Course Structure and Syllabi

Bachellor of Computer applications (BCA)

Academic Programmes

July, 2013
## Semester – I

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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**Total** | **25**   |
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# BCA Syllabus at JECRC University

## Semester – Vth

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6
## Semester – VI<sup>th</sup>

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Course Code: CA-1001
Course Name: Computer Fundamentals & Office Automations

UNIT-I

Introduction to Computers

UNIT-II

Algorithm and Flowcharts
Algorithm: Definition, Characteristics, Advantages and disadvantages, Examples Flowchart: Definition, Define symbols of flowchart, Advantages and disadvantages, Examples.

UNIT-III

Operating System and Services in O.S.
Dos – History, Files and Directories, Internal and External Commands, Batch Files, Types of O.S.

UNIT-IV

Editors and Word Processors
Basic Concepts, Examples: MS-Word, Introduction to desktop publishing. Spreadsheets and Database packages Purpose, usage, command, MS-Excel, Creation of files in MS-Access, Switching between application, MS-PowerPoint.

Text Books:
1. Fundamental of Computers – By V.Rajaraman B.P.B. Publications
2. Fundamental of Computers – By P.K. Sinha
3. MS-Office 2000 (For Windows) – By Steve Sagman
Course Code: CA-1002
Course Name: Programming Principles & Algorithms

UNIT-I
Introduction to ‘C’ Language
History, Structures of ‘C’ Programming, Function as building blocks. Language Fundamentals
Character set, C Tokens, Keywords, Identifiers, Variables, Constant, Data Types, Comments.

UNIT-II
Operators
Types of operators, Precedence and Associatively, Expression, Statement and types of statements
Build in Operators and Function Console based I/O and related built in I/O function: printf(), scanf(), getch(), getchar(), putchar(); Concept of header files, Preprocessor directives: #include, #define.

UNIT-III
Control structures
Decision making structures: If, If-else, Nested If-else, Switch; Loop Control structures: While, Dowhile, for, Nested for loop; Other statements: break, continue, goto, exit. Introduction to problem solving Concept: problem solving, Problem solving techniques (Trail & Error, Brain Stroming, Divide & Conquer) Steps in problem solving (Define Problem, Analyze Problem, Explore Solution) Algorithms and Flowcharts (Definitions, Symbols), Characteristics of an algorithm Conditionals in pseudo-code, Loops in pseudo code. Time complexity: Big-Oh notation, efficiency Simple Examples: Algorithms and flowcharts (Real Life Examples).

UNIT-IV
Simple Arithmetic Problems
Addition / Multiplication of integers, Determining if a number is +ve / -ve / even / odd, Maximum of 2 numbers, 3 numbers, Sum of first n numbers, given n numbers, Integer division, Digit reversing, Table generation for n, ab, Factorial, sine series, cosine series, nCr , Pascal Triangle, Prime number, Factors of a number, Other problems such as Perfect number, GCD numbeersetc (Write algorithms and draw flowchart), Swapping. Functions Basic types of function, Declaration and definition, Function call, Types of function, Parameter passing, Call by value, Call by reference, Scope of variable, Storage classes, Recursion.

Text Books:
1. Programming in C-Balguruswamy
2. The C programming Lang., Pearson Ecl - Dennis Ritchie
BCA Syllabus at JECRC University

Course Code: CA-1003  
Course Name: Information Technology  

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UNIT-I  
Computer Fundamentals: Block structure of a computer, characteristics of computers, problem solving with computers, generations of computers, and classification of computers on the basis of capacity, purpose, and generation.  
Number System: Bit, byte, binary, decimal, hexadecimal, and octal systems, conversion from one system to the other, representation of characters, integers and fractions.  
Binary Arithmetic: Addition, subtraction and multiplication.

UNIT-II  
Memory Types: Magnetic core, RAM, ROM, Secondary, Cache, Bubble Memory.  
Input and Output Units: Keyboard, Mouse, Monitor (CRT and LCD): Light pen, joystick, Mouse, Touch screen; OCR, OMR, MICR  
Overview of storage devices: Floppy disk, hard disk, compact disk, tape.  

UNIT-III  
Operating system: Batch, multi-programming, time sharing, network operating system, on-line and real time operating system, Distributed operating system, multi-processor, Multi-tasking.  
Graphical OS: Fundamentals of windows, types of windows, anatomy of windows, windows explorer, customizing windows, control panel, taskbar setting, Network Neighborhood.  
Personal Productivity Software:  
Word processing: Editing features, formatting features, saving, printing, table handling, page settings, spell-checking, macros, mail-merge, equation editors.  
Spreadsheet: Workbook, worksheets, data types, operators, cell formats, freeze panes, editing features, formatting features, creating formulas, using formulas, cell references, replication, sorting, filtering, functions, Charts & Graphs.  
Presentation Graphics Software: Templates, views, formatting slide, slides with graphs, animation, using special features, presenting slide shows.

UNIT-IV  
Computer Network and Communication: Network types, network topologies, network communication devices, physical communication media.  
Internet and its Applications: E-mail, TELNET, FTP, World Wide Web, Internet chatting; Intranet, Extranet, Gopher, Mosaic, WAIS.

Text Books:
Course Code: CA-1004
Course Name: Mathematics – I

UNIT-I

DETERMINANTS:

UNIT-II

LIMITS & CONTINUITY:
Limit at a Point, Properties of Limit, Computation of Limits of Various Types of Functions, Continuity at a Point, Continuity Over an Interval, Intermediate Value Theorem, Type of Discontinuities

UNIT-III

DIFFERENTIATION:
Derivative, Derivatives of Sum, Differences, Product & Quotients, Chain Rule, Derivatives of Composite Functions, Logarithmic Differentiation, Rolle’s Theorem, Mean Value Theorem, Expansion of Functions (Maclaurin’s& Taylor’s), Indeterminete Forms, L’ Hospitals Rule, Maxima & Minima, Curve Tracing, Successive Differentiation &LiebnitzTheorem.

INTEGRATION: Integral as Limit of Sum, Fundamental Theorem of Calculus( without proof.), Indefinite Integrals, Methods of Integration Substitution, By Parts, Partial Fractions, Reduction Formulae for Trigonometric Functions, Gamma and Beta Functions(definition).

UNIT-IV

VECTOR ALGEBRA:
Definition of a vector in 2 and 3 Dimensions; Double and Triple Scalar and Vector Product and physical interpretation of area and volume.

Text Books:
Course Code: CA-1005
Course Name: Computer Laboratory and Practical Work of Office Automation

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Course Code: CA-1006
Course Name: Computer Laboratory and Practical Work of Programming Principles & Algorithms

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Course Code: CA-2001
Course Name: Computer System Architecture

UNIT-I

Introduction to Computer Organization: Introduction to Computer and CPU (Computer Organization, Computer Design and Computer Architecture), Stored Program Concept- Von Neumann Architecture. Introduction to Flynn’s Classification- SISD, SIMD, MIMD

Register Transfer and Micro operations: Introduction to Registers, Register Transfer Language, Data movement among Registers and Memory.

Micro operations: Introduction to micro operations, Types of micro operations—Logic Operations, Shift operations, Arithmetic and Shift operations.


UNIT-II

Basic Computer Instructions: Introduction to Instruction, Types of Instructions (Memory Reference, I/O Reference and Register Reference), Instruction Cycle, Instruction Formats (Direct and Indirect Address Instructions, Zero Address, One Address, Two Address and Three Address Instructions)

Interrupt: Introduction to Interrupt and Interrupt Cycle.

Design of Control Unit: Introduction to Control Unit, Types of Control Unit (Hardwired & Micro programmed Control Unit).

Addressing Modes: Introduction & different types of Addressing Modes.

UNIT-III

I/O Organization: I/O Interface Unit, types of ports (I/O port, Network Port, USB port, Serial and Parallel Port), Concept of I/O bus, Isolated I/O versus Memory Mapped I/O.

I/O Data Transfer Techniques: Programmed I/O, Interrupt Initiated I/O, DMA Controller and IOP.

Synchronous and Asynchronous Data Transfer: Concept of strobe and handshaking, source and destination initiated data transfer.

UNIT-IV

Stack Organization: Memory Stack and Register Stack

Memory organization: Memory Hierarchy, Main Memory (RAM and ROM chips, Logical and Physical Addresses, Memory Address Map, Memory Connection to CPU), Associative Memory

Cache Memory: Cache Memory (Initialization of Cache Memory, Writing data into Cache, Locality of Reference, Hit Ratio), Replacement Algorithms (LRU and FIFO).

Text Books:
Course Code: CA-2002
Course Name: C Programming

UNIT-I
Arrays
Definition, declaration and initialization of one dimensional array; Accessing array elements; Displaying array elements; Sorting arrays; Arrays and function; Two Dimensional array: Declaration and Initialization, Accessing and Displaying, Memory representation of array [Row Major, Column Major]; Multidimensional array.

UNIT-II
Pointers
Definition and declaration, Initialization; Indirection operator, address of operator; pointer arithmetic; dynamic memory allocation; arrays and pointers; function and pointers.

UNIT-III
Strings
Definition, declaration and initialization of strings; standard library function: strlen(), strcpy(), strcat(), strcmp(); Implementation without using standard library functions. Structures
Definition and declaration; Variables initialization; Accessing fields and structure operations; Nested structures; Union: Definition and declaration; Differentiate between Union and structure.

UNIT-IV
Introduction C Preprocessor
Definition of Preprocessor; Macro substitution directives; File inclusion directives; Conditional compilation. Bitwise Operators Bitwise operators; Shift operators; Masks; Bit field. File handling Definition of Files, Opening modes of files; Standard function: fopen(), fclose(), feof(), fseek(), rewind(); Using text files: fgetc(), fputc(), fscanf() Command line arguments.

Text Books:
1. Programming in C-Balguruswamy
2. The C programming Lang., Person Ecl – Dennis Ritchie
Course Code: CA-2003
Course Name: Digital Electronics & Computer Organization

UNIT-I
Logic gates and circuit
Gates (OR, AND, NOR, NAND, XOR & XNOR); Demorgan’s laws; Boolean laws, Circuit designing techniques (SOP, POS, K-Map).

UNIT-II
Combinational Building Blocks
Multiplexes; Decoder; Encoder; Adder and Subtracter.

UNIT-III
Memories
ROMs, PROMs, EPROMs, RAMs, Hard Disk, Floppy Disk and CD-ROM.

UNIT-IV
Sequential Building Blocks
Flip-Flop (RS, D, JK, Master-slave && T flip-flops); Registers & Shift registers; Counters; Synchronous and Asynchronous Designing method. **Memory Organization:** Basic cell of static and dynamic RAM; Building large memories using chips; Associative memory; Cache memory organization and Virtual memory organization.

Text Books:
2. Digital Electronics (TMH) 1998 : Malvino and Leach
Course Code: CA-2004  
Course Name: Mathematics –II  

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UNIT-I  
SETS  
Sets, Subsets, Equal Sets Universal Sets, Finite and Infinite Sets, Operation on Sets, Union, Intersection and Complements of Sets, Cartesian Product, Cardinality of Set, Simple Applications.

UNIT-II  
RELATIONS AND FUNCTIONS  
Properties of Relations, Equivalence Relation, Partial Order Relation Function: Domain and Range, Onto, Into and One to One Functions, Composite and Inverse Functions, Introduction of Trignometric, Logarithmic and Exponential Functions.

UNIT-III  
PARTIAL ORDER RELATIONS AND LATTICES  

UNIT-IV  
FUNCTIONS OF SEVERAL VARIABLES  
Partial Differentiation, Change of Variables, ChainRule, Extrema of Functions of 2 Variabes, Euler’s Theorem.

Text Books:  
Course Code: CA-2005
Course Name: Computer Laboratory and Practical Work of C Programming

L  T  P  C
0  0  2  1

Course Code: CA-2006
Course Name: Computer Laboratory and Practical Work of Digital Electronics & Computer Organization

L T P C
0 0 2 1

Course Code: CA-3001  
Course Name: Object Oriented Programming Using C++

UNIT-I
Introduction
Introducing Object-Oriented Approach, Relating to other paradigms {Functional, Data decomposition}.

Basic terms and ideas
Abstraction, Encapsulation, Inheritance, Polymorphism, Review of C, Difference between C and C++ - cin, cout, new, delete, operators.

UNIT-II
Classes and Objects
Encapsulation, information hiding, abstract data types, Object & classes, attributes, methods, C++ class declaration, State identity and behaviour of an object, Constructors and destructors, instantiation of objects, Default parameter value, object types, C++ garbage collection, dynamic memory allocation, Metaclass / abstract classes.

UNIT-III
Inheritance and Polymorphism
Generic function Template function, function name overloading, Overriding inheritance methods, Run time polymorphism, Multiple Inheritance.

UNIT-IV
Files and Exception Handling
Streams and files, Namespaces, Exception handling, Generic Classes.

Text Books:
The C programming Lang., Person Ecl – Dennis Ritchie
Course Code: CA-3002  
Course Name: Data Structure Using C & C++  

UNIT-I  
**Introduction to Data Structure and its Characteristics Array**  
Representation of single and multidimensional arrays; Sparse arrays – lower and upper triangular matrices and Tridiagonal matrices with Vector Representation also.

UNIT-II  
**Stacks and Queues**  
Introduction and primitive operations on stack; Stack application; Infix, postfix, prefix expressions; Evaluation of postfix expression; Conversion between prefix, infix and postfix, introduction and primitive operation on queues, D- queues and priority queues.

UNIT-III  
**Lists**  
Introduction to linked lists; Sequential and linked lists, operations such as traversal, insertion, deletion searching, Two way lists and Use of headers. **Trees** Introduction and terminology; Traversal of binary trees; Recursive algorithms for tree operations such as traversal, insertion, deletion; Binary Search Tree.

UNIT-IV  
**B-Trees**  
Introduction, The invention of B-Tree; Statement of the problem; Indexing with binary search trees; a better approach to tree indexes; B-Trees; working up from the bottom; Example for creating a B Tree. **Sorting Techniques**; Insertion sort, selection sort, merge sort, heap sort, searching Techniques: linear, search, binary search and hashing.

Text Books:
Course Code: CA-3003
Course Name: Computer Architecture & Assembly Language

UNIT-I
Basic computer organization and design, Instructions and instruction codes, Timing and control/instruction cycle, Register/ Types of register/ general purpose & special purpose registers/ index registers, Register transfer and micro operations/ register transfer instructions, Memory and memory function, Bus/ Data transfer instructions, Arithmetic logic micro-operations/ shift micro operations, Input/ Output and interrupts, Memory reference instructions, Memory interfacing memory/ Cache memory.

UNIT-II
Central Processing Unit

UNIT-III
Computer Arithmetic
Addition, subtraction and multiplication algorithms, divisor algorithms. Floating point, arithmetic operations, decimal arithmetic operations, decimal arithmetic operations. Input – Output Organization Peripheral devices, Input/output interface, ALU Asynchronous Data transfer, mode of transfer, priority interrupts, Direct memory Address (DMA), Input/ Output processor (IOP), serial communication.

UNIT-IV
Evaluation of Microprocessor
Overview of Intel 8085 to Intel Pentium processors Basic microprocessors, architecture and interface, internal architecture, external architecture memory and input/ output interface. Assembly language, Assembler, Assembly level instructions, macro, use of macros in I/C instructions, program loops, programming arithmetic and logic subroutines, Input-Output programming.

Text Books:
1. Leventhal, L.A, “Introduction to Microprocessors”, Prentice Hall of India
Course Code: CA-3004
Course Name: Computer Laboratory and Practical Work of OOPS

L T P C
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Computer Laboratory and Practical Work of OOPS
Course Code: CA-3005
Course Name: Computer Laboratory and Practical Work of DS

L T P C
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Computer Laboratory and Practical Work of DS
Practical will be based on Paper Data Structure: Covers UNIT-I, UNIT-II, UNIT-III, UNIT-IV, UNIT-V of Syllabus.
Course Code: CA-4001
Course Name: Computer Graphics & Multimedia Application

UNIT-I

Introduction:

UNIT-II


UNIT-III

Geometrical Transformation

UNIT-IV

Introductory Concepts: Multimedia Definition, CD-ROM and the multimedia highway, Computer Animation (Design, types of animation, using different functions) Uses of Multimedia, Introduction to making multimedia – The stage of Project, hardware & software requirements to make good multimedia skills and Training opportunities in Multimedia Motivation for Multimedia usage.

Text Books:
Course Code: CA-4002
Course Name: Operating System & Software Engineering

UNIT-I
Software Engineering: Definition and paradigms, A generic view of software engineering.

UNIT-II
Processes: Process Concept, Process Scheduling, Operation on Processes
CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple – Processor Scheduling.
Process Synchronization: Background, The Critical – Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization
Requirements Analysis: Statement of system scope, isolation of top level processes and entitles and their allocation to physical elements, refinement and review. Analyzing a problem, creating a software specification document, review for correctness, consistency, and completeness.

UNIT-III
Designing Software Solutions: Refining the software Specification; Application of fundamental design concept for data, architectural and procedural designs using software blue print methodology and object oriented design paradigm; Creating design document: Review of conformance to software requirements and quality. Software Implementation: Relationship between design and implementation, Implementation issues and programming support environment, Coding the procedural design, Good coding style and review of correctness and readability.

UNIT-IV

**Software Maintenance:** Maintenance as part of software evaluation, reasons for maintenance, types of maintenance (Perceptive, adoptive, corrective), designing for maintainability, techniques for maintenance. Comprehensive examples using available software platforms/case tools, Configuration Management.

**Text Books:**
Course Code: CA-4003
Course Name: Optimization Techniques

UNIT-I

Linear programming
Central Problem of linear Programming various definitions included Statements of basic theorem and also their properties, simplex methods, primal and dual simplex method, transport problem, tic-tac problem, and its solution. Assignment problem and its solution. Graphical Method Formulation, Linear Programming Problem.

UNIT-II

Queuing Theory
Characteristics of queuing system, Classification of Queuing Model Single Channel Queuing Theory, Generalization of steady state M/M/1 queuing models(Model-I, Model-II).

UNIT-III

Replacement Theory
Replacement of item that deteriorates replacement of items that fail. Group replacement and individual replacement. Inventory Theory Cost involved in inventory problem- single item deterministic model economics long size model without shortage and with shorter having production rate infinite and finite.

UNIT-IV

Job Sequencing
Introduction, solution of sequencing problem Johnson's algorithm for n jobs through 2 machines.

Text Books:
1. Gillet B.E. “Introduction to Operation Research”
2. Taha,H.A. “Operation Research - an introduction”
4. S.D.Sharma “Operation Research”
Course Code: CA-4004  
Course Name: Computer Laboratory and Practical Work of Computer Graphics & Multimedia Application  

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0  0  2  1

Practical will be based on Paper Computer Graphics & Multimedia Application: Covers UNIT-II, UNIT-III, UNIT-V of Syllabus
Course Code: CA-4005
Course Name: Computer Laboratory and Practical Work of Operating System & Software Engineering

Practical will be based on Paper Operating System & Software Engineering: Covers UNIT- II, UNIT-III, UNIT-V of Syllabus
Course Code: CA-5001
Course Name: Introduction to DBMS & Numerical Methods

UNIT-I
Introduction: Characteristics of database approach, data models, DBMS architecture and data independence.

UNIT-II
E-R Modeling: Entity types, Entity set, attribute and key, relationships, relation types, roles and structural constraints, weak entities, enhanced E-R and object modeling, Sub classes; Super classes, inheritance, specialization and generalization.
Interpolation and Extrapolation: Finite Differences, The operator E, Newton’s Forward and Backward Differences, Newton’s dividend differences formulae, Lagrange’s Interpolation formula for unequal Intervals, Gauss’s Interpolation formula, Starling formula, Bessel’s formula, Laplace-Everett formula.

UNIT-III
File Organization: Indexed sequential access files; implementation using B & B++ trees, hashing, hashing functions, collision resolution, extendible hashing, dynamic hashing approach implementation and performance. Relational Data Model: Relational model concepts, relational constraints, relational algebra SQL: SQL queries, programming using SQL.
Numerical Differentiation Numerical Integration: Introduction, direct methods, maxima and minima of a tabulated function, General Quadratic formula, Trapezoidal rule, Simpson’s One third rule, Simpson’s three-eighth rule.

UNIT-IV
EER and ER to relational mapping: Data base design using EER to relational language.
Solution of Linear Equation: Gauss’s Elimination method and Gauss’s Siedel iterative method.
Text Books:
5. Scarbourogh, “Numerical Analysis”.
   S.S. Shashtri, “Numerical Analysis”, PHI
Course Code: CA-5002
Course Name: Java Programming and Dynamic Web Design page

UNIT-I
Java Programming: Data types, control structured, arrays, strings, and vector, classes (inheritance, package, exception handling) multithreaded programming.

UNIT-II
Java applets, AWT controls (Button, Labels, Combo box, list and other Listeners, menu bar) layoutmanager, string handling (only main functions)

UNIT-III
Networking (datagram socket and TCP/IP based server socket) event handling, JDBC:Introduction, Drivers, Establishing Connection, Connection Pooling. HTML: use of commenting, headers, text styling, images, formatting text with <FONT>, special characters, horizontal rules, line breaks, table, forms, image maps, <META> tags, <FRAMESET> tags, file formats including image formats.

UNIT-IV

Text Books:
1. Patrick Naughton and Herbert Schildt, “Java-2 The Complete Reference” 199, TMH.
3. Ivor Horton, “Beginning Java-2” SPD Publication
Course Code: CA-5003  
Course Name: Data communication & Computer Network

UNIT-I


UNIT-II

Transmission Media: Guided and unguided, Attenuation, distortion, noise, throughput, propagation speed and time, wavelength, Shannon capacity, comparison of media

UNIT-III

Telephony: Multiplexing, error detection and correction: Many to one, One to many, WDM, TDM, FDM, Circuit switching, packet switching and message switching. Data link control protocols: Line discipline, flow control, error control, synchronous and asynchronous protocols, character and bit oriented protocols, Link access procedures. Point to point controls: Transmission states, PPP layers, LCP, Authentication, NCP. ISDN: Services, Historical outline, subscriber’s access, ISDN Layers and broadcast ISDN.

UNIT-IV


Text Books:
Course Code: CA-5004
Course Name: Computer Laboratory and Practical Work of DBMS

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Computer Laboratory and Practical Work of DBMS Practical will be based on Paper Data Base Management System: on UINT-IV converging the concept from UNIT-II to UNIT-VI of Syllabus.
Course Code: CA-5005
Course Name: Computer Laboratory and Practical Work of Java Programming, Dynamic Webpage Design

L  T  P  C
0  0  2  1

Computer Laboratory and Practical Work of Java Programming and Dynamic Webpage Design Practical will be based on Paper Java Programming & Website Design: on Whole Syllabus
Course Code: CA-5006
Course Name: Minor Project

Minor Project: Evaluation will be based on Summer Training held after fourth semester in following organization: R& D organization, Govt. Sector, BSNL, ITI, RDSO, NIC, PNB and it will be by super wised & Evaluated by Department teacher / Examiner appointed by the concerned University only.
Course Code: CA-5007  
Course Name: Viva-Voice on Summer Training

L   T   P   C  
0   3   0   3

The viva will be conducted based on summer training of four weeks after the end of fourth Semester and will be conducted by the Examiner appointed by the concerned University only.
Course Code: CA-6001
Course Name: Computer Network Security and Management

UNIT-I

UNIT-II

UNIT-III

UNIT-IV

Text Books:
Course Code: CA-6002
Course Name: Information System: Analysis Design & Implementation

UNIT-I
Overview of System Analysis and Design: Systems Development Life Cycle; concept and Models: requirements determination, logical design, physical design, test planning, implementation, planning and performance evaluation, communication, interviewing, presentation skills; group dynamics; risk and feasibility analysis; group based approaches, JAD, structures walkthroughs, and design and code reviews; prototyping; database design software quality metrics; application categories software package evaluation and acquisition.

UNIT-II
Information Requirement Analysis: Process modeling with physical logical data flow diagrams, data modeling with logical entity relationship diagrams.

UNIT-III
Developing a Proposal: Feasibility study and cost estimation. System Design: Design of input and control, design of output and control, file design/database design, process, user interface design, prototyping; software constructors; documentation. Application Development Methodologies and CASE tools: Information engineering structured system analysis and design, and object oriented methodologies for application development data modeling, process modeling, user interface design, and prototyping, use of computer aided software engineering (CASE) tools in the analysis design and implementation of information systems.

UNIT-IV
Design and Implementation on OO Platform: Object oriented analysis and design through object modeling technique, object modeling, dynamic modeling and functional object oriented design and object oriented programming systems for implementation, object oriented data bases. Managerial issues in Software Projects: Introduction to software markets; planning of software projects, size and cost estimates; project scheduling; measurement of software quality and productivity, ISO and capability maturity models for organizational growth.

Text Books:
Course Code: CA-6003
Course Name: Major Project

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3  2  2  6

The allotment of the project will be held after fifth semester. The major project will be in the following organization: R & D organization, Govt. Sector, BSNL, ITI, RDSO, NIC, PNB and it will be supervised & Evaluated by Department teacher / Examiner appointed by the concerned University only.
Course Code: CA-6004
Course Name: Presentation/Seminar based on Major Project

L  T  P  C
2  2  2  5

Presentation/Seminar based on Major Project will be evaluated by external examiner appointed by the concerned University.