**JSS COLLEGE FOR WOMEN (Autonomous)**

**Saraswathipuram Mysore-9**

# Choice Based Credit System

# CBCS Scheme

# Bachelor of Computer Applications (BCA)

# (2018-19)

# DEPARTMENT OF COMPUTER SCIENCE

**JSS COLLEGE FOR WOMEN (AUTONOMOUS)**
**SARASWATHIPURAM MYSURU-570009**

# CBCS Syllabus - BCA. for 2018-19 onwards

| Year | Sem | Corse | Title | Hours / Week | | | Credits | | | Maximum Marks | | | | | | Exam Duration | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Th IA | | Pr IA | | Exam | | | |
| | | | | L | T | P | L | T | P | C1 | C2 | C1 | C2 | Th | Pr | | |
| I | I | DSC 1 | Computer Fundamentals and PC maintenance | 4 | 0 | 4 | 4 | 0 | 2 | 10 | 10 | 05 | 05 | 70 | 50 | 3 Hours | 100 |
| | | DSC 2 | Digital Electronics and Computer Architecture | 4 | 0 | 4 | 4 | 0 | 2 | 10 | 10 | 05 | 05 | 70 | 50 | 3 Hours | 100 |
| | | DSC 3 | Programming in C and Python | 4 | 0 | 4 | 4 | 0 | 2 | 10 | 10 | 05 | 05 | 70 | 50 | 3 Hours | 100 |
| | II | DSC 4 | Problem Solving and Data Structure | 4 | 0 | 4 | 4 | 0 | 2 | 10 | 10 | 05 | 05 | 70 | 50 | 3 Hours | 100 |
| | | DSC 5 | Database Management System | 4 | 0 | 4 | 4 | 0 | 2 | 10 | 10 | 05 | 05 | 70 | 50 | 3 Hours | 100 |
| | | DSC 6 | Visual Programming | 4 | 0 | 4 | 4 | 0 | 2 | 10 | 10 | 05 | 05 | 70 | 50 | 3 Hours | 100 |
| II | III | DSC 7 | Operating system | 4 | 0 | 4 | 4 | 0 | 2 | 10 | 10 | 05 | 05 | 70 | 50 | 3 Hours | 100 |
| | | DSC 8 | Advanced Visual Programming | 4 | 0 | 4 | 4 | 0 | 2 | 10 | 10 | 05 | 05 | 70 | 50 | 2 Hours | 50 |
| | | DSC 9 | Software Engineering | 4 | 0 | 4 | 4 | 0 | 2 | 10 | 10 | 05 | 05 | 70 | 50 | 2 Hours | 50 |
| | IV | DSC 10 | Java Programming | 4 | 0 | 4 | 4 | 0 | 2 | 10 | 10 | 05 | 05 | 70 | 50 | 3 Hours | 100 |
| | | DSC 11 | Computer Networks | 4 | 0 | 4 | 4 | 0 | 2 | 10 | 10 | 05 | 05 | 70 | 50 | 3 Hours | 100 |
| | | DSC 12 | Object Oriented Analysis and Design | 4 | 0 | 4 | 4 | 0 | 2 | 10 | 10 | 05 | 05 | 70 | 50 | 3 Hours | 100 |

| Year | Sem | Corse | Title | Hours / Week | | | Credits | | | Maximum Marks | | | | | | Exam Duration | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Th IA | | Pr IA | | Exam | | | |
| | | | | L | T | P | L | T | P | C1 | C2 | C1 | C2 | Th | Pr | | |
| | | **DSE** | **Any Three of the Following for DSE1, DSE2 and DSE3** | | | | | | | | | | | | | | |
| **III** | **V** | **DSE 5.1** | Operational Research | **4** | **0** | **4** | **4** | **0** | **2** | **10** | **10** | **05** | **05** | **70** | **50** | **3 Hours** | **100** |
| | | **DSE5.2** | Data warehouse and Data mining | **4** | **0** | **4** | **4** | **0** | **2** | **10** | **10** | **05** | **05** | **70** | **50** | **3 Hours** | **100** |
| | | **DSE 5.3** | E-Commerce Technology | **4** | **0** | **4** | **4** | **0** | **2** | **10** | **10** | **05** | **05** | **70** | **50** | **3 Hours** | **100** |
| | | **DSE 5.4** | PHP Programming | **4** | **0** | **4** | **4** | **0** | **2** | **10** | **10** | **05** | **05** | **70** | **50** | **3 Hours** | **100** |
| | | **DSE 5.5** | Cloud Computing | **4** | **0** | **4** | **4** | **0** | **2** | **10** | **10** | **05** | **05** | **70** | **50** | **3 Hours** | **100** |
| | | **DSE 5.6** | Analysis and Design of Algorithm | **4** | **0** | **4** | **4** | **0** | **2** | **10** | **10** | **05** | **05** | **70** | **50** | **3 Hours** | **100** |
| | | **DSE 5.7** | J2EE | **4** | **0** | **4** | **4** | **0** | **2** | **10** | **10** | **05** | **05** | **70** | **50** | **3 Hours** | **100** |
| | | **DSE 5.8** | Numerical Techniques and Statistics | **4** | **0** | **4** | **4** | **0** | **2** | **10** | **10** | **05** | **05** | **70** | **50** | **3 Hours** | **100** |
| | | **DSE 5.9** | Computer Graphics | **4** | **0** | **4** | **4** | **0** | **2** | **10** | **10** | **05** | **05** | **70** | **50** | **3 Hours** | **100** |
| | | **SEC** | **Any One of the Following for SEC1 and SEC2** | | | | | | | | | | | | | | |
| | | **SEC 1.1** | R Programming | **1** | **0** | **2** | **1** | **0** | **1** | **05** | **05** | **05** | **05** | **40** | **40** | **2 Hours** | **50** |
| | | **SEC 1.2** | Computer Simulation | **1** | **0** | **2** | **1** | **0** | **1** | **05** | **05** | **05** | **05** | **40** | **40** | **2 Hours** | **50** |
| | | **SEC 1.3** | Graphics Design Interface using c# | **1** | **0** | **2** | **1** | **0** | **1** | **05** | **05** | **05** | **05** | **40** | **40** | **2 Hours** | **50** |
| | | **SEC 1.4** | XML Programming | **1** | **0** | **2** | **1** | **0** | **1** | **05** | **05** | **05** | **05** | **40** | **40** | **2 Hours** | **50** |

| Year | Sem | Corse | Title | Hours / Week | | | Credits | | | Maximum Marks | | | | | | Exam Duration | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Th IA | | Pr IA | | Exam | | | |
| | | | | L | T | P | L | T | P | C1 | C2 | C1 | C2 | Th | Pr | | |
| | | **DSE** | **Any Two of the Following for DSE4 and DSE 5** | | | | | | | | | | | | | | |
| **III** | **VI** | **DSE 6.1** | Android Programming | **4** | **0** | **4** | **4** | **0** | **2** | **10** | **10** | **05** | **05** | **70** | **50** | **3 Hours** | **100** |
| | | **DSE6.2** | Multimedia Computing | **4** | **0** | **4** | **4** | **0** | **2** | **10** | **10** | **05** | **05** | **70** | **50** | **3 Hours** | **100** |
| | | **DSE 6.3** | Fuzzy Logic | **4** | **0** | **4** | **4** | **0** | **2** | **10** | **10** | **05** | **05** | **70** | **50** | **3 Hours** | **100** |
| | | **DSE 6.4** | Internet Programming | **4** | **0** | **4** | **4** | **0** | **2** | **10** | **10** | **05** | **05** | **70** | **50** | **3 Hours** | **100** |
| | | **DSE 6.5** | Microprocessor | **4** | **0** | **4** | **4** | **0** | **2** | **10** | **10** | **05** | **05** | **70** | **50** | **3 Hours** | **100** |
| | | **DSE 6.6** | Digital Image Processing | **4** | **0** | **4** | **4** | **0** | **2** | **10** | **10** | **05** | **05** | **70** | **50** | **3 Hours** | **100** |
| | | **DSE 6** | Project Work | **0** | **0** | **12** | **0** | **0** | **6** | **-** | **-** | **15** | **15** | **-** | **70** | **3 Hours** | **100** |
| | | **SEC** | **Any One of the Following for SEC3 and SEC4** | | | | | | | | | | | | | | |
| | | **SEC 2.1** | Advanced R Programming | **1** | **0** | **2** | **1** | **0** | **1** | **05** | **05** | **05** | **05** | **40** | **40** | **2 Hours** | **50** |
| | | **SEC 2.2** | Advanced Computer Simulation | **1** | **0** | **2** | **1** | **0** | **1** | **05** | **05** | **05** | **05** | **40** | **40** | **2 Hours** | **50** |
| | | **SEC 2.3** | Tally | **1** | **0** | **2** | **1** | **0** | **1** | **05** | **05** | **05** | **05** | **40** | **40** | **2 Hours** | **50** |
| | | **SEC 2.4** | Advanced XML | **1** | **0** | **2** | **1** | **0** | **1** | **05** | **05** | **05** | **05** | **40** | **40** | **2 Hours** | **50** |

**JSS COLLEGE FOR WOMEN (AUTONOMOUS)**
**SARASWATHIPURAM MYSURU-570009**

**CBCS SCHEME FOR BCA PROGRAMME**

I SEMESTER

| Ability Enhancement Course | Course | Credits |
|---|---|---|
| AECC 1.1 | English | 3 |
| AECC 1.2 | Kannada / MIL-1 | 3 |
| AECC 1.3 | Constitution of India | 2 |

II SEMESTER

| Ability Enhancement Course | Course | Credits |
|---|---|---|
| AECC 1.1 | English | 3 |
| AECC 1.2 | Kannada / MIL-1 | 3 |
| AECC 1.3 | Environmental Studies | 2 |

III SEMESTER

| Ability Enhancement Course | Course | Credits |
|---|---|---|
| AECC 1.1 | English | 3 |
| AECC 1.2 | Kannada / MIL-1 | 3 |

IV SEMESTER

| Ability Enhancement Course | Course | Credits |
|---|---|---|
| AECC 1.1 | English | 3 |
| AECC 1.2 | Kannada / MIL-1 | 3 |

# BCA I SEMESTER
# DSC 1
# Credit (L: T: P = 4: 0: 2)
# Computer Fundamentals and PC Maintenance (Theory)

**Unit – 1** **16 hrs**

**Computer Fundamentals**

History of computers, Generations, Evolution of Computers, Hardware, Software, firmware, Assembler, Compiler and Interpreters, Types of computers, Computer applications- Business, Scientific, Analog, Digital and Hybrid Computers, Micro, Mini, Mainframe and super computers lap top , palm top.
Basic components of a computer, Input devices- keyboard, mouse, trackball, joystick, scanner, digital camera, bar code reader, Output devices – Monitor: CRT ,LCD, printers : types – impact ( line ,dot matrix, daisy wheel) & non impact (inkjet, laser) Memory Primary memory (ROM, PROM, EPROM, EEPROM, RAM), Secondary Memory (Floppy disks and Hard disks, CDROM,CD R/W DVD, pen drive, external hard disk). Program, software –system software, application software, Machine, Assembly language and High Level languages, translator: compiler, interpreter, assembler.

**Unit – 2** **16 hrs**

**PC Hardware overview**

Introduction, System Configuration, H/w – Bios – Dos interaction, PC – Family: Old generation and New generation, PC – H/w, Product Engineering, AC power Connections, interconnection between boxes, System box components, (inside the system box), Mother Board and its components, Front panel indicators and controllers, Wait state, Interrupts, Peripheral interfaces and controllers, Keyboard interface, Serial and Parallel interface, CRT Display controller, Hard disk controller, Memory refresh, POST sequence

**Unit – 3** **16 hrs**

**HD Controller sub system**: Introduction, Overview of HDC organization, HDC specification and features.
**Display adapters:** CRT display, Color monitor, CRT interface, Composite video, CRT controller principle, Character generator, Video processing logic, different types of display adapters, characteristics.
**Printer controller:** Introduction, Centronics interface, Data buffer, Printer mechanism, new generation printer controller.
Installation and Preventive maintenance: Introduction, Pre-installation planning, Installation practice, Routine checks, Special configuration, Memory up-gradation: Hard disk up-gradation, DOS and S/w up-gradation, Preventive maintenance, System usage (HDC and HDD Models)

**Unit – 4** **16 hrs**

**Trouble shooting:**

Introduction, Computer faults, Nature of faults, Types of faults, Diagnostic programs and tools, Bus faults, Faults elimination process, Dead system, Spurious problems, Security failures, Symptoms observation and Analysis, Fault diagnosis, Troubleshooting levels, Layman checks,

Visual inspection, Mother board problems diagnosis, HDC problems, Display adapter problems, Printer problems, Printer interface problems, HDD problems, Reliability problems, Handling procedures.

**Text book:**


1. IBM PC and Clones- B Govindarajalu-I and II edition
2. M. Mano, Computer System Architecture, Pearson Education 1992
3. W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition, Prentice Hall of India, 2009


## DSC 1: Computer Fundamentals and PC Maintenance (Practical)

## Part A:

1. Explore Windows and DOS basic commands.
2. Creating a merge document containing invitation for a college function to be sent to invitees through a created address book.
3. Create a table containing information regarding Examination Time Table.
4. Create salary slip using a spread sheet.
5. Create Transaction details with Data validation using Excel
6. Create student's details of a class with register number, name, subjects, IA marks and sort it in ascending order using a spread sheet and generate different types of relevant graphs.
7. Create a payroll database using any database management system software.
8. Create a college database to get relevant reports required by the college
9. Create slides for a topic of your choice with animations using any presentation software.
10. Creating a free e mail Id and composing, forwarding, replying to email and creating an address book on web and searching information on web.

## Part B:

**PC Maintenance:**

1. Demonstration of Hardware components like Motherboard, Ram, different cards.
2. Formatting Floppy, Hard Disk.
3. Partitioning Hard Disk.
4. Assembling and Disassembling PC Components.
5. Installation of Printer and other software.
6. Installation of OS XP and windows 7.

# BCA I SEMESTER
# DSC 2
# Credit (L: T: P = 4 : 0 : 2)
# Digital Electronics and Computer Architecture (Theory)

**Unit 1:** **16 hrs**

**Number Systems:** Introduction to number systems- Decimal, Binary (Addition, Subtraction, Multiplication, Division, 1's and 2's complement methods), Octal and hexadecimal number systems, BCD number system and addition of BCD numbers.

Conversion from one number system to another number system. Non-weighted number systems. Excess-3- code and gray code. Conversion between gray and binary codes. Fixed point and floating point representation of numbers.

**Unit 2:** **16 hrs**

Introduction: Boolean algebra: Basic Laws, Demorgan's theorem, duality theorem, sum of products method and products of sum method. Karnaugh map (Not more than 4 variables)

**Logic gates and combinational circuit**

Fundamentals of gates: OR, AND, NOT, EX-OR & EX-NOR gates. Universal gates, combinational logic circuits: Half adder, Full adder, half subtractor & Full subtractor.

**Unit-3** **16 hrs**

Flip-Flops: SR, D, JK, JK Master Slave and T Flip flops.
Decoders: 3 to 8 line
Encoders: Octal to Binary
Multiplexers: 4 to 1 line and 8 to 1 line. De-multiplexer:
Counters: 3 bit binary Asynchronous binary counter, 3 bit synchronous binary counter
Shift registers: four types of shift registers.

**Unit – 4** **16 hrs**

**Computer Architecture:**

CPU Architecture, Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control. Addressing modes – Direct, Indirect, Immediate, Relative, Indexed.

Addressing Format: Zero Address, One address, 1 ½ address, Two address, Three address. I/O interface I/O Transfers – Program controlled, Interrupt controlled, DMA (Direct Memory Access)

Text Book:

1. Floyd -Digital Fundamentals.
2. Computer organization and Architecture: Moris Mano
3. Digital Electronics: V K Mehta
4. Digital Electronics: Malvino, Malvino & Leech.

## DSC 2: Digital Electronics and Computer Architecture (Practical)

## Part A:

1. Verification of Basic gates(AND,OR,NOT)
2. Verification of Universal gates(NAND,NOR,EX-OR)
3. Verification of NAND gate as a Universal gate
4. Verification of NOR gate as a Universal gate
5. Verification of Demorgon's theorem
6. Verification of Half adder
7. Verification of Full Adder
8. Verification of Half subtractor
9. Verification of Full Subtractor

## Part B

10. Conversion of Binary to Gray & gray to Binary Code
11. Simplification of Boolean Expressions using K-Map
12. Flip-Flops: SR FF (clock, without clock)
13. JK FF
14. Toggle FF
15. Delay FF
16. Mod-10 Counter

# BCA I SEMESTER
# DSC 3
# Credit (L: T: P = 4: 0: 2)
### Programming in C and Python (Theory)

**Unit-1** **16 hrs**

Introduction to C language– History, Features and Applications of 'C'. Programming preliminaries – Character set, definitions and declarations of Identifiers, Variables, Constants, Keywords, Data types with examples.

**Operators & expressions** – Various operators & expressions, Operator precedence with example programs

**Control structures –** Decisions making and branching statements, Decisions making and looping statements with example programs. **Arrays –** Definition and need of arrays, 1-d and 2-d arrays with example programs. Introduction to multidimensional arrays.

**Unit - 2** **16 Hrs**

**String handling –** Declarations, Initialization, reading and writing of strings, operations and string functions with example programs.

**Functions:** Definition and neesd of functions. Library functions, user defined functions in detail, functions and arrays, recursion, storage classes with example program. **Structures and Unions –** Definition and use of structures. Declaring, initializing and accessing structure member, arrays of structures, introduction to union.

**Pointers -** Introduction to pointers, Declaring and initializing a pointer, accessing a variable using pointer. pointers and arrays, pointers and functions, pointers and structures with example programs.

**Unit - 3** **16Hrs**

**Overview of Programming:** Structure of a Python Program, Elements of Python

**Introduction to Python:** Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator). Input and Output Statements,

**Unit - 4** **16 Hrs**

**Creating Python Programs:** Control statements Conditional Statement- if...else, Difference between break, continue and pass. (Looping- while Loop, for Loop, Loop Control)

**Structures:** Numbers, Strings, Lists, Tuples, Dictionary, Date & Time, Modules, Defining Functions, Exit function, default arguments.

**Reference Books:**


1. C Programming for BCA - Srikanth
2. E. Balaguruswamy – Programming In C – Second edition – Tata Mcgraw Hill Publishing.
3. V. Rajaraman – Computer programming in c – PHI 2000.
4. Byron S Gottfried–Schaum's outline of theory and problems of programming with C
5. M G Venkatesh Murthy - Programming in C.
6. P. K. Sinha & Priti Sinha , "Computer Fundamentals", BPB Publications, 2007.
7. Dr. Anita Goel, Computer Fundamentals, Pearson Education, 2010.
8. T. Budd, Exploring Python, TMH, 1st Ed, 2011
9. Python Tutorial/Documentation www.python.or 2010
10. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely available online.2012


## DSC 3: Programming in C and python (Practical)

## Part-A:

1. PROGRAM to find the roots of the quadratic equation using nested if.
2. Given two numbers PROGRAM to perform arithmetic operations using switch statement.
3. PROGRAM to generate Fibonacci series upto N numbers and to find palindrome or not using Switch Statement.
4. PROGRAM to generate prime numbers using for loop.
5. Program to find sin/cos series using any of the loops.
6. PROGRAM for Addition and Subtraction two M X N matrices
7. PROGRAM to multiply two M X N matrices using Functions
8. PROGRAM to find the factorial of a number using recursion.
9. PROGRAM to find the length, concatenate, copy the strings using inbuilt functions.
10. PROGRAM to calculate the marks card of student using structure.
11. PROGRAM to swap two numbers using function and pointers.

## Part-B:

1. WAP to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria Grade A: Percentage >=80, Grade B: Percentage>=70 and <80, Grade C: Percentage>=60 and <70, Grade D: Percentage>=40 and <60, Grade E: Percentage<40
2. WAP to find the largest of three number
3. WAP to find the given number is Palindrome or not
4. WAP to display the first n terms of Fibonacci series.
5. WAP to find factorial of the given number
6. Generate Prime Numbers
7. WAP to find sum of the following series for n terms: 1 – 2/2! + 3/3! - - - - - n/n!
8. WAP to Transpose a Matrix
9. WAP to calculate the sum and product of two compatible matrices.

## BCA II SEMESTER
## DSC 4
## Credit (L : T : P = 4 : 0 : 2)
## Problem Solving and Data Structures (Theory)

### Unit 1: 16 hrs

**Techniques of Problem Solving:** Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation, Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming. **Basic File System Operations:** Create, open, close, extend, delete, read-block, write-block, protection mechanisms. **Data Structure:** Fundamentals, Primitive & Non primitive data structure, Operations on primitive data structure.

### Unit 2: 16 hrs

**Arrays:** Introduction as linear data structure, Different operations on array:
Traversal, Insertion, Deletion, Sorting, Searching, Merging, Simple applications to implement traversing, **Sorting:** Bubble sort, insertion sort, selection sort, merge sort. **Searching** - linear search, binary search. Merge 2 arrays.
**Two dimensional arrays as linear data structure:** Memory representation with address computation, Computation of simultaneous equation using Gauss elimination procedure. **Stack:** Introduction as linear data structure, Memory representation of stacks, Push & Pop operations, Implementation of Push and Pop algorithms using arrays, and linked list, application of stack:

### Unit 3: 16 hrs

**Linear Queue:** Introduction as linear data structure, Memory representation of linear queue, Different operations on linear queue, insertion, deletion, implementation of insertion & deletion algorithms using arrays, Disadvantages of linear queue. Application of Queues.
**Circular Queue:** Introduction as linear data structure, Memory representation of circular data structure, Different operations on circular queue, insertion, deletion, Implementation of insertion & deletion algorithms using arrays. **Single Linked List:** Introduction as linear data structure, Memory representation of linked list, Different operations on linked list (inserting and deleting a node at front rear and at position), traversing, searching an item in linked list in sorted list and in unsorted list,

### Unit 4: 16 hrs

**Double Linked List:** Inserting a node into the linked list, Deleting a node from the linked list, Concept of garbage collection, Variations in linked list, difference between single and double linked list and application of linked list.
**Trees :** Introduction as nonlinear data structure ,Concepts of node, terminal node, depth, general tree, Definition for binary tree, left skewed tree, right skewed tree, Memory representation using arrays and linked list, Tree traversal algorithms (preorder, post order, in

order) using recursive method, Implementation of tree traversal algorithms using linked list representation, hashing.

**Text books :-**

1. Trembly and Sorenson- Data structure - Tata McGraw Hill Pub
2. Dromey - How to solve it by computer - PHI
3. Rajaraman. V – Data Structure Studies of Computer Science

**Reference Books:**

1. M.T. Goodrich, R. Tamassia and D. Mount, Data Structures and Algorithms in C++, John Wiley and Sons, Inc., 2004.
2. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, Introduction to Algorithms, 2nd Ed. Prentice-Hall of India, 2006.

## DSC 4: Data Structure using C and Python (Practical)

**Part-A**

1. Write a program to search an element (Sequential & Binary)
2. Write a program to sort the array using Bubble sort.
3. Write a program to sort the array selection sort.
4. Write a program to sort the array insertion sort.
5. Write a program to sort the array merge sort.
6. Write a program to implement the stack using arrays (push and pop).
7. Write a program to implement tower of Hanoi.
8. Write a program to implement Linear queue using arrays (insertion & deletion)
9. Write a program to implement Circular queue using arrays (insertion & deletion)
10. Write a program to solve the simultaneous equations using gauss elimination.

**Part-B**

1. Write a program to implement the stack using linked list (push and pop).
2. Write a program to implement Linear queue using linked list(insertion and deletion)
3. Write a program to implement circular queue using linked list (insertion and deletion)
4. Write a program to add and delete a node at the beginning in single linked list.
5. Write a program to add and delete a node at the end in single linked list.
6. Write a program to add and delete a node at the specified position in single linked list.
7. Write a program to search an element in single linked list.
8. Write a program to add and delete a node at the beginning in double linked list.
9. Write a program to add and delete a node at the end in double linked list.
10. Write a program to traverse the tree in order, preorder and postorder using recursive algorithms.

# BCA II SEMESTER
# DSC 5
# Credit (L: T: P = 4: 0: 2)
# Database Management System (Theory)

**Unit 1: DBMS** **16 hrs**

**DBMS:** Introduction, Problems with File-based system, objectives of database management, Database administrator, Database Designers, Data Models, Schemas and instances, Three-Schema Architecture, DBMS languages.

E-R diagram with some case-study (Strong entity and weak entity), Different types of keys (Primary key, Secondary key, Candidate key, foreign key and Alternate key)

**Normalization:** Functional dependency, first NF, second NF, third normal form, BCNF.

**Unit 2: RDBMS** **16 hrs**

**RDBMS:** Introduction to RDBMS, Structure of Relational Database, Relational Algebra, Extended Relational Algebra Operations, Modification of the Database, Tuple Relational Calculus

**Relational Algebra** – Select Project, Union, Intersection, Difference, Cartesian product, Join, Equijoin, Natural Join, Outer Join, and Outer Union Operation. Examples of queries in Relational Algebra

**Unit 3: SQL Commands** **16 hrs**

**SQL:** Introduction, data types and table definition-constraints, null primary key, Unique, check and Referential Integrity, SQL function, SET operator (Union, Union all, Intersect, Difference), SQL Operator (Arithmetic, Comparison, Logical operator).

DDL – Create, Alter, Truncate, View and Drop command .

DML - Insert, Select with different clauses (Simple, Nested Queries), Update and Delete Command.

DCL – Grant privilege command, Revoke privilege command.

Transaction control Language- commit, save point, Rollback command.

**Unit 4: Triggers and PL/SQL** **16 hrs**

**Database Triggers:** Introduction, use of database triggers, types of triggers – row triggers, statement triggers, before triggers, after triggers, combination triggers, deleting a trigger.
**PL/SQL:** Introduction, Advantages of PL/SQL, The generic PL/SQL block, The character set, literals, data types, variables, constants, LOB types, Logical comparisons, control structure – conditional control, iterative control, sequential control.

**PL/SQL Security** – Types of locks, levels of locks, Explicit locking.

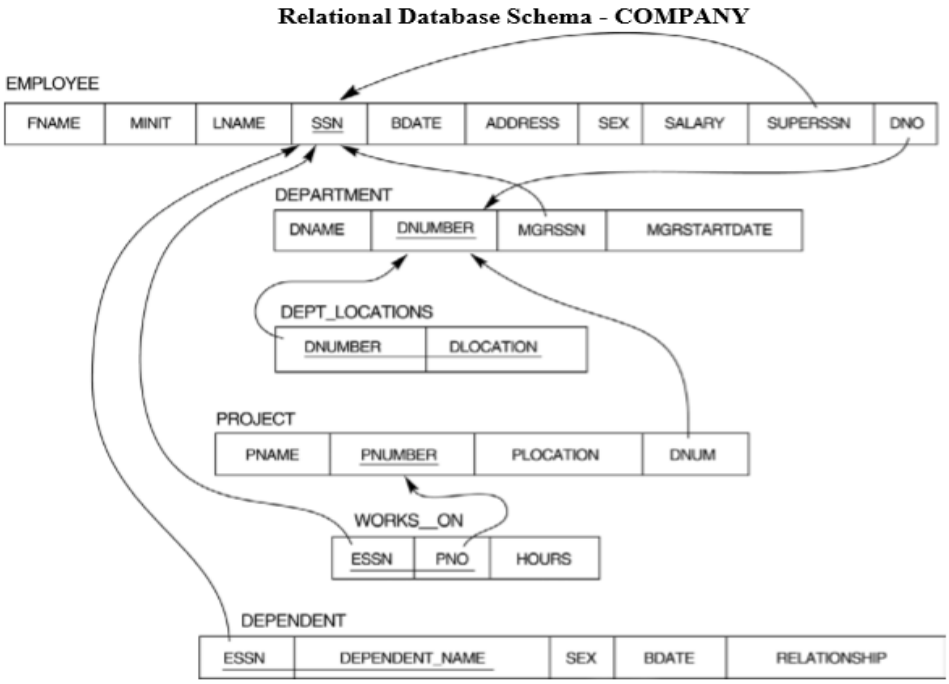
**Text Book:**

1.SQL, PL/SQL The programming language of oracle, 4th edition – Ivan Bayross
2.SQL : Ivan Bayross

**Reference Books:**

1.Database system concepts 4th edition by Korth, Sudarshan, Silberchatz.
2.Database system: Navathe
3.Database Management Systems : Alexis Leon & Mathews Leon

## DSC5 Database Management System (Practical)




1. Create tables with relevant foreign key constraints
2. Populate the tables with data
3. Perform the following queries on the database :
   a. Display all the details of all employees working in the company.
   b. Display ssn, lname, fname, address of employees who work in department no 7.
   c. Retrieve the birthdate and address of the employee whose name is 'Franklin T. Wong'
4. Retrieve the name and salary of every employee
5. Retrieve all distinct salary values
6. Retrieve all employee names whose address is in ‘Bellaire’
7. Retrieve all employees who were born during the 1950s
8. Retrieve all employees in department 5 whose salary is between 50,000 and 60,000(inclusive)
9. Retrieve the names of all employees who do not have supervisors
10. Retrieve SSN and department name for all employees

11. Retrieve the name and address of all employees who work for the 'Research' department
12. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birth date.
13. For each employee, retrieve the employee's name, and the name of his or her immediate supervisor.
14. Retrieve all combinations of Employee Name and Department Name
15. Make a list of all project numbers for projects that involve an employee whose last name is 'Narayan' either as a worker or as a manager of the department that controls the project. 16. Increase the salary of all employees working on the 'ProductX' project by 15%. Retrieve employee name and increased salary of these employees.
17. Retrieve a list of employees and the project name each works in, ordered by the employee's department, and within each department ordered alphabetically by employee first name.
18. Select the names of employees whose salary does not match with salary of any employee in department.
19. Retrieve the employee numbers of all employees who work on project located in Bellaire, Houston, or Stafford.
20. Find the sum of the salaries of all employees, the maximum salary, the minimum salary, and the average salary. Display with proper headings.
21. Find the sum of the salaries and number of employees of all employees of the 'Marketing' department, as well as the maximum salary, the minimum salary, and the average salary in this department
22. Select the names of employees whose salary is greater than the average salary of all employees in department 10.
23. For each department, retrieve the department number, the number of employees in the department, and their average salary.
24. For each project, retrieve the project number, the project name, and the number of employees who work on that project.
25. Change the location and controlling department number for all projects having more than 5 employees to 'Bellaire' and 6 respectively. 27. For each department having more than 10 employees, retrieve the department no, no of employees drawing more than 40,000 as salary.
26. Delete all dependents of employee whose ssn is '123456789'.
27. Delete an employee from Employee table with ssn = '12345'( make sure that this employee has some dependents, is working on some project, is a manager of some department and is supervising some employees). Check and display the cascading effect on Dependent and Works on table. In Department table MGRSSN should be set to default value and in Employee table SUPERSSN should be set to NULL 31. Perform a query using alter command to drop/add field and a constraint in Employee table.
28. Create different users by granting different privileges to them and Revoke the users
29. Write a PL SQL program according to the syllabus

# BCA II SEMESTER
# DSC 6
# Credit (L: T: P = 4: 0: 2)
# Visual Programming (Theory)

**Unit 1** **16 hrs**

**I**ntroduction to C#, Understanding C# environment, Overview of C#, Literals, variables, and Data types, operators and expressions, Decision making and branching, Decision making and looping, Methods in C#, Handling Arrays, Manipulating Strings.

**Unit 2** **16 hrs**

Structures and Enumerations, Classes and Objects, Constructor, destructor,Inheritance and polymorphism, interface: multiple inheritance. Operator overloading, Delegates and Events.

**Unit 3** **16 hrs**

Managing errors and exceptions, multithreading in C#, Managing Console I/O Operation, **Memory management and pointers:** Memory management under the Hood, value data types, reference data types, garbage collection, freeing unmanaged resources (Refer Wrox programmer to programmer page no. 329-335)

**Unit 4** **16 hrs**

**Windows Forms:** Control class, Standard controls and components (check box, radio button, comboBox, ListBox, Checked List Box, Label, Listview, picture box, textbox, rich text box, panel, flow layout panel and table lay out panel, tool strip, menu strip(Refer Wrox programmer to programmer only the mentioned standard controls))

**ADO.Net overview,** Using database connection, commands (Refer Wrox programmer to programmer page no. 846-860) **Fast Data Access:** Data Reader, Data Set class (Refer Wrox programmer to programmer page no. 863-870)

**Text Book :**

Programmer in C# A Primer by Balagurusamy E.

Wrox Programmer to Programmer Professional C# 2008

## DSC 6 Visual Programming (Practical)

**Part A:**

1. Console application using class and objects
2. Console application to perform Stack operation.
3. Console application to reverse the number and to find palindrome or not.
4. Console application to find the product of two matrices.
5. Console application to display the marks of a student using struts
6. Console application to perform string handling functions.
7. Console application to create user defined exception
8. Console Application to perform operator overloading
9. Console application to achieve multiple inheritances using interface.
10. Console application to assign the priority to a thread.

**Part B:**

1. Design a calculator using windows application
2. Design a window application to calculate the NET SALARY of an Employee
3. Design a window application using check box and option button
4. Design a window application using list box and combo box
5. Design a window application using picture box.
6. Design a window application for edit menu and change the size of the font using menu strip and tool strip
7. Design a window application to use a frame control to navigate to web pages
8. design a window application to Display Content in a Multitabbed User Interface
9. Design a window application to insert, delete, update and search operation of a student information
10. Design a window application to bind data to combo box

# BCA III SEMESTER
# DSC 7
# Credit (L: T: P = 4: 0: 2)
# Operating System (Theory)

**Unit - 1** **16 Hours**

**Introduction:** Fundamentals of Operating System: An introduction, History, Types of operating system, multi-user, single user, batch systems, multitasking, multiprogramming, real time systems
Operating system functions/services: System calls, System programs
**Process Management:** Process concept, Process state, Process control block
Initiating the OS, process address space, process abstraction, resource abstraction, process hierarchy, Thread model**,** CPU scheduling CPU-I/O burst cycle, CPU schedulers, Scheduling queues, Scheduling criteria

**Unit - 2** **16 Hours**

**Scheduling algorithms:** FIFS scheduling, SJF schedules, Priority scheduling, Round robin scheduling.
**Deadlocks:** Characterization, Methods for handling deadlocks, Deadlock Prevention, mutual exclusion, hold and wait, no pre-emption, circular wait, Deadlock avoidance, safe state, Banker's algorithm, Deadlock detection, single and several instances of resources type.

**Unit - 3** **16Hours**

**Memory Management:** Mapping addresses space to memory space. Memory allocation strategies, fixed partition, variable partition, paging, virtual memory
**Device scheduling:** Disk scheduling, FCFS, SSTF (Shortest seek time first), Disk Management, formatting, Swap space management, use, location

**Unit - 4** **16 Hours**

**Shell introduction and Shell Scripting**: What is shell and various type of shell, Various editors present in Linux, Different modes of operation in vi editor, What is shell script, Writing and executing the shell script, Shell variable (user defined and system variables), System calls, Using system calls, Pipes and Filters, Decision making in Shell Scripts (If else, switch), Loops in shell, Functions, Utility programs (cut, paste, join, tr , uniq utilities), Pattern matching utility (grep)

**Reference Books:**


1. A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8th Edition, John Wiley Publications 2008.
2. A.S. Tanenbaum, Modern Operating Systems, 3rd Edition, Pearson Education 2007.
3. G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education 1997.
4. W. Stallings, Operating Systems, Internals & Design Principles , 5th Edition, Prentice Hall of India. 2008.
5. M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill 1992.

## DSC 7 Operating Systems (Practical):

**Part A:**

1. Usage of following commands: ls, pwd, tty, cat, who, who am I, rm, mkdir, rmdir, touch, cd.
2. Usage of following commands: cal, cat(append), cat(concatenate), mv, cp, man, date.
3. Usage of following commands: chmod, grep, tput (clear, highlight), bc.
4. Write a shell script to check if the number entered at the command line is prime or not.
5. Write a shell script to modify "cal" command to display calendars of the specified months.
6. Write a shell script to modify "cal" command to display calendars of the specified range of months.
7. Write a shell script to accept a login name. If not a valid login name display message Entered login name is invalid.
8. Write a shell script to display date in the mm/dd/yy format.
9. Write a shell script to display on the screen sorted output of "who" command along with the total number of users.
10. Write a shell script to display the multiplication table any number,

**Part B:**

1. Write a shell script to compare two files and if found equal asks the user to delete the duplicate file.
2. Write a shell script to find the sum of digits of a given number.
3. Write a shell script to merge the contents of three files, sort the contents and then display them page by page.
4. Write a shell script to find the LCD (least common divisor) of two numbers.
5. Write a shell script to perform the tasks of basic calculator.
6. Write a shell script to find the power of a given number.
7. Write a shell script to find the factorial of a given number.
8. Write a shell script to check whether the number is Armstrong or not.
9. Write a shell script to check whether the file have all the permissions or not.
10. Program to show the pyramid of special character "*".

# BCA III SEMESTER
# DSC 8
# Credit (L: T: P = 4 : 0 : 2)
# Advanced Visual Programming (Theory)

**Unit 1:** **16 hrs**

**Getting Started with ASP.Net:** what is static web page, how are static web pages served, how are dynamic web pages served : Two ways of providing Dynamic Web Page content, An overview of the Technologies, What is ASP .NET, how does ASP.NET differ from ASP?.**Anatomy of an ASP.NET:** What is .NET: The .Net base class, How ASP.NET works **Forms and HTML Server Controls:** Simple web Theory, HTML Forms, How the <form> tag works in ASP.NET, **Introducing XML:** The format of XML, Examples of Markup Languages, creating an XML document, Styling XML.

**Unit 2:** **16 hrs**

**Event-driven programming and post back:** What is an event?, What is event-driven programming, ASP.NET events, Events in html, server control events in ASP.Net, event-driven programming and post back.

**Objects in ASP.NET:** Namespaces, The page class, ASP.NET core objects. **HTML5 & CSS3 Design with ASP.NET:** HTML5 Overview, CSS3 Overview, Working with HTML and CSS in Visual Studio. **ASP.NET Web Forms Structure:** The ASP.NET Page Structure Options, ASP.NET 4.5 Page Directives, ASP.NET Page Events, Dealing with Post backs. **ASP.NET Server Controls and Client-Side Scripts:** ASP.NET Server Controls, HTML Server Controls, Identifying ASP.NET Server Controls.

**Unit 3:** **16 hrs**

**ASP.NET Web Server Controls:** An Overview of Web Server Controls: The Label Server Control, The Literal Server Control, The TextBox Server Control, The Button Server Control, The DropDownList Server Control, The RadioButton Server Control, AdRotator Server Control. **Validation Server Controls:** Understanding Validation, Client-Side versus Server-Side Validation, ASP.NET Validation Server Controls [page no 202 to 216]. **Data Binding:** Data Source Controls: SqlData Source Control, Access Data Source Control, Xml Data Source Control. Data-Bound Controls [page No 314 to 333].

**Unit 4:** **16 hrs**

**Working With Services:** Communication between Disparate Systems, Building a Simple XML Web Service, Consuming a Simple XML Web Service, Overloading Web Methods, Caching Web Service Responses, Using SOAP Headers. **State Management:** Your Session State Choices, Understanding the Session Object in ASP.NET: Sessions and the Event Model, configuring Session State Management, In-Process Session State, Out-Process Session State, Cookie less session State. Application Object, Cookies. **ASP.NET MVC:** Defining Model-View-Controller, MVC on the Web Today, Model-View-Controller and ASP.NET, Understanding the Routes and URLs, Controllers, Views.

**Text Books:**

Beginning ASP.NET 1.0 with C# - Wrox

ASP.NET 4.5 in C# and VB – Wrox

**Reference Books:** ASP.NET Using C# - Black Book

## DSC 8 Advanced Visual Programming (Practical)

**PART A**

1. Design a web application to find the sum of two numbers.
2. Design a web application to create user login page.
3. Design a web application to format the display message using radio button and checkbox.
4. Design a web application to create feedback form for asp.net textbook using radio button.
5. Design a web application to upload a file.
6. Design a web application to add selected employees from list box to text box.
7. Design a web application to create online shopping using adrotator.
8. Design a web application for online ticket booking using click event.
9. Design a web application to read data from xml and bind to asp data grid.
10. Design a web application to create user details application using grid view.

**PART B**

1. Design a web application to bind data to list box using data bind.
2. Design a web application to bind data source to asp radio button list.
3. Design a web application to add and display the event using calendar control.
4. Design a web application to develop phone book using database connectivity.
5. Design a web application to develop student admission form using database connectivity.
6. Design a webapplication to design an online shopping cart.
7. Design a webapplication to retain inforamtion from one page to another using session.
8. Design a web service program to perform arithmatic operations.
9. Design a web service to convert Celsius to Fahrenheit and Fahrenheit to Celsius.
10. Design a web service to display employee salary information.

# BCA III SEMESTER
# DSC 9
# Credit (L: T: P = 4: 0: 2)
# Software Engineering (Theory)

**Unit - 1** **16 Hours**

**Software Process:** Introduction, S/W Engineering Paradigm, life cycle models (water fall, incremental, spiral, evolutionary, prototyping, object oriented), System engineering, computer based system, verification, validation, life cycle process, development process, system engineering hierarchy.

**Software requirements:** Functional and non-functional, user, system, requirement engineering process, feasibility studies, requirements, elicitation, validation and management, software prototyping, prototyping in the software process, rapid prototyping techniques, user interface prototyping, S/W document.

**Unit - 2** **16 Hours**

Analysis and modeling, data, functional and behavioral models, structured analysis and data dictionary.

**Design Concepts and Principles:** Design process and concepts, modular design, design heuristic, design model and document, Architectural design, software architecture, data design, architectural design, transform and transaction mapping, user interface design, user interface design principles. Real time systems, Real time software design, system design, real time executives, data acquisition system, monitoring and control system.

**Unit - 3** **16 Hours**

**Software Configuration Management:** The SCM process, Version control, Change control, Configuration audit, SCM standards.

**Software Project Management:** Measures and measurements, S/W complexity and science measure, size measure, data and logic structure measure, information flow measure. Estimations for Software Projects, Empirical Estimation Models, Project Scheduling.

**Unit - 4** **16 Hours**

**Testing:** Taxonomy of software testing, levels, test activities, types of s/w test, black box testing, testing boundary conditions, structural testing, test coverage criteria based on data flow, mechanisms, regression testing, testing in the large. S/W testing strategies, strategic approach and issues, unit testing, integration testing, validation testing, system testing and debugging.
**Trends in Software Engineering:** Reverse Engineering and Re-engineering – wrappers – Case Study of CASE tools.

**Text Books:**


1. Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill
2. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.
3. Pankaj Jalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.

**DSC 9 Software Engineering (Practical):**

**Part A: Students has to write Manual Test cases for the Given EXE files**

**Part B: Students has to use any automated testing Software**

# BCA IV SEMESTER
# DSC 10
# Credit (L: T: P = 4: 0: 2)
# Java Programming (Theory)

**Unit 1:** **16 hrs**

**Basic Concept of Object Oriented Programming**

Basic concepts of Object-Oriented Programming: Objects, Classes, Data abstraction, encapsulation Inheritance, Polymorphism, Dynamic binding, Message Communication. Benefits of OOP, Application of OOP, Java History and its features, Java Environment

**Overview of Java Language:**

Simple java program, java program structure, java tokens, java statements, Implementing a java program, java virtual machine, command line arguments, programming style, constants, variables, Data types, Declaration of variables, giving values to variables, scope of variables, scope of variables, symbolic constants, type casting, getting values of variables, standard default values, Operators and Expressions(60-76), Decision making and branching(80-96), Decision making and looping(103-119), Arrays: one-dimensional arrays, creating an array, initialization of arrays, two dimensional arrays, variable size arrays, Strings: string arrays, string methods, string buffer class, Vectors, Wrapper classes, Autoboxing and Unboxing, Enumerated types

**Unit 2:** **16 hrs**

**Classes, Objects and methods**

Defining a class, Fields declaration, methods declaration, creating objects, accessing class members, constructors, method overloading, static members, nesting of methods

**Inheritance**

Definition, types of Inheritance; overriding methods, final variables & methods, final classes, finalizer methods, abstract methods & classes

**Interfaces & Packages**

Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface variables. java packages, using system packages, naming conventions, creating packages, accessing a package, using a package, adding class to a package, hiding classes

**Unit3:** **16hrs**

**Multithreaded Programming:** creating thread, extending the thread class, stopping & blocking a thread, life cycle of a thread, using thread methods, thread exceptions, Thread priority, synchronization, implementing the 'Runnable Interface', Inter-thread communication, suspending, resuming and stropping thread

**Exception Handling** Definition, types of errors, exceptions, syntax of exception handling code, multiple catch statements. Using finally statements, throwing our own exception, using exceptions for debugging

**Unit 4:** **16hrs**

**Applet programming:** Introduction, Local and remote applets, how applets differ from applications, preparing to write applets, building applet code, Applet life cycle, creating an executable applet, designing a web page, more about html tags, displaying numeric values, getting input from the user, Event handling

**Graphics programming:** graphics class, lines and rectangles, circles and ellipses, drawing arcs, line graphs, drawing bar charts, introduction to AWT packages

**I/O Files** Concept of streams, stream class, byte stream, input stream classes, output stream classes character stream classes, using streams, other useful I/O classes ,creating a file, input/output exceptions, creation of files, trading/writing characters, reading/writing bytes, random access files,

**Text Books:**

1. Programming in Java: E Balaguruswamy

## DSC 9 Java Programming (Practical)

**Part A:**

1. Write a program to implement class and object
2. Write a program to pass command line arguments
3. Write a program to perform Stack operation
4. Write a program to find the product of two matrices
5. Write a program to manipulate strings using string handling functions
6. Write a program to achieve hierarchical inheritance
7. Write a program to achieve multiple inheritance using interface
8. Write a program to create a user defined packages.
9. Write a program to implement wrapper classes
10. Write a program to assign the priority to a thread

**Part B:**

1. Write a program to perform Array Index Out Of Bound Exception mechanism
2. Write a program to create user defined exception
3. Design an application to find the factorial of a number and check the number is a prime number using applet
4. Write a applet program for drawing a human face
5. Write a applet program to create a bar charts
6. Write a java program to demonstrate simple calculator
7. Write a program to demonstrate free hand writing in a painter applet.
8. Write a java applet to demonstrate animation using some image file
9. Create a java applet to create student form using java applet
10. Write a program to read and write into a file

# BCA IV SEMESTER
# DSC 11
# Credit (L: T: P = 4: 0: 2)
# Computer Networks (Theory)

**Unit-1** **16hrs**

**Data communication,** Components & Basic Concepts Line Configuration: Point – to – Point, Multipoint. Topology: Mesh, Star, Tree, Bus, Ring, hybrid Topologies. Transmission Modes: Simplex, Half-Duplex, Full-Duplex. Categories of Networks: LAN, MAN, WAN, Internet Works.

**Transmission Media**

Guided Media: Twisted pair cable, Co-axial Cable, Optical Fibre. Unguided Media : Radio Frequency Allocation , Propagation of Radio Waves ,

Terrestrial Microwaves , Satellite Communication , Cellular Telephony.

**Unit-2** **16hrs**

**Multiplexing:** Many to one / One to Many, Types of Multiplexing frequency -division Multiplexing, Time-division Multiplexing, Multiplexing applications

Introduction Analog & Digital Signals Amplitude, Period & Phase, Use of Analog Signals to transmit digital data.

**Encoding**

**Analog to Digital Encoding** Pulse Amplitude Modulation (PAM), Pulse Code Modulation (PCM) sampling rate. Digital to Analog Encoding amplitude shift key (ASK) , Frequency Shift key (FSK) , Phase Shift Key (FSK).

**Analog to Analog Encoding** Amplitude Modulation, Frequency Modulation, and Phase Modulation.

**Digital to Digital Encoding, Line** coding, Block coding

**Unit-3** **16hrs**

**The OSI Model**

Model Layered Architecture Functions of Layers Physical Layer, Data Link Layer, Network Layer, transport Layer, Session Layer, Presentation Layer, and Application Layer.

**TCP/IP**

Overview of TCP/IP , TCP/IP & Internet , TCP/IP & OSI , Encapsulation , Network Layer , Internet work Protocol Other Protocols in the Network Layer , Transport Layer User Datagram Protocol (UDP) , Transmission Control Protocol (TCP) , , ICMP,IGMP, Application Layer , Domain Name system , Telnet , File Transfer Protocol (FTP) , File Transfer using NFS & RPC , Electronic Mail : SMPT , Simple Network Management Protocol(SNMP), Archie, Veronia, Wide area Information Service(WAIS), Hyper Text Transport Protocol (HTTP) .World Wide Web Uniform Resource Labor (URL), Browser Architecture.

**Unit 4** **16hrs**

**Network & Internetworking devices**

Repeaters, Bridges, Types of Bridges, Routers-Routing concepts, gateways

**Error detection**

Types of error Multiple bit error , Burst error Detection Redundancy , Checksum,Block coding

Error Correction Single-bit error correction , Hamming Code CRC IPv4 class full, classless addressing ,Structure of IPv4

IPv6 structure, address apace

**Text book:**

Behrouz Forouzan: Introduction to Data Communication s & Networking

**Reference:**

**Tanenbaum: Computer Networks.**

## DSE 5.1.1.2 (Practical)

1. Program for Identifying well known Ports
2. Program for Data Retrieval from Remote Database.
3. Program for Simulating SMTP Client.
4. Program for Simulating Telnet Client
5. Program for Simple file transfer between two systems, (without using Protocols)
6. Program for implementing HTTP.
7. Program for Downloading Image files.
8. Simulate Checksum Algorithm.
9. Simulate Stop & Wait Protocol.
10. Simulate Go-Back-N Protocol.
11. Simulate Selective Repeat Protocol.
12. Take an example subnet of hosts. Obtain broadcast tree for it.
13. Network address with automatic subnet address generation:

# BCA IV SEMESTER
# DSC 12
# Credit (L: T: P = 4: 0: 2)
# Object Oriented Analysis and Design (Theory)

**Unit - 1** **16Hrs**

**INTRODUCTION:** An overview of Object-Oriented Systems Development, Two Orthogonal Views of the Software, Object-Oriented Systems Development methodology, Why an Object-Oriented? Overview of Unified Approach

Object Basics – Introduction, an Object-Oriented Philosophy, Objects, Objects are Grouped in Classes, Attributes: Objects State and Properties, Object Behavior and Methods, Object Response to Messages, Encapsulation and Information Hiding, Class Hierarchy – Inheritance and Multiple Inheritance, Polymorphism, Object Relationships and Associations, Aggregations and Object Containment.

**Unit – 2** **16 Hrs**

Object-Oriented Systems Development Life Cycle – Introduction, the Software Development Process, Building High Quality Software, Object-Oriented Systems Development: A use case Driven Approach:- Analysis, Design, Prototyping, Implementation and Testing.

Object-Oriented Methodologies – Introduction: Towards Unification – Too many Methodologies

Survey of some of the Object-Oriented Methodologies, Rumbaugh et al.'s Object Modeling Technique, The Booch Methodology, The Jacobson et al. Methodologies, The United Approach

**Unit – 3** **16 Hrs**

Unified Modeling Language – Introduction, Static and Dynamic Models, Why Modeling, Introduction to the UML, UML diagrams, UML Class Diagrams, Use case Diagrams, UML Dynamic Modeling, Model Management: Packages and Model Organization, UML Extensibility:-Model Constraints and Comments, Note, Stereotype, UML Meta – Model.

**MODELING CONCEPTS:** Modeling as a design technique- Modeling, Abstraction, the three models. Class modeling -object and class concepts, link and association concepts.

**Unit – 4** **16 Hrs**

Object – Oriented Analysis Process: Identifying use cases – Introduction, Why Analysis is a Difficult Activity, Business Object Analysis: Understanding the business layer, Use – case driven Object Oriented Analysis: The Unified Approach, Business Process Modeling, Use – case Model, Developing Effective Documentation, Case Study: Analyzing the Via Net Bank ATM

View layer: Designing Interface Objects – Introduction, User Interface Design as a Creative Process, Designing View Layer Classes, Macro Level Process, Micro Level Process, The Purpose of View Layer Interface, Prototyping the User Interface, Case Study: Designing User Interface for the Via Net Bank ATM.

**Text Book:** Object Oriented Systems Development – Ali Bahrami [McGraw Hill]

**Reference Books:**


1. Object –oriented modeling and design- Michael R Blaha and James R Rumbaugh
2. Fowler, Martin and Scott, Kendall, UML Distilled:
3. Object Oriented Design with Applications – Menlo Park, Booch, Grady
4. Designing Flexible Object Oriented systems with UML – Charles Ritcher
5. Object Oriented Modeling and Design - James Rumbaugh
6. Object Oriented Analysis & Design, Sat/.inger. Jackson, BurdThomson
7. Teach Yourself UML in 24 Hours - Joseph Schmuilers

Object Oriented Analysis 2nd Ed. Englewood Chiffs.


## DSC 12 Object Oriented Analysis and Design (Practical)

**To develop a mini-project following the 12 exercises listed below.**

1. To develop a problem statement.
2. Develop an IEEE standard SRS document. Also develop risk management and project plan (Gantt chart).
3. Identify Use Cases and develop the Use Case model.
4. Identify the business activities and develop an UML Activity diagram.
5. Identity the conceptual classes and develop a domain model with UML Class diagram.
6. Using the identified scenarios find the interaction between objects and represent them using UML Interaction diagrams.
7. Draw the State Chart diagram.
8. Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
9. Implement the Technical services layer.
10. Implement the Domain objects layer.
11. Implement the User Interface layer.
12. Draw Component and Deployment diagrams.

**Suggested domains for Mini-project.**

1. Passport automation system.
2. Book bank
3. Exam Registration
4. Stock maintenance system.
5. Online course reservation system
6. E-ticketing
7. Software personnel management system
8. Credit card processing
9. e-book management system
10. Recruitment system
11. Foreign trading system
12. Conference Management System
13. BPO Management System

# BCA V SEMESTER
# DSE 1: Elective
# Credit (L: T: P = 4: 0: 2)
# Elective 5.1 Operation Research (Theory)

**Unit 1:** **16Hrs**

**Operations Research:** Introduction, scope of OR, faces of OR, Models in OR, classification of models, uses and limitations of OR, OR and decision making.

Linea Programming: Introduction, formulation of LPP-general and matrix form of LPP, advantages of linear programming, limitations of linear programming, application area of linear programming.

Graphical method: introduction, important definitions, procedure for solving LPP by Graphical method, general formulation of LPP, matrix form of LPP, canonical or standard form of LPP, special cases in LPP.

**Unit 2:** **16Hrs**

**Simplex method:** introduction, simplex algorithm- exercises.

**Artificial variable technique:** introduction, the charne's Big M method- exercises, the two phase simplex method- exercises, Degeneracy- method to resolve degeneracy- exercises, unbounded solutions,

**Duality in linear programming:** Introduction, formation of Dual problems, Definition, important result in Duality, Dual simplex method – exercises.

**Unit 3:** **16Hrs**

**Transportation Problem:** introduction, mathematical formulation, definition, optimal solution- North-West corner method, Least-cost method, Vogel's method, optimality test- Modi method, the stepping stone method.

**Assignment Problem:** Introduction, Mathematical formulation of the problem, Difference between Transportation and Assignment Problem.

**Hungarian method:** exercises, unbalanced assignment problem, maximization in assignment problem- travelling salesman problem, Mathematical formulation exercises.

**Unit 4:** **16Hrs**

**Network scheduling by PERT/CPM:**

Introduction, basic term, common error, rules of network construction, numbering the events(Fulkerson's Rules)- construction of network, time analysis- forward pass computations(For Earliest Event Time)- Backward Pass Computations(for latest allowable tome)- determination of Floats and Slack times, critical path method(CPM)- exercises, program evaluation and review technique(PERT)- PERT procedure- exercises, cost consideration in PERT/CPM- project cost-cost slope-time-cost optimization algorithm-exercises

**TEXT BOOK:**

1. **OPERATIONAL RESEARCH: JK SHARMA 2$^{ND}$ edition**
2. **OPERATIONAL RESEARCH: Kalavathy 4$^{th}$ edition**

## Elective 5.1 Operation Research (Practical) As Per the Syllabus

## BCA V SEMESTER
## DSE 1: Elective
## Credit (L: T: P = 4: 0: 2)
## Elective 5.2 Operation Research (Theory)

**Unit - 1** **16 Hrs**

**Data Warehousing:** Introduction- Definition and description need for data ware housing, need `for strategic information, failures of past decision support systems, OLTP vs DWH-DWH requirements-trends in DWH-Application of DWH.

**Data Warehousing Architecture:** Reference architecture- Components of reference architecture - Data warehouse building blocks, implementation, physical design process and DWH deployment process.

**Unit - 2** **16 Hrs**

A Multidimensional Data, Model Data Warehouse Architecture.

**Data Mining:** Data mining tasks-Data mining vs KDD- Issues in data mining, Data Mining metrics, Data mining architecture - Data cleaning- Data transformation- Data reduction - Data mining primitives.

**Unit - 3** **16 Hrs**

**Association Rule Mining:** Introduction - Mining single dimensional Boolean association rules from transactional databases - Mining multi-dimensional association rules.

**Classification and Prediction:** Classification Techniques - Issues regarding classification and prediction - decision tree - Bayesian classification –Classifier accuracy.

**Unit - 4** **16 Hrs**

**Clustering**: Clustering Methods - Outlier analysis.

**Applications and Other Data Mining Methods:** Distributed and parallel Data Mining Algorithms, Text mining- Web mining.

**Reference Books:**


1. Jiawei Han and Micheline Kamber, ” Data Mining Concepts and Techniques”, Morgan Kaufmann Publishers, USA, 2006.
2. Berson,”DataWarehousing, Data Mining and OLAP”, Tata McGraw Hill Ltd, New Delhi, 2004.
3. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, , Pearson Education.
4. Arun K Pujari,”Data mining techniques”, Oxford University Press, London, 2003.
5. Dunham M H,”Data mining: Introductory and Advanced Topics”. Pearson Education, New Delhi, 2003.
6. Mehmed Kantardzic,” Data Mining Concepts, Methods and Algorithms”, John Wiley and Sons, USA, 2003.
7. Soman K. P., DiwakarShyam, Ajay V., Insight into Data mining: Theory and Practice, PHI


## Elective 5.2 Data warehouse and Data Mining (Practical): As Per the Syllabus

## BCA V SEMESTER
## DSE : Elective
## Credit (L: T: P = 4: 0: 2)
## Elective 5.3 E-Commerce Technologies (Theory)

**Unit - 1** **16 Hrs**

**An introduction to Electronic commerce:** What is E-Commerce (Introduction And Definition), Main activities E-Commerce, Goals of E-Commerce, Technical Components of E-Commerce, Functions of E-Commerce, Advantages and disadvantages of E-Commerce, Scope of E-Commerce, Electronic Commerce Applications, 9 Electronic Commerce and Electronic Business(C2C)(C2G,G2G, B2G, B2P, B2A, P2P, B2A, C2A, B2B, B2C)

**The Internet and WWW:** Evolution of Internet, Domain Names and Internet Organization (.edu, .com, .mil, .gov, .net etc.) , Types of Network, Internet Service Provider, World Wide Web, Internet & Extranet, Role of Internet in B2B Application, building own website, Cost, Time, Reach, Registering a Domain Name, Web promotion, Target email, Baner, Exchange, Shopping Bots.

**Unit - 2** **16 Hrs**

**Internet Security:** Secure Transaction, Computer Monitoring, Privacy on Internet, Corporate Email privacy, Computer Crime( Laws , Types of Crimes), Threats, Attack on Computer System, Software Packages for privacy, Hacking, Computer Virus( How it spreads, Virus problem, virus protection, Encryption and Decryption, Secret key Cryptography, DES, Public Key Encryption, RSA, Authorization and Authentication, Firewall, Digital Signature( How it Works)

**Unit- 3** **16 Hrs**

**Electronic Data Exchange:** Introduction, Concepts of EDI and Limitation, Applications of EDI, Advantages and Disadvantages of EDI, EDI model, Electronic Payment System: Introduction, Types of Electronic Payment System, Advantages and Disadvantages of Electronic Payment System, Payment Types, Value Exchange System, Credit Card System, Electronic Fund Transfer, Paperless bill, Modern Payment Cash, Electronic Cash.

**Unit - 4** **16 Hrs**

**Planning for Electronic Commerce:** Planning Electronic Commerce initiates, Linking objectives to business strategies, Measuring cost objectives, Comparing benefits to Costs, Strategies for developing electronic commerce web sites.

**Internet Marketing:** The PROS and CONS of online shopping, The cons of online shopping, Justify an Internet business, Internet marketing techniques, The E-cycle of Internet marketing, Personalization e-commerce.

## Elective 5.3 E-Commerce Technologies (Practical): As per the Syllabus

# BCA V SEMESTER
# DSE : Elective
# Credit (L: T: P = 4: 0: 2)
# Elective 5.4 PHP Programming (Theory)

**Unit 1: Introduction** **16hrs**

Introduction to basic PHP concept – Creating first PHP scripts – Using variables and operators – Storing data in variable – Understanding data types – Setting and checking variables data types – Using constants – Manipulating variables with operators.Controlling program flow: Writing simple conditional statements – Writing more complex conditional statements – Repeating action with loops – Working with storing and Numeric functions.

**Unit 2: Arrays and Functions** **16hrs**

Working with Arrays: Simple Arrays – Storing Data in Arrays –Processing Arrays with Loops and Iterations – Using Arrays with Forms – Working with Array Functions –Working with Dates and times.Using Functions: Creating User –Defined Functions. Array Pointer – Sorting Arrays.

**Unit 3: Classes and Objects** **16hrs**

Object oriented concepts, Define a Class – Attributes – Object – Object properties – Methods – Constructors and Destructors – Class constants–Class inheritance – Abstract classes – Extending classes – Static method – Final keyword – Implementing Interface – Object serialization.

**Unit 4: MySQL Database** **16hrs**

History of MySQL – Working with Database and SQL: Introducing Database and SQL – Using MySQL – Building the SQL –Adding and modifying Data – Error Handling – Using SQLite Extension and PDO Extension. Introduction XML – Simple XML – XML installation and XML Handling – XML functions. DOM Extension – Installing DOM XML – DOM XML Functions.

**Text Books:**

- PHP A Beginner's Guide –Vikram vaswani, Tata McGraw –Hill Edition.
- PHP Black Book – Peter Moulding.

**Reference Books:**

- The PHP Complete Reference–Steven Holzer, Tata McGraw–Hill Edition.
- Spring into PHP5 –Steven Holzer, Tata McGraw –Hill Edition.
- PHP4: A Beginner's Guide by William McCarty.
- PHP Reference: Beginner to Intermediate PHP5 by Mario Luring.
- PHP and MySQL Web Development by Laura Thomson and Luke welling.
- Complete Beginner's Guide to PHP: Programming and Web Development by Cedric Palmer.

**Elective 5.4 PHP Programming (Practical) :As per the Syllabus**

# BCA V SEMESTER
# DSE : Elective
# Credit (L: T: P = 4: 0: 2)
# Elective 5.5 Cloud Computing (Theory)

**Unit - 1** **16 Hrs**

**Cloud Introduction:** Cloud Computing Fundamentals: Cloud Computing definition, Types of cloud, Cloud services: Benefits and challenges of cloud computing, Evolution of Cloud Computing , usage scenarios and Applications , Business models around Cloud– Major Players in Cloud Computing - Issues in Cloud - Eucalyptus - Nimbus - Open Nebula, CloudSim.

**Cloud Services And File System:** Types of Cloud services: Software as a Service - Platform as a Service – Infrastructure as a Service - Database as a Service - Monitoring as a Service – Communication as services.

**Unit - 2** **16 Hrs**

Service providers- Google App Engine, Amazon EC2, Microsoft Azure, Sales force.

**Collaborating With Cloud:** Collaborating on Calendars, Schedules and Task Management – Collaborating on Event Management, Contact Management, Project Management – Collaborating on Word Processing , Databases – Storing and Sharing Files- Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Collaborating via Social Networks – Collaborating via Blogs and Wikis.

**Unit - 3** **16 Hrs**

**Virtualization For Cloud:** Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization – System Vm, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM , VMWare, Virtual Box, Hyper-V.

**Unit - 4** **15 Hrs**

**Security, Standards, And Applications:** Security in Clouds: Cloud security challenges – Software as a Service Security, Common Standards: The Open Cloud Consortium – The Distributed management Task Force – Standards for application Developers – Standards for Messaging – Standards for Security, End user access to cloud computing, Mobile Internet devices and the cloud.

**Reference Books:**


1. Bloor R., Kanfman M., Halper F. Judith Hurwitz “Cloud Computing ” Wiley India Edition,2010
2. John Rittinghouse & James Ransome, “Cloud Computing Implementation Management and Strategy”, CRC Press, 2010
3. Antohy T Velte ,Cloud Computing : “A Practical Approach”, McGraw Hill,2009
4. Michael Miller, Cloud Computing: “Web-Based Applications That Change the Way You

Work and Collaborate Online", Que Publishing, August 2008.
5. James E Smith, Ravi Nair, "Virtual Machines", Morgan Kaufmann Publishers, 2006.

**Online Reading/Supporting Material**

1. Haley Beard, "Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing", Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008
2. webpages.iust.ac.ir/hsalimi/.../89.../Cloud%20Common%20standards.pptop ennebula.org,
3. www.cloudbus.org/cloudsim/, http://www.eucalyptus.com/
4. hadoop.apache.org
5. http://hadoop.apache.org/docs/stable/hdfs_design.html
6.http://static.googleusercontent.com/external_content/untrusted_dlcp/research.google.com/en/ /archive /mapreduce-osdi04.pdf

## Elective 5.5 Cloud Computing (Practical): As per the Syllabus

## BCA V SEMESTER
## DSE : Elective
## Credit (L: T: P = 4: 0: 2)
## Elective 5.6 Analyses and Design of Algorithm (Theory)

**Unit – 1** **16 hrs**

**Introduction:** Analysis Framework (worst ,best and average case efficiencies), Asymptotic Notations and Basic Efficiency Classes, Mathematical Analysis of Non-Recursive and Recursive Algorithms.

**Brute Force Approaches** - Selection Sort and Bubble Sort, Sequential Search and Brute Force String Matching,Exhaustive search- Knapsack Problem, Assignment Problem.

**Unit - 2** **16 hrs**

**Divide-and-Conquer approaches:** Introduction, Merge Sort, Quick Sort, Binary Search, Binary tree traversals and properties.

**Decrease-and-Conquer approaches:** Introduction, Insertion Sort, Depth First Search and Breadth First Search.

**Unit – 3** **16hrs**

**Transform-and-Conquer approaches**: Presorting, Gaussian Elimination, Heaps and Heapsort

**Space and time tradeoffs**: Hashing (open and closed hashing), B-trees

**Dynamic programming:** Warshall's Algorithm and Floyd's Algorithm.

**Unit-4** **16 hrs**

**Greedy Technique:** Prim's Algorithm, Kruskal's Algorithm, Huffman trees

**Backtracking:** n-Queens problems , Hamiltonian circuit problem.

**Reference Books:**

1. Anany Levitin: Introduction to The Design & Analysis of Algorithms, 2nd Edition, Pearson Education, 2007.

2. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran: Fundamentals of Computer Algorithms, 2nd Edition, Universities Press, 2007.

3. Analysis & design of Algorithm-Padma Reddy

4. Analysis & design of Algorithms-Chitra Ravi

## Elective 5.6 Analyses and Design of Algorithm (Practical) : As per the Syllabus

# BCA V SEMESTER
# DSE : Elective
# Credit (L: T: P = 4: 0: 2)
# Elective 5.7 J2EE (Theory)

**Unit - 1** **16 Hrs**

**Interdiction:** The ABC of Programming Languages, taking programming languages up a notch, the beginning of java, java byte-code, the advantages of Java, J2EE and J2SE.

**J2EE Multi-Tier Architecture:** Distributive systems, the Tier, J2EE Multi-Tier Architecture, Client Tier Implementation, Web Tier Implementation, Enterprise JavaBeans Tier Implementation, Enterprise Information Systems Tier Implementation, Challenges.

**J2EE Nest Practices:** Enterprise Application Strategy, The enterprise application, clients, Sessions Management, Web Tier and Java Server pages, Enterprise Java Beans Tier, The Myth of using inheritance, Maintainable classes, Performance Enhancements, The power of Interfaces, The power of threads, The power of Notification.

**Unit - 2** **16 Hrs**

**J2EE Database Concepts:** Data, Database, Database Schema, The Art of Indexing.

**JDBC Objects:** The concept of JDBC, JDBC Driver Types, JDBC packages, A Brief overview of the JDBC Process, Database Connection, Associating the JDBC / ODBC Bridge with the database, Statement Objects, Result Set, Transaction Processing, Metadata.

**Unit - 3** **16 Hrs**

**JDBC and Embedded SQL:** Model Programs: Model A Program, Model B Program, Tables: Creating a Table, Dropping a Table, Indexing: Creating an Index, Dropping an Index, Inserting Data into tables: Inserting a Row, Inserting the systems date into a column, Inserting the system Time into a column, Inserting a Timestamp into a column, Selecting Data from a Table: Selecting all data from a Table, Requesting one column, Requesting Multiple column, Requesting rows, Requesting rows and columns, AND, OR, and NOT clauses, Joining multiple compound expressions, equal & not equal operators, Less than & greater than operators, Less than equal to & greater than equal to, BETWEEN, LIKE, IS NULL Operator, DISTINCT Modifier, IN modifier,

**Unit - 4** **16 Hrs**

Metadata: Number of columns in result set, Data type of a column, Name of a column, Column Size, updating Tables: Updating a row and column, updating multiple rows, Deleting Data from a table: Deleting a Row from a table, Joining tables, Calculating Data, Grouping and ordering data, sub queries, view.

**Java Servlets:** Java servlets and common gateway interface programming: Benefits of using a Java servlet, A simple Java servlet, Anatomy of a java servlet: Development Descriptor, Reading Data from a client, Reading HTTP request Headers, Sending Data to a Client & writing the HTTP response Header, Working with cookies, Tracking Sessions, Quick reference guide.

**JAVA Server Pages:** JSP installation, JSP Tags: Variables & objects, Methods, Control Statements, Loops, Tomcat, Request string: Parsing other information, User sessions, cookies, Session objects, Quick reference guide.

**Reference Books:**


1. The complete reference J2EE seventh edition - Java 2 Enterprise edition overview
2. J2EE: The complete Reference - McGraw-Hill Education


## Elective 5.7 J2EE (Practical): As per the Syllabus

## BCA V SEMESTER
## DSE : Elective
## Credit (L: T: P = 4: 0: 2)
## Elective 5.8 Numerical Techniques and Statistics (Theory)

**Unit - 1** **16 hrs**

**Computer Arithmetic:** Fixed and Floating point representation, Normalization of numbers. Errors in numbers.

**Iterative methods:** Bisection method, Regula-Falsi method, Secant method, Newton-Raphson method

**Unit - 2** **16 hrs**

**Matrices and Linear System of Equations:** LU decomposition method, Gauss elimination, Gauss seidal and Gauss Jordan for solving system of equations

**Interpolation:** Polynomial interpolation, Newton-Gregory forward and backward interpolation, Newton's divided differences interpolation formulae.

**Unit - 3** **16 hrs**

**Numerical Integration:** Trapezoidal rule, Simpson's 1/3 rd and 3/8 th rule,

**Numerical Differentiation:** Euler's, modified Euler's and Runge-Kutta (RK) $2^{nd}$ order and $4^{th}$ order.

**Unit - 4** **16 hrs**

**Statistics:** Definition, Importance, Functions and Limitations of statistics.

**Graphic presentation:** Frequency distribution, Histogram, Frequency polygon, frequency curve and O gives Measures of central tendency: (Mean, Median, Mode) Dispersion, Correlation, Regression.

**Text Books**


**1.** K.E. Atkinson, W. Han, Elementary Numerical Analysis, 3rd Ed., Wiley, 2003.
**2.** Computer oriented numerical methods by V Rajaraman
**3.** Statistics Theory and Practice by R S N Pillai, Bagavathi


**Reference Books:**


C. Xavier, S.S. Iyengar, Introduction to Parallel Algorithms, Wiley-Interscience, 1998.
1. M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering
2. A. Kharab, R.B. Guenther, An Introduction to Numerical Methods: A MATLAB Approach,1st Ed. Chapman and Hall/CRC, 2001.
4. B. Bradie, A Friendly Introduction to Numerical Analysis, Pearson Education, 2007.
5. S.R. Otto and J.P. Denier, An Introduction to Programming and Numerical Methods in MATLAB, Springer, 2005.
6. Computation, 7th Ed., New Age International Publishers, 2007.


## Elective 5.8 Numerical Techniques and Statistics (Practical): As per the syllabus

# BCA V SEMESTER
# DSE : Elective
# Credit (L: T: P = 4: 0: 2)
# Elective 5.9 Computer Graphics (Theory)

**unit-1** **16Hrs**

**Introduction to computer graphics**: Introduction, Brief history, Some terminologies, characteristics, components, classification, advantages and disadvantages of interactive computer graphics, applications, some basic mathematics for computer graphics.

**Graphic Primitive**: Introduction, Display devices: CRT, Beam penetration CRT and shadow mask, Random/vector displays, Raster displays, character based frame buffer, LCDs, DVST, PDP, Thin film electroluminescent displays, FED, LEDs and OLEDs, laser scan display, other flat panel display technologies, Input devices, some output devices.

**Unit-2** **16 Hrs**

**Scan conversion**: Introduction, vector generation, points scan conversion. **Line's scan conversion**: DDA algorithm, Bresenham's line drawing algorithm. **Circle scan conversion**: DDA method, Bresenham's method. Ellipse's scan conversion: Midpoint ellipse algorithm. Aliasing and Antialiasing**. Polygons**: Introduction, Polygon representation, Entering polygon, Inside and Outside test of polygon: Even-Odd method. **Polygon filling**: Boundary fill algorithm, Flood-fill algorithm, Edge-fill algorithm, Fence fill algorithm, scan-line algorithm.

**Unit-3** **16Hrs**

**2D-Transformation**: Introduction, Points/Objects representation (metrices), Geometric transformation: Translations, Rotation about origin, Scaling transformation, Mirror reflection about any axis. Coordinate transformation: Translations, Rotation about origin, Scaling with respect to origin, Mirror reflection about any axis. Composite transformation: Rotation about an arbitrary point, scaling about any arbitrary point, Reflection of an object about any line. Shearing transformation and its types.

**Windowing and clipping**: Introduction, viewing transformation, window-to-view port coordinate transformation, clipping: Point clipping, line clipping:- cohen-sutherland algorithm. Polygon clipping:- Sutherland-hodgman polygon clipping algorithm. Curve clipping, Text clipping, Interior and exterior clipping, Multiple windowing, circular clipping.

**Unit-4** **16 Hrs**

**3D- Transformation**: Introduction, 3D- geometry primitives, 3D-transformation: Geometric transformations:- Translation, Scaling transformation, rotation about the origin, rotation about an arbitrary line, Mirror reflection, 3D shearing. Multiple transformations: Rotation about an axis parallel to a coordinate axis, rotation about an arbitrary axis in space, scaling with respect to fixed point. 3D-Clipping process.

**3D-Projections**: Introduction, Basic terminologies related to projection, Categories of projection, Parallel projection: oblique parallel projection. Perspective projection: One point perspective, Two point perspective, Three point perspective. 3D-Viewing, Viewing parameters.

**Reference Books:**


1. Computer Graphics C Version by Donald Hearn & M. Pauline Baker Pearson Education, New Delhi, 2004
2. Procedural Elements for Computer Graphics by David F. Rogers, Tata McGraw Hill Book Company, New Delhi, 2003
3. Computer Graphics: Principles & Practice in C by J. D. Foley, S. K Feiner, A Van Dam F. H John, Pearson Education, 2004
4. Computer Graphics using Open GL by Franscis S Hill Jr Pearson Education, 2004.


## Elective 5.9 Computer Graphics (Practical): As per the Syllabus

# BCA V SEMESTER
# SEC :
# Credit (L: T: P = 1: 0: 1)
# SEC 1.1 R Programming (Theory)

**Unit-1** **16hrs**

**Introduction:** Overview and History of R, Getting Help, Data Types, Simple manipulations; numbers and vectors: Vectors and assignment, Vector arithmetic, Generating regular sequences, Logical vectors, Missing values, Character vectors, Index vectors; selecting and modifying subsets of a data set, Other types of objects

Objects, their modes and attributes: Intrinsic attributes: mode and length, Changing the length of an object, Getting and setting attributes, The class of an object

Ordered and unordered factors, Arrays and matrices.

Reference Book
W. N. Venables, D. M. Smith, An Introduction to R, R-core team, 2015

## SEC 1.1 Software Lab Based on R Programming:

1. Write a program that prints 'Hello World' to the screen.
2. Write a program that asks the user for a number n and prints the sum of the numbers 1 to n
3. Write a program that prints a multiplication table for numbers up to 12.
4. Write a function that returns the largest element in a list.
5. Write a function that computes the running total of a list.
6. Write a function that tests whether a string is a palindrome.
7. Implement the following sorting algorithms: Selection sort, Insertion sort, Bubble Sort
8. Implement linear search.
9. Implement binary search.
10. Implement matrices addition , subtraction and Multiplication

**BCA V SEMESTER**
**SEC:**
**(Credit L: T: P = 1: 0:)**
**SEC 1.2: Computer Simulation (Theory)**

**Unit - 1** **16 Hrs**

**Introduction:** Concept of simulation – simulation as a decision making tool- Monte Carlo simulation.

**Random Numbers/Variates:** Pseudo random numbers – methods of generating random variates – random variates for uniform, normal, binominal, passion, exponential distributions.

**Reference Books:**


1. Jerry Banks and John S.Carson, Barry L Nelson, David M.Nicol, P.Shahabudeen "Discrete event system simulation"' Pearson, 2007.
2. Thomas J.Schriber, "Simulation using GPSS", John Wiley, 2002.
   Law A.M. and Kelton W.D "Simulation Modeling and Analysis, McGraw Hill, 2003

## BCA V SEMESTER
## SEC:
## Credit (L: T: P = 1: 0: 1)
## SEC 1.3: Graphics Design Interface using C# (Theory)

**Unit - 1** **16 Hrs**

Graphics with GDI+

Understand Drawing Principles-GDI and GDI+,GDI Namespaces, Device Contents and the Graphics object, Drawing shapes, Painting shapes using OnPaint(),Using the clipping Region, Measuring co-ordinates and Areas, Point and PointF, Size and SizeF, Rectangle and RectangleF, Region.Colours, Pens and Brushes, drawing Shapes and lines, Displaying images, drawing text, font and font families, printing, print and print preview

Reference Book:

Professional C# 4 and .NET 4 by Wrox Publication

## SEC 2.1: Graphics Design Interface (Practical): As per the syllabus

**BCA V SEMESTER**

**SEC:**

**Credit (L: T: P = 1: 0: 1)**

**SEC 1.4: XML Programming (Theory)**

**Unit-1** **16 Hrs**

XML Basics: History of XML, Simple XML Document, the Origin of XML, the development of XML, Setting up for XML, XML Application and XML Document, Basic Syntax and DTD's, XML Schema, Schema data type, namespaces and advanced schema, XML applications, XLink, XPath, XPointer

## Reference Books:


1. XML a Beginner's Guide : Dave Mercer,Tata Mcgraw-hill
2. William J. Pardi , XML in action web technology, Microsoft Press, 1999
3. Michael J. Young ,Step by Step XML , Microsoft Press, 2002


## SEC 2.0: XML Programming (Practical): As per the syllabus

## BCA VI SEMESTER
## DSE: Elective
## Credit (L: T: P = 4: 0: 2)
## Elective 6.1 Android Programming (Theory)

**Unit -1** **16 Hrs**

**Introduction:** What is Android, Android Ecosystem, Why Android? Android Versions, Android activity, Features of Android, Android Architecture, Application framework, libraries, android runtime, Configuration of Android Environment, Operating System, Java JDK, Android SDK, Android Development tools (ADT), Android Virtual Devices (AVDs), Emulators, Dalvik Virtual Machine, Difference between Java Virtual Machine (JVM) and Dalvik Virtual Machine (DVM), Create the first Android Application: Directory Structure, Android User Interface: Understanding the components of a screen, Linear Layout, Absolute Layout, Frame Layout, Relative Layout, Table Layout.

**Unit 2** **16 Hrs**

**Designing your user Interface with view:** Text view, Button – A standard push button, Image Button, Edit Text, checkbox, Toggle Button, Radio Button and Radio Group, Progress Bar, Auto complete Text view, Spinner, List view, Grid view, Image view, Scroll view, Custom Toast Alert, Time and Date picker

Introduction, Intent, Intent – filter, Activity life cycle, broadcast life cycle, Service, Multimedia: Android System Architecture, Play Audio and Video: Play audio, Text to speech,

**Unit 3** **16 Hrs**

Sqlite Database in Android: SQLite Database, why is SQLite? Creation and connection of the database, Extracting value from a cursors, Transactions

Telephoning and Messaging, SMS Telephony, creating the project, Getting the maps API Key: displaying the zoom control, changing views, Navigating to a specific location, adding markers, getting the location which was touched, geo coding and Reverse Geo coding, Getting location Data, Monitoring a location

**Unit 4** **16 Hrs**

JSON: What is JSON? XML and JSON, use of JSON, syntax and rule of JSON, SSON Name / value pairs, JSON values, JSON objects, JSON Arrays, how to JSON uses Javascript syntax, Parsing JSON and XML, Parsing JSON and XML, Parsing JSON Http Response, Parsing XML Http Response

**Text Book:**

Android by Prasanna kumar Dixit, Vikas Publishing House Pvt Ltd.

## Elective 6.1 Android Programming (Practical): As per the Syllabus

## BCA VI SEMESTER
## DSE : Elective
## Credit (L: T: P = 4: 0: 2)
## Elective 6.2 Multimedia Computing (Theory)

Unit 1: **16 Hrs**

**what is multimedia**: Definitions – CD-ROM and the Multimedia highway- where to use multimedia- **Introduction to Making Multimedia**: The stages of a project- what you need- **Multimedia skills and Training**: The terms – **Macintosh and windows production platforms**: Macintosh Versus PC – The Macintosh and Windows Computers- **Hardware Peripherals**: connection- Memory and storage Devices – Input Devices- Output Hardware- Communication Devices.

**Unit-2:** 16 Hrs

**Basic Tools:** Text Editing and Word Processing Tools – OCR Software- Painting and Drawing Tools – 3-D Modeling and Animation Tools – Image – Editing Tools – Sound Editing Tools – Animation, Video and Digital Movies Tools – Helpful Accessories **– Making Instant Multimedia :** Linking Multimedia Object – Office suites- Word Processors – spread sheets – Databases- presentation Tools. **Multimedia Authoring Tools :** Types of Authoring Tools – card and page Based Authoring Tools- Icon – Based Authorized Tools – Time Based Authoring Tools – Object – Oriented Authoring Tools – Cross – Platform Authoring Notes.

**Unit 3:** **16 Hrs**

**Text:** The Power of Meaning – About Fonts and Faces –Using Text in Multimedia – Computers and Text – Font Editing and Design Tools – Hypermedia and Hypertext- **Sound:** The Power of Sound – Multimedia System Sounds- MIDI Versus Digital Audio – Digital Audio – Making MIDI Audio – Audio file formats – Working with sound on the Macintosh – Notation Interchange File Format (NIFF) – Adding Sound to your multimedia project – Towards professional sound – The Red Books standard production tips.

**Unit 4:** **16 Hrs**

**Images:** Making Still Images – color- Image File formats. **Animation:** The Power of motion – Principles of Animation - Making Animation That Work – Video : Using video – How video works – Broadcast Video Standards – Integrating Computers and Television – shooting and Editing Video – Video Tips – Recording Formats – Digital video.

**Text Book:**


1. Tay Vaughan - 1999– Multimedia : Making it work – Fourth Edition – Tata McGraw – Hill Edition.
2. Walterworth john A– 1991- Multimedia Technologies and Application - Ellis Horwood Ltd. – London.
3. John F koegel Buford – Multimedia Systems – Addison Wesley – First Indian Reprint.


## Elective 6.2 Multimedia Computing (Practical): As per the syllabus

# BCA VI SEMESTER
# DSE : Elective
# Credit (L: T: P = 4: 0: 2)
# Elective 6.3 Fuzzy Logic (Theory)

**Unit 1** **16 Hrs**

From classical (crisp) sets to fuzzy sets: a grand paradigm shift: Introduction, Crisp sets: An overview, Fuzzy sets: basic types Fuzzy sets: basic concepts Characteristics and Significance of the paradigm shift. Fuzzy sets versus crisp sets: Additional properties of α -cuts Representations of fuzzy sets Extension principle for fuzzy sets. Operations On fuzzy sets: Types of operations, Fuzzy complement, fuzzy intersections:t-Norms, Fuzzy unions: t-conorms, Combinations of operations Aggregation operations

**Unit 2** **16 Hrs**

Fuzzy arithmetic: Fuzzy numbers, Linguistic variables Arithmetic operations on intervals, Arithmetic operations on fuzzy numbers Lattice of fuzzy numbers Fuzzy equations. Fuzzy Relations: Crisp versus fuzzy relations, projections and Cylindric extensions, Binary fuzzy relations, Binary relations on a single set Fuzzy equivalence relations, Fuzzy compatibility relations, Fuzzy ordering relations Fuzzy morphisms, Sup-*i* Composition of fuzzy relations, Inf-$\acute{\omega}_i$ Compositions of fuzzy relations. Possibility theory: Fuzzy measures, Evidence theory, Possibility theory, Fuzzy sets and possibility theory, Possibility theory versus probability theory

**Unit 3** **16Hrs**

Fuzzy Logic:Classical logic: An overview multivalued logics, Fuzzy propositions Fuzzy quantifiers, Linguistic hedges, Inference from conditional fuzzy propositions, Inference from conditional and qualified propositions, Inference from quantified propositions. Constructing fuzzy sets and operations on fuzzy sets: General discussion, Methods of construction: an overview, Direct methods with one expert, Direct methods with multiple experts, Indirect methods with one expert, Indirect methods with multiple experts, Constructions from sample data. Approximate Reasoning: Fuzzy expert systems: An overview, Fuzy implications, Selection of fuzzy implications, multiconditional approximate reasoning, The role of fuzzy relation equations, Interval-valued approximate reasoning

**Unit 4** **16Hrs**

Fuzzy Systems: General discussion, Fuzzy controllers: An overview, Fuzzy controllers: An example, Fuzzy systems and neural networks, Fuzzy neural networks Fuzzy automata, Fuzzy dynamic systems. Pattern Recognition: Introduction, Fuzzy clustering, Fuzzy pattern recognition, Fuzzy image processing. Fuzzy databases and information retrieval systems: General discussion, Fuzzy databases, Fuzzy information retrieval. Fuzzy decision making: General discussion, Individual decision making, Multiperson decision making, Multicriteria decision making, Multistage decision making, Fuzzy ranking methods, Fuzzy linear programming. Engineering Applications: Introduction, Civil Engineering, Mechanical Engineering, Industrial Engineering, Computer Engineering, Reliability Theory, Robotics.

**Text book:**

George J.Klir/Bo Yuan “Fuzzy Sets And Fuzzy Logic, Theory and Applications”

**References:**

M.Ganesh “Introduction to Fuzzy Sets And Fuzzy Logic”
Timothy J.Ross “Fuzzy Logic with Engineering Applications”

## Elective 6.3 Fuzzy Logic (Practical): As per the Syllabus

# BCA VI SEMESTER
# DSE : Elective
# Credit (L: T: P = 4: 0: 2)
# Elective 6.4 Internet Programming (Theory)

**Unit -1** **16 Hrs**

**Fundamentals of HTML**

Introduction to HTML, Origin and Evolution, Basic Syntax, Basic tags, Images, Hypertext Links, Lists, Tables, Frames, Forms.

**More HTML5** Thinking HTML5 semantics, Why semantic markup?, Browser support for HTML5, Creating semantic HTML5 documents, Creating an HTML5 layout container, Controlling format by using the <*div*> element, Adding thematic breaks Annotating content, Working with lists. Working with tables, Table misuse, Creating a basic table, Adding header cells, Styling the table headers, Declaring the header, footer, and table body, Creating irregular tables, Adding a caption to a table, Styling columns

**Unit-2** **16 Hrs**

**HTML5 supports multimedia** Playing video: Video formats, Implementing the <*video*> element, Setting the source, Configuring the <*video*> element, Accessing tracks, Playing audio: Audio formats, The <*audio*> element, Setting the source, Configuring the <*audio*> element, Lesson summary, Lesson review, Using the HTML Media Element object: Understanding the HTML Media Element methods, Using HTML Media Element properties, Subscribing to HTML Media Element event, Using media control

**Drawing with HTML5** Drawing by using the <*canvas*> element, The <*canvas*> element reference, CanvasRenderingContext2D context object reference, Implementing the canvas, Drawing rectangles, Configuring the drawing state, Saving and restoring the drawing state, Drawing by using paths, Drawing text, Drawing with images, Using scalable vector graphics, Using the <*svg*> element, Displaying SVG files by using the <*img*> element

**Unit-3 : JavaScript** **16 Hrs**

**Getting started with JavaScript**

Introducing JavaScript, Understanding JavaScript, Understanding the role of dat, Using statements, Working with functions, Scoping variables, Nesting functions and nested local variable scoping, Converting to a different type, Conditional programming, Implementing code loops, Handling errors.

**Writing, testing, and debugging JavaScript**: Hello World from JavaScript, Using the script tag, Handling browsers that don't support JavaScript, Inline JavaScript vs. external JavaScript files, Placing your script elements, Using the Visual Studio .NET JavaScript debugger. **Working with objects:** Working with arrays, Accessing DOM objects

**Unit-**4 **Cas cading style sheet** **16 Hrs**

**Getting started with CSS3** Introducing CSS3, Defining and applying a style, Adding comments within a style sheet, Creating an inline style, Creating an embedded style, Creating an external style sheet.

**Understanding selectors, specificity, and cascading** Defining selectors, Understanding the browser's built-in styles, Extending browser styles with user styles, Working with important

styles, How do styles cascade?, Using specificity, Understanding inheritance, Working with CSS properties Working with CSS colors, Working with text ,Working with the CSS box model, Setting the border, padding, and margin properties, Positioning <*div*> elements, Using the float property, Using the clear property, Using the box-sizing property, Centering content in the browser window

**Reference Book:**

HTML by Complete Reference

Programming in HTML5 with java script and css3 by Glenn Johnson

JavaScript step by step by Steve Suehring

## Elective 6.4 Internet Programming (Practical): As per the Syllabus

# BCA VI SEMESTER
# DSE : Elective
# Credit (L: T: P = 4: 0: 2)
# Elective 6.5 Microprocessor (Theory)

**UNIT 1:** **16 Hrs**

**Computer Architecture:**

CPU Architecture, Addressing modes- Direct, Indirect, Immediate, Relative, Indexed.
Addressing formats: program controlled, Interrupt controlled, DMA(Direct Memory Access)

**Introduction to Microprocessors, Microcomputer and Assembly language:**

Microprocessors: Advances in semiconductor technology, Organization of a Microprocessor-based system.

Microprocessor instruction set and computer languages: Machine Language, 8085 Machine Language, 8085 Assembly Language, ASCII Code, Writing and Executing an Assembly Language program, High Level language, operating systems.

From Large computer to single chip microcontrollers: Large computers, Medium size computers, Microcomputers.

**UNIT 2:** **16Hrs**

**Microprocessor Architecture:**

Microprocessor Architecture and its operations: Microprocessor-Initiated Operations and 8085 Bus, Internal Data operations and the 8085 Registers, peripheral or externally initiated operations.

**8085 MPU:** 8085 Pin diagram, Microporcessor communication and Bus timings, Demultiplexing tne Bus $AD_7$-$AD_0$ Generating control singnals, a detailed look at the 8085 MPU and its architecture, Decoding and executing an instruction.

**Introduction to 8-85 Assembly Language Programming:**

8085 Programming Model: Programming Registers.
Instruction Classification: 8085 instruction set.
Instruction and data format: instruction Word size, Opcode Format, Data format.
How to write and execute a simple assemble program
Overview of the 8085 instruction set.

**UNIT 3:** **16 Hrs**

**Introduction to 8085 Instructions:**

Data Transfer operations, Arithmetic operations, Logic operation, Branch operations, Writing Assembly Language programs, Debugging a program.

**Programming Techniques with additional instructions:**

Programming Techniques: Looping, counting and indexing, additional data transfer and 16bit arithmetic instructions, arithmetic operations related to memory, logical operations:rotate,compare,dynamic debugging.

**Counters and Time Delays:**

Counters and time delays, illustrative program: Hexadecimal counter, Zero to nine counter, generating pulse waveforms, debugging counter and time delay programs**.**

**UNIT 4:** **16 Hrs**

**Stack and subroutines:**

Stack, subroutine, restart, conditional call and return instruction, advanced subroutine concepts**.**

**Interrupts:** 8085 interrupts 8085 vectored interrupts.

Introduction to 8086, advantages over 8085,additional features of 8086, modified addressing schemes.

**Text Books:**

1. M. Morris Mono – Digital logic and Computer design
2. Ramesh S. Gaonkar – Microprocessor Architectre, Programming and Applications with 8085

## Elective 6.5 Microprocessor (Practical): As per the syllabus

## BCA VI SEMESTER
## DSE : Elective
## Credit (L: T: P = 4: 0: 2)
## Elective 6.6 Digital Image Processing (Theory)

**UNIT 1:** **16Hrs**

**Introduction:** What is digital image processing, The origins of digital image processing, Examples of fields that uses digital image processing, fundamental steps in digital image processing, components of image processing system.

**Digital Image Fundamentals:**

Elements of visual perception, light and the electromagnetic spectrum, image sensing and acquisition, image sampling and quantization, some basic Relationships between pixels, linear and nonlinear operations.

**UNIT 2:** **16Hrs**

**Image Enhancement in the spatial domain:**

Some basic gray level transformations, Histogram processing, Enhancement using arithmetic/logic operations, basic of spatial filtering, smoothing, sharpening spatial filters, combining spatial enhancement methods.

**UNIT 3:** **16Hrs**

**Image enhancement in the frequency domain:** Introduction to the Fourier transform and the frequency domain, smoothing, sharpening frequency domain filters, homomorphic filtering, implemention.

**UNIT 4:** **16Hrs**

**Image restoration:**

A model of the image degradation/restoration process, noise models, restoration in the presence of noise only spatial filtering, periodic noise reduction by frequency domain filtering, linear, position-Invariant degradations, estimating the degradation function, inverse filtering, minimum mean square error filtering, constrained lest square filtering, geometric mean filter, geometric transformations.

**Text Books:**

1. Digital Image Processing – Rafael C. Gonzalez.
   - Richard E. Woods

## Elective 6.6 Digital Image Processing (Practical): As per the Syllabus

## VI SEMESTER

### DSE 6: Elective: Dissertation / Project
### Credit (L: T: P = 0: 0: 6) 12 Hours/Week

- This option is to be offered only in 6th Semester.
- The students will be allowed to work on any project based on the concepts studied in
  Core/elective or skill based elective courses.
- The group size should be maximum of TWO (02) students.
- Each group will be assigned a teacher as a supervisor who will handle both their theory as Well as lab classes.
- A maximum of Four (05) projects would be assigned to one teacher.

## BCA VI SEMESTER

## SEC:
## Credit (L: T: P =1: 0: 1)
## SEC 2.1: Advanced R Programming (Theory)

**Unit -1** **16 Hrs**

Lists and data frames: Constructing and modifying lists, Concatenating lists, Data frames: Making data frames, attach() and detach(),Working with data frames, Attaching arbitrary lists, Managing the search path.

Grouping, loops and conditional execution: Grouped expressions, Control statements, Conditional execution: if statements, Repetitive execution: for loops, repeat and while .

Writing your own functions: Defining new binary operators, Named arguments and defaults, The '...' argument, Recursive numerical Customizing the environment .Classes, generic functions and object orientation. Statistical models in R

Reference Book
W. N. Venables, D. M. Smith, An Introduction to R, R-core team, 2015

## SEC 3.1: Advanced R Programming (Practical): As per the Syllabus

## BCA VI SEMESTER

## SEC:
## Credit (L: T: P =1: 0: 1)
## SEC 2.2: Advanced Computer Simulation (Theory)

**Unit - 1** **16 Hrs**

**Design Of Simulation Experiments:** Problem formulation – data collection and reduction – logic developments – initial conditions – run length, tabular method of simulation – development of models using higher level languages for systems like queuing, production, inventory and maintenance – output analysis and interpretation, validation.

**Discrete System Simulation Languages:** Need for simulation language – Comparison of simulation languages: SIMCRIPT, GASP, SIMULA, GPSS, PROMODEL, etc…

**Case Studies Using Simulation Languages:** Development of simulation models using the simulation language studies for systems for systems like, queuing systems, production systems, inventory systems, maintenance and replacement systems, investment analysis and network.

**Reference Books:**


1. Jerry Banks and John S.Carson, Barry L Nelson, David M.Nicol, P.Shahabudeen "Discrete event system simulation"' Pearson, 2007.
2. Thomas J.Schriber, "Simulation using GPSS", John Wiley, 2002.
   Law A.M. and Kelton W.D "Simulation Modeling and Analysis, McGraw Hill, 2003


## SEC 3.2: Advanced Computer Simulation (Practical): As per the syllabus

## BCA VI SEMESTER

## SEC:
## Credit (L: T: P =1: 0: 1)
## SEC 2.3: Tally (Theory)

**Unit - 1** **16 Hrs**

**Introduction to accounting:** Meaning of Accounts, Accounting, Accountancy and Accountant, meaning and objectives of Book keeping Basic terms; transaction Capital Drawing Assets Liabilities debtor creditor Revenue debit and credit

**Accounting Principles Standards Concepts and Conventions**

Meaning types objectives of Accounting principles standards concepts and conventions

**Double Entry System of Book keeping**

Meaning features objectives advantages and limitations of Double entry system of book keeping kinds of accounts; personal real and nominal rules of debiting and crediting accounts. Journal journalizing business transactions ledger and balancing (problems on journal entry and ledger)

**Trial Balance**

Purchase, sales returns Cash (three columns) B/R and B/P books journal proper Meaning importance of trial balance preparation and types of Errors Suspense account

(problems on purchase sales and returns and cash book with 3 columns and Rectification of Errors

**Final Accounts of Sole trader and Non-trading concerns**

Simple problem only with the following adjustment/s expenses and incomes, prepaid, depreciation bad debts and RBD and loss of stock and preparation of Income and Expenditure account from R and P accounts only excluding opening balance sheet

## SEC 1.4: Tally (Practical): Implementation using Tally

## BCA VI SEMESTER

## SEC:
## Credit (L: T: P =1: 0: 1)
## SEC 2.4: Advanced XML (Theory)

**Unit-1** **16Hrs**

Extended XML:

The Document Object model, The DOM reconnection, designing data models for XML data bases, XML and Data models, databases and XML, Activex data Objects, XML presentation and XSL, CSS extensible style sheet language, XSLT

### Reference Books:


1. XML a Beginner's Guide : Dave Mercer,Tata Mcgraw-hill
2. William J. Pardi , XML in action web technology, Microsoft Press, 1999
3. Michael J. Young ,Step by Step XML , Microsoft Press, 2002


### SEC 4.2: Advanced XML Programming (Practical): As per the syllabus

## Question Paper Pattern
## Theory (4 Credits)

Time: 3 Hours Max. Marks: 70

Part – A

**I. Answer any Eleven Question out of given Twelve Questions.11 X 2 = 22**

**1.**
**2.**
**3.**
**4.**
**5.**
**6.**
**7.**
**8.**
**9.**
**10.**
**11.**
**12.**

**Note: Three Questions each from the Units 1, 2, 3, and 4**

Part - B

**II. Answer any Two Sub Questions from each main Question.**

**13. A)** **2 X 6 = 12**
**B)**
**C)**

**14. A)** **2 X 6 = 12**
**B)**
**C)**

**15. A)** **2 X 6 = 12**
**B)**
**C)**

**16. A)** **2 X 6 = 12**
**B)**
**C)**

**Note: Each Main questions contains 3 sub questions carries 06 Marks (may have internal Split-ups) and from Units 1, 2, 3 and 4 respectively**

## Question Paper Pattern

## Theory (1 or 2 Credits)

Time: 2 Hours Max. Marks: 40

Part – A

**I. Answer all Questions. 05 X 02 = 10**

**1.**
**2.**
**3.**
**4.**
**5.**

Part - B

**II. Answer any Four Questions out of given Five Questions. 4 X 10 = 40**

**6.**
**7.**
**8.**
**9.**

**JSS COLLEGE FOR WOMEN (AUTONOMOUS)**
**SARASWATHIPURAM MYSURU-570009**

# Department of Computer Science

## CBCS 2018

## BCA Learning Outcomes

| I$^{st}$ Semester | | | |
|---|---|---|---|
| **Sl No** | **Subject name** | **DSC/DSE/SEC** | **Learning Outcomes** |
| 1 | Computer Fundamentals and PC maintenance | DSC 1 | • Identify the tools and test equipment associated with PC repair and maintenance activity.<br>• Know how hardware and software works together in the operation of a PC, and outline the process for assembling and disassembling a personal computer |
| 2 | Digital Electronics and Computer Architecture | DSC 2 | • To present the principles of combinational and sequential digital logic circuits and optimization at a gate level.<br>• The uses and applications of logic gates and universal gates. |
| 3 | Programming in C and Python | DSC 3 | • Understanding Problem solving through computer programming<br>• Familiarity of programming environment in an operating system<br>• Ability to use different control structures<br>• Ability to deal with different input/output methods |
| II$^{nd}$ Semester | | | |
| 1 | Problem Solving and Data Structure | DSC 4 | • To understand the abstract data types stack, queue, deque, and list.<br>• To understand the performance of the implementations of basic linear and non linear data structures.<br>• To understand and implementation of data structures<br>• To be able to implement the abstract data type list as a linked list using the node and reference pattern. |
| 2 | Database Management System | DSC 5 | • Understanding database and database management system and RDBMs<br>• Describe different database architecture and analyses the use of appropriate architecture in real time environment<br>• Understanding how to design relational |

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| | | | database<br>• Implementing relational database using SQL & PL/SQL |
| 3 | Visual Programming | DSC 6 | • Problem solving through computer object oriented programming<br>• Familiarity of programming environment in an .NET framework<br>• Ability to use different control structures<br>• Ability to design windows application<br>• Ability to do database connectivity |
| **III rd Semester** | | | |
| 1 | Operating system | DSC 7 | • Analyze and synthesize system software<br>• Implement operating system functions<br>• Implementation of UNIX commands |
| 2 | Advanced Visual Programming | DSC 8 | • Ability create dynamic web pages using ASP.NET<br>• Implementation of web services<br>• Understanding client server technology<br>• Implementation of database connectivity to a web page<br>• Creating small websites |
| 3 | Software Engineering | DSC 9 | • Decide on a process model for a developing a software project<br>• Classify software applications and Identify unique features of various domains<br>• Design test cases of a software system |
| **IVth Semester** | | | |
| 1 | Java Programming | DSC 10 | • To understands the platform independent concepts<br>• Ability to use different control structures<br>• Ability to deal with different input/output methods<br>• Ability to understand object oriented concepts<br>• Ability to design own package and applet |
| 2 | Computer Networks | DSC 11 | • Analyze the requirements for a given organizational structure to select the most appropriate networking architecture<br>• Demonstrate design issues, flow control and error control<br>• Analyze data flow between TCP/IP model using Application, Transport and Network Layer Protocols<br>• Illustrate applications of Computer Network capabilities, selection and usage for various sectors of user community<br>• Illustrate Client - Server architectures and prototypes by the means of correct standards |

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| | | | and technology.<br>• Demonstrate different routing and switching algorithms |
| 3 | Object Oriented Analysis and Design | DSC 12 | • Be able to use an object-oriented method for analysis and design<br>• Be able to analyze information systems in real-world settings and to conduct methods such as interviews and observations<br>• Have a general understanding of a variety of approaches and perspectives of systems development, and to evaluate other IS development methods and techniques<br>• Know techniques aimed to achieve the objective and expected results of a systems development process<br>• Know different types of prototyping<br>• Know how to use UML for notation |
| **V$^{th}$ Semester** | | | |
| 1 | Operational Research | DSE 5.1 | • Understand how to translate a real-world problem, given in words, into a mathematical formulation.<br>• Better understand design and analysis of algorithms: specifically through complexity analysis.<br>• Write and apply computer code to problems,. Specific knowledge: Formulate a Linear Program (LP) or translate into standard form, and use the Simplex Method to solve, Use duality and complementary slackness to analyze problems, for instance in applying sensitivity analysis to a LP. Formulation and solution of network problems using graph optimization algorithms. Use branch-and-bound and heuristic methods to solve general integer problems.<br>• Ability to work in a team: specifically to solve larger problems, communicate technical knowledge, partition a problem into smaller tasks, and complete tasks on time. |
| 2 | Data warehouse and Data mining | DSE5.2 | • Interpret the contribution of data warehousing and data mining to the decision-support level of organizations<br>• Evaluate different models used for OLAP and data preprocessing<br>• Categorize and carefully differentiate between situations for applying different data-mining techniques: frequent pattern mining, association, correlation, classification, |

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| | | | prediction, and cluster and outlier analysis<br>• Design and implement systems for data mining<br>• Evaluate the performance of different data-mining algorithms<br>• Propose data-mining solutions for different applications |
| 3 | E-Commerce Technology | DSE 5.3 | • Demonstrate an understanding of the foundations and importance of E-commerce<br>• Demonstrate an understanding of retailing in E-commerce by:<br>1. Analyzing branding and pricing strategies,<br>2. Using and determining the effectiveness of market research<br>3. Assessing the effects of disintermediation.<br>• Analyze the impact of E-commerce on business models and strategy<br>• Describe Internet trading relationships including Business to Consumer, Business-to-Business, Intra-organizational.<br>• Describe the infrastructure for E-commerce<br>• Describe the key features of Internet, Intranets and Extranets and explain how they relate to each other.<br>• Discuss legal issues and privacy in E-Commerce<br>• Assess electronic payment systems<br>• Recognize and discuss global E-commerce issues |
| 4 | PHP Programming | DSE 5.4 | • Analyze and apply the role of languages like HTML, XHTML, CSS, XML, JavaScript, PHP and protocols in the workings of the web and web applications<br>• Analyze a web page and identify its elements and attributes<br>• Create web pages using HTML, XHTML and Cascading Style sheets<br>• Create dynamic web pages using JavaScript<br>• Create interactive web applications using php |
| 5 | Cloud Computing | DSE 5.5 | • Develop and deploy cloud application using popular cloud platforms<br>• Design and develop highly scalable cloud-based applications by creating and configuring virtual machines on the cloud and building private cloud<br>• Explain and identify the techniques of big data analysis in cloud<br>• Compare, contrast, and evaluate the key trade-offs between multiple approaches to cloud |

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| | | | system design, and Identify appropriate design choices when solving real-world cloud computing problems. |
| 6 | Analysis and Design of Algorithm | DSE 5.6 | • Argue the correctness of algorithms using inductive proofs and invariants.<br>• Analyze worst-case running times of algorithms using asymptotic analysis.<br>• Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize divide-and-conquer algorithms. Derive and solve recurrences describing the performance of divide-and-conquer algorithms.<br>• Explain the major graph algorithms and their analyses.<br>• Explain what amortized running time is and what it is good for. Describe the different methods of analysis (aggregate analysis, accounting, and potential method). Perform analysis.<br>• Explain what competitive analysis is and to which situations it applies. Perform competitive analysis.<br>• Compare between different data structures. Pick an appropriate data structure for a design situation.<br>• Explain what an approximation algorithm is, and the benefit of using approximation algorithms. |
| 7 | J2EE | DSE 5.7 | • Explain the JSP technology, its features and advantages<br>• Explain Web development process and various server-side technologies<br>• Develop JSP applications using JSP Tags, JSP Script lets and JavaBeans<br>• Explain JSP Application Models<br>• Develop JSP applications implementing Session Management and Database<br>• Connectivity |
| 8 | Numerical Techniques and Statistics | DSE 5.8 | • Apply numerical methods to obtain approximate solutions to mathematical problems.<br>• Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and |

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| | | | the solution of differential equations.<br>• Analyse and evaluate the accuracy of common numerical methods<br>• Implement numerical methods in SPSS |
| 9 | Computer Graphics | DSE 5.9 | • Understand the structure of modern computer graphics systems<br>• Understand the basic principles of implementing copmputer graphics primitives<br>• Familiarity with key algorithms for modelling and rendering graphical data<br>• Develop design and problem solving skills with application to computer graphics<br>• Gain experience in constructing interactive computer graphics programs using C programming language |
| 10 | R Programming | SEC 1.1 | • Understand the concepts of R programming language<br>• Manipulate data within R<br>• Perform basic data analysis procedures<br>• Create plots |
| 11 | Computer Simulation | SEC 1.2 | • Understand fundamental concepts of computer simulation and its role in problem solving.<br>• Develop and model problems and apply procedures for modeling systems.<br>• Appreciate the advantages of using simulation and modeling for taking decision in problems.<br>• Understand the need to incorporate simulation and modeling considerations throughout the design and execution of a project aiming at understanding its limitations and ways of improvement. |
| 12 | Graphics Design Interface using c# | SEC 1.3 | • Understanding the basic concepts of graphics<br>• Designing posters, flyers, web banners and magazine ads using C#<br>• Creating images and illustrations for our social media accounts C#<br>• Setting up files for printing<br>• Coordinating production timelines with printers |
| 13 | XML Programming | SEC 1.4 | • Design and code data transfer scripts using XML languages for the transfer of data over business networks and the Internet.<br>• Validate XML documents with the use of Document Type Definitions and schemas according to industry standards. |
| **VI$^{th}$ Semester** | | | |

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| 14 | Android Programming | DSE 6.1 | • Install and configure Android application development tools.<br>• Design and develop user Interfaces for the Android platform.<br>• Save state information across important operating system events.<br>• Apply Java programming concepts to Android application development. |
| 15 | Multimedia Computing | DSE6.2 | • Discuss the technical details of common multimedia data formats, protocols, and compression techniques of digital images, video and audio content.<br>• Describe and understand the technical details of JPEG and MPEG families of standards.<br>• Discuss the significance of "Quality of Service" in multimedia networking.<br>• Describe the principles and technical details of several wired and wireless networking protocols.<br>• Develop simple but demonstrative multimedia applications using JAI and JMF.<br>• Understand and describe technical aspects of popular multimedia web applications including VoD and VoIP |
| 16 | Fuzzy Logic | DSE 6.3 | • Learn crips and fuzzy set theory<br>• Decide the difference between crips set and fuzzy set theory.<br>• Make calculation on fuzy set theory.<br>• Recognize fuzzy logic membership function.<br>• Recognize fuzzy logic fuzzy inference systems<br>• Make applications on Fuzzy logic membership function and fuzzy inference systems.<br>• Analyse statistical data by using fuzzy logic methods.<br>• Compare statistical methods against fuzzy logic methods.<br>• Get theory of the statistics fuzzy logic theory together<br>• Evaluate fuzzy statistics applications. |
| 17 | Internet Programming | DSE 6.4 | • Understanding HTML and HTML tags<br>• Implementing multimedia using HTML5<br>• Learn about coding, testing and debugging in JavaScript |

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| | | | • Learn about Cascading style sheet<br>• Embedding html , JavaScript and CSS and able to develop small website |
| 18 | Microprocessor | DSE 6.5 | • Realize the data transfer<br>• Ability to write the program by using the instructions of conditioned branching.<br>• Ability to know how to write instructions which have to be repeated in the program in various loops.<br>• Write and apply programmes consist of arithmetic and logical works and shift work. |
| 19 | Digital Image Processing | DSE 6.6 | • Demonstrate a knowledge of a broad range of fundamental image processing and image analysis techniques and concepts (linear and non-linear filtering, denoising, deblurring, edge detection, line finding, detection, morphological operators, compression, shape metrics and feature based recogniton)<br>• Identify, Demonstrate and apply their knowledge by analysing image processing problems and recognising and employing (or proposing) effective solutions<br>• Design and create practical solutions to a range of common image processing problems and to critically assess the results of their solutions, including shortcomings |
| 20 | Project Work | DSE 6 | • To write review SRS, reliability testing reports, and other software engineering documents in the project report;<br>• To write problem solution using multi-core, distributed, embedded,<br>• To write the test cases to demonstrate the results of the project;<br>• To write code using FOSS tools and technologies or propitiatory Tools as per requirements;<br>• To practice presentation, communication and team-work skills |
| 21 | Advanced R Programming | SEC 3.1 | • Understand List and frames<br>• Understanding how to use Loops and implementation<br>• Understanding how to write own functions<br>• Preparation of statistical Model |
| 22 | Advanced Computer Simulation | SEC3.2 | • Able to design some simulation experiments<br>• Able to prepare discrete System simulation |
| 23 | Tally | SEC 4.1 | • Understanding accounts and types of accounts<br>• Able create ledger, voucher and balance sheet |

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| | | | using tally software |
| 24 | Advanced XML | SEC 4.2 | • Able to Use database connectivity in XML<br>• Understanding CSS and implementation in XML<br>• Able to create Activex object |