



Kristu Jayanti College

AUTONOMOUS

Bengaluru

Accredited 'A' Grade by NAAC | Affiliated to Bangalore University

DEPARTMENT OF COMPUTER SCIENCE

**Bachelor of Computer Application
Curriculum 2015 -18 Batch**

<http://www.kristujayanti.edu.in>

CURRICULUM OVERVIEW

1. Aim

The programme aims to make the student equip with the knowledge background required to be a successful IT professional.

2. Eligibility

A Student should have passed 10 + 2 or equivalent academic stream.

3. Credits

Part	Category	Category Description	Hours Per Week	Credits	Total Credits	Semester
I	Language	Theory	4	3	6	I, II
	English	Theory	4	3	12	I, II, III, IV
	Major (Core)	Theory	4	3	51	I, II, III, IV, V, VI
		Practical	4	3	36	I, II, III, IV, V, VI
		Project	7	5	5	VI
II	Major (Allied)	Theory	4	3	9	I, II, III
		Practical	4	3	3	I
III	Allied	Practical	4	3	3	IV
IV	Non – Core (Compulsory)	-	2	1	3	I, II
V	Life Skill Education (LSE)	-	3	2	2	I
VI	NSS/NCC/ Certificate Program/ Extra-Curricular/ Co-Curricular and Social Outreach Program	-	-	3	3	I, II, III, IV
VII	CBCS	Theory	4	3	3	IV

Note:

- ✦ In case of Part VI – One credit is equal to 20 hours.
- ✦ Application Project : During the III semester which carries 2 credits

4. Attendance

- ✦ A student should have 85 percentage of attendance in each course.
- ✦ Any student who is not complying with this requirement will not be allowed to appear for End Semester Examination.

5. Passing Criteria

- ✦ No minimum pass mark for CIA
- ✦ ESE (End Semester Examination) alone 35% - (25 marks out of 70)
- ✦ (ESE + CIA) aggregate 40% or 40 marks out of 100
- ✦ Student has to get pass mark in non-core course of the respective semester to get Overall “Pass” status.

ESE alone 35% - (16 marks out of 45) and (ESE + CIA) aggregate 40% or 20 marks out of 50.

- ♦ A student has to earn a total of 138 credits for the successful completion of the programme.

6. Specialization / Electives

Electives are not offered for this programme.

7. Orientation & Bridge Programmes

Orientation Programme

Orientation is offered at the beginning of the programme. It basically includes sessions as mentioned below:

- ♦ Campus Culture
- ♦ Introduction to the Programme and Syllabus
- ♦ Soft skills
- ♦ Basic computing
- ♦ English communication
- ♦ Basic electronics
- ♦ Introduction to programming

Bridge Programme

Bridge courses are offered on different subjects in order to cop up with the syllabus of the programme.

II Semester

- ♦ Basic Mathematics
- ♦ Project Designing Tools

8. Value Added Courses / Certificate Courses

Value Added Courses

II Semester

- ♦ Basic HTML and XML

III Semester

- ♦ PL/SQL with Database Connectivity

IV Semester

- ♦ VB.NET

V and VI Semester

- ♦ Quantitative Aptitude

Certificate Courses

V Semester

- ♦ Information Storage Management

9. Internship / Project

The student has to undergo one Internship application project during the programme.

- ♦ **Application Project** : During the III semester which carries 2 credits

10. Skill Development Activities

The Computer Academy offers provisions for students to be a part of the different technical communities which aims at the skill development in the respective domain. The various communities include:

- ♦ Coding and Debugging
- ♦ Lecture
- ♦ IT Quiz
- ♦ IT Manager
- ♦ Electronics
- ♦ Mathematics
- ♦ Statistics
- ♦ Web Designing
- ♦ Event Management

11. Co-curricular Activities

The department has an auspicious club namely “Computer Academy” which organizes the various activities like:

- ♦ Synchronize: Intra collegiate IT Fest
- ♦ Xactitude: Inter collegiate IT Fest
- ♦ Galaxia: Science Exhibition
- ♦ Industrial Visit
- ♦ Guest Lecture
- ♦ Workshop/Seminars

12. Any Other Activities

- ♦ Computer Literacy Programme
- ♦ Social Outreach Program

13. Programme Matrix

Abbreviations

ESE – End Semester Examination

CIA – Continuous Internal Assessment

MC - Major Core

MC Practical - Major Core Practical

MA - Major Allied

MA Practical - Major Allied Practical

A-Allied,

NC - Non Core

CBCS – Choice Based Credit Course

Lang - Language

* A Pass mark in the non core course is mandatory but marks secured for the same is not considered for grand total/grade/class

** Non-core subjects.

***Vernacular languages syllabus is available in the college library.

SEMESTER I

Course Code	Course Title	Course Type	Hours / Week	Credits	CIA	ESE	Max Marks
ENG151201	English - I	Lang	4	3	30	70	100
AEN151201	II Language : Additional English***	Lang	4	3	30	70	100
HIN151201	II Language : Hindi***						
KAN151201	II Language : Kannada***						
BCA151201	Basic Electronics	MA	4	3	30	70	100
BCA151202	Programming in C	MC	4	3	30	70	100
BCA151203	Computing and Programing Fundamentals	MC	4	3	30	70	100
BCA1512L1	Electronics Practical	MA Practical	4	3	15	35	50
BCA1512L2	Programming in C Practical	MC Practical	4	3	15	35	50
NCS150101	Computer Fundamentals **	NC	2	1	5*	45*	50*
Total			30	22	180	420	600

SEMESTER II

Course Code	Course Title	Course Type	Hours / Week	Credits	CIA	ESE	Max Marks
ENG152201	English - II	Lang	4	3	30	70	100
AEN152201	II Language : Additional English***	Lang	4	3	30	70	100
HIN152201	II Language : Hindi***						
KAN152201	II Language : Kannada***						
BCA152201	Data Structures	MC	4	3	30	70	100
BCA152202	OOPS Using C++	MC	4	3	30	70	100
BCA152203	Mathematical Foundation in Computer Applications	MA	4	3	30	70	100
BCA1522L1	Data Structures Practical	MC Practical	4	3	15	35	50
BCA1522L2	OOPS Using C++ Practical	MC Practical	4	3	15	35	50
NHU150101	Environment Studies & Civic Sense **	NC	2	1	5*	45*	50*
Total			30	22	180	420	600

SEMESTER III

Course Code	Course Title	Course Type	Hours / Week	Credits	CIA	ESE	Max Marks
ENG153201	English III	Lang	4	3	30	70	100
BCA153201	Programming in Java	MC	4	3	30	70	100
BCA153202	Database Management System	MC	4	3	30	70	100
BCA153203	Operating System	MC	4	3	30	70	100
BCA153204	Probability and Statistics	MA	4	3	30	70	100
BCA1532L1	Programming in Java Practical	MC Practical	4	3	15	35	50
BCA1532L2	Database Management System Practical	MC Practical	4	3	15	35	50
NHU150102	Indian Constitution **	NC	2	1	5*	45*	50*
Total			30	22	180	420	600

SEMESTER IV

Course Code	Course Title	Course Type	Hours / Week	Credits	CIA	ESE	Max Marks
ENG154201	English IV	Lang	4	3	30	70	100
BCA154201	Software Engineering	MC	4	3	30	70	100
BCA154203	Data Communication and Networks	MC	4	3	30	70	100
BCA1542L1	UNIX / LINUX Practical	MC Practical	4	3	15	35	50
BCA1542L2	Soft Skills Practices	A	4	3	15	35	50
BCA1542P1	Software Engineering Project	MC Practical	4	3	35	65	100
	Accounting and Financial Management	CBCS	4	3	30	70	100
Total			28	21	185	415	600

SEMESTER V

Course Code	Course Title	Course Type	Hours / Week	Credits	CIA	ESE	Max Marks
BCA155201	Information Storage and Management	MC	4	3	30	70	100
BCA155202	Computer Graphics	MC	4	3	30	70	100
BCA155203	Web Programming using PHP	MC	4	3	30	70	100
BCA155204	Computer Architecture	MC	4	3	30	70	100
BCA1552L1	Computer Graphics Practical	MC Practical	4	3	15	35	50
BCA1552L2	Web Programming using PHP Practical	MC Practical	4	3	15	35	50
BCA1552P1	Enterprise Computing Project using ASP.NET	MC Practical	4	3	35	65	100
Total			28	21	185	415	600

SEMESTER VI

Course Code	Course Title	Course Type	Hours / Week	Credits	CIA	ESE	Max Marks
BCA156201	Multimedia Tools and Applications	MC	4	3	30	70	100
BCA156202	Design and Analysis of Algorithms	MC	4	3	30	70	100
BCA156203	Mobile Application	MC	4	3	30	70	100
BCA156204	System Programming	MC	4	3	30	70	100
BCA1562L1	Multimedia Tools and Applications Practical	MC Practical	4	3	15	35	50
BCA1562L2	Mobile Application Practical	MC Practical	4	3	15	35	50
BCA1562P1	Project	MC Practical	7	5	45	105	150
Total			31	23	195	455	650

Credit Structure

Semester	1	2	3	4	5	6	Total
Credits	22	22	22	21	21	23	131
Application Project (During III Semester)							2
Life Skill Education - Part V							2
NCC/NSS/Certificate Program/Extracurricular/ Co-curricular - Part-VI							3
Total Credits							138

I SEMESTER

ENG151201 ENGLISH I

Credits: 3

Total: 60 Hours

Objectives:

- ♦ To attune young minds to concerns and issues which have a broad and wide scope of use and application to life.
- ♦ To cut across the history of creative expression in focusing primarily on the core values that governs human lives.

UNIT 1: Prose

15 hrs

On Saying Please- A G Gardiner; Are the Rich Happy- Stephen Leacock; The Lost Child- Mulk Raj Anand; Mrs. Packletide's Tiger- Saki; Lamb to the Slaughter -Roald Dahl.

UNIT 2: Poetry

15 hrs

On His Blindness- John Milton; The Village Schoolmaster - Oliver Goldsmith; The Solitary Reaper -William Wordsworth; Ozymandias- P.B.Shelley; La Belle Dame Sans Merci- John Keats.

UNIT 3: Remedial Grammar

15 hrs

Subject-Verb Agreement-Tenses-Do-Forms-Active and Passive Voices-Use of Negatives-Prepositions-Vocabulary.

UNIT 4: Communication Skills

15 hrs

Understanding Communication-Greeting and Introducing-Making Requests-Asking for and Giving Permission-Offering Help-Giving Instructions and Directions.

References:

- Glendinning, Eric H. and Beverly Holmstrom (2008), *Study Reading: A Course in Reading Skills for Academic Purposes*, New Delhi: CUP.
- Joan Van Emden and Lucinda Becker Palgrave. *Effective Communication for Arts and Humanities Students*. Macmillan.
- Langan, John (1996). *College Writing Skills*. McGraw Hills.
- Murphy, Raymond.(1998), *Intermediate English Grammar*. New Delhi: CUP.
- Wren & Martin (2001), *English Grammar & Composition*. S.Chand & Company Ltd.

BCA151201 BASIC ELECTRONICS

Credits: 3

Total: 60 Hours

Objective:

The students will be familiarized with the fundamental concepts of electronics and its application.

UNIT 1: Introduction to Network Theorems & AC Fundamentals 12 hrs

Network theorems- Ohm's law, Kirchhoff's law: Statement and explanation. Mesh/loop analysis and node voltage method, Numerical problems. Delta/star and star/delta transformation. Superposition theorem, Thevenini's theorem, Norton's theorem: statement, Steps to apply the theorem and problems for one voltage source. Maximum power transfer theorem: statement, expression for maximum power delivered.

AC fundamentals- Representation of AC sine wave, frequency, time-period, rms value, average value (No derivation, only mention)

UNIT 2: Semiconductor Devices 12 hrs

Introduction-Atomic structure, energy level, energy bands diagram in solids.

Semiconductor-Properties, crystal structure, Effect of temperature on intrinsic semiconductor, Doping, donor, acceptor impurities, n-type and p-type semiconductor.

Semiconductor devices- PN junction diode, formation of PN junction, biasing of PN junction under forward and reverse biasing, breakdown in PN junction: avalanche and zener breakdown. V-I characteristics.

Rectifier- Half wave: Circuit, working, wave forms and expression for ripple factor and efficiency (no derivation), advantages and disadvantages. Full wave: Circuit, working, wave forms and expression for ripple factor and efficiency (no derivation), advantages and disadvantages. Bridge wave rectifier: Circuit, working, wave forms and expression for ripple factor and efficiency (no derivation), advantages and disadvantages.

Digital ICs- Classifications, features.

UNIT 3: Introduction to Digital Electronics 12 hrs

Introduction-Comparison with analog systems, Need and advantages of digital systems, Noise and error corrections. Logic gates: AND, OR, NOT, NAND, XOR, NOR: Assembly with discrete components, Definition, pin diagram, truth table and timing diagram.

Demorgan's theorem-Statements, proof using truth tables. Simplification of Boolean expressions using Boolean laws. Definition of product term, sum term, minterm, maxterms, SOP, standard SOP, POS and Standard POS, Conversion of Boolean expression to standard SOP and standard POS forms.

Karnaugh maps-Definitions, for 2, 3, and 4 variables, grouping of cells, redundant groups and don't care conditions; Simplification of 3 and 4 variable Boolean expression using K-maps (SOP only).

UNIT 4: Combinational Circuits 12 hrs

Half Adder- Symbol, truth table, working; using logic circuit using basic gates and universal gates.

Full Adder-Symbol, truth table, working; using logic circuit using basic gates and universal gates.

Half Subtractor-Symbol, truth table, working; using logic circuit using basic gates and universal gates.

Full Subtractor-Symbol, truth table, working; using logic circuit using basic gates and universal gates.

Adder-Subtractor- Logic circuit, pin diagram IC 7483, IC 7486: Parallel adder: 4 bit parallel binary adder, BCD adder, IC 7483.

Two Bit Comparator-Symbol, logic circuit using XOR and basic gates, truth table.

Encoder-Decimal to BCD priority encoder.

Decoder-2:4 using AND gates, 3:8 using NAND gates, BCD to Decimal decoder and BCD to 7 segment decoder.

Multiplexer- 4:1 Symbol, logic circuit using basic gates, truth table.

Demultiplexer- 1:4 Symbol, logic circuit using basic gates, truth table.

UNIT 5: Sequential Circuits

12 hrs

Flip-flop-Introduction, definition, difference between latch and flip-flop, Qualitative study of level and edge triggering. RS latch/unclocked- symbol and truth table. RS flip-flop using NAND gate, symbol, truth table and timing diagram. D flip-flop: logic symbol, J-K flip-flop: symbol, truth table, realization of JK flip-flop using NAND gates, working and timing diagram. Race around condition, preset and clear inputs, pin diagram of IC 74112. T flip-flop: logic symbol, JK flip-flop as a T flip-flop, truth table and timing diagram. Master-slave flip-flop: logic circuit, truth table and timing diagram. Pin diagrams of IC 7473, IC 7476.

Registers-Definition, types of registers: SISO, SIPO, PISO and PIPO (block diagram representation for each), truth table, timing diagram and speed comparison.

Text Books:

B. Basavaraj. (2002). *Fundamentals of Electronics* (revised ed)., Omkar Publications.

Jain R P. (2002). *Modern Digital Electronics* (2nd ed.). TMH Publishing Company Limited.

Kharate, G K (2010). *Digital Electronics Fundamentals*, Oxford university press.

R.S. Sedha. (2005). *Text book of Applied Electronics*. (1st ed.). S. Chand and Co, Ltd.

References:

Chattopadhyay, Rakshit, Saha, Par. (2000). *Fundamentals of Electronics* (2nd ed.). New Age International.

Grob, Bernard. (2002). *Basic Electronics I* (8th ed.). TMH.

Malvino, Albert Paul and Brown, Jerald A. (2009). *Digital Computer Electronics* (3rd ed.). Tata Mcgraw Hill Publishing co Ltd.

Rangnekar, Saroj. (2001). *Digital Electronics* (1st ed.). ISTE.

BCA151202 PROGRAMMING IN C

Credits: 3

Total: 60 Hours

Objective:

On successful completion of the course the student should be able to develop programs using C language

UNIT 1: Introduction

18 hrs

Problem solving using computers; Concept of flowcharts and algorithms.

Basic programming concepts - Algorithm; Flowchart; Modular and structured programming.

Overview of C - Introduction; Importance of C; Sample C programs; Basic structure of a C program; Programming style; Executing a C program.

Constants, Variables and Data types - C tokens; Keywords and identifiers; Constants; variables; Data types; Declaration of variables; Assigning values to variables; Defining symbolic constants.

Input and Output: Input and output statement; Reading a character; Writing characters; Formatted input and output statement.

UNIT 2: C Operators & Control Structures

12 hrs

Operators and Expression –Arithmetic, relational, logical, assignment, increment, decrement, conditional, bitwise, special operators and some computational problems; Type conversion in expressions; Operator precedence and associativity; Mathematical functions.

Decision making, Branching and Looping - IF statement- Simple IF statement, The IF-ELSE statement, Nesting of IF-ELSE statements, The ELSE-IF ladder; The switch statement; Ternary operator; The GOTO statement; The WHILE statement; The DO-WHILE statement; The FOR statement; Jumps in loops.

UNIT 3: Arrays and Functions

12 hrs

Arrays - One dimensional array, two dimensional arrays and multi-dimensional arrays; Initializing arrays.

Handling of character strings - Declaring and initializing string variables; Reading string from terminal; Writing string to screen; Arithmetic operations on characters; Putting strings together; Comparison of two strings; String handling functions.

Functions - Need for user defined functions; Multifunctional program; Form of C function; Return values and their types; Calling a function; Category of functions; Handling of non-integer functions; Nesting of functions; Recursion; Functions with arrays.

UNIT 4: Structures and Unions

10 hrs

Structures– Structure definition; Giving values to members; Structure initialization; Comparison of structure variables; Array as structure; Array within structure; Unions.

UNIT 5: Pointers and Files

08 hrs

Pointers - Understanding pointers; Accessing the address of variables; Declaring and initializing pointers; Accessing a variable through its pointer.

Files -Types of file access; Types of files; File operations; Input and output operations on files.

Text Books:

Balagurusamy.E.*Programming in ANSI* .(5th ed.). Tata McGraw Hill.

Kamthane Ashok.(2003).*Programming with ANSI and Turbo C*.Pearson Education.

References:

ByronGottfried.S (2000).*Programming with C*. Tata McGraw Hill.

Deitel & Deitel.(2001).*C How to Program*.Addisson Wesley.

Kanetkar Yashavant. *Let Us C*. New Delhi :BPB Publication.

Kernighan Brian, Ritchie Dennis(1988).*The C Programming Language*. Prentice Hall.

Rajaraman.V. (2000). *Programming in C*.PHI (EEE).

Steve Oualline(2010).*Practical C Programming*.O'reilly.

Stephen G. Kochan(2005).*Programming in C*.Pearson

BCA151203 COMPUTING AND PROGRAMMING FUNDAMENTALS

Credits: 3

Total: 60 Hours

Objective:

This course is intended for a better understanding of computational thinking and programming processes, the fundamental approach to solve the real world problems.

UNIT 1: Programming Process

12 hrs

Developing a program, program development cycle; Introduction to Algorithms, Characteristics, writing an algorithm; Flowchart, Symbols, guidelines for preparing flowchart, benefits of flowcharts, limitations of flowcharts; Pseudocode, Pseudocode guidelines, benefits of pseudocode, limitations of pseudocode; program control structures.

UNIT 2: Programming Paradigms

12 hrs

Unstructured programming, Structured programming, Object oriented programming, characteristics of a good program. Types of programming languages; Machine language, Assembly language; procedural language, Natural programming language, Visual programming language, graphical programming language, scripting language, Hypertext Markup language, Extensible Markup language. Program Translation: Program translation hierarchy; compiler, Interpreter, linker, loader; Features of a good programming language.

UNIT 3: Software Paradigms

14 hrs

Definition, relationship between software and hardware, categories of software: system software, application software; System software; operating systems, device drivers and system utilities; Application Software: mathematical software packages, statistical software packages, Enterprise software packages, Editor Packages, Database Software packages; Desktop publishing software; Software piracy and terminologies.

UNIT 4: Computing Paradigms

12 hrs

Introduction to Client server computing; basics of distributed computing, Introduction to Grid computing, parallel computing, cloud computing, Mobile computing; Difference between various computing paradigms and functionalities; Introduction to soft computing, applications and scope; Future computing techniques.

UNIT 5: Case Study

10 hrs

Case study on modern data storage and accessing concepts; case study on modern scripting languages; case study on IT Industry [Technology and business platforms]; case study on open source technology;

References:

B. Muthukumaran (2010). *Information Technology for Management*, Oxford Higher Education.

Dr. Michael Arock, (2014). *Fundaments of programming with C*. Yes Dee publishing. ITL

Education solution Limited. *Introduction to Information Technology*. Pearson.

R.G.Saha Anannya Saha. *Computer Fundamentals*, Himalaya Publication House.

V.Rajaraman, Neeharika Adabala (2015). *Fundamentals of Computers*, (6th ed.). PHI Learning Privated Limited.

Online Resources

<http://blogs.msdn.com/b/vasudevkh/archive/2009/02/06/different-types-of-computing-grid-cloud-utility-distributed-and-cluster-computing.aspx>.

BCA1512L2 PROGRAMMING IN C PRACTICAL

Credits: 3

Total: 60 Hours

1. Write a C program to generate and print first N Fibonacci numbers.
2. Write a C program to find the GCD and LCM of two integer numbers.
3. Write a C program that reverses given integer number and checks whether the number is palindrome or not.
4. Write a C program to find whether a given number is prime number or not.
5. Write a C program to read a string and check whether it is palindrome or not without using built-in function.
6. Write a C program to find the factorial of a number using function.
7. Write a C program to find if a character is alphabetic or numeric or special character.
8. Write a C program to compute the sum of even numbers and the sum of odd numbers using function.
9. Write a C program to accept a sentence and convert all lowercase characters to uppercase and vice-versa.
10. Write a C program to find the largest and second largest of N numbers.
11. Write a C program to find the roots of the given quadratic equation using switch case.
12. Write a C program to input numbers and to find mean variance and standard deviation.
13. Write a C program to accept different goods with the number, price and date of purchase and display them using structure.
14. Write a C program to find the length of a string without using built-in function.
15. Write a C program to read two matrices and perform addition and subtraction of two matrices.
16. Write a C program to find the trace and normal of a square matrix using function.
17. Write a C program to copy one string to another using pointer.
18. Write a C program to count the number of vowels, consonants, digits, special characters, whitespace in a given string.
19. Write a C program to create file for storing details of N students. Student record should contain Roll No, Name and marks secured in two subjects. Copy the contents of the above created file to another file.
20. Write a C program to sort an array of strings.

Evaluation Criteria

Criteria	Marks
Writing any two programs from the given three questions	7.5 x 2 = 15
Executing the written two programs.	7.5 x 2 = 15
Viva Voce	5
Total	35

BCA1512L1 ELECTRONICS PRACTICAL

Credits: 3

Total: 60 Hours

1. Study of Logic gates- AND,OR,NOT,NAND,NOR XOR(using respective IC's)
2. Realization of AND, OR and NOT gates using Universal gates.
3. Design and Realization of Half adder/Subtractor using NAND gates.
4. Design and Realization of Full adder using logic gates.
5. Design and Realization of 4 bit adder/Subtractor using IC 7483.
6. Design and Realization of BCD Adder using IC 7483.
7. Realization of R-S flip flop using NAND gates.
8. Realization of J-K flip flop using IC 7400 and 7410.
9. Realization of T and D flip flop using IC 7400.
10. Realization of 2:4 Decoder.
11. Implementation of SISO shift registers using flip flops (IC 7474).
12. Implementation of SIPO shift registers using flip flops (IC 7474).
13. Implementation of PISO shift registers using flip flops (IC 7474).
14. Implementation of PIPO shift registers using flip flops (IC 7474).

Note: List of Practical experiments (at least 10 experiments to be conducted)

Evaluation Criteria

Criteria	Marks
Writing 2 experiments (Procedure, truth table)	10
Construction and Conducting 1 experiment.	15
Output and Result	05
Viva Voce	05
Total Marks	35

SEMESTER II

ENG152201 ENGLISH II

Credits: 3

Total: 60 Hours

Objectives:

- ♦ To develop the ability to get student's ideas across clearly to an audience, both in speech and in writing
- ♦ To help students develop important practical skills.

UNIT 1: Prose & Poetry

30 hrs

Food -J B S Haldane; A Devoted Son -Anita Desai; Love is a Fallacy -Max Schulman; Night Train at Deoli-Ruskin Bond; Incident of the French Camp - Robert Browning; A Passerby - Robert Bridges; Snake – D H Lawrence; Matilda - Hilaire Belloc; Stopping by Woods on a Snowy Evening -Robert Frost; The Speaking Tree (The Times of India) 2 extracts; Human Rights (Extensive Reading).

UNIT 2: Functional Communication

16 hrs

Essential English Grammar-Presentation Skills & Paper presentation-Note Taking-Report Writing-Letter Writing-Filling Challan, Bank forms & Application forms.

UNIT 3: Media Awareness

14 hrs

Kinds of News-Who and Which News gets Prominence?-Who Controls the News?-Types of Radio Programmes-Types of Television Programmes-Elements of Advertising-Use of blog.

References:

Glendinning, Eric H. and Beverly Holmstrom (2008), *Study Reading: A Course in Reading Skills for Academic Purposes*, New Delhi: CUP.
Joan Van Emden and Lucinda Becker Palgrave. *Effective Communication for Arts and Humanities Students*. Macmillan.
Murphy, Raymond. (1998), *Intermediate English Grammar*. New Delhi: CUP.
Langan, John (1996). *College Writing Skills*. McGraw Hills.
Wren & Martin (2001), *English Grammar & Composition*. S.Chand & Company Ltd.

BCA152201 DATA STRUCTURES

Credits: 3

Total: 60 Hours

Objective:

To inculcate knowledge on implementing Data Structure concepts using C programming language.

UNIT 1: Introduction to Data Structures

14 hrs

Introduction - Definition; Classification of data structures, primitive and non-primitive; Operations on data structures.

Pointers - Definition; Accessing the address of a variable; Declaring and initializing pointers; Accessing a variable through its pointer.

Dynamic Memory Allocation – Define static and dynamic memory allocation; Memory allocation functions, malloc, calloc, free and realloc.

Recursion - Definition; Types; Recursion in C; Writing recursive programs, Binomial coefficient, Fibonacci series, GCD, Towers of Hanoi.

UNIT 2: Searching and Sorting

12 hrs

Searching - Basic searching techniques: Sequential search, Binary search – Iterative and recursive methods; Comparison between sequential and binary search.

Sorting - Definition; Different types, Bubble sort, Selection sort, Insertion sort, Merge sort, Quick sort, Heap sort.

UNIT 3: Stack and Queue

10 hrs

Stack - Definition; Array representation of stack; Operations on stack; Polish notation; Reverse Polish notation; Applications of stack, Conversion of an infix arithmetic expression to postfix, Evaluation of postfix expression.

Queue - Definition; Array representation of queue; Types of queue, Simple queue, Circular queue, Double ended queue, Priority queue, Operations on all types of queues.

UNIT 4: Linked List

12 hrs

Definition; Components of linked list; Representation of linked list; Advantages and disadvantages of linked list; Types of linked list: Singly linked list, Doubly linked list, Circular linked list, Circular doubly linked list; Operations on singly linked list: creation, insertion, deletion, search and display.

UNIT 5: Tree

12 hrs

Tree – Definition, Tree, Binary tree, Complete binary tree, Binary search tree, Heap; Tree terminology, Root, Node, Degree of a node, Degree of a tree, Terminal nodes, Non terminal nodes, Siblings, Level, Edge, Path, Depth, Parent node, Ancestors of a node. Binary tree: Array and linked representation of binary tree; Creation of binary tree; Traversal of binary tree: Preorder, Inorder, Postorder; Variations of binary tree: Binary search tree(BST); Heap: Insertion and deletion of a node.

Text Books:

Kamthane Ashok.(2009).*Introduction to Data Structures in C*. (1st ed.). Pearson.
Langsam Yedidiah, Augenstein J Moshe,Tenenbaum M Aaron.(2010).*Data Structures Using C and C++*(2nd ed.). New Delhi : PHI Learning Private Ltd.
Lipschutz Seymour.(2010). *Data Structures with C*(1st ed.).New Delhi :Tata McGraw-Hill Education.

References:

Balagurusamy .E.(2013). *Data Structures Using C*(1st ed.). New Delhi:McGraw Hill Education.
Horowitz Ellis, Sahni Sartaj, Freed Anderson Susan.(2008).*Data Structures Using C*(2nd ed.). Universities Press.
Gilberg F Richard ,Forouzan A Behrouz. (2007). *Data Structures : A Pseudocode Approach with C*(2nd ed.). Cengage Learning.
Kanetkar Yashavant.(2010). *Data Structures Through C*(2nd ed.). New Delhi :BPB Publication.
Kanetkar P Yeshwant.(2009).*Understanding Pointers in C* (4th ed.). New Delhi: BPB Publications.
Tremblay Paul Jean,Sorenson Paul.(2001). *An Introduction to Data Structures with Application*(2nd ed.).New Delhi:Tata McGraw - Hill Education.

BCA152202 OOPS USING C++

Credits : 3

Total : 60 Hours

Objective :

On successful completion of the course the student will be able to appreciate the concepts of object oriented programming and apply them using C++.

UNIT 1: OOPS Paradigm

04 hrs

Programming language - Procedural languages; Object-oriented programming ; Object-based programming languages; Object-oriented programming languages.

Basic concept of OOPS - Definition of OOPS; Objects; Classes; Encapsulation; Data abstraction; Inheritance; Polymorphism; Dynamic binding; Message passing.

UNIT 2: Introduction to C++

14 hrs

Brief history of C++; Structure of a C++ program; Comments; C++ keywords.

Variables - Identifiers; Data types; Declaration of variables; Initialization of variables; Scope of variables; Constants.

Operators - Types of operators; Priority of operators; Arrays; Initializing arrays; Strings; Pointers; Pointers and arrays ; Dynamic memory.

Functions - Function declaration; function definition; calling the function; passing argument to function; returning value; Call by reference; Default arguments; Function overloading; inline functions.

UNIT 3: Classes and Objects

14 hrs

Class - Introduction to class; Class definition; Classes and objects; Access specifiers: Private, Public , Protected; Member functions; Objects as function arguments.

Constructors - Definition; Default constructor; Constructor with arguments; Dynamic constructor; Copy constructor; Constructor overloading; Destructors; Static class member: Static data member , Static member function; Friend functions.

UNIT 4 : Operator Overloading and Inheritance

14 hrs

Operator overloading - Operator overloading fundamentals; Overloading unary operator; Operator keyword; Operator arguments; Operator return value; Overloading binary operator; Data conversions - Basic to class type, class to basic type, Conversion from one class to another class type.

Inheritance - Concept of Inheritance ; Derived class and base class; Derived class constructor; Single inheritance; Multiple inheritance, Multilevel inheritance; Hybrid Inheritance; Virtual base class; Member functions in multiple inheritance; Constructors in multiple inheritance; Overriding member functions; Containership in C++; Nested classes.

UNIT 5 : Polymorphism and Files

14 hrs

Polymorphism - Virtual functions; Dynamic binding; Pure virtual function; *this* pointer; Accessing member data with *this*; Using *this* for returning values.

Templates and Exception handling - Introduction; Templates; Class templates; Function templates; Template arguments; Exception handling.

Files - Stream class hierarchy; Reading and writing strings; character I/O; Detecting end-of-file; Opening files; Reading and writing class objects; Closing files; File Pointers;

Operations on files; Reading an object from disk ; Writing an object to disk; Command line arguments.

Text Books:

E. Balaguruswamy. *Object-oriented Programming with C++*. Tata McGraw-Hill.

Herbert Schildt(2003). *The complete reference C++*, Tata McGraw-Hill.

Robert Lafore. *Object Oriented Programming in Turbo C++*. Galgotia Publications.

Stephen Prata. *C++ Primer Plus*. (4th ed.). Pearson Education.

References:

John. R. Hubbard(2002). *Programming with C++*, Tata McGraw-Hill.

Kamthane. *Object Oriented Programming with ANSI and Turbo C++*. Pearson Education.

Stanley B.Lippman, Josee Lajoie, Barbara E. Moo. *C++ Primer*. (5th ed.). Pearson Education.

Yashwant Kanetkar(2010). *Let Us C++*. BPB Publications.

BCA152203 MATHEMATICAL FOUNDATION IN COMPUTER APPLICATIONS

Credits: 3

Total: 60 Hours

Objective:

To acquire basic knowledge of various mathematical concepts related to computer programming

UNIT 1: Matrices

10 hrs

Review of fundamentals: Definition of matrix, order of a matrix, types of matrices, algebra of matrices; Determinant: Value of determinant of order 2x2 and 3x3, Minors, cofactors, adjoint and inverse of a matrix; Solutions of systems of linear equations in two and three variables: Cramer's rule and matrix method; Eigen values and Eigen vectors: definition and problems (no theorems) for matrices of order 2x2; Cayley-Hamilton theorem (only statement); Verification of Cayley Hamilton theorem (only 2x2 matrices); Inverse of a matrix using Cayley-Hamilton theorem.

UNIT 2: Algebraic Structures & Vectors

15 hrs

Binary operations: definition of group, properties (only statements), problems, finite and infinite groups, subgroups, theorems (no proofs), problems.

Vectors: Definition of vectors and scalars; vector addition; dot and cross product; projection of a vector on another (no geometric meaning); area of a parallelogram; area of a triangle; scalar triple product; volume of parallelepiped; Coplanarity of three vectors; vector triple product.

UNIT 3: Analytical Geometry

12 hrs

Definition of vector r ; magnitude; problems; distance between two points; direction cosines; direction ratios; angle between two lines; angle between two vectors; angles of a triangle; angle between diagonals of a cube.

Equation of a line, condition for lines to be parallel and perpendicular, point of intersection of lines; equation of a plane, reflection of a point on a line and on a plane.

UNIT 4: Differential Calculus

08 hrs

Derivatives: Standard derivatives, product rule, quotient rule, chain rule, second order derivatives, n^{th} derivative of some standard functions.

UNIT 5: Integral Calculus

15 hrs

Standard Integrals; Integration by substitution; Integration by partial fractions; Integrals of the type $\int \frac{dx}{ax^2+bx+c}$, $\int \frac{(px+q)dx}{ax^2+bx+c}$, Integration by parts; Definite integrals (without properties).

Text Books:

Gururajachar G.B.(2013). *A Text Book of Mathematics for B.C.A, Second Semester*. Bangalore :Excellent Series Publications.

Ranganath, G.K.(2013). *A Text for BCA Mathematics*. Delhi: S.Chand .

References:

Herstein, I.N. *Topics in Algebra*(2nd ed.). Wiley Eastern Limited.

Sharma, J K (2011).*Discrete Mathematics*(3rd ed). New Delhi : Macmillan Publishers India ltd.

Shantinakaran, S. *Differential Calculus* Delhi: S.Chand.

Shantinakaran, S. *Integral Calculus*, Delhi: S.Chand.

Shantinakaran, S. *Elements of Analytical Solid Geometry*.Delhi: S.Chand.

BCA1522L1 DATA STRUCTURES PRACTICAL

Credits: 3

Total: 60 Hours

1. Write a C program to find the Binomial coefficient using recursion.
2. Write a C program to simulate the working of Towers of Hanoi problem for N disks, print the moves taken by the problem using recursion.
3. Write a C program to find the greatest common divisor of two numbers using recursion.
4. Write a C program to search for the greatest and smallest element in an array of integers using sequential search.
5. Write a C program to search for an element in an array using Binary search.
6. Write a C program to sort a list of N elements using Bubble sort technique.
7. Write a C program to sort a list of N elements of integer type using Selection sort technique.
8. Write a C program to sort a list of N elements using Merge sort technique.
9. Write a C program to sort a list of N elements of integer type using Quick sort technique.
10. Write a C program to demonstrate the working of a stack using an array. The elements of the stack may be integers. Operations to be supported are 1.PUSH, 2.POP, 3.DISPLAY. The program should print appropriate messages for stack overflow, underflow. Use separate functions to detect these cases.
11. Write a C program to convert and print a given valid fully parenthesized infix arithmetic expression to postfix expression.
12. Write a C program to simulate the working of linear queue using an array. Provide the operations QINSERT, QDELETE and QDISPLAY. Check the queue status for empty and full.
13. Write a C program to simulate the working of a circular queue using an array. Provide the operations CQINSERT, CQDELETE and CQDISPLAY. Check the circular queue status for empty and full.
14. Using dynamic variables and pointers write a C program to construct a singly linked list consisting of the following information in each node. Roll Number (Integer), Name (Character String) .The Operations to be supported are:
 - a. LINSERT - Inserting a node in the front of the list and after a node.
 - b. LDELETE - Deleting the node based on Roll no.
 - c. LSEARCH - Searching a node based on Roll no.
 - d. LDISPLAY - Displaying all the nodes in the list.
15. Using dynamic variables and pointers, Write a C program to construct a doubly linked list consisting of the following information in each node. Roll Number (Integer), Name (Character String) .The Operations to be supported are:
 - a. DLINSERT - Inserting a node in the front of the list and after a node.
 - b. DLDELETE - Deleting the node based on Roll no.
 - c. DLSEARCH - Searching a node based on Roll no.
 - d. DLDISPLAY - Displaying all the nodes in the list.
16. Write a C program to implement the operations of a linear queue using linked list.
17. Write a C program to create file for storing details of N students. Student record should contain Roll Number, Name and marks secured in two subjects. Using the above created file, create an output file which contains Roll Number, Name, and Marks in two subjects, Total and Average.
18. The preorder and inorder traversals of a Binary search tree is given below:

Inorder: 5, 10, 15, 20, 30, 40

Preorder: 20, 10, 5, 15, 40, 30

Write a program that can generate the postorder traversal of the Binary search tree.

19. Using dynamic memory allocation, construct a Binary search tree of integers. Write C functions to do the following:

Given a Key, Perform a search in Binary search tree. If it is found display Key found else insert the Key in the Binary search tree.

While constructing the Binary search tree do not add any duplicate.

Display the tree using all the traversal methods.

20. Write a C program to sort a list of N elements of integer type using Heap sort technique.

Evaluation Criteria

Criteria	Marks
Writing any two programs from the given three questions	7.5 x 2 = 15
Executing the written two programs.	7.5 x 2 = 15
Viva Voce	5
Total	35

BCA1522L2 OOPS USING C++ PRACTICAL

Credits : 3

Total : 60 Hours

1. Write a C++ program which will accept a temperature in Fahrenheit and will convert it into celcius and display.
2. Write a C++ program to implement a digital clock.
3. Write a C++ program to print the number of days in a month.
4. Write a C++ program to generate a simple calculator.
5. Write a C++ program to swap two numbers using function call through pass by reference.
6. Write a C++ program to demonstrate function overloading by adding two integers, two double data and concatenating two strings.
7. Define a class to represent a bank account. Write a C++ program to perform bank transaction.
8. Write a class called DataGen that has 4 functions – setDate(), getDate(), previousDay(), nextDay(). Add appropriate data members to the class. The setDate() function should accept and validate the date entered by the user. The getDate() function should display the date on the console.
9. Write a program to calculate area and circumference of a circle using inline function.
10. Define a class called String that would work as a user-defined string type. Include default constructor, parameterized constructor and copy constructor. Test your class.
11. Create a class called FLOAT that contains one float data member. Overload all the four arithmetic operators so that they operate on the objects of FLOAT.
12. Write a program to find maximum of two numbers using a friend function.
13. Write a class called Fraction to represent a fractional number. Overload all the four arithmetic operators, using friend functions.
14. Create a base class called Employee. It should contain two methods called getData() and showData(). Create a sub class called SalariedEmp which contains the monthly net salary paid to the employee. Appropriately override the getData() and showData() functions.
15. Write a C++ program to demonstrate the static and non static variable usage by defining them within a function.
16. Create a base class called shape. Use this to derive two classes called triangle and rectangle. Add to the base calss getData() and displayArea() functions. Make displayArea() as a virtual function. Derive appropriate data members and objects.
17. Write a C++ program to demonstrate the use of exception handling in a class.
18. Write a C++ program to find minimum of two values using a function template.
19. Write a C++ program to copy a text file to another.
20. Write a C++ program to create a file of objects and display the objects stored.

Evaluation Criteria

Criteria	Marks
Writing any two programs from the given three questions	$7.5 \times 2 = 15$
Executing the written two programs.	$7.5 \times 2 = 15$
Viva Voce	5
Total	35

SEMESTER III

ENG153201 ENGLISH III

Credits: 3

Total: 60 Hours

Objectives:

- ♦ To develop student's proficiency in the language and develop their communication skills.
- ♦ To equip learners with skills for self-learning.

UNIT 1: Prose & Poetry

24 hrs

Life Doesn't Frighten Me -Maya Angelou; Letters: Letter from a Concentration Camp, Letter to Scottie-F Scott Fitzgerald; Kabuliwala-Rabindranath Tagore; The Shroud -Munshi Premchand; Forum-William Shakespeare; Writing a Curriculum Vitae-Wislawa Szymborska.

UNIT 2: Play

15 hrs

Lady Windermere's Fan- Oscar Wilde.

UNIT 3: Writing Skills

21 hrs

Applying for Passport-Comprehension-Letters to the Editor-Dialogue Writing-Story Writing.

References:

Bevington, David (2002). *Shakespeare*. Oxford: Blackwell, ISBN 0-631-22719-9.
Connecticut : Greenwood Press. ISBN 978-0-313-30325-8.
Lupton, Mary Jane (1998). *Maya Angelou: A Critical Companion*. Westport, Macmillan Publishing (published January 1952). ISBN 978-0-02-615920-3.
Murphy, Raymond. (1998), *Intermediate English Grammar*. New Delhi: CUP.
Tagore Rabindranath (1952). *Collected Poems and Plays of Rabindranath Tagore*.
Wren & Martin (2001), *English Grammar & Composition*. S.Chand & Company Ltd.

BCA153201 PROGRAMMING IN JAVA

Credits: 3

Total: 60 Hours

Objective:

To inculcate knowledge on the architecture-neutral nature of java which enables us to write applications once and run anywhere anytime forever.

UNIT 1: Introduction to Java and Features of Java

10 hrs

History; Evolution of Java; How Java changed internet; Fundamentals of object-Oriented programming; Basic concepts of object-oriented programming; Benefits of object-oriented programming; Features of Java; How Java differs from C And C++; Overview of Java; Simple Java program; Structure; Java development kit (JDK); Java interpreter; Java virtual machine. Data types; Variable; Type conversion and casting; Operators and expressions; Programming structure; Operators and expressions; Decision-making and branching: If; If.. Else; Nested If; Switch; ?: Operator; Looping: While; Do; For – Jumps In Loops - Labeled loops; Array – Types of arrays; String handling.

UNIT 2: Classes Inheritance Packages & Interfaces

16 hrs

Classes - Class fundamentals; Methods; Naming conventions; Declaring objects; Access specifiers; Final; Static; Abstract. Native. Volatile; Synchronized. Constructors; Command line arguments; this keyword; Garbage collection; finalize method; Overloading methods.

Inheritance - Single; Multilevel inheritance; Method overriding-Dynamic method Dispatch; Abstract classes ,Usage of Super; Abstract; Final keywords.

Interfaces - Defining a Package; CLASSPATH; Defining an interface; Implementing interfaces; Variables in interfaces; Extending interfaces; Implementing interface.

Package - Define package; CLASS PATH; Access protection; Importing packages. Lang-Package - Wrapper classes; Util package:-Date; Calendar; Random; IO packages:- File input stream and Output stream.

UNIT 3: Exception Handling Multithreading

10 hrs

Exception Handling - Fundamental of exception; Exception types; Using try & catch; Multiple catch; Nested try; Throw; Finally; Built-in exception; User-defined exception.

Multithreading-Thread fundamentals; Priorities; Creating thread using thread class and runnable interface.

UNIT 4: Applets & Event Handling

10 hrs

Applet - Basics; Applet architecture; Applet life cycle; Applet display methods; Repaint; Status window; Passing parameters to applets; Getdocumentbase(); Getcodebase(); Applet context and showdocument().

Event Handling – Event handling mechanisms; Delegation event model; Event classes; Sources of events; Event listener interfaces; Handling mouse and keyboard events; Adapter classes; Inner classes.

UNIT 5: AWT & AWT Controls

14 hrs

AWT-AWT classes; Window fundamentals; Working with frame windows; Creating a frame window in an applet; Creating a windowed program; Displaying information within a window.

AWT Controls-Layout managers and menus – Control fundamentals; Labels; Buttons; Check boxes; Check box group; Choice control; Lists; Scroll bar; Text field; Text area; Layout managers; Menu bars and Menus; Dialog boxes; File dialog; Handling events by extending AWT components.

Introducing Swing – Origins; Features; MVC connection; Components & containers; Simple swing application; Swing applet.

Java I/O Classes – File; Stream classes; Byte streams; Character streams.

Text Books:

Balagurusamy.E. *Programming with JAVA a Primer*. NewDelhi : Tata McGraw- Hill Publishing Company Limited.

Herbert Schildt. *The Complete Reference- Java* (7th ed.). New Delhi : Tata McGraw-Hill Publishing Company Limited.

References:

Daniel Liang Y.(2007). *Introduction to JAVA Programming* (6th ed.).Pearson Education.

Deitel and Deitel. *Java Programming*. Prentice Hall.

Debasish Jana .(2005).*Java and Object-Oriented Programming Paradigm*, PHI.

John Hubbard R. *Programming With Java* (2nd ed.). TMH.

Kathy Sierra. *Head First Java*. (2nd ed.).O'Reilly Media.

NageswaraRao.R .(2008).*CORE JAVA An Integrated Approach*. Dreamtech Press.

BCA153202 DATABASE MANAGEMENT SYSTEM

Credits: 3

Total: 60 Hours

Objective:

On successful completion of the course the students should have gained knowledge on data base designing and concepts of data base management system.

UNIT 1: Introduction to Database Management System 09 hrs

Introduction - Database and database users; Characteristics of the database approach; Different people behind DBMS; Implications of database approach; Advantages of using DBMS; When not to use DBMS.

Database System Concepts and Architecture - Data models; Schemas and instances; DBMS architecture and data independence; Database languages and interfaces; The database system environment; Classification of DBMS.

UNIT 2: Data Modeling and Record Storage 10 hrs

Data Modeling Using the ER Model - High level conceptual data models for DB design with an example; Entity types; Entity sets; Attributes; Keys; ER model concepts; Notation for ER diagrams; Proper naming of schema constructs; Relationship types of degree higher than two.

Record Storage and Primary File Organization - Hardware description of disk devices-Track, Sector, Disk block or pages; Buffering of blocks; Placing file records on disk; Operations on files; File of unordered records (Heap files); Files of ordered records (Sorted files); Hashing techniques .

UNIT 3: Normalization and Relational Data Model 15 hrs

Functional Dependencies and Normalization for Relational Databases - Informal design guidelines for relational DB schema; Functional dependencies; Normal forms based on primary keys; General definitions - First normal form, Second normal form and Third normal forms, Boyce-Codd normal form.

Relational Data Model - Relational model concepts; Relational constraints and relational database schemas; Defining relations; Update operations and dealing with constraint violations.

Relational Algebra - Basic relational algebra operations; Additional relational operations; Examples of queries in the relational algebra; Relational database design using ER-to- relational mapping; ER-to-relational mapping algorithm.

UNIT 4: Relational Database Language 15 hrs

SQL - Data definition in SQL; Queries in SQL-Insert, Delete and Update statements in SQL; Views in SQL; Specifying general constraints as assertions; Specifying domain and indexes; Additional features of SQL.

UNIT 5: Transaction Processing Concepts 11 hrs

Transaction Processing - Introduction; Transaction and system concepts; Desirable properties of transaction; Schedules and recoverability; Serializability of schedules; Transaction support in SQL.

Concurrency Control Techniques - Locking techniques for concurrency control; Concurrency control based on time stamp ordering; Optimistic concurrency control techniques.

Text Books:

Elmasri & Navathe.(2003).*Fundamentals of Database Systems*.Pearson Education.
Scott Ulman. *Oracle9i PL/SQL programming*.Tata McGraw-Hill.

References:

C.J.Date.*Introduction to Database Systems*. (6th ed.)AddisionWesley.
Das Gupta,Pranab Kumar(2009).*Database Management System, Oracle SQL and PL/SQL*.PHI Learning.
Hector Garcia-Molina,Jeffrey D. Ullman,Jennifer Widom (2006).*Database Systems: The Complete Book* . Pearson.
Ivan Bayross(2008).*The Programming Languages of Oracle*.(3rd ed.).BPB Publications.
Patrick O'Neil (2002).*Data Base Principles; Programming & Performance*.(2nd ed.). Academic Press.
Raghu Ramakrishnan, Johannes Gehrke. *Database Management Systems*.(3rd ed.). Kindle Edition.
Silberschataz, Korth,Sudarshan. *Database System Concepts*. McGrawHill.
Sundarraman.*Oracle 9i Programming A Primer*.(1st ed.) Pearson Education.

BCA153203 OPERATING SYSTEM

Credits: 3

Total: 60 Hours

Objective:

Learning the functions of Operating System in detail.

UNIT 1: Introduction to Operating Systems

07 hrs

Batch systems; Concepts of multiprogramming and time sharing; Parallel; Distributed & real-time systems; Operating system structures; Components & services; System calls; System programs and virtual machines.

UNIT 2: Process Management, Synchronization and Deadlocks

21 hrs

Process concept; Process scheduling; Cooperating processes; Threads; Inter process communication; Scheduling criteria; Scheduling algorithms; CPU scheduling; Multiple processor scheduling; Real time scheduling; Algorithm evaluation; The critical section problem; Synchronization hardware; Semaphores; Classical problems; Critical regions; Monitors; Deadlock: System model; Characterization; Deadlock prevention; Avoidance and detection; Recovery from deadlock; Combined approach to deadlock handling.

UNIT 3: Memory Management

11 hrs

Logical and Physical address space; Swapping; Contiguous allocation space; Paging; Segmentation; Segmentation with paging in Linux and Intel 386; Virtual Memory: Demand Paging and its performance; Page replacement algorithm; Allocation of frames; Thrashing; Page size and other consideration; Demand Segmentation.

UNIT 4: File and Disk Management

15 hrs

File concepts; Access methods; Directory structure; File sharing; Protection; File system structures; File system implementation; Directory implementation; Allocation methods; Free space management; Efficiency and performance; Recovery; Disk structure & scheduling methods; Disk management; Swap-space management.

UNIT 5: Protection and Security

06 hrs

Goals of protection; Domain of protection; Access matrix; Security problem; User authentication; Program threats and system threats.

Text Books:

Silberschartz Abraham, Galvin Baer Peter. (2000). *Operating System Concepts*. (5th and 6th ed.). John Wiley & Sons.

Stallings Williams. (2005). *Operating Systems*. (2nd ed.). Prentice Hall.

Tanenbaum Andrew, S. and Woodhull Albert, S. (2009). *Operating Systems: Design and Implementation*. (3rd ed.). PHI Learning Pvt. Ltd.

References:

Bach Maurice, J. (2012). *The Design of the UNIX Operating System*. Prentice Hall India.

Bhatt Chandra Pramod, P. (2008). *Introduction to Operating System: Concepts and Practices*. (2nd ed.). PHI Learning Pvt. Ltd.

Deitel Harvey M., Choffnes David R. and Deitel Paul J. (2007). *Operating System*. (3rd ed.). Pearson.

Deitel, H. M. *Operating Systems including Case Studies in UNIX, OS/2, MS-DOS, Macintosh, VM, MVS, Open Systems*. (2nd ed.). Pearson Education.

Dhamdhere, D. M. (1996). *Systems Programming and Operating Systems* .Tata McGraw-Hill Education.

Godbole Achyut, S . *Operating Systems with case studies in UNIX, Netware and Windows NT*.Printice Hall Publications.

Madnick Stuart , E. and Donovan John, J. *Operating Systems*.Tata McGrawHill Edition.

Nutt Gary. (2004). *Operating Systems*. Pearson Education.

BCA153204 PROBABILITY AND STATISTICS

Credits: 3

Total: 60 Hours

Objective:

On successful completion of the course the students should be able to do data analysis, draw inferences using hypothesis testing and estimation.

UNIT 1: Univariate Data Analysis

18 hrs

Need for quantifying data; Quantitative and qualitative data; Frequency distributions- discrete and continuous; Histogram, Frequency curve, Cumulative frequency curve; Measures of central tendency -Mean, median and mode; Measures of dispersion - quartile deviation, standard deviation, coefficient of variation; Skewness -Karl Pearson and Bowley's formula; Kurtosis(definition).

UNIT 2: Bivariate Data Analysis

12 hrs

Correlation and regression -Definition, Explanation of concepts, Karl Pearson and Spearman's rank correlation; Curve Fitting - Linear and quadratic.

UNIT 3: Probability

10 hrs

Basic concepts- Trail, Sample space, Event, Types of events; Definitions of probability; Addition and multiplication rules of probability; Conditional probability; Baye's theorem; Random variables; Expectation.

UNIT 4: Probability Distribution

08 hrs

Discrete: Binomial, Poisons, - mean and variance (without proof) and problems. Continuous: Exponential, Normal -Mean and variance (without proof) and problems.

UNIT 5: Inferential Statistics

12 hrs

Definition of null, Alternate, Simple and composite hypothesis; Level of significance; Type I and type II errors; Testing equality of single and two means (large samples), Single and two proportions; Independence of attributes.

Text Books:

Seema Sambargi-itagi. (2001). *A Text Book of Probability and Statistics*. (1st ed.). Himalaya Publishing House.

Srimani, P. K. (2000). *A Text Book of Probability and Statistics*. (1st ed.). Subhash Stores.

References:

Gupta, S.C. (2005). *Fundamentals of Statistics*. (6th ed.). Himalaya Publishing House.

Gupta, S.P. (2006). *Statistical Methods*. (4th ed.). S. Chand.

Mann, et. al. (2012). *An Introduction to Probability and Statistics*. (2nd ed.). Wiley India.

Ravi Kumar, Hema .(1998). *A Text Book of Statistics*. (2nd ed). United Pub.

Sharma, K.V.S. (2002). *Statistics made Simple Do it yourself on PC*. Prentice Hall of India Pvt. Ltd.

Sooryanarayana, B. *Probability and Statistics*. (2008). S. Chand.

Spieger, M.R. (1980). *Theory and Problems of Probability and Statistics*. London: Schaum's Outline Series, McGraw Hill,

Srimani, P. K. and Vinayaka, M.M. *Probability and Statistics*. Subhas Sotres.

BCA1532L1 PROGRAMMING IN JAVA PRACTICAL

Credits: 3

Total: 60 Hours

1. Write a program to display all prime numbers between a given range.
2. Write a program to implement at least six String methods.
3. Write a program to display a multiplication table.
4. Write a program to insert element in existing array.
5. Write a program to demonstrate the usage of *super* and *this* keyword.
6. Write a program to find area of geometrical figures using method overloading.
7. Write a program to execute any Windows95 application (Like notepad calculator etc.).
8. Write a program to find out total memory, free memory and free memory after executing garbage collector (*gc* ()).
9. Write a program to copy a file to another file using java.io package classes. Get the file names at run time and if the target file exists then ask confirmation for overwriting and take necessary actions.
10. Write a program to list files in the current working directory depending upon a given pattern.
11. Write a program to create object for *TreeSet* and *Stack* and implement all its methods.
12. Write a java program to implement Exception Handling.
13. Write a java program to create an Interface and implement it in a class.
14. Write a java program to create a class by extending the Thread class and use the methods of Thread class to change name, priority of the current Thread and display the same.
15. Create a text field that allows only numeric value and in specified length.
16. Write a program to implement mouse events in an applet.
17. Create a Frame and checkbox group with five checkboxes, with label as Red, Green, Blue, Yellow and White. At runtime change the background color of the frame with appropriate selection of the checkbox.
18. Create a Frame with three Scrolls and change the background color of the frame using RGB function with values of scrolls.
19. Write a program to display a frame with a button. The caption of the button should be "Change Color". For every click of the button, the background color of the frame should change randomly.
20. Write an applet that displays the current time. This applet should also change its color after every 2 seconds.

Evaluation Criteria

Criteria	Marks
Writing any two programs from the given three questions	7.5 x 2 = 15
Executing the written two programs.	7.5 x 2 = 15
Viva Voce	5
Total	35

BCA1532L2 DATABASE MANAGEMENT SYSTEM PRACTICAL

Credits: 3

Total: 60 Hours

1. STUDENT DETAILS DATABASE

The student details database has a table with the following attributes.

STUDENT (RegNo: number; Name : text; DOB : date ; Marks : number)

- Remove the existing attribute marks from the table.
- Change the data type of regno from integer to string.
- Add a new attribute PhoneNo to the existing table.
- Enter 5 tuples into the table.
- Display all the tuples in student table.
- Display all the students who were born in 1980s.
- Display all the students in alphabetical order of their names.

2. LIBRARY DATABASE

A library database has a table with the following attributes:

LIBRARY (BookId: number; Title : text; Author : text; Publisher : text; Year_Pub : number; Price :number (6,2))

- Enter 5 tuples into the table.
- Display the different publishers from the list.
- Arrange the tuples in the alphabetical order of book titles.
- List details of all the books whose price ranges between Rs. 100.00 and Rs.300.00.
- Display all the authors under a specific publisher.

3. EMPLOYEE SALARY DATABASE

The salary database of an organization has a table with the following attributes:

EMPSALARY (EmpCode : number; EmpName : text; DOB : date; Dept : text; Salary number(10,2))

- Enter 5 tuples into the table.
- Display the number of employees working in each department.
- Find the sum of the salaries of all employees.
- Find the sum and average of the salaries of employees of a particular department.
- Find the highest salary that an employee draws.
- Find the least salary that an employee draws.
- Find the total salary for each department.
- Increase the salary of those employees working for the computer department by Rs. 1000.
- Display all employees increasing order of their age for a specific department.

4. INVENTORY DATABASE

An inventory database has the following tables

ITEM (ItemCode : number; ItemName : text; Price : number(10,2))

PURCHASE (ItemCode : number; Quantity : number)

- Create the tables with the above attributes.
- Enter 5 – 7 tuples into the tables.
- List the items purchased.
- Display the total items purchased (listing must have the columns : ItemCode, ItemName,TotalQuantity).
- List the items which are not purchased by anyone.

5. BANK CUSTOMER DATABASE

A bank customer database has two tables CUSTOMER and ACCOUNT.

CUSTOMER (CustNo: number; CustName : text; City : text; AccNo : number ; Balance: number(10,2))

ACCOUNT (AccNo: number; AccType: text; Branch : text; AccStatus : text; ChequeFacility : text)

- Create the above tables and specify the primary and foreign keys.
- Enter 5 – 8 tuples for each relation.
- List the customers from “Bangalore” who have cheque facility.
- List all the customers whose balance is greater than 30000.00 and have an active account.
- Find the current outstanding balance amount of branch “Malleswaram”.

6. INSURANCE DATABASE

Consider the Insurance database given below. The primary keys are underlined and the data types are specified.

PERSON (DriverId: text; Name : text; Address : text)

CAR (RegNo: text; Model: text; Year: number)

OWNS (DriverId : text; RegNo: text)

ACCIDENT (ReportNo: number; AccDate: Date; Location: text)

PARTICIPATED (DriverId: text; RegNo: text; ReportNo: number; Dmg_Amt: number(10,2))

- Create the above tables by specifying the primary and foreign keys.
- Enter atleast five tuples for each relation.
- Update the damage amount for each car accident.
- Add a new accident to the database.
- Find the total number of people who owned cars that were involved in accidents in the year 2002.
- Find the number of accidents in which cars belonging to a specific model were involved.
- Display the owners and their car details.

7. ORDER PROCESSING DATABASE

Consider the following relations for an order processing database application in a company.

CUSTOMER(CustId: number; CustName: text; City: text)

CUSTORDER(OrderNo: number; OrderDate: date; CustId: number; OrderAmount: number)

ITEM (ItemNo : number; ItemName: text; UnitPrice number(10,2));

ORDER_ITEM(OrderNo: number; ItemNo: number; OrdItemQty : number)

WAREHOUSE(WarehouseNo: number; City: text)

SHIPMENT(OrderNo: number; WarehouseNo: number; ShipDate: date)

- Create the above tables by properly specifying the primary keys and the foreign keys.
- Enter atleast five tuples for each relation.
- Produce a listing: CustName; no_of_orders; avg_order_amt; where the middle attribute is the total average order amount for that customer.
- List the order_no for orders that were shipped from all the warehouses that the company has in a specific way.
- Demonstrate the delete of itemno 10 from the ITEM table and make that field null in the ORDER_ITEM table.
- List all the items ordered by a particular customer.

8. STUDENT ENROLLMENT DATABASE

Consider the following database of students enrollment in courses and books adopted for each course.

STUDENT(RegNo : number; Name : text; Major : text; BDate :date)

COURSE(CourseNo : number; CourseName: text; Departmentt: text)

ENROLL(RegNo: number; CourseNo: number; Semester: number; TotalMarks: number)

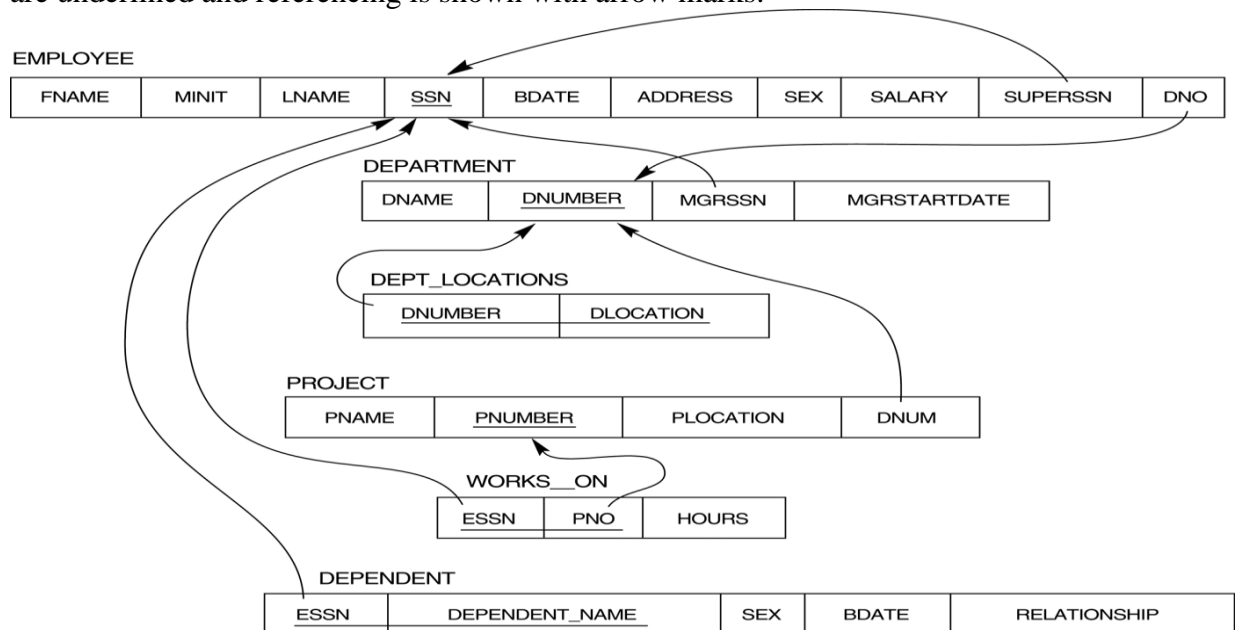
TEXTBOOK (Bk ISBN: number; BookTitle: text; Publisher:text; Author: text)

BOOK_ADOPTION (CourseNo: number; Bk ISBN: number ;Semester: number;)

- Create the above tables by specifying the primary keys and the foreign keys.
- Enter atleast five tuples for each relation.
- Insert a new text book to the database and make this book be adopted by some department.
- List the students who have been enrolled.
- List the students who have registered but not enrolled.
- List the books which have been adopted.
- List any department that has all its adopted books published by a specific publisher.
- Illustrate inner join ; outer join by joining student and enroll table.

9. COMPANY DATABASE1

The database schema of a company is given in the following picture. Primary key fields are underlined and referencing is shown with arrow marks.



- Create the above tables by specifying the primary and foreign keys.
- Enter atleast five tuples for each relation.
- Retrieve the names of employees in department 5 who work more than 10 hours per week on the 'Product X' project.
- For each project, list the project name and the total hours per week (by all employees) spent on that project.
- Retrieve the names of employees who work on every project.
- Retrieve the names of employees who do not work on any project.

10. MOVIE DATABASE

A movie database has a table with the following attributes:

MOVIE (title : text, year : number, length : number, incolour : text, studioname : text, producer : text)

MOVIESTAR(starname : text, address : text, gender : char, birthdate : date)

STARSIN (movietitle : text, movieyear : number, starname : text)

MOVIEEXECUTIVE(starname : text, address : text, networth : number)

STUDIO(studioname : text, address : text)

- Create the above tables by specifying the primary and foreign keys.
- Enter atleast five tuples for each relation.
- Find the address of MGM Studios.
- Find Julia Roberts birth date.
- Find all the stars that appear in a movie made in 1980 or a movie with “life” in the title.
- Find all the executives worth \$100000.
- Find all the stars who are either a male or live in “Miami”.(Miami as part of their address).

11. STUDENT-FACULTY ALLOTMENT DATABASE

Consider the following relations:

Student (snum: integer, sname: text, major: text, level: text, age: integer)

Class (name: text, meets_at: text, room: text, fid: integer)

Enrolled (snum: integer, cname: text)

Faculty (fid: integer, fname: text, deptid: integer)

- Create the above tables by specifying the primary and foreign keys.
- Enter atleast five tuples for each relation.
- Find the names of all Juniors (level = JR) who are enrolled in a class taught by Prof. Ram.
- Find the names of all classes that either meet in room R128 or have five or more Students enrolled.
- Find the names of all students who are enrolled in two classes that meet at the same time.
- Find the names of faculty members who teach in every room in which some class is taught.
- Find the names of faculty members for whom the combined enrollment of the courses that they teach is less than five.

12. Write a program to multiply two numbers by prompting for values from the user. Then the result should be display as "The multiplication of 5 and 10 is 50" (if 5 and 10 were supplied by the user).

13. Display the name, salary and job of the employee MARTIN of the emp table in the format MARTIN is working as SALESMAN and earning a salary of 1250 using a PL/SQL block.

Note:

- Any fully fledged DBMS (like Oracle and SQL server) package may be used.
- The primary key for the table is underlined.

Evaluation Criteria

Criteria	Marks
Writing any two programs from the given three questions	$7.5 \times 2 = 15$
Executing the written two programs.	$7.5 \times 2 = 15$
Viva Voce	5
Total	35

SEMESTER IV

ENG154201 ENGLISH IV

Credits: 3

Total: 60 Hours

Objectives:

- ♦ To develop student's proficiency in the language and develop their communication skills
- ♦ To equip learners with skills for self-learning.

UNIT 1: Prose & Poetry

24 hrs

I Have a Dream-Martin Luther King Jr.; Song of the Rain-Khalil Gibran; The Moustache - Guy de Maupassant; India's Heroes -Anonymous; Nightingale and the Rose-Oscar Wilde; Diary of Anne Frank-An Autobiographical Extract.

UNIT 2: Novel

16 hrs

Bachelor of Arts - R K Narayan.

UNIT 3: Word Power & Writing Skills

10 hrs

Exercise & Worksheets.

UNIT 4: Functional English

10 hrs

Curriculum Vitae and Cover Letters-Precise writing-Facing an Interview-Kinds of Paragraph Writing.

References:

- Bushrui, Suheil B.; Jenkins, Joe (1998). *Kahlil Gibran, Man and Poet: a New Biography*. Oneworld Publications. p.55. ISBN 978-1851682676.
- Mendelsohn, Daniel.(2008). "The two Oscar Wildes". *How Beautiful It Is and How Easily It Can Be Broken: Essays By Daniel Mendelsohn*. New York: HarperCollins. p. 218. ISBN 978-0-06-145644-2.
- Murphy, Raymond.(1998).*Intermediate English Grammar*.New Delhi: CUP.
- Sales-Pontes, A Hilda (1983). *R.K. Narayan*. Atlantic Highlands. ISBN 978-0-391-02962-0.OCLC 10625411.
- Wren &Martin (2001).*English Grammar & Composition*. S.Chand & Company Ltd.

BCA154201 SOFTWARE ENGINEERING

Credits: 3

Total: 60 Hours

Objective:

Student should be able to explain the software engineering principles and techniques that are used in developing quality software products.

UNIT 1: The Product

04 hrs

Evolution of software; Characteristics of software; Software applications; Components of software; Software myths; Software problems; Software reuse; Overview of risk management; Process visibility; Professional responsibility.

UNIT 2: The Process

05 hrs

Definition of software engineering; Software engineering models :Waterfall model, Prototyping model, Spiral model.

UNIT 3: Project Management and Planning

20 hrs

Management spectrum : People, Product, Process ,Project; Metrics-Measures; Metrics and indicators; Types of metrics-Size oriented, Function-oriented metrics, Metrics for software quality; Resources-Human, hardware ,Software resources; Software project estimation-Decomposition technique, LOC based estimation, Empirical estimation; COCOMO model; Risk management: Risk identification, Risk analysis, Risk projection, Risk assessment, Risk prioritization, Risk resolution, Risk monitoring and control; Project scheduling-Work tasks, Time line charts and CPM; Software quality assurance; Quality; Formal technical review and software reliability.

UNIT 4: Analysis Principles and Design Concepts

20 hrs

Analysis Principles - Prototyping; Software requirement specification(SRS).

Analysis Modeling- Data modeling; Data flow diagram(DFD); Structured analysis.

Design Concepts and Principles-Design process; Design principles; Design concepts and effective modular design; Design steps; Data design; Object oriented design; Function oriented design; Interface design and procedural design.

UNIT 5: Software Testing and Maintenance

11 hrs

Software Testing - The testing process; Test planning & strategies; Types of testing: Unit testing; Integration testing; System testing; Acceptance testing; Black box and White box testing and static verification.

Maintenance- Types of maintenance; Enhancing maintainability during development.

Text Books:

Ian Sommerville. (2002). *Software Engineering*(6th ed.). Pearson Education, Asia.

Roger S Pressman. *Software Engineering – A practitioner's Approach*. (5th ed.).Mc Graw Hill International Edition.

References:

James F Peters and WitoldPedryez.(2000).*Software Engineering – An Engineering Approach*. New Delhi: John Wiley and Sons.

Jon Fairclough. (1996). *Software Engineering*. Prentice Hall Press.

Pankaj Jalote.(1995). *An Integrated Approach to Software Engineering*. Narosa Publications.

Richard Fairley. *Software Engineering Concepts*. Tata McGraw Hill Edition.

ACCOUNTING & FINANCIAL MANAGEMENT

3 Credits

Total: 60 Hours

Objective:

The understanding of financial concepts related to accounting and financial management helps the students in developing financial application software in a better way.

UNIT 1: Introduction

10 hrs

Major types of accounting-financial accounting, Cost accounting, Management accounting; Management accounting-Need; Essentials of management Accounting-Importance, Objectives, Scope, Functions, Principal systems and techniques, Advantages, Limitations; Distinction between financial accounting and management accounting; Distinction between cost accounting and management accounting.

UNIT 2: Analysis and Interpretation of Financial Statement

15 hrs

Methods of analysis-Comparative statements; Common size statement; Trend percentage or trend ratio (Horizontal analysis); Ratios; Fund flow statement; Ratio analysis - Meaning of ratio; Necessity and advantages of ratio analysis; Interpretation of ratios; Types of ratio- A) According to the nature of items-Balance sheet ratios, Revenue statements or profit and loss account ratios, Inter statement or composite ratios B)Functional classification - Liquidity ratios ,Leverage ratios, Activity ratios, Profitability ratios; Problems.

UNIT 3: Working Capital

08 hrs

Meaning; Objective and importance; factors determining requirement of working capital; Sources of working capital; Computation of working capital.

UNIT 4: Marginal Costing

10 hrs

Meaning and definition of marginal cost and marginal costing; Contribution; Profit volume ratio; Advantages of marginal costing; Limitation; Problems.

UNIT 5: Budget and Budget Types

17 hrs

Budget - Meaning of budget and budgetary control; Definition; Nature of budget and budgetary control; Objective of budget and budgetary control; Limitations of budget and budgetary control; Steps in budgetary control.

Types/Classification of Budgets - According to time- Short term, Long term ;According to flexibility -Flexible ,Fixed .

References:

B.S. Khanna. *Cost Accounting Principles and Practice*.

I. M. Pandey. *Management Accounting* , Vikas publishing house .

M. Y. Khan; K. P. Jain. *Management Accounting*. Tata Mc Graw Hill Publishing Company Ltd.

M.N. Arora .*Cost Accounting Principles and practice*, New Delhi:Vikas Publishing House Pvt. Ltd.

R. N. Anthony, G. A. Walsh . *Management Accounting*. Tata Mc Graw Hill Publishing Company Ltd.

S.N. Maheshwari . *Cost Accounting Theor y and Problems*, New Delhi: Mittal Shree Mahvir Book Dept.

V.K. Sexena, *Cost Accountant Textbook*, New Delhi: Sultan Chand and Sons.

BCA154203 DATA COMMUNICATION AND NETWORKS

Credits: 3

Total: 60 Hours

Objective

To inculcate knowledge on the data transfer techniques over the digital networks.

UNIT 1: Basic Network Architecture

08 hrs

Network Goals; Network Types; Network topologies: Message, Packet and Circuit switching, Architecture, Services-Layered Architecture: OSI Reference Model, TCP/IP Model, Comparison: OSI and TCP /IP model.

UNIT 2: Digital Transmission & Physical Layer

12 hrs

Chapter 1: Digital Transmission:

Basic properties of digital transmission systems - Fundamentals of digital transmission: Nyquist signaling rate, Shannon channel capacity, Line coding, Types of Encoding, ASK, FSK, PSK, Modems: Modulation & demodulation.

Chapter 2: Transmission Media:

Transmission Media-Twisted pair, Coaxial cable, Optical fiber, Satellite communication networks; -Introduction to wireless transmission-Satellite communication.

UNIT 3: Data Link Layer

20 hrs

Chapter 1: Medium Access Control Sublayer

Introduction to Mac layer-Multiple Access protocols-Types of MAC protocols: Random Access Protocols-ALOHA, CSMA, CSMA/CD, CSMA/CA Controlled Access Protocols:-Reservation, Polling, Token passing, Channelization Protocols.

Chapter 2: LAN And IEEE Standards

IEEE 802.2 Ethernet –IEEE 802.3; Ethernet addressing; Ethernet Topology; Token Bus-IEEE 802.4; Token ring –IEEE 802.5; Wireless LAN –IEEE 802.11; Bridges, FDDI.

Chapter 3: Logical Link Layer

Logical Link Layer-Error Control & Flow Control; Error Control ; Types of Errors; Error Detection: Parity check method ; Checksum method; Cyclic redundancy check method (CRC)-Error correcting methods: Automatic repeat request method (ARQ), Forward error correction method (FEC), Flow Control Methods.

UNIT 4: Transport Layer & Network Layer

14 hrs

Function of Network Layer; Packet Switching concepts; Connection oriented Vs connectionless services; Peer to peer Protocol; Point to Point Protocols; Datagram - Virtual Circuit; Routing concepts; Routing Tables: Non-Adaptive or static routing, Adaptive Algorithms; User datagram protocol (UDP);Transmission control protocol (TCP) ; Congestion control.

UNIT 5: Session Layer, Presentation Layer & Application Layer

06 hrs

Session & Presentation Layer functions - Protocols; Remote Procedure Call, TELNET-Remote Login Access, Network Virtual Terminal; Application layer protocols -Simple Mail transfer Protocol, File transfer Protocol, Hyper Text Transfer protocol, World Wide Web, Domain Name server TCP/IP utilities: PING, TRACEROUTE, IPCONFIG, NETSTAT.

Text Books:

William Stallings. *Data & Computer Communication*. Maxwell Macmillan International Edition.

Andrew Tanenbaum. (2009). *Computer Networks* (4th ed.). Prentice Hall of India.

References:

B.A. Forouzan. *Data Communication and Networking*. (2nd ed.). Tata McGraw Hill.

Peterson . (2008). *Computer Networks*. Tata McGraw Hill.

Robertazzi. (2000). *Computer Networks and Systems*, Springer.

BCA1542L1 UNIX / LINUX PRACTICAL

Credits: 3

Total: 60 Hours

1. Write shell script to count the number of characters in a given string.
2. Write a shell script to count the number of vowels.
3. Write a shell script to find whether the given year is leap year or not.
4. Write a shell script to check whether given string is palindrome or not.
5. Write a shell script to display all the files in a current directory.
6. Write a shell script to find the factorial of a given number.
7. Write a shell script to print a string in a reverse order.
8. Write a shell script to print the multiplication table.
9. Write a menu based shell script to grant or revoke read/write/execute permission of a file using symbolic mode and absolute mode.
10. Write a shell script to compare two strings given by the user.
11. Write a menu driven shell script to implement the following UNIX commands:
a) **rm -r** b) **uniq** c) **tail** d) **cmp**
12. Write a shell script to create a file and compress it using
a) **gzip** b) **gunzip**
13. Write a shell script to find a given pattern in a list of files of the current directory using **grep** command.
14. Write a shell script to generate the prime numbers between a lower limit and upper limit.
15. Write a shell script to send a message to another terminal using **write** command.
16. Write a shell script to create two directories and store five files in one directory using the related commands and to transfer all the files to another directory.

Evaluation Criteria

Criteria	Marks
Writing any two programs from the given three questions	7.5 x 2 = 15
Executing the written two programs.	7.5 x 2 = 15
Viva Voce	5
Total	35

BCA1542L2 SOFT SKILLS PRACTICES

Credits: 3

Total: 60 Hours

Objective:

To enhance the personality of the student and empower them with soft skills through a practical approach.

UNIT 1: The Self-Concept

10 hrs

What is attitude; The process of attitude formation; You are the chief architecture of yourself; Self-management techniques.

UNIT 2: Believe in Yourself

12 hrs

Self-image and self-esteem; Building self-confidence; Environment we mix with; How to build self-image; Meaning and definition of personality.

UNIT 3: Personal Planning and Success Attitude

12 hrs

Prioritizing; Creating the master plan; Active positive visualization and positive attitude; How to build a successful attitude; Spot analysis.

UNIT 4: Self-Motivation and Communication

14 hrs

Levels of motivation; Power of irresistible enthusiasm; Etiquettes and manners in a group; Public speaking; Oral and written communication; Body language; Importance of listening and responding; Tips for technical writing.

UNIT 5: Leadership as a Process

12 hrs

Coordination while working in a team; Leadership styles; Leader and team player; Management of conflict; Profiles of great and successful personalities; Role of career planning in personality development; How to face personal interviews and group discussions.

Guidelines

All the topics to be worked out practically by

- ◆ Conducting Personal Interviews.
- ◆ Giving Presentation On A Technical Topic Based On The Curriculum.
- ◆ Conducting Group Discussions.

References:

Dharam Prakash.(2010).17 Steps to Excellence. Better Yourself Books.
Fr.Anthony D'Souza.(2011).Leadership,Better Yourself Books.
Hurlock,Elizabeth B.(2003). *Personality Development*.TMH.
Richard Denny.(2000) .*Succeed For Yourself* .Kogan Page India.

BCA1542P1 SOFTWARE ENGINEERING PROJECT

Credits: 3

Total: 60 Hours

Guidelines:

- ◆ Students have to develop a project using VB.NET.
 - ◆ Project should be implemented live and should be demonstrated at the time of examination.
 - ◆ The Internal Assessment (IA) marks will be awarded by the guide after evaluating the performance of the student during the course of the project work.
 - ◆ The students can do the project in a group (team) consisting of not more than 2.
 - ◆ Each member of a team must submit a project report.
 - ◆ Students should use Microsoft Project Planner (MPP) to allocate the duration and resource to monitor the progress of the project.
 - ◆ A report of each individual phase has to be submitted within the stipulated time length (mentioned below) to the concerned faculty. The individual report for each phase has to be submitted as mentioned below with time lengths.
1. Initiation phase: The initiation phase is the beginning of the project. In this phase, the idea for the project is explored and elaborated. The goal of this phase is to examine the feasibility of the project. Questions to be answered in the initiation phase include the following:
 - Why this project?
 - Is it feasible?
 - What should the results be?
 - What are the boundaries of this project (what is outside the scope of the project)?Time Length: 8 hours of project lab.
 2. Definition phase: After the project plan (which was developed in the initiation phase) has been approved, the project enters the second phase: the definition phase. In this phase, the requirements that are associated with a project result are specified as clearly as possible.
It is important to identify the requirements as early in the process as possible. The several categories of project requirements are:
 - Preconditions
 - Functional requirements
 - Operational requirements
 - Design limitationsTime Length: 10 hours of project lab.
 3. Design phase: The list of requirements that is developed in the definition phase can be used to make design choices. In the design phase, one or more designs are developed, with which the project result can apparently be achieved.
Time Length: 12 hours of project lab.
 4. Development phase: During the development phase, everything that will be needed to implement the project is arranged. The development phase is complete when implementation is ready to start.

Time Length: 20 hours of project lab.

5. Implementation phase: The project takes shape during the implementation phase. This phase involves the construction of the actual project result.

Time Length: 5 hours of project lab.

6. Follow-up phase: Although it is extremely important, the follow-up phase is often neglected. During this phase, everything is arranged that is necessary to bring the project to a successful completion.

Time Length: 5 hours of project lab.

Evaluation Criteria

Total (IA+EA) = 30+70

Internal Assessment (Record + Class Work + Preparatory): 5+10+15

External Assessment (Viva + Demonstration): 30+40

SEMESTER V

BCA155201 INFORMATION STORAGE AND MANAGEMENT

Credits: 3

Total: 60 Hours

Objectives:

- ♦ To understand storage architectures and key data center elements in classic, virtualized, and cloud environments.
- ♦ To learn the physical and logical components of a storage infrastructure and networking technologies.

UNIT 1: Introduction to Information Storage**10 hrs**

Evolution of storage architecture; Key data center elements; Virtualization and Cloud computing; Data center environment: Characteristics, connectivity, storage and application in both classic and virtual environments; Components; Addressing scheme and performance of mechanical and solid state drives.

UNIT 2: RAID**10 hrs**

RAID implementations; Techniques and levels; Impact of RAID on application performance.

Intelligent Storage System - Components of intelligent storage systems; Cache management; Traditional storage provisioning; Virtual storage provisioning; Implementations.

UNIT 3: FC SAN and FCoE**15 hrs**

Fibre Channel Storage Area Network (FC SAN) - FC SAN components, connectivity options; FC protocol stack; Addressing; Fabric services; Login types; Topologies; Zoning; Virtualization in SAN.

IP SAN and Fibre Channel over Ethernet (FCoE) - iSCSI and FCIP protocols; Components; Topologies.

UNIT 4: NAS and OBS**15 hrs**

Network Attached Storage (NAS)- Benefits; Components; File sharing protocols and input/output operations; Implementations; File level storage virtualization.

Object based and Unified Storage - Object-based storage model; Components, Content address storage; Unified storage solutions : Components, Data access.

UNIT 5: Cloud Computing**10 hrs**

Cloud Computing - Definition, benefits, characteristics; Cloud enabling technologies; Cloud service models; Deployment models and services; Cloud infrastructure and challenges.

References:

EMC Education Services. *Information Storage and Management: Storing, Managing, and Protecting Digital Information in Classic, Virtualized, and Cloud Environments*, (2nd ed), Wiley ISBN: 978-1-1180-9483-9.

Marc Farley (2001). *Building Storage Networks*, TataMcGraw Hill, Osborne.

Meeta Gupta (2002). *Storage Area Network Fundamentals*, Pearson Education Limited.

Spalding Robert (2003). *Storage Networks: The Complete Reference*, TataMcGraw Hill, Osborne.

Online Resources

https://www.education.emc.com/ISMbookv2/resources_content.aspx

<http://www.mikeownage.com/mike/ebooks/InformationStorageandManagement.pdf>

Credits: 3

Total: 60 Hours

Objective:

To provide students with an understanding of the algorithms and theories that forms the basis of computer graphics and modeling and its practical implementations.

UNIT 1: Graphics Systems

12 hrs

Application of computer graphics; Graphic software; Video display devices– Raster scan and random scan displays; CRT functioning - Factors affecting CRT; Raster scan system; Color CRT monitors - Display processor with raster system; Raster co-ordinate system; Color mapping - Instruction set and raster system applications; OpenGL Implementation- Introduction to OpenGL; Basic OpenGL syntax; Display; Window management using GLUT.

UNIT 2: Output Primitives

14 hrs

Line Drawing Methods- DDA and Bresenham; Line attributes; Circle drawing methods – Direct and midpoint circle drawing; Ellipse drawing - Bresenham's ellipse algorithm; Area filling - Scan line area filling and character attributes; OpenGL Implementation - OpenGL pixel; Array functions; OpenGL bitmap function; OpenGL Pixmap function; OpenGL character functions.

UNIT 3: 2D- Transformation

14 hrs

Geometric transformation; Translation; Rotation; Scaling; Reflection and shear matrix representations; Homogeneous co-ordinates - Composite transformation - Raster methods for geometric transformations; Window and viewport; Clipping & classifications - Point clipping, Line clipping, Text clipping, Polygon clipping, Curve clipping; Line clipping techniques - Cohen Sutherland line clipping algorithm, Midpoint subdivision algorithm; Area clipping -Sutherland and Hodgman polygon clipping algorithm.

OpenGL Implementation- OpenGL two dimensional viewing functions; Implementing GLUT display windows; Viewing graphics objects in a GLUT display window; Basic OpenGL geometric transformation functions.

UNIT 4: 3D Graphics

14 hrs

3D-Coordinate system; 3D-Display techniques; 3D-Transformations – Projection transformations, Orthogonal projections, Oblique parallel projections, Perspective projections; Polygon surfaces; Octrees; Bezier curves; Hidden surface removal; Depth buffer and scan line method introduction; Functions for segmenting; Display file; Segment attributes; Display file compilation.

OpenGL Implementation - OpenGL three dimensional viewing; OpenGL general perspective projection function; OpenGL display lists.

UNIT 5: Graphical Input Techniques

06 hrs

Positioning techniques; Grid; Constraints; Dynamic manipulation; Gravity field; Rubber band; Selection technique; Menu; Pointing and selection by naming; Keyboard; Mouse; Joystick; Touch panels; Track ball; Tablet; Data glove; Digitizers; Voice systems.

OpenGL Implementation- OpenGL interactive input device functions.

Text Books:

Donald Hearn & M. Pauline Baker. (2013). *Computer Graphics OpenGL* (3rd ed.). Pearson.

Donald Hearn & M. Pauline Baker. (2012). *Computer Graphics C Version* (2nd ed.). Pearson.

Sumit Chauhan. (2011). *Introduction to Computer Graphics* (1st ed.). Himalaya Publishing House.

References:

Edward Angel.(2013). *Interactive Computer Graphics A Top-Down Approach Using OpenGL* (5th ed.). Pearson.

James D. Foley, Andries Van Dam, Steven K. Feiner & F Hughes John.(2013). *Computer Graphics Principles & Practice in C* (2nd ed.).Pearson.

Roger T. Stevens. (1993). *Graphics Programming in C*. BPB Publications.

Steven Harrington. (1987). *Computer Graphics A Programming Approach*. (2nd ed.). International Edition. McGraw-Hill Publications.

Tom McReynolds, David Blythe. (2005.). *Advanced Graphics Programming Using OpenGL*. Elsevier Publications.

William M. Newman & Robert F. Sproull. (1997). *Interactive Computer Graphics*. Tata McGraw Hill.

Yeshwant Kanetkar. (1998). *Graphics Under C* (1st ed.).BPB Publications.

BCA155203 WEB PROGRAMMING USING PHP

Credits: 3

Total: 60 Hours

Objective:

To make students aware of open source web-based tools and to enable them to interact with the relational database and to develop dynamic web based applications.

UNIT 1: Introduction to PHP

10 hrs

Installation of PHP and MySQL; PHP configuration in IIS & Apache web server; Features of PHP; Writing PHP; How PHP code is parsed; Embedding PHP and HTML; Executing PHP and viewing in browser; Data types; Operators; PHP variables: Static and global variables; Comments in PHP.

UNIT 2: Control Structures

12 hrs

Condition statements: If...Else, Switch, ? operator; Loops: While, break statement, continue, do...while, for, foreach, exit, die, return; Arrays in PHP.

UNIT 3: Working With Data

14 hrs

FORM and INPUT elements; Validating the user input; Passing variables: Between pages, through GET, through POST, through REQUEST; Built-in functions - String Functions: chr, ord, strtolower, strtoupper, strlen, ltrim, rtrim, substr, strcmp; Math Functions: abs, ceil, floor, round, fmod, min, max, pow, sqrt, rand; Array Functions: count, list, in_array, current, next, previous, end, each, sort, rsort; User Defined Functions.

UNIT 4: Sessions and cookies

12 hrs

Concept of session: Starting session, modifying session variables, unregistering and deleting session variable; Concept of cookies.

UNIT 5: Introduction of MySQL

12 hrs

Types of tables in MySQL; Query in MySQL: Select, insert, update, delete, truncate, alias, order by; Database connectivity of PHP with MySQL.

Text Books:

Leon Atkinson. *Core PHP Programming*. Pearson publishers.

Stever Holzner. *The Complete Reference*. PHY McGraw Hill.

Christopher Scollo, Harish Rawat, Deepak Thomas. *Beginning PHP 5.0 Database*. Wrox Press.

Ashok Appu. *PHP – A beginners*. Wiley.

References:

Bible Tim Converse, Joyce Park, Clark Morgan. *PHP 5.0 and MySql*. John Wiley & Sons.

Steve Suehring. *MySQL Bible*. John Wiley & Sons.

Joyce Park and Clark Morgan. *PHP 5 and MySql Tim converse*. Bible Wiley.

Matt Doyle. *Beginning PHP 5.3*. Wrox Publication.

BCA155204 COMPUTER ARCHITECTURE

3 Credits

Total: 60 Hours

Objective:

To have a thorough knowledge of the basic structure and operation of a digital computer.
To study the different ways of communicating with I/O devices and standard I/O interfaces

UNIT 1: Computer Organization and Design **12 hrs**

Instruction codes - Stored program organization; Computer registers; Computer instruction; Instruction cycle-Fetch and decode; Input output and interrupt- I/O instructions; Program interrupt; Design of basic computer.

UNIT 2: Central Processing Unit **12 hrs**

Introduction; General register organization; Stack organization- Register stack; Memory stack; Instruction format; Addressing modes; Data transfer and manipulation- Data transfer instructions and data manipulation instructions; Program control- Status bit conditions.

UNIT 3: Input/ Output Organization **12 hrs**

Peripheral devices; I/O interface-I/O bus and interface modules; I/O Vs. Memory bus; Asynchronous data transfer; Programmed I/O interrupt; Interrupt initiated I/O; Priority interrupt; Direct memory access.

UNIT 4: Parallel Processing **12 hrs**

Parallelism in uniprocessor system; Parallel computer structures; Pipeline computers; Array computers; Multiprocessor systems.

UNIT 5: Architectural Classification **12 hrs**

Multiplicity of instruction - Data streams; Serial versus Parallel processing; Parallelism versus Pipelining.

Text Books:

Kai Hwang, Faye A. Briggs. *Computer Architecture & Parallel Processing*. McGraw-Hill.

Morris Mano. M. *Computer System Architecture*. (3rd ed.). PHI Publications.

References:

Carl Hamacher, Zvonko Vranesic, Safwat Zaky(2002). *Computer Organization*.(5th ed.).Tata Mcgraw Hill.

Hayes. John. P. *Computer Architecture and Organization*. (3rd ed). Tata Mcgraw-Hill

Pal Chaudhary P. *Computer Organization and Design*. New Delhi:Prentice Hall.

Stalling, Williams. *Computer Organization And Architecture* .(4th ed). Prentice Hall.

BCA1552L1 COMPUTER GRAPHICS PRACTICAL

Credits: 3

Total: 60 Hours

1. Write an OpenGL program for drawing a wireframe sphere.
2. Write an OpenGL program for implementing 2-D transformations.
3. Write an OpenGL program for drawing Sierpinski Gasket.
4. Write an OpenGL program for implementing animation.
5. Write an OpenGL program for implementing menu driven graphics package
6. Write a C program to implement DDA line drawing algorithm.
7. Write a C program to implement Bresenham's line drawing algorithm.
8. Write a C program to implement DDA circle drawing algorithm.
9. Write a C program to implement Bresenham's circle drawing algorithm.
10. Write a C program for drawing a Pie chart depicting the election result of 4 parties.
11. Write a C program for drawing a vertical histogram depicting the production of cars in a manufacturing company for four different years.
12. Write a C program for clipping of a triangle.
13. Write a C program for implementing the 2-D transformations.
14. Write a C program to implement Cohen Sutherland line clipping algorithm.
15. Write a C program to implement midpoint sub division method of line clipping.

Evaluation Criteria

Criteria	Marks
Writing any two programs from the given three questions	7.5 x 2 = 15
Executing the written two programs.	7.5 x 2 = 15
Viva Voce	5
Total	35

BCA1552L2 WEB PROGRAMMING USING PHP PRACTICAL

Credits: 3

Total: 60 Hours

1. Write a PHP program to print whether current year is leap year or not.
2. Write a PHP program to print whether given number is odd or even.
3. Write a PHP program to make the sum of first 100 odd numbers.
4. Write a PHP program to print first 10 Fibonacci numbers.
5. Write a PHP program that will compare two strings whether they are same or not.
6. Write a PHP program that will convert a string into lowercase string and uppercase string.
7. Write a PHP program to find a position of a given character into given string.
8. Write a PHP program to replace one string using another string.
9. Write a PHP program to reverse an array.
10. Write a PHP program to find out maximum and minimum number.
11. Write a PHP program to create file with yourname.txt and write few lines about you into it.
12. Write a PHP program to develop E-mail registration form and store all the submitted data in database table.
13. Write a PHP program that keeps track of how many times a visitor has loaded the page.
14. Write a PHP program to read customer information like Cust_no, Cust_name, Item_purchased and Mob_no. from Customer table and display all these information in table format on output screen.
15. Write a PHP program for editing and deleting a particular record from database.
16. Write a PHP program to display Good Morning / Good Afternoon / Good Evening message according to current time.
17. Write a PHP program to demonstrate any 5 date functions.
18. Write a PHP program to load a simple xml file.
19. Write a PHP program to give authentication for registered users with database connectivity.
20. Write a PHP program to store images in table.

Evaluation Criteria

Criteria	Marks
Writing any two programs from the given three questions	7.5 x 2 = 15
Executing the written two programs.	7.5 x 2 = 15
Viva Voce	5
Total	35

BCA1552P1 ENTERPRISE COMPUTING PROJECT (ASP.NET)

Credits: 3

Total: 60 Hours

Guidelines:

- ◆ Students have to develop a project using ASP.NET.
 - ◆ Project should be implemented live and should be demonstrated at the time of examination.
 - ◆ The Internal Assessment (IA) marks will be awarded by the guide after evaluating the performance of the student during the course of the project work.
 - ◆ The students can do the project in a group (team) consisting of not more than 2.
 - ◆ Each member of a team must submit a project report.
 - ◆ Students should use Microsoft Project Planner (MPP) to allocate the duration and resource to monitor the progress of the project.
 - ◆ A report of each individual phase has to be submitted within the stipulated time length (mentioned below) to the concerned faculty. The individual report for each phase has to be submitted as mentioned below with time lengths.
1. Initiation phase: The initiation phase is the beginning of the project. In this phase, the idea for the project is explored and elaborated. The goal of this phase is to examine the feasibility of the project. Questions to be answered in the initiation phase include the following:
 - Why this project?
 - Is it feasible?
 - What should the results be?
 - What are the boundaries of this project (what is outside the scope of the project)?Time Length: 8 hours of project lab.
 2. Definition phase: After the project plan (which was developed in the initiation phase) has been approved, the project enters the second phase: the definition phase. In this phase, the requirements that are associated with a project result are specified as clearly as possible.

It is important to identify the requirements as early in the process as possible. The several categories of project requirements are:

 - Preconditions
 - Functional requirements
 - Operational requirements
 - Design limitationsTime Length: 10 hours of project lab.
 3. Design phase: The list of requirements that is developed in the definition phase can be used to make design choices. In the design phase, one or more designs are developed, with which the project result can apparently be achieved.

Time Length: 12 hours of project lab.
 4. Development phase: During the development phase, everything that will be needed to implement the project is arranged. The development phase is complete when implementation is ready to start.

Time Length: 20 hours of project lab.

5. Implementation phase: The project takes shape during the implementation phase. This phase involves the construction of the actual project result.
Time Length: 5 hours of project lab.
6. Follow-up phase: Although it is extremely important, the follow-up phase is often neglected. During this phase, everything is arranged that is necessary to bring the project to a successful completion.
Time Length: 5 hours of project lab.

Evaluation Criteria

Total (IA+EA) = 30+70

Internal Assessment (Record + Class Work + Preparatory): 5+10+15

External Assessment (Viva + Demonstration): 30+40

SEMESTER VI

BCA156201 MULTIMEDIA TOOLS AND APPLICATION

Credits: 3

Total: 60 Hours

Objective:

Students should be able to understand the relevance and underlying infrastructure of the multimedia systems, multimedia technologies and multimedia standards.

UNIT 1: Introduction to Multimedia & Texts

12 hrs

Multimedia: Development platforms for multimedia: DOS, Windows and Linux; Identifying multimedia elements: Text, Images, Sound, Animation and Video; Making simple multimedia with PowerPoint; Trends in multimedia; Needs and areas of use multimedia.

Text: Concepts of plain and formatted text, RTF and HTML text; Common text preparation tools; Conversion to and from the various text formats; Using standard software; Object linking and embedding concept; Basics of font design; Overview of font editing and designing tools; Understanding and using various text effects.

UNIT 2: Images & Animation

12 hrs

Images: Importance of graphics in multimedia; Vector and Raster graphics; Image capturing methods: Scanner, Digital camera; Various attributes of images: Size, Color, Depth; Image file formats: BMP, DIB, EPS, CIF, PEX, PIC, JPG, TGA, PNG and TIF; Graphic file format conversions; Processing images with common software tools: Photoshop, Paint Shop pro, Corel draw.

Animation: Basics of animation; Principle and use of animation in multimedia; Effect of resolutions; Pixel depth; Image size on quality and storage; Overview of 2D and 3D animation techniques and software tools : Animation pro, 3D studio and Paint Shop pro animator ; Animation on the Web; Features and limitations; Creating simple animations for the web using GIF animator and Flash.

UNIT 3: Sound & Video

12 hrs

Sound

Sound and its attributes; Mono V/s Stereo sound; Sound channels; Sound and its effect in multimedia; Analog V/s Digital sound; Basics of digital sounds; Sampling; Frequency; Sound depth; Sound on PC; Sound standards on PC; Capturing and editing sound on PC; Overview and using some sound recording; Editing software. Overview of various sound file formats: WAV, MP3, MP4.

Video: Basics of video: Analog and digital video; Using video on PC; Introduction to graphics accelerator cards; DirectX; Introduction to AV/DV and IEEE1394 cards; Digitization of analog video to digital video; Interlacing and non-interlacing; Brief note on various video standards: NTSC, PAL, SECAM, HDTV; Introduction to video capturing media and instrument: Videodisk, DVCAM, Camcorder; Introduction to digital video compression techniques and various file formats : AVI, MPEG, MOV Real Video; Brief introduction to video editing and movie making tools: Quick time, video for windows , Adobe premiere.

UNIT 4: Authoring Tools and Multimedia Project

14 hrs

Multimedia authoring tools: Types of tools : Card and page based authoring tools, Icon based authoring tools, Time based authoring tools; Planning and distribution of a multimedia project; Multimedia development team and required skills; Stages in

designing and producing multimedia products for CD; Testing of product; Distribution of multimedia product; Various formats of CD's and DVD's.

Multimedia Project: Multimedia project plan; Multimedia project team; Multimedia Project design and development; Different phases of multimedia project; Examples of multimedia projects.

UNIT 5: Multimedia on the Web

10 hrs

Tools for the World Wide Web: Web servers; Web browsers; Web page makers and site builders ; Plugins and delivery vehicles: Text, Images, Sound, Animation, Video and Presentation ; Working with HTML, XML and PHP; Designing multimedia web pages; Design templates and design factors.

Text Books:

Andreas Holzinger.*Multimedia Basics: Vol – 1 Technology, Firewall Media*. Laxmi Publications Pvt. Ltd .

Tay Vaughan. *Multimedia: Making It Work*. (4th ed.). Tata McGraw Hill.

References:

David Hillman.*Multimedia–Technology and Applications*. Delhi : Galgotia Publications.

James E Shuman. *Multimedia In Action*. Vikas Publishing House.

Judith Jeffcoate. (1998).*Multimedia in Practice Technology and Applications*. PHI.

Parag Havaladar and Gerard Medioni. (2009).*Multimedia Systems: Algorithms, Standards, and Industry Practices*. PaperBack.

Prabat K Andleigh and KiranThakrar .(2003).*Multimedia Systems and Design*. PHI.

Ray Villalobos. (2007).*Exploring Multimedia for Designers*. Design Exploration.

Stephen M. Alessi and Stanley R.Trollip. (2000).*Multimedia for Learning: Methods and Development*. Amazon publications (3rd ed.).

Timothy Paul Garrand.(2006). *Writing for Multimedia and the Web*. (3rd ed.) *A Practical Guide to Content Development for Interactive Media*.

BCA155203 DESIGN AND ANALYSIS OF ALGORITHMS

Credits: 3

Total: 60 Hours

Objective:

To develop the analytical skills in students, to enable them to design algorithms for various applications and to analyze the same.

UNIT 1: Introduction

12 hrs

Definition of algorithm; Characteristics; Different control structures; Writing structured programs; Analysis of algorithm; Asymptotic notations and Basic efficiency classes.

UNIT 2: Divide and Conquer Method

12 hrs

General method; Binary search; Finding maximum & minimum; Merge sort; Quick sort.

UNIT 3: Greedy Method

12 hrs

General method; Knapsack problem; 0/1 Knapsack problem; Job sequencing with deadline; Minimum cost spanning tree; Single source shortest path.

UNIT 4: Dynamic Programming

12 hrs

General method ;Introduction to graphs; Definition; Types; Terms related to graph; Multi stage graphs; All pairs shortest path; 0/1 knapsack; The travelling sales person problem; Flow shop scheduling.

UNIT 5: Basic Traversal & Search Techniques

12 hrs

Search & traversal techniques for trees; Search & traversal techniques for graphs; Introduction to NP-hard and NP-completeness.

Backtracking - General method; 4-queens problem; The 8-queens problem; Sum of subsets problem; Graph coloring problem; Hamiltonian problem.

Text Books:

Aho Ullman & Hopkraft .*Design & Analysis Of Algorithms* .(1st ed.). Dorling kindersley
Ellis Horowitz Sartaj Sahni & SanguthevarRajasekaran.(2007). *Fundamentals Of Computer Algorithms*. Silicon Press.

References:

A.A. Patambekar.(2011). *Design & Analysis of Algorithm*. Technical Publishers.
M.H.Alsuwaiyel.(1999).*Algorithms:Design Techniques and Analysis*.World Scientific Publications.
Sara Base, Allen Van Gelder.(1999).*Computer Algorithms Introduction to Design and Analysis* (3rd ed.). Addison Wesley Publishing Company
T.H.Cormen, C.E.Leiserson, R.L.Rivest, C.Stein.(2003). *Introduction to Algorithms* (2nd ed.).Prentice Hall of India Pvt. Ltd.
V.V.Miniswamy. (2009).*Design and Analysis of Algorithms* .I. K. International Pvt Ltd.

BCA156203 MOBILE APPLICATION

Credits: 3

Total: 60 Hours

Objective:

On successful completion of the course the student should be able to develop and deploy their own mobile applications.

UNIT 1: Overview

12 hrs

Background about mobile technologies; Different mobile technologies: Android, Windows, IOS, Black Berry, Series 40, Bada; Benefits and drawbacks of smartphone programming; Android: Overview, Evolution, Features, Stack overview; Linux kernel; Native libraries; App framework; Apps; SDK: Overview, platforms; Tools.

UNIT 2: Get Started with Android

12 hrs

Get to know Eclipse: Build, Install, Run the application in the emulator or device, Project structure.

Designing User interface - Designing by declaration; Creating the opening screen; Using alternate resources; Implementing an *About Box*; Applying a theme; Adding a menu; Adding settings; Debugging with log messages; Debugging with debugger.

UNIT 3: Exploring 2D graphics and Multimedia

12 hrs

Learning the basics; Adding graphics to existing apps; Handling input, Learn to change the final improvements; Playing audio; Playing video; Adding sound to existing app; Storing local data; Reading/writing local data; Accessing the internal file system; Accessing SD card.

UNIT 4: Location and Sensing

12 hrs

SMS Messaging; Displaying MAPS location Data; Monitoring and tracking a location.

Putting SQL to work: Introducing SQLite; In and Out of SQLite; Hello database; Data binding; Using content provider; Implementing content provider.

UNIT 5: Introduction to Windows Phone Programming

12 hrs

Windows 8 GUI development; Windows 8 software development tools; .Net 4.5 features Windows Phone platform overview; Multitasking windows; Interacting from background; Local data, Working with sensors, tools and phone emulator; Debugging and performance; What's new in Windows phone 8; App-to-App communication; Lock screen background; Lock screen badges; Tiles; Tiles templates; Tiles update; Final touch before deploying and testing in emulators.

Text Books:

Grant Allen. (2012) . *Beginning Android 4*. Apress.

Wei-Meng Lee. (2012). *Beginning Android 4 Applications Development*. John Wiley & sons, Inc.

References:

Charles Petzold. (2010). *Programming Windows Phone*. Microsoft Press. India.

Ed Burnette. (2009). *Hello, Android: Introducing Google's Mobile Development Platform*. Pragmatic. Bookshelf. ISBN-13: 978-1934356173.

Jerome (J.F) DiMarzio. (2010). *Android - A programmer's Guide*. Tata Mcgraw Hill.

Wallace B. McClure, Nathan Blevins, John J. Croft IV, Jonathan Dick and Chris Hardy. (2012). *Professional Android Programming with Mono for Android and .NET / C#*. Wiley India Pvt, Ltd.

Zigurd Mednieks, Laird Dornin, G. Blake Meike, and Maumi Nakamura. (2012). *Programming Android*. O'Reilly. Shroff Publishers. India.

BCA156204 SYSTEMS PROGRAMMING

Credits: 3

Total: 60 Hours

Objectives:

- ♦ The subject introduces the design and implementation of system software.
- ♦ To understand the relationship between the system software and machine architecture.

UNIT 1: Machine Structure, Machine Language and Assembly Language

12 hrs

Machine structure; Evolution of the components of a programming system; General machine structure; Machine language; Assembly language.

UNIT 2: Assemblers

12 hrs

General design procedure; Design of an assembler - Statement of a problem, Data structure, Format of databases; Algorithm of two pass assembler and brief flowchart.

UNIT 3: Macro Language and Macro Processor

12 hrs

Macro instruction; Features of macro facility; Macro instruction arguments; Conditional macro expansion; Macro calls within macros; Macro instructions defining macros; Implementation; A two pass algorithm and brief flowchart.

UNIT 4: Loaders

12 hrs

Loader schemes; Compile & go; General loader schemes; Absolute loaders; Subroutine linkages; Relocating loaders; Direct linking loaders; Other loader schemes - Binders, Linking loaders, Overlays, Dynamic binders; Design of an absolute loader.

UNIT 5: Compilers

12 hrs

Statement of Problem- Problem1: Recognizing basic elements; Problem 2: Recognizing syntactic units & Interpreting meaning; Problem 3: Storage allocation; Problem 4: Code generation; Optimization (Machine independent); Optimization(Machine dependent); Assembly phase; General model of compiler; Brief introduction to 7 phases of the compiler; Passes of a compiler with flow chart.

Text Books:

Dhamdhere. *System Programming and Operating System*. (2nd ed.). Tata McGraw- Hill Education.

John J. Donowon. *System Programming*. Tata McGraw-Hill Education.

References:

A.A. Puntambekar, I.A. Dhotre. *System Software*. Technical Publication.

Aho, Sethi and Ullman. (2002). *Compilers Principles, Techniques and Tools* Pearson Education.

Asoke K. Talukder and Manish Chaitanya. *Architecting Secure Software Systems*. CRC Press.

Beck. *System Software*. (3rd ed.). Pearson Education.

Brian Berenbach, Daniel Paulish, JuergenKazmeier, and Arnold Rudorfer. *Software & Systems Requirements Engineering In Practice* .

D.M.Dhamdere. (1987). *Introduction to System Software*. McGraw-Hill Education.

David Salomon. *Assembler and Loader*. Ellis Horwood.

BCA1562L1 MULTIMEDIA TOOLS AND APPLICATION PRACTICAL

Credits: 3

Total: 60 Hours

1. Create Sun Flower using Photoshop.
2. Create Plastic Surgery for the Nose using Photoshop.
3. Create See-through text using Photoshop.
4. Create a Web Page of displaying event brochure using Photoshop.
5. Create a picture in the existing image background in Corel Draw.
6. Create a 3D text in Corel Draw.
7. Design a business card for a company embed photo in it using Core Draw.
8. Design a banner for a marriage function using Corel Draw.
9. Create an advertisement for a Textile company in Corel Draw.
10. Animate Plane Flying in the Clouds using Photoshop/Flash.
11. Preproduction & Presentation Graphics: Create a 7-10 slide presentation in your favorite presentation graphics application. (Power point is suggested).
12. Desktop Publishing: Create a 2-page desktop-published "newsletter," possibly using your "What is Multimedia?" text. Include graphics.
13. Multimedia Sound: Create 2 soundtracks and 2 EFX sounds for a previous project.
14. Digital Video: Use video capture to digitize your video shoot to another video source to create short production (15-45 seconds).
15. Create three basic Web pages using Dreamweaver / flash or other authoring package or write bare HTML if you are able; pages must be linked and must include at least one graphic per page.
16. Production Planning and Design: Create a proposal of project. Include summary, flowchart, element and resource lists.

Evaluation Criteria

Criteria	Marks
Writing any two programs from the given three questions	7.5 x 2 = 15
Executing the written two programs.	7.5 x 2 = 15
Viva Voce	5
Total	35

BCA1562L2 MOBILE APPLICATION PRACTICAL

Credits: 3

Total: 60 Hours

1. Creating “Hello world” Application.
2. Creating an Application that displays message based on the screen orientation.
3. Create an application that displays custom designed Opening Screen.
4. Create menu in Application.
5. Play an audio, based on the user event.
6. Read/ write the Local data.
7. Dynamically Listing and catching You tube video content.
8. Hello world – windows app.
9. Create a Tiles based app.
10. Using Bluetooth in Android applications.
11. Animating custom graphics.
12. Developing Search application.
13. Display Map based on the Current location.
14. Working with Remote SQL servers.
15. Create / Write data with database (SQLite).
16. Reading data from Remote database.
17. Design a Lock Screen in the existing app.
18. Creating network connectivity notifications.
19. Building our own Custom Library Modules.
20. Learn to deploy both Android and Windows Applications.

Note : All the exercises is to be developed using ANDROID SDK tools .

Evaluation Criteria

Criteria	Marks
Writing any two programs from the given three questions	7.5 x 2 = 15
Executing the written two programs.	7.5 x 2 = 15
Viva Voce	5
Total	35

BCA1562P1 PROJECT

5 Credits

Total: 105 Hours

Guidelines:

- ✦ Students have to develop a project using any advanced technology.
- ✦ Project should be implemented live and should be demonstrated at the time of examination.
- ✦ The Internal Assessment (IA) marks will be awarded by the guide after evaluating the performance of the student during the course of the project work.
- ✦ The students can do the project in a group (team) consisting of not more than 2.
- ✦ Each member of a team must submit a project report.
- ✦ Students should use Microsoft Project Planner (MPP) to allocate the duration and resource to monitor the progress of the project.
- ✦ A report of each individual phase has to be submitted within the stipulated time length (mentioned below) to the concerned faculty. The individual report for each phase has to be submitted as mentioned below with time lengths.

1. Initiation phase: The initiation phase is the beginning of the project. In this phase, the idea for the project is explored and elaborated. The goal of this phase is to examine the feasibility of the project. Questions to be answered in the initiation phase include the following:

- Why this project?
- Is it feasible?
- What should the results be?
- What are the boundaries of this project (what is outside the scope of the project)?

Time Length: 5 hours of project lab.

2. Definition phase: After the project plan (which was developed in the initiation phase) has been approved, the project enters the second phase: the definition phase. In this phase, the requirements that are associated with a project result are specified as clearly as possible.

It is important to identify the requirements as early in the process as possible.

The several categories of project requirements are:

- Preconditions
- Functional requirements
- Operational requirements
- Design limitations

Time Length: 10 hours of project lab.

3. Design phase: The list of requirements that is developed in the definition phase can be used to make design choices. In the design phase, one or more designs are developed, with which the project result can apparently be achieved.

Time Length: 30 hours of project lab.

4. Development phase: During the development phase, everything that will be needed to implement the project is arranged. The development phase is complete when implementation is ready to start.

Time Length: 50 hours of project lab.

5. Implementation phase: The project takes shape during the implementation phase. This phase involves the construction of the actual project result.

Time Length: 5 hours of project lab.

6. Follow-up phase: Although it is extremely important, the follow-up phase is often neglected. During this phase, everything is arranged that is necessary to bring the project to a successful completion.

Time Length: 5 hours of project lab.

Evaluation Criteria

Total (IA+EA) = 45+105

Internal Assessment (Record + Class Work + Preparatory): 10+15+20

External Assessment (Viva + Demonstration): 45+60

NON CORE COURSES

1 Credit

Total: 30 Hours

Objectives:

- ♦ Enables the citizens to know their rights and duties
- ♦ Makes them an ideal citizen of India
- ♦ Helps them for their valuable contribution of nation building

UNIT 1: Introduction

06 hrs

Constituent assembly, preamble, features of Indian constitution, fundamental duties, fundamental rights, methods of constitutional amendment, directive principles of state policy.

UNIT 2: Union Parliament

07 hrs

Rajya Sabha- powers and functions, Loka Sabha- powers and functions, committees of the parliament, speaker. State legislature- Legislative council and legislative assembly – powers and functions.

UNIT 3: Union Executive

07 hrs

President, Prime Minister Powers and functions. Governor, Chief Minister- powers and functions. Union and state council of ministers. Coalition government.

UNIT 4: Judiciary

05 hrs

Features of Indian judiciary. Supreme court- powers and functions. High court- powers and functions. Public interest litigation.

UNIT 5: Issues

05 hrs

Indian federation- Centre and state powers, Indian secularism. Reservations in India, Social justice, Environmental protection, Human rights.

References:

- Austin, Granville (1999), *Indian constitution: cornerstone of a nation* New Delhi
- Bakshi, P.M (2002), *The Constitution of India* – Universal Law publishers.
- Basu, Durga Das (1995), *Introduction to the constitution of India* New Delhi: Prentice – hall of India Pvt.
- Basu, Durga Das (2002), *Introduction to the Constitution of India* New Delhi: Wadhwa and Company Law Publishers.
- Kabburi, S.K (2006), *Indian constitution-institutions and process*.
- Kagzi, M.C. (2001), *The Constitutional of India Vol.1 & 2*.New Delhi: India law house.
- Pylee, M.V (2002), *Constitution Government and Politics* New Delhi: Universal Law publishing Co.Pvt.Ltd.
- Raj, Hans (1998), *The Constitution of India*: New Delhi: Surjeet Publications.

1 Credit

Total: 30 Hours

Objectives:

- ♦ To provide basic knowledge of Computer and its Usage.

UNIT 1: Introduction to Computers

05 hrs

General features of a Computer – Generation of Computers - Personal Computer – Workstation – Mainframe Computer and Super Computers. Computer Applications – Data Processing – Information Processing – Commercial – Office Automation – Industry and Engineering – Healthcare – Education – Graphics and Multimedia.

UNIT 2: Computer Organization

05 hrs

Central Processing Unit – Computer Memory – Primary Memory – Secondary Memory – Secondary Storage Devices – Magnetic and Optical Media – Input and Output Units – OMR – OCR – MICR – Scanner – Mouse - Modem.

UNIT 3: Computer Hardware and Software

10 hrs

Machine language and high level language. Application software. Computer program. Operating system. Computer virus, antivirus and Computer security. Elements of MS DOS and Windows OS. Computer arithmetic. Binary, octal and hexadecimal number systems. Algorithm and flowcharts. Illustrations. Elements of database and its applications.

UNIT 4: Microsoft Office

05 hrs

Word processing and electronic spread sheet. An overview of MS WORD, MS EXCEL and MS POWERPOINT. Elements of BASIC programming. Simple illustrations.

UNIT 5: Computer Networks

05 hrs

Types of networks. LAN, Intranet and Internet. Internet applications. World wide web. E-mail, browsing and searching. Search engines. Multimedia applications.

LIST OF PRACTICAL ASSIGNMENTS: (12 Sessions of 2 hours each)

System use, keyboard, mouse operations. Word pad and paint brush.

Creating a folder and saving a document – 2 sessions.

Simple MS. DOS commands – 1 session.

Windows operating system – icons, menus and submenus, my computer – 2 sessions

Desktop publishing – preparation of a document using MS.WORD – 2 sessions

Installation of a software, virus scanning – illustrations – 1 session.

Spreadsheet calculations using MS.EXCEL – 1 session.

BASIC programming – illustrations – 1 session.

Internet use. Surfing, browsing, search engines, E-mail. – 2 sessions.

References:

Alexis Leon and Mathews Leon (1999): *Fundamentals of information technology*, Leon Techworld Pub.

Archanakumar – *Computer Basics with office automation*, I.K. International Publishers.

Jain, S.K. (1999): *Information Technology* “O” level made simple, BPB Pub.

Jain, V.K. (2000): “O” Level Personal Computer Software, BPB Pub.

Rajaraman, V. (1999): *Fundamentals of Computers*, Prentice Hall India.

Sinha, *Computer Fundamentals*, BPB Pub.

1 Credit

Total: 30 Hours

Objectives:

- ✦ Understand the various aspects of Environment
- ✦ To harness the concern for the environment and its resources
- ✦ Comprehend the correlation between human population, social issues with that of environment

UNIT 1: Nature of Environmental Studies:

03 hrs

Definition, scope and importance, Multi - disciplinary nature of environmental studies, need for public awareness. Natural resources and associated problems: (a) Forest resources: Use and over-exploitation, deforestation timber extraction, mining, dams and their effects on forests and tribal people, (b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. (c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources. (d) Food resources: World food problems, changes caused by agriculture effects of modern agriculture, fertilizer-pesticide problems. (e) Energy resources: Growing energy needs, renewable and non -renewable energy sources, use of alternate energy sources. (f) Land resources: land as resources, and land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources equitable use of resources for sustainable lifestyles.

UNIT 2: Ecosystems

03 hrs

Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids, Introduction, types, Characteristic features, structure and function of the following ecosystem: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

UNIT 3: Biodiversity and its Conservation

03 hrs

Introduction-Definition: genetic, species and ecosystem diversity, Biogeographical classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option value, Biodiversity at global, national and local levels, India as a mega-diversity nation, Western ghat as a bio-diversity, Hot-spots of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife Conflicts, Endangered and endemic species of India, Conservation of biodiversity: In-situ and Ex-situ, Conservation of biodiversity.

UNIT 4: Environmental Pollution

05 hrs

Definition, causes, effects and control measures of: a) Air pollution b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear hazards., Solid waste management: causes, effects and control measures urban and industrial wastes, Role of an individual in prevention of pollution, Disaster management: folds, earthquake, cyclone and landslides, Tsunami.

UNIT 5: Social Issues, Human Population and Environment

06 hrs

From Unsustainable to Sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people; its problems and concerns, Environmental ethics: Issues and possible solutions, Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Wasteland reclamation, consumerism and waste products, Environment protection Act, Air (Prevention and control of pollution) Act., Water (Prevention and control of pollution) Act., Wildlife protection act, Forest conservation Act, Issues involved in enforcement of environmental legislation public awareness. Population growth, variation among nations, Population explosion, Family welfare programme, Environment and human health, Value Education, Women and Child Welfare, Role of information technology in Environmental and human health.

CIVIC SENSE

Objectives:

- ◆ To sensitize students to the concept and practice of civic sense
- ◆ Understanding the pivotal role in the transformation of urban attitudes along with the local government for sustainable change
- ◆ Fortifying experiential understanding of initiating and sustaining good civic sense in the community

UNIT I: Introduction to Civic Sense / Social Ethics

03 hrs

Concept nature and scope of civic sense, need and importance of civic sense, inter-relation between civic sense, citizenship and community.

UNIT II: Issues of Promoting Civic Sense

03 hrs

Spitting, urinating and defecating in public, lettering, shop lifting, consuming alcohol in public, smoking in public, consuming drugs, mugging, vandalizing public property, vulgar graffiti on public spaces, loud and rude behavior, argumentativeness, lack of humility and conduct, general disregard to the law of the land, disrespect to elders, ragging, eve teasing, women subjugation, stalking, lack of traffic discipline, jay walking, honking without reason, willful noise pollution, road rage, use of cell phones while driving. Reporting Instances of Poor Civic Sense: Highlighting the manifestations and ramifications including the moral and the legal consequences of the victims and the accused. Preventive / precautionary measures for the innocent victims who are soft targets.

UNIT III: Promotion of Civic Sense**02 hrs**

Role of educational institutions and media; the role of family / teachers, local self-Government and non-Government organization .

UNIT IV: Success stories signifying good Civic Sense within India and Foreign Countries**01 hr****UNIT V: Group Project****01 hr**

Sensitizing students to the practice and inculcation of civic sense.

References:

- Agarwal, K.C., (2001) *Environmental Biology*, Nidi Publ. Ltd. Bikaner
- Bharucha Erach, *The Biodiversity of India*, Mapin publishing Pvt. Ltd. Ahmedabad-
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. (2001) *Environmental Chemistry*, Wiley Eastern Ltd.,
- Heywood, Vh & Watson R.T. 1995 *Global biodiversity Assement* Cambridge Univ.
- Jadhav H & Bhosle V.M. 1995 *Environmental Protection and laws*. Himalayas Pub. House Delhi, 284p
- Mckinney M.L. & Schoel R.M. 1996 *Environmental Science systems & Solutions* Web.Enhanced edition 639p.