



JECRCTM
UNIVERSITY
BUILD YOUR WORLD

Course Structure and Syllabi
Bachelor of Computer applications (BCA)

Academic Programmes

July, 2013

BCA Syllabus at JECRC University

Semester – I

Course Code	Course Name	L (Hr.)	T (Hr.)	P (Hr.)	C
CA-1001	Computer Fundamentals& Office Automation	3	0	0	3
CA-1002	Programming Principles& Algorithms	3	0	0	3
CA-1003	Information Technology	3	0	0	3
CA-1004	Mathematics –I	3	0	0	3
CA-1005	Lab. Office Automation	0	0	2	1
CA-1006	Lab. Programming Principles& Algorithms	0	0	2	1
G1001	Current Affairs	2	1	0	3
G1002	Computer Applications	2	1	0	3
G1003	Computer Lab - I	0	0	2	1
G1004	Communication Skills	2	1	0	3
CA-1007	Seminar	0	1	0	1
	Total				25

BCA Syllabus at JECRC University

Semester – II

Course Code	Course Name	L (Hr.)	T (Hr.)	P (Hr.)	C
CA-2001	Computer System Architecture	2	1	0	3
CA-2002	C Programming	3	0	0	3
CA-2003	Digital Electronics & Computer Organization	3	0	0	3
CA-2004	Mathematics –II	3	0	0	3
CA-2005	Lab.C Programing	0	0	2	1
CA-2006	Lab. Digital Electronics & Computer Organization	0	0	2	1
G2001	Current Affairs	2	1	0	3
G2002	Computer Applications	2	1	0	3
G2003	Computer Lab - II	0	0	2	1
G2004	Communication Skills	2	1	0	3
CA-2007	Seminar	0	1	0	1
	Total				25

BCA Syllabus at JECRC University

Semester – III

Course Code	Course Name	L (Hr.)	T (Hr.)	P (Hr.)	C
CA-3001	Object Oriented Programming Using C++	3	1	0	4
CA-3002	Data Structure Using C & C++	3	1	0	4
CA-3003	Computer Architecture & Assembly Language	3	1	0	4
CA-3004	Lab. OOPS	0	0	2	1
CA-3005	Lab. DS	0	0	2	1
G3001	Current Affairs	2	1	0	3
G3002	Computer Applications	2	1	0	3
G3003	Computer Lab - III	0	0	2	1
G3004	Environmental Studies	2	1	0	3
CA-3006	Seminar	0	1	0	1
	Total				25

BCA Syllabus at JECRC University

Semester – IVth

Course Code	Course Name	L (Hr.)	T (Hr.)	P (Hr.)	C
CA-4001	Computer Graphics & Multimedia Application	3	1	0	4
CA-4002	Operating System & Software Engineering	3	1	0	4
CA-4003	Optimization Techniques	3	1	0	4
CA-4004	Lab. Computer Graphics & Multimedia Application	0	0	2	1
CA-4005	Lab. Operating System & Software Engineering	0	0	2	1
G4001	Current Affairs	2	1	0	3
G4002	Computer Applications	2	1	0	3
G4003	Computer Lab - IV	0	0	2	1
G4004	Value Education	2	1	0	3
CA-4006	Seminar	0	1	0	1
	Total				25

BCA Syllabus at JECRC University

Semester – Vth

Course Code	Course Name	L (Hr.)	T (Hr.)	P (Hr.)	C
CA-5001	Introduction to DBMS & Numerical Methods	3	1	0	4
CA-5002	Java Programming and Dynamic We Design page	3	1	0	4
CA-5003	Data Communication & Computer Network	3	1	0	4
CA-5004	Lab. DBMS	0	0	2	1
CA-5005	Lab. Java Programming and Dynamic We Design page	0	0	2	1
CA-5006	Miner project	0	1	0	1
CA-5007	Viva-Voice on Summer Training	0	3	0	3
G5001	Current Affairs	2	1	0	3
G5004	Communication Skills	2	1	0	3
CA-5008	Seminar	0	1	0	1
	Total				25

BCA Syllabus at JECRC University

Semester – VIth

Course Code	Course Name	L (Hr.)	T (Hr.)	P (Hr.)	C
CA-6001	Computer Network Security and Management	3	1	0	4
CA-6002	Information System: Analysis Design & Implementation	3	1	0	4
CA-6003	Major Project	3	2	2	6
CA-6004	Presentation/Seminar based on Major Project	2	2	2	5
G6001	Current Affairs	3	0	0	3
G6004	Personality Development	2	1	0	3
	Total				25

BCA Syllabus at JECRC University

Course Code: CA-1001

Course Name: Computer Fundamentals & Office Automations

L T P C
3 0 0 3

UNIT-I

Introduction to Computers

Introduction, Characteristics of Computers, Block diagram of computer. Types of computers and features, Mini Computers, Micro Computers, Mainframe Computers, Super Computers. Types of Programming Languages (Machine Languages, Assembly Languages, High Level Languages). Data Organization, Drives, Files, Directories. Types of Memory (Primary And Secondary) RAM, ROM, PROM, EPROM. Secondary Storage Devices (FD, CD, HD, Pen drive) I/O Devices (Scanners, Plotters, LCD, Plasma Display) Number Systems Introduction to Binary, Octal, Hexadecimal system Conversion, Simple Addition, Subtraction, Multiplication.

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.

Windows Operating Environment Features of MS – Windows, Control Panel, Taskbar, Desktop, Windows Application, Icons, Windows Accessories, Notepad, Paintbrush.

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

BCA Syllabus at JECRC University

Course Code: CA-1002

Course Name: Programming Principles & Algorithms

L	T	P	C
3	0	0	3

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 Associativity, 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, Dohwhile, 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 numbersetc (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
3. Structured programming approach using C- Forouzah&Ceilber Thomson learning publication.

BCA Syllabus at JECRC University

Course Code: CA-1003

Course Name: Information Technology

L T P C
3 0 0 3

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.

Printers: Impact, non-impact, working mechanism of Drum printer, Dot Matrix printer, Inkjet printer and Laser printer.

Computer languages: Machine language, assembly language, higher level language, 4GL. Introduction to Compiler, Interpreter, Assembler, Assembling, System Software, Application Software.

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.

BCA Syllabus at JECRC University

Security management tools: PC tools, Norton Utilities, Virus, worms, threats, virus detection, prevention and cure utilities, Firewalls, Proxy servers.

Text Books:

1. "Computers Today", D. H. Sanders, Fourth Edition, McGraw Hill, 1988.
2. "Fundamentals of Computers", V. Rajaraman, Second Edition, Prentice Hall of India, New Delhi, 1996.
3. "Information Technology", Satish Jain, Paperback Edition, BPB 1999.
4. "Information Technology Inside and Outside", David Cyganski, John A. Orr, Paperback Edition, Pearson Education 2002.
5. "Computer Fundamentals", B. Ram, Third Edition, Wiley, 1997.
6. "Fundamentals of Information Technology", Chetan Srivastva, Third edition, Kalayani Publishers
7. Computers, Larry Long & Nancy Long, Twelfth edition, Prentice Hall

BCA Syllabus at JECRC University

Course Code: CA-1004

Course Name: Mathematics –I

L T P C
3 0 0 3

UNIT-I

DETERMINANTS:

Definition, Minors, Cofactors, Properties of Determinants MATRICES: Definition, Types of Matrices, Addition, Subtraction, Scalar Multiplication and Multiplication of Matrices, Adjoint, Inverse, Cramers Rule, Rank of Matrix Dependence of Vectors, Eigen Vectors of a Matrix, Caley-Hamilton Theorem (without proof).

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), Indeterminate Forms, L' Hospital's Rule, Maxima & Minima, Curve Tracing, Successive Differentiation & Leibnitz Theorem. **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:

1. B.S. Grewal, "Elementary Engineering Mathematics", 34th Ed., 1998.
2. Shanti Narayan, "Integral Calculus", S. Chand & Company, 1999
3. H.K. Dass, "Advanced Engineering Mathematics", S. Chand & Company, 9th Revised Edition, 2001.

BCA Syllabus at JECRC University

Course Code: CA-1005

Course Name: Computer Laboratory and Practical Work of Office Automation

L	T	P	C
0	0	2	1

Practical will be based on Paper Office Automation: Covers UNIT-I,UNIT-II, UNIT-III, UNIT-IV, UNIT-V of Syllabus.

BCA Syllabus at JECRC University

Course Code: CA-1006

Course Name: Computer Laboratory and Practical Work of Programming Principles & Algorithms

L	T	P	C
0	0	2	1

Practical will be based on Paper Programming Principle & Algorithm: Covers UNIT-I, UNIT-II, UNIT-III, UNIT-IV, UNIT-V of Syllabus.

BCA Syllabus at JECRC University

Course Code: CA-2001

Course Name: Computer System Architecture

L T P C
2 1 0 3

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.

Common Bus System: Introduction to Common Bus System, Types of Buses (Data Bus, Control Bus, Address Bus), 16 bit Common Bus System--Data Movement among registers using Bus.

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).

Cache Memory Mapping Techniques: Direct Mapping, Associative Mapping and Set-Associative Mapping. Harvard Architecture, Mobile Devices Architecture (Android, Symbian and Windows Lite), Layered Approach Architecture.

BCA Syllabus at JECRC University

Text Books:

1. Computer System Architecture, M.M. Mano, Third Edition, PHI
2. Computer Organization and Architecture, J.P. Hayes, Third Edition, TMH
3. Computer Organization and Architecture, Stallings, Eighth Edition, PHI

BCA Syllabus at JECRC University

Course Code: CA-2002
Course Name: C Programming

L T P C
3 0 0 3

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
3. Structured programming approach using C-Forouzah&Ceilberg Thomson learning publication.

BCA Syllabus at JECRC University

Course Code: CA-2003

Course Name: Digital Electronics & Computer Organization

L	T	P	C
3	0	0	3

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 Subtractor.

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:

1. Computer Architecture (PHI) 1998 : M.M. Mano
2. Digital Electronics (TMH) 1998 : Malvino and Leach
3. Computer Organization and Architecture : William Stallings

BCA Syllabus at JECRC University

Course Code: CA-2004

Course Name: Mathematics –II

L T P C
3 0 0 3

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 Trigonometric, Logarithmic and Exponential Functions.

UNIT-III

PARTIAL ORDER RELATIONS AND LATTICES

Partial Order Sets, Representation of POSETS using Hasse diagram, Chains, Maximal and Minimal Point, Glb, lub, Lattices & Algebraic Systems, Principle of Duality, Basic Properties, Sublattices, Distributed & Complemented Lattices.

UNIT-IV

FUNCTIONS OF SEVERAL VARIABLES

Partial Differentiation, Change of Variables, Chain Rule, Extrema of Functions of 2 Variables, Euler's Theorem.

Text Books:

1. Kolman, Busby and Ross, "Discrete Mathematical Structure", PHI, 1996.
2. S.K. Sarkar, "Discrete Maths"; S. Chand & Co., 2000

BCA Syllabus at JECRC University

Course Code: CA-2005

Course Name: Computer Laboratory and Practical Work of C Programming

L	T	P	C
0	0	2	1

Practical will be based on Paper Programming Principle & Algorithm: Covers UNIT-I, UNIT-II, UNIT-III, UNIT-IV, UNIT-V of Syllabus.

BCA Syllabus at JECRC University

Course Code: CA-2006

Course Name: Computer Laboratory and Practical Work of Digital Electronics & Computer Organization

L	T	P	C
0	0	2	1

Practical will be based on Paper Digital Electronics & Computer Organization: Covers UNIT-I, UNIT-II, UNIT-III, UNIT-IV, UNIT-V of Syllabus.

BCA Syllabus at JECRC University

Course Code: CA-3001

Course Name: Object Oriented Programming Using C++

L	T	P	C
3	1	0	4

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

Inheritance, Class hierarchy, derivation – public, private & protected, Aggregation, composition vs classification hierarchies, Polymorphism, Categorization of polymorphism techniques, Method polymorphism, Polymorphism by parameter, Operator overloading, Parameteric 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:

1. A.R.Venugopal, Rajkumar, T. Ravishanker “Mastering C++”, TMH, 1997.
2. S.B.Lippman&J.Lajoie, “ C++ Primer”, 3rd Edition, Addison Wesley, 2000.The C programming Lang., Person Ecl – Dennis Ritchie
3. R.Lafore, “Object Oriented Programming using C++”, Galgotia Publications, 2004

BCA Syllabus at JECRC University

Course Code: CA-3002

Course Name: Data Structure Using C & C++

L	T	P	C
3	1	0	4

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:

1. E.Horowitz and S.Sahani, “ Fundamentals of Data structures”, Galgotia Book source Pvt. Ltd.,2003
2. R.S.Salaria, “ Data Structures & Algorithms” , Khanna Book Pblishing Co. (P) Ltd.,2002
3. Y.Langsamet. Al., “ Data Structures using C and C++” , PHI, 1999

BCA Syllabus at JECRC University

Course Code: CA-3003

Course Name: Computer Architecture & Assembly Language

L	T	P	C
3	1	0	4

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

General Register Organization/ stacks organizations instruction formats, addressing modes, Data transfer and manipulation. Program control reduced computer, pipeline/ RISC/ CISC pipeline vector processing/ array processing. Arithmetic Algorithms: Integer multiplication using shift and add, Booth's algorithm, Integer division, Floating-point representations.

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
2. Mathur, A.P., "Introduction to Microprocessors", Tata McGraw Hill
3. Rao,P.V.S., "Prospective in Computer Architechture", Prentice Hall of India

BCA Syllabus at JECRC University

Course Code: CA-3004

Course Name: Computer Laboratory and Practical Work of OOPS

L	T	P	C
0	0	2	1

Computer Laboratory and Practical Work of OOPS

Practical will be based on Paper Object Oriented Programming: Covers UNIT-I, UNIT-II, UNIT-III, UNIT-IV, UNIT-V of Syllabus.

BCA Syllabus at JECRC University

Course Code: CA-3005

Course Name:Computer Laboratory and Practical Work of DS

L	T	P	C
0	0	2	1

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.

BCA Syllabus at JECRC University

Course Code: CA-4001

Course Name: Computer Graphics & Multimedia Application

L	T	P	C
3	1	0	4

UNIT-I

Introduction:

The Advantages of Interactive Graphics, Representative Uses of Computer Graphics, Classification of Application Development of Hardware and software for computer Graphics, Conceptual Framework for Interactive Graphics, Overview, Scan: Converting Lines, Scan Converting Circles, Scan Converting Ellipses.

UNIT-II

Hardcopy Technologies, Display Technologies, Raster-Scan Display System, Video Controller, Random-Scan Display processor, Input Devices for Operator Interaction, Image Scanners, Working exposure on graphics tools like Dream Weaver, 3D Effects etc, **Clipping** Southland- Cohen Algorithm, Cyrus-Beck Algorithm, Midpoint Subdivision Algorithm.

UNIT-III

Geometrical Transformation

2D Transformation, Homogeneous Coordinates and Matrix Representation of 2D transformations, composition of 2D Transformations, the Window-to-Viewport Transformations, Introduction to 3D Transformations Matrix. **Representing Curves & Surfaces** Polygon meshes parametric, Cubic Curves, Quadric Surface; **Solid Modeling** Representing Solids, Regularized Boolean Set Operation primitive Instancing Sweep Representations, Boundary Representations, Spatial Partitioning Representations, Constructive Solid Geometry Comparison of Representations.

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:

1. Foley, Van Dam, Feiner, Hughes, Computer Graphics Principles & practice, 2000.
2. Ralf Skinmeiz and KlanaNaharstedt, Multimedia: computing, Communication and Applications, Pearson, 2001
3. D.Haran & Baker. Computer Graphics Prentice Hall of India, 1986

BCA Syllabus at JECRC University

Course Code: CA-4002

Course Name: Operating System & Software Engineering

L	T	P	C
3	1	0	4

UNIT-I

Introduction, What is an operating system, Simple Batch Systems, Multi-programmed Batch systems, Time- Sharing Systems, Personal – Computer Systems, Parallel systems, Distributed systems, Real- Time Systems. **Memory Management:** Background, Logical versus physical Address space, swapping, Contiguous allocation, Paging, Segmentation **Virtual Memory:** Demand Paging, Page Replacement, Page- replacement Algorithms, Performance of Demand Paging, Allocation of Frames, Thrashing, Other Considerations.

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 entities 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

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock. **Device Management:** Techniques for Device Management, Dedicated Devices, Shared Devices, Virtual Devices; Input or Output Devices, Storage Devices, Buffering, Secondary Storage Structure: Disk Structure, Disk Scheduling, Disk Management, Swap- Space Management, Disk

Reliability

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

Information Management: Introduction, A Simple File system, General Model of a File System, Symbolic File System, Basic File System, Access Control Verification, Logical File System, Physical File system File – System Interface; File Concept, Access Methods, Directory

BCA Syllabus at JECRC University

Structure, Protection, Consistency Semantics File – System Implementation: File – System Structure, Allocation Methods, Free- Space Management.

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:

1. Silberschatz and Galvin, “Operating System Concepts”, Person, 5th Ed. 2001
2. Madnick E., Donovan J., “Operating Systems:”, Tata McGraw Hill, 2001
3. Tannenbaum, “Operating Systems”, PHI, 4th Edition, 2000
4. K.K. Aggarwal & Yogesh Singh “Software engineering”, 2nd Ed., New Age International 2005.
5. I. Sommerville, “Software Engineering”, Addison Wesley, 2002.
6. James Peter, W. Pedrycz, “Software Engineering: An Engineering Approach” John Wiley & Sons.

BCA Syllabus at JECRC University

Course Code: CA-4003

Course Name: Optimization Techniques

L T P C
3 1 0 4

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"
3. Kanti Swarup "Operation Research"
4. S.D. Sharma "Operation Research"

BCA Syllabus at JECRC University

Course Code: CA-4004

Course Name: Computer Laboratory and Practical Work of Computer Graphics & Multimedia Application

L	T	P	C
0	0	2	1

Practical will be based on Paper Computer Graphics &Multimedia Application: Covers UNIT-II, UNIT-III, UNIT-V of Syllabus

BCA Syllabus at JECRC University

Course Code: CA-4005

Course Name: Computer Laboratory and Practical Work of Operating System & Software Engineering

L	T	P	C
0	0	2	1

Practical will be based on Paper Operating System & Software Engineering: Covers UNIT- II, UNIT-III, UNIT-V of Syllabus

BCA Syllabus at JECRC University

Course Code: CA-5001

Course Name: Introduction to DBMS & Numerical Methods

L T P C
3 1 0 4

UNIT-I

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

Roots of Equations: Bisections Method, False Position Method, Newton's Raphson Method, Rate of convergence of Newton's method.

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, Stirling 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- eight rule.

UNIT-IV

EER and ER to relational mapping: Data base design using EER to relational language.

Data Normalization: Functional Dependencies, Normal form up to 3rd normal form. **Concurrency Control:** Transaction processing, locking techniques and associated, database recovery, security and authorization. Recovery Techniques, Database Security.

Solution of Linear Equation: Gauss's Elimination method and Gauss's Siedel iterative method. **Solution of Differential Equations:** Euler's method, Picard's method, Fourth-order Runga – Kutta method.

BCA Syllabus at JECRC University

Text Books:

1. Abraham Silberschatz, Henry Korth, S.Sudarshan, "Database Systems Concepts", 4thEdition, McGraw Hill, 1997.
2. Jim Melton, Alan Simon, "Understanding the new SQL: A complete Guide", MorganKaufmann Publishers, 1993.
3. A.K.Majumdar, P. Bhattacharya, "Database Management Systems", TMH, 1996.
4. Bipin Desai, "An Introduction to database systems", Galgotia Publications, 1991.
5. Scarbourogh, "Numerical Analysis".
6. Gupta & Bose S.C. "Introduction to Numerical Analysis, "Academic Press, Kolkata, 3. S.S. Shashtri, "Numerical Analysis", PHI

BCA Syllabus at JECRC University

Course Code: CA-5002

Course Name:Java Programming and Dynamic We Design page

L T P C
3 1 0 4

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 , special characters, horizontal rules, line breaks, table, forms, image maps, <META> tags, <FRAMESET> tags, file formats including image formats.

UNIT-IV

Java Servlets: Introduction, HTTP Servlet Basics, The Servlet Lifecycle, Retrieving Information,Sending HTML Information, Session Tracking, Database Connectivity. **Java Server Pages:** Introducing Java Server Pages, JSP Overview, Setting Up the JSP Environment, Generating Dynamic Content, Using Custom Tag Libraries and the JSP Standard Tag Library, Processing Input and Output.

Text Books:

1. Patrick Naughton and HerbertzSchildt, “Java-2 The Complete Reference” 199, TMH.
2. Shelley Powers, “Dynamic Web Publishing” 2nd Ed. Techmedia, 1998.
3. Ivor Horton, “Beginning Java-2” SPD Publication
4. Jason Hunter, “Java Servlet Programming” O’Reilly

BCA Syllabus at JECRC University

Course Code: CA-5003

Course Name: Data communication & Computer Network

L T P C
3 1 0 4

UNIT-I

Basic Concepts: Components of data communication, distributed processing, standards and organizations. Line configuration, topology, Transmission mode, and categories of networks. **OSI and TCP/IP Models:** Layers and their functions, comparison of models. Digital Transmission: Interfaces and Modems: DTE-DCE Interface, Modems, Cable modems.

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

Devices: Repeaters, bridges, gateways, routers, The Network Layer; Design issues, Routing algorithms, Congestion control Algorithms, Quality of service, Internetworking, Network-Layer in the internet. **Transport and upper layers in OSI Model:** Transport layer functions, connection management, functions of session layers, presentation layer and application layer.

Text Books:

1. Brijendra Singh, "Data Communication and Computer Networks", PHI, Second Ed. 2006
2. A.S. Tanenbaum, "Computer Networks"; Pearson Education Asia, 4th Ed. 2003.
3. Behrouz A. Forouzan, "Data Communication and Networking", 3rd Ed. Tata McGraw Hill, 2004.

BCA Syllabus at JECRC University

Course Code: CA-5004

Course Name: Computer Laboratory and Practical Work of DBMS

L	T	P	C
0	0	2	1

Computer Laboratory and Practical Work of DBMS Practical will be based on Paper Data Base Management System: on UNIT-IV converging the concept from UNIT-II to UNIT-VI of Syllabus.

BCA Syllabus at JECRC University

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

BCA Syllabus at JECRC University

Course Code: CA-5006

Course Name:Minor Project

L	T	P	C
0	1	0	1

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.

BCA Syllabus at JECRC University

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.

BCA Syllabus at JECRC University

Course Code: CA-6001

Course Name: Computer Network Security and Management

L	T	P	C
3	1	0	4

UNIT-I

Introduction: Attack, Services and Mechanism, Model for Internetwork Security. Cryptography: Notion of Plain Text, Encryption, Key, Cipher Text, Decryption and cryptanalysis; Public Key Encryption, digital Signatures and Authentication.

UNIT-II

Network Security: Authentication Application: Kerberos, X.509, Directory Authentication Service, Pretty Good Privacy, S/Mime.

UNIT-III

IP security Architecture: Overview, Authentication header, Encapsulating Security Payload, Combining Security Associations, Key Management. **Web Security:** Requirement, Secure Socket Layer, Transport Layer Security, and Secure Electronic Transactions.

UNIT-IV

Network Management Security: Overview of SNMP Architecture-SMMPV11 Communication Facility, SNMPV3. **System Security:** Intruders, Viruses and Related Threats, Firewall Design Principles. Comprehensive examples using available software platforms/case tools, Configuration Management.

Text Books:

1. Brijendra Singh, "Network Security and Management", PHI, Second Ed. 2009
2. W. Stallings, Networks Security Essentials: Application & Standards, Pearson Education, 2000.
3. W. Stallings, Cryptography and Network Security, Principles and Practice, Pearson Education, 2000.

BCA Syllabus at JECRC University

Course Code: CA-6002

Course Name: Information System: Analysis Design & Implementation

L T P C
3 1 0 4

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:

1. I.T.Haryszkiewicz, Introduction of System Analysis and Design, Pearson Education, (PHI) 1998.
2. V.Rajaraman, Analysis and Design of Information System, Pearson Education, 1991.
3. J.A.Senn, "Analysis and Design of Information Systems"

BCA Syllabus at JECRC University

Course Code: CA-6003

Course Name: Major Project

L	T	P	C
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.

BCA Syllabus at JECRC University

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.