variable Function, String Function, Math Function, Date Function, Array Function, File Function.

UNIT V: WORKING WITH DATABASE AND PHP FUNCTION: Creating a table, Manipulating the table, Filling the table with data, Adding links to the table, Adding data to the table, Displaying the new information, Displaying the movie details, Editing the database, Inserting a record, Deleting a record, Editing data.

Reference Books:
(1) Beginning PHP, Apache, MySQL Web Development Elizabeth Naramore, Jason Gerner, Yann Le Scouarnec, Jeremy Stolz, Michael K. Glass, Gary Mailer - By Wrox Publication
(2) PHP, MySQL and Apache – Julie C. Melone By Pearson Education
(3) Beginning PHP 5.3 by Matt Doyle - By Wrox Publication
(4) PHP and MySQL Bible – Tim Converse and Joyce Park with Clark Morgan

II. DISTRIBUTED DBMS
UNIT-I: Database Design: Multivalued dependencies, theory of normalisation-4NF, 5NF, 6NF DKNF
UNIT-II: SQL: DDL, DML, constraints and assertions, views, database security.

Reference Books:
1. Data Base System Concepts, Korth, MH
2. Data Base Management System, Rama Krishnan, MH
4. Data Base Management System, Leon, VIKAS
5. Data Base Management System, V.K. Jain, Wiley Dreamtech L
III. MOBILE COMPUTING

UNIT – I: Introduction to wireless networking, advantages and disadvantages of wireless networking.

UNIT – II: Characteristics of radio propagation, fading, Multipath propagation

UNIT – III: Introduction to digital transmission-Definition of bit-rate and signaling rate, Introduction to synchronous transmission. The need for pulse shaping, synchronous and line-coding. Calculation of bit-error probabilities when the channel is affected by the addition of Gaussian noise.

UNIT – IV: narrowband digital modulation-The need for modulation, Binary and multi-level (M-ary) amplitude-shift keying (ASK), frequency-shift keying (FSK) and phase-shift keying(PSK).

UNIT – V: Wideband modulation technique to cope with intersymbol interference-Direct sequence spread spectrum Adaptive Equalization Orthogonal frequency division multiplex

UNIT – VI: Medium Access Control (MAC)-MAC protocols for digital cellular systems such as GSM. MAC protocols for wireless LANs such as IEEE802.11 and HIPERLAN I and II. The near-far effect, Hidden and exposed terminals, Collision Avoidance (RTS-CTS) protocols.

UNIT – VII: Protocols supporting mobility-Mobile network layer protocols such as mobile-IP, Dynamic Host Configuration Protocol(DHCP). Mobile transport layer protocols such as mobile-TCP, indirect-TCP. Wireless Application protocol(WAP).

REFERENCE BOOKS:
1. Jochen Schiller,”Mobile Communications”, Addison-Wesley
2. Stojmenovic and Cacute, “Handbook of Wireless Networks and Mobile Computing”.

IV. ARTIFICIAL INTELLIGENCE

UNIT – I: Introduction to AI, Goals and applications of AI, Intelligence agent, computer visions, games, theorem proving, natural language processing, robotics, expert systems, problem solving in games, examples, summary.

UNIT – II: Problem Solving- search algorithms-state space search, search space control, DFS, BFS, hill climbing Heuristic algorithm vs. solution guaranteed algorithms, heuristic search/optimistic problems- hill climbing, BFS, Branch and Bound, A* method, Minimax search- Alpha- Beta cut offs.
SIXTH SEMESTER


UNIT-VI: handling uncertainty, Probabilistic reasoning. Use of certainty factors, Fuzzy logic.


Reference Book:

2. D.W. Patterson, "Introduction to AI and Expert Systems", PHI,

3290: COMPUTER GRAPHICS & MULTIMEDIA LAB (ESE-70+CIA-30:-FM:-100):

Assignments on-
1. Point plotting, line & regular figure algorithms
2. Raster scan line & circle drawing algorithms
3. Clipping & Windowing algorithms for points, lines & polygons
4. 2-D / 3-D transformations
5. Simple fractals representation, Demonstrate the properties of the Bézier curves.
6. Filling algorithms, Clip line segments against windows
7. Web document creation using Dreamweaver.
8. Creating Animation using Flash.

3291: PROJECT WORK (ESE-210+CIA-90:-FM:-300):

Project Based on latest SOFTWARE and guided by faculty member of the department.