KAKATIYA UNIVERSITY
WARANGAL-506009

Bachelor of Computer Application (BCA) Syllabus

Under the

CHOICE BASED CREDIT SYSTEM
(With effect from 2016-17)

DEPARTMENT OF COMPUTER SCIENCE

University College, KU, Warangal-506009

BCA I YEAR I SEMESTER

Code	Subject	Workload Per Week	Marks			Credit
			External	Internal	Total	
BCA11	General English- I	T(4)	70	30	100	4
BCA12	Fundamentals Of Information Technology	T (4)	70	30	100	4
BCA13	Programming with C	T (4)	70	30	100	4
BCA14	Discrete Mathematics	T (4)	70	30	100	4
BCA15	Management Information Systems	T (4)	70	30	100	4
BCA16	Fundamentals Of Information Technology Lab	L (4)	50	0	50	2
BCA17	Programming with C Lab	L (4)	50	0	50	2
				Total credits		24

BCA I YEAR II SEMESTER

Code	Subject	Workload Per Week	Marks			Credit
			External	Internal	Total	
BCA21	General English - II	T (4)	70	30	100	4
BCA22	Object Oriented Programming With C++	T (4)	70	30	100	4
BCA23	Probability And Statistics	T (4)	70	30	100	4
BCA24	Operating System	T (4)	70	30	100	4
BCA25	Computer Organization	T (4)	70	30	100	4
BCA26	Object Oriented Programming With C++ Lab	L (4)	50	0	50	2
BCA27	Operating system - lab	L (4)	50	0	50	2
				Total credits		24

BCA II YEAR I SEMESTER

Code	Subject	Workload Per Week	Marks			Credit
			External	Internal	Total	
BCA31	Data Structures With C++	T (4)	70	30	100	4
BCA32	Operation Research	T (4)	70	30	100	4
BCA33	Web Programming	T (4)	70	30	100	4
BCA34	Software Engineering	T (4)	70	30	100	4
BCA35	Computer Networks	T (4)	70	30	100	4
BCA36	Data Structures - Lab	L (4)	50	0	50	2
BCA37	Web Programming - Lab	L (4)	50	0	50	2
				Total credits		24

BCA II YEAR II SEMESTER

Code	Subject	Workload Per Week	Marks			Credit
			External	Internal	Total	
BCA41	Design And Analysis Of Algorithms	T (4)	70	30	100	4
BCA42	Database Management Systems	T (4)	70	30	100	4
BCA43	Java Programming	T (4)	70	30	100	4
BCA44	System Approach To Management	T (4)	70	30	100	4
BCA45	Computer Graphics	T (4)	70	30	100	4
BCA46	Database Management Systems - Lab	L (4)	50	0	50	2
BCA47	Java Programming - Lab	L (4)	50	0	50	2
				Total credits		24

BCA III YEAR I SEMESTER

Code	Subject	Workload Per Week	Marks			Credit
			External	Internal	Total	
BCA51	Multimedia Systems And Applications	T (4)	70	30	100	4
BCA52	Object Oriented Design in UML	T (4)	70	30	100	4
BCA53	Visual Programming	T (4)	70	30	100	4
BCA54	E-Commerce Technologies	T (4)	70	30	100	4
BCA55	Cryptography and Network Security	T (4)	70	30	100	4
BCA56	Multimedia Systems And Applications- lab	L (4)	50	0	50	2
BCA57	Visual Programming- Lab	L (4)	50	0	50	2
				Total credits		24

BCA III YEAR II SEMESTER

Code	Subject		Workload Per Week	Marks			Credit
				External	Internal	Total	
BCA61	Elective A1/B1/C1		T(4)	70	30	100	4
	A1	Artificial Intelligence					
	B1	Theory of Computation					
	C1	Digital Image Processing					
BCA62	Elective A2/B2/C2		T(4)	70	30	100	4
	A2	Data mining					
	B2	Android Programming					
	C2	Unix programming					
BCA63	Major project (including Seminars)			300	100	400	16
					Total credits		24

BCA I YEAR I SEMESTER

Code	Subject	Workload Per Week	Marks			Credit
			External	Internal	Total	
BCA11	General English- I	T(4)	70	30	100	4
BCA12	Fundamentals Of Information Technology	T (4)	70	30	100	4
BCA13	Programming with C	T (4)	70	30	100	4
BCA14	Discrete Mathematics	T (4)	70	30	100	4
BCA15	Management Information Systems	T (4)	70	30	100	4
BCA16	Fundamentals Of Information Technology Lab	L (4)	50	0	50	2
BCA17	Programming with C Lab	L (4)	50	0	50	2
				Total credits		24

GENERAL ENGLISH I

LESSON ONE (SHORT FICTION)	**TEXT**	**OLD MAN AT THE BRIDGE by Ernest Hemmingway**
	PRONUNICIATION	CONSONANTAL SOUNDS
	GRAMMAR	ARTICLES
	VOCABULARY	SYNONYMS
	SPELLING	PICK OUT THE WRONGLY-SPELT WORDS
	CONVERSATIONS	ICE-BREAKING
	READING PASSAGE	RUDRAMA DEVI
	LIFE SKILLS	SELF-AWARENESS
LESSON TWO (PROSE)	**TEXT**	**INDIA AND DEMOCRACY by Dr. B.R. AMBEDKAR**
	PRONUNICIATION	VOWEL SOUNDS:
	GRAMMAR	PREPOSITIONS
	VOCABULARY	ANTONYMS
	SPELLING	USE OF 'UN' OR 'DIS'
	CONVERSATIONS	INTRODUCING
	READING PASSAGE	MEDARAM JATARA
	LIFE SKILLS	EMPATHY
LESSON THREE (POETRY)	**TEXT**	**THE SCRIBE by WALTER DE LA MARE**
	PRONUNICIATION	VOWEL SOUNDS: DIPHTHONGS
	GRAMMAR	TENSES
	VOCABULARY	HOMOPHONES & HOMONYMS
	SPELLING	USE OF 'TION' OR 'SION'
	CONVERSATIONS	DESCRIBING A PERSON/PLACE/EVENT
	READING PASSAGE	KALOJI
	LIFE SKILLS	CRITICAL THINKING & CREATIVE
LESSON FOUR (DRAMA)	**TEXT**	**THE NEVER-NEVER NEST by CEDRIC MOUNT**
	PRONUNICIATION	PLOSIVES
	GRAMMAR	FRAMING QUESTIONS
	VOCABULARY	ONE-WORD SUBSTITUTES
	SPELLING	USE OF 'MENT'
	CONVERSATIONS	GIVING DIRECTIONS
	READING PASSAGE	KUNTALA WATERFALL
	LIFE SKILLS	DECISION-MAKING SKILL

FUNDAMENTALS OF INFORMATION TECHNOLOGY

Unit – I

Introduction to Computer : Introduction, Digital and Analog Computers, Characteristics of Computer, History of Computer, Generations of Computer, Classification of Computer, The Computer System, Application of Computers.

The Computer System Hardware: Introduction, Central Processing Unit, Memory Unit, Instruction Format, Instruction Set, Instruction Cycle, Microprocessor, Interconnecting the Units of a Computer, Performance of a Computer, Inside a Computer Cabinet

Computer Memory : Introduction, Memory Representation, Memory Hierarchy, CPU Registers, Cache Memory, Primary Memory, Secondary Memory, Access Types of Storage Devices, Magnetic Tape, Magnetic Disk, Optical Disk, Magneto-Optical Disk, Using the Computer Memory.

Unit – II

Input and Output Devices: Introduction, Input-Output Unit, Input Devices, Human Data Entry Devices, Source Data Entry Devices, Output Devices, I/O Port, Working of I/O System.

Data Representation : Introduction, Number System, Conversion from Decimal to Binary, Octal, Hexadecimal, Conversion of Binary, Octal, Hexadecimal to Decimal , Conversion of Binary to Octal, Hexadecimal, Conversion of Octal, Hexadecimal to Binary, Binary Arithmetic, Signed and Unsigned Numbers, Binary Data Representation, Binary Coding Schemes, Logic Gates.

Interaction of User and Computer: Introduction, Types of Software, System Software, Application Software, Software Acquisition.

Unit – III

Operating System : Introduction, Objectives of Operating System, Types of OS, Functions of OS, Process Management, Memory Management, File Management, Device Management, Protection and Security, User Interface, Examples of Operating Systems.

Computer Programming Fundamentals: Introduction, Program Development Life Cycle, Algorithm, Control Structures, Flowchart, Pseudo Code, Programming Paradigms.

The Internet and Internet Services: Introduction, History of Internet, Internetworking Protocol, the Internet Architecture, Managing the Internet, Connecting to Internet, Internet Connections, Internet Address, Internet Services, Uses of Internet.

Unit IV

Information Systems : Introduction, Data, Information and Knowledge, Characteristics of Information, Information System (IS), Computer-Based Information System (CBIS), Need for Efficient Information System, Categories of Information System, Operations Support System, Management Support System, Specialized Information System, Careers in Information Systems.

Computer Security: Introduction, Security Threat and Security Attack, Malicious Software, Hacking, Security Services, Security Mechanisms, Cryptography, Digital

Signature, Firewal, Users Identification and Authentication, Other Security Measures, Security Awareness, Security Policy.

Emerging Computer Technologies: Distributed Networking, Peer-to-Peer Computing, Grid Computing, Cloud Computing, Utility Computing, On-demand Computing, Wireless Network, Bluetooth, and Artificial Intelligence.

Text Books:

1. A. Goel, Computer Fundamentals, Pearson Education, 2010.
2. Reema Thareja, Fundamentals of Computers, Oxford 2015.

References:

1. Spoken Tutorial on “Linux (Ubuntu), LibreOffice (Writer, Calc, Impress), Firefox”, as E-resource for Learning. http://spoken-tutorial.org

PROGRAMMING WITH C

Unit - I

Computing Concepts: Types of Software, Programming Languages, Translator Programs, Problem Solving Techniques, Using Computer.

Overview of C: History of C, Importance of C, Sample Programs, Basic Structure of C Programs, Programming Style, Executing a ' C ' Program.

Constants, Variables, and Data Types : Introduction, Character set, C tokens, Keywords and Identifiers, Constants, Variables, Data Types, Declaration of Variables, Declaration of Storage Class, Assigning Values to Variables, Defining Symbolic Constant, Declaring Variable as Constant and Volatile, Overlow and Underflow of Data.

Managing Input and Output Operations: Introduction, Reading a Character, Writing a Character, Formatted Input and Output.

Operators and Expressions : Introduction, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operator, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evalution of expressions, Precedence of Arithmetic Operators, Some Computational Problems, Type Conversions in Expressions, Operator Precedence and Associativity, Mathematical Functions.

Unit – II

Decision Making and Branching: Introduction, Decision Making with IF Statement, Simple If Statement, The If....Else Statement, Nested of If....Else Statements, The else if Ladder, The Switch Statement, The?: Operator, The Goto Statement.

Decision Making and Looping: Introduction, The While statement, the do Statement, the For Statement, Jumps in Loops.

Arrays: Introduction, One-dimensional Arraays, Declaration and Initialization of One-dimensional Arrays, Two-dimensional Arrays, Initializing two-dimensional Arrays, Multi-dimensional Arrays, Dynamic Arrays.

Unit III

Character Arrays and Strings: Introduction, Declaring and Initializing String Variables, Reading Strings from Terminal, Writing Strings to Screen, Arithmetic Operations on Characters, Putting Strings together, Comparison of Two Strings, String-handling Functions, Table of Strings, Other Features of Strings.

User-Defined Functions : Introduction, Need for User-Defined Functions, A Multi-function Program, Elements of user-defined Functions, Definition of Functions, Return Valus and their Types, Function Calls, Function Declaration, Category of Functions, No Arguments and No Return Values, Arguments but No Return Values, Arguments with Return Values, No Arguments but Returns a Value, Functions that Return Multiple Values, Nesting of Functions, Recursion, Passing Arrays to Functions, Passing Strings to Functions, The Scope, Visibility and Lifetime of Variables, Multifile Programs.

Unit- IV

Pointers : Introduction, Understanding Pointers, Accessing the Address of a Variable, Decalring Pointer Variables, Initilization of pointer Variables, Accessing a Variable through its pointer, Chain of Pointers, Pointer Expressions, Pointer Increments and Scale Factor, Pointers and Arrays, Pointer and Arrays, Pointers and Character Strings, Arrays of Pointers, Pointers as Function Arguments, Functions Returning Pointers, Pointers to Functions, Pointers and Structures.

Structures and Unions : Introduction, Defining a Structure, Declaring Structure Variables, Accessing Structure Members, Structure Initialization, Copying and Comparing Structure Variables, Operations on Individuals Members, Arrays of Structures, Arrays within Structures, Structures within Structures, Structures and Functions, Unions, Size of Structures, Bit Fields.

File Management in C : Introduction, Defining and Opening a File, Closing a File, Input/Output Operations on Files, Error Handling During I/O Operations, Random Access to Files, Command Line Arguments.

Text Book:

1. Computing Fundamentals & C Programming – by E Balagurusamy, 1st Edition McGrawHill Education.

References:

1. Spoken Tutorial on “C”, as E-resource for Learning. http://spoken-tutorial.org

DISCRETE MATHEMATICS

UNIT I

Sets, relations and functions, problem solving strategies, fundamentals of logic, logical inferences, first order logic, mathematical induction.

UNIT II

Elementary Combinations: Combinations and permutations, enumerations with repetitions, with constrained repetitions, Principle of Inclusion-Exclusion.

UNIT III

Graphs: Basic Concepts, Isomorphism, Trees, Spanning Trees, Binary Trees, Planar Graphs, Euler Graphs. Chromatic numbers, four-color problem

Unit IV

Boolean algebra: Introduction to Boolean Algebra Functions, Switching Mechanisms, Minimization of Boolean Functions, Applications to Boolean Design, Finite State Diagrams

TEXT BOOKS:

1. Discrete Mathematics For Computer Scientist And Mathematicians By Joe L.Mott, Abraham Kandel, Theodore P.Baker.Z

References:

1. Discrete Mathematics By Trembely And Manohar. (Tmh).Z
2. Discrete Mathematics By Bernord Kolnan, Robert C.Busby And Sharon Ross (Phi Third Edition)

MANAGEMENT INFORMATION SYSTEM

UNIT I

Introduction to Management Information System (MIS) - Evolution - Definition – Role of MIS - Approaches' to Management - Models of Organization Structure - Strategic Uses of Information Technology - Components of Information System.

UNIT II

Structure of Information System - Information System for Strategic Planning - Management Control and Operational Control - Applications of Tactical And Strategic Information System to Accounting and Finance, Marketing Production And Human Resources.

UNIT III

Decision Making Process - Intelligence Design and Choice - Structured and Un- Structured Decisions Theory - Decision Support System (DSS)
Inventory Model- Capital Budgeting - Break Even Analysis - Decision Support System (DSS) Components – DSS And Major Business Functions

UNIT IV

Planning and Developing Information Systems -MIS Planning Approaches - Internal Problems Related to MIS - Pit Falls in MIS Development - Organization for MIS - Centralization vs Decentralization.

REFERENCE BOOKS:

1. Robert Schultheis. Mary Sumner Management Information System: The Manager's View Tata Nc Graw Hill Publishing Company Limited, New Delhi.
2. W.S. Jawadeker ,Management Information Systems, Tata Mcgraw Hill Publishing Company Limited, New Delhi.
3. David Kroenke, Management Information Systems Tata Mcgrawhill Book Company.
4. Robert G.Mudrick. Joel Ross James, Clagget, Information System For Modern Management Prentice Hall Of India Private Limited, New Delhi.
5. Gordan A Davis Margrethe H. Olson,Management Information System Conceptual Foundations-Structure And Development Mc Graw Hill International Edition.

PRACTICAL: FUNDAMENTALS OF INFORMATION TECHNOLOGY

NOTE:

- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25 – 30.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

Example programs:

The practical assignment must include connecting parts of a computer and assembling it to an extent, media formatting and installation of some software.

Practical exercises based on Open Office tools using document preparation and spreadsheet handling packages.

Text Editor

1. Prepare a grocery list having four columns (Serial number, The name of the product, quantity and price) for the month of April, 06.
   - Font specifications for Title (Grocery List): 14-point Arial font in bold and italics.
   - The headings of the columns should be in 12-point and bold.
   - The rest of the document should be in 10-point Times New Roman.
   - Leave a gap of 12-points after the title.
2. Create a telephone directory.
   - The heading should be 16-point Arial Font in bold
   - The rest of the document should use 10-point font size
   - Other headings should use 10-point Courier New Font.
   - The footer should show the page number as well as the date last updated.
3. Design a time-table form for your college.
   - The first line should mention the name of the college in 16-point Arial Font and should be bold.
   - The second line should give the course name/teacher's name and the department in14-point Arial.
   - Leave a gap of 12-points.
   - The rest of the document should use 10-point Times New Roman font.
   - The footer should contain your specifications as the designer and date of creation.
4. BPB Publications plans to release a new book designed as per your syllabus. Design the first page of the book as per the given specifications.
   - The title of the book should appear in bold using 20-point Arial font.
   - The name of the author and his qualifications should be in the center of the page in 16-point Arial font.
   - At the bottom of the document should be the name of the publisher and address in 16-point Times New Roman.

- The details of the offices of the publisher (only location) should appear in the footer.

5. Create the following one page documents.

   a. Compose a note inviting friends to a get-together at your house, Including a list of things to bring with them.

   b. Design a certificate in landscape orientation with a border around the document.

   c. Design a Garage Sale sign.

   d. Make a sign outlining your rules for your bedroom at home, using a numbered list.

6. Create the following documents:

- A newsletter with a headline and 2 columns in portrait orientation, including at least one image surrounded by text.
- Use a newsletter format to promote upcoming projects or events in your classroom or college.
- Convert following text to a table, using comma as delimiter
- Type the following as shown (do not bold).

  Color, Style, Item

  Blue, A980, Van

  8Red, X023, Car

  Green, YL724, Truck

  Name, Age, Sex

  Bob, 23, M

  Linda, 46, F

  Tom, 29, M

7. Enter the following data into a table given on the next page.

Salesperson	Dolls	Trucks	Puzzles
Kennedy, Sally	1327	1423	1193
White, Pete	1421	3863	2934
Pillar, James	5214	3247	5467
York, George	2190	1278	1928
Banks, Jennifer	1201	2528	1203
Atwater, Kelly	4098	3079	2067

Add a column Region (values: S, N, N,S,S,S) between the Salesperson and Dolls columns to the given table Sort your table data by Region and within Region by Salesperson in ascending order:

In this exercise, you will add a new row to your table, place the word "Total" at the bottom of the Salesperson column, and sum the Dolls, Trucks, and Puzzles columns.

8. Wrapping of text around the image.
9. Create your resume by incorporating most of the options learned till now.
10. Following features of menu option must be covered

FILE	Complete menu
EDIT	Complete menu
VIEW	Complete menu
INSERT	Complete menu
FORMAT	Complete menu
TABLE	Complete menu
WINDOW	Complete menu
HELP	Complete menu
TOOLS	All options except Online collaboration, Tools on Macro, Templates

Spreadsheet

1. Enter the Following data in Excel Sheet

REGIONAL SALES PROJECTION

State	Qtr1	Qtr2	Qtr3	QTR4	Qtr Total	Rate	Amount
Delhi	2020	2400	2100	3000		15	
Punjab	1100	1300	1500	1400		20	
U.P.	3000	3200	2600	2800		17	
Harayana	1800	2000	2200	2700		15	
Rajasthan	2100	2000	1800	2200		20	
TOTAL							
AVERAGE							

(a) Apply Formatting as follow:

I. Title in TIMES NEW ROMAN

ii. Font Size - 14

iii. Remaining text - ARIAL, Font Size -10

iv. State names and Qtr. Heading Bold, Italic with Gray Fill Color.

v. Numbers in two decimal places.

vi. Qtr. Heading in center Alignment.

Vii. Apply Border to whole data.

(b) Calculate State and Qtr. Total

(c) Calculate Average for each quarter

(d) Calculate Amount = Rate * Total.

2. Given the following worksheet

	A	B	C	D
1	Roll No.	Name	Marks	Grade
2	1001	Sachin	99	
3	1002	Sehwag	65	
4	1003	Rahul	41	
5	1004	Sourav	89	
6	1005	Har Bhajan	56	

Calculate the grade of these students on the basis of following guidelines:

If Marks	Then Grade
>= 80	A+
10>= 60 < 80	A
>= 50 < 60	B
< 50	F

3. Given the following worksheet

A	B	C	D	E	F	G
1	Salesman	Sales in (Rs.)				
2	No.	Qtr1	Qtr2	Qtr3	Qtr4	Total Commission
3	S001	5000	8500	12000	9000	
4	S002	7000	4000	7500	11000	
5	S003	4000	9000	6500	8200	
6	S004	5500	6900	4500	0500	
7	S005	7400	8500	9200	8300	
8	S006	5300	7600	9800	6100	

Calculate the commission earned by the salesmen on the basis of following Candidates:

If Total Sales	Commission
< 20000	0% of sales
> 20000 and < 25000	4% of sales
> 25000 and < 30000	5.5% of sales
> 30000 and < 35000	8% of sales
>= 35000	11% of sales

The total sales is sum of sales of all the four quarters.

4. A company XYZ Ltd. pays a monthly salary to its employees which consists of basic salary, allowances & deductions. The details of allowances and deductions are as follows:

Allowances

• HRA Dependent on Basic

30% of Basic if Basic <=1000

25% of Basic if Basic>1000 & Basic<=3000

20% of Basic if Basic >3000

- DA Fixed for all employees, 30% of Basic
- Conveyance Allowance

Rs. 50/- if Basic is <=1000

Rs. 75/- if Basic >1000 & Basic<=2000

Rs. 100 if Basic >2000

•Entertainment Allowance NIL if Basic is <=1000

Rs. 100/- if Basic > 1000

Deductions

- Provident Fund 6% of Basic
- Group Insurance Premium Rs. 40/- if Basic is <=1500

Rs. 60/- if Basic > 1500 & Basic<=3000

Rs. 80/- if Basic >3000

Calculate the following:

Gross Salary = Basic + HRA + DA + Conveyance + Entertainment

Total deduction = Provident Fund + Group Insurance Premium

Net Salary = Gross Salary – Total Deduction

5. Create Payment Table for a fixed Principal amount, variable rate of interests and time in the format below:

No. of Instalments	5%	6%	7%	8%	9%
3	XX	XX	XX	XX	XX
4	XX	XX	XX	XX	XX
5	XX	XX	XX	XX	XX
6	XX	XX	XX	XX	XX

6. Use an array formula to calculate Simple Interest for given principal amounts given the rate of Interest and time

Rate of Interest	8%
Time	5 Years
Principal	Simple Interest
1000	?
18000	?
5200	?

7. The following table gives year wise sale figure of five salesmen in Rs.

Salesman	2000	2001	2002	2003
S1	10000	12000	20000	50000
S2	15000	18000	50000	60000

S3	20000	22000	70000	70000
S4	30000	30000	100000	80000
S5	40000	45000	125000	90000

(a) Calculate total sale year wise.

(b) Calculate the net sale made by each salesman

(c) Calculate the maximum sale made by the salesman

(d) Calculate the commission for each salesman under the condition.

(i) If total sales >4,00,000 give 5% commission on total sale made by the salesman.

(ii) Otherwise give 2% commission.

(e) Draw a bar graph representing the sale made by each salesman.

(f) Draw a pie graph representing the sale made by salesman in 2000.

8. Enter the following data in Excel Sheet

PERSONAL BUDGET FOR FIRST QUARTER

Monthly Income (Net): 1,475

EXPENSES	**JAN**	**FEB**	**MARCH**	**QUARTER**	**QUARTER**
				TOTAL	**AVERAGE**
Rent	600.00	600.00	600.00		
Telephone	48.25	43.50	60.00		
Utilities	67.27	110.00	70.00		
Credit Card	200.00	110.00	70.00		
Oil	100.00	150.00	90.00		
AV to Insurance	150.00				
Cable TV	40.75	40.75	40.75		

Monthly Total

(a) Calculate Quarter total and Quarter average.

(b) Calculate Monthly total.

(c) Surplus = Monthly income - Monthly total.

(d) What would be total surplus if monthly income is 1500?

(e) How much does telephone expense for March differ from quarter average?

(f) Create a 3D column graph for telephone and utilities.

(g) Create a pie chart for monthly expenses.

9. Enter the following data in Excel Sheet

TOTAL REVENUE EARNED FOR SAM'S BOOKSTALL

Publisher name	**1997**	**1998**	**1999**	**2000**	**total**
A	Rs. 1,000.00	Rs. 1100.00	Rs. 1,300.00	Rs.800.00	
B	Rs. 1,500.00	Rs. 700.00	Rs. 1,000.00	Rs. 2,000.00	
C	Rs. 700.00	Rs. 900.00	Rs. 1,500.00	Rs.600.00	
D	Rs. 1,200.00	Rs. 500.00	Rs. 200.00	Rs. 1,100.00	
E	Rs 800.00	Rs. 1,000.00	Rs. 3,000.00	Rs.560.00	

(a) Compute the total revenue earned.

(b) Plot the line chart to compare the revenue of all publisher for 4 years.

(b) Chart Title should be 'Total Revenue of sam's Bookstall (1997-2000)'

(c) Give appropriate categories and value axis title.

10. Generate 25 random numbers between 0 & 100 and find their sum, average and count. How many no. are in range 50-60

PRACTICAL: PROGRAMMING WITH C

NOTE:

- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25 – 30.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

Example programs:

1. Write a c program for electricity bill tacking different categories of users, diffrent slabs in each category.(using nested if else statement)
2. write a c program to evaluate the following using loops
    a. 1+x2/2!+x4/4!+...upto 5 terms
    b. x+x3/3!+x5/5!+...upto 5 terms
3. Write a c program to check whether the given number is
    a. Prime or not
    b. Perfect or abundant or deficient
4. Write a c program to find the mean, mode, median, and variance of list of values by using one dimensional array
5. Write a menu driven program to read a list of numbers and perform the following operations
    a. Print the list
    b. Delete duplicates from the list
    c. Reverse the list
6. Write a program to read a list of numbers and search for given number using binary search algorithm and if found display its index otherwise display the message "element not found in the list" using functions
7. Write a menu driven program to read two matrices and compute their sum and product using functions
8. Write a menu driven program to read list of student names and perform the following operations using functions.
    a. To print list of names
    b. To sort them in ascending order
    c. To print the list after sorting
9. Write a c program that consists of recursive functions to find
    a. Factorial of a given number
    b. Print the pascal triangle using bionomial theorem
10. Write a menu driven program to read list of student names and perform the following operations using array of charecter pointers.

    a). To insert a student name b). To delete a name c). To print the names

BCA I YEAR II SEMESTER

Code	Subject	Workload Per Week	Marks			Credit
			External	Internal	Total	
BCA21	General English - II	T (4)	70	30	100	4
BCA22	Object Oriented Programming With C++	T (4)	70	30	100	4
BCA23	Probability And Statistics	T (4)	70	30	100	4
BCA24	Operating System	T (4)	70	30	100	4
BCA25	Computer Organization	T (4)	70	30	100	4
BCA26	Object Oriented Programming With C++ Lab	L (4)	50	0	50	2
BCA27	Operating system - lab	L (4)	50	0	50	2
				Total credits		24

GENERAL ENGLISH II

LESSON FIVE (SHORT FICTION)	**TEXT**	**THE RELUCTANT PHILANTHROPIST by GOLLAPUDI SRINIVASA RAO**
	PRONUNICIATION	FRICATIVES
	GRAMMAR	DISCOURSE MARKERS
	VOCABULARY	IDIOMS & PHRASES
	SPELLING	USE OF 'IE' AND 'EI'
	CONVERSATIONS	SEEKING INFORMATION
	READING	BATHUKAMMA
	LIFE SKILLS	PROBLEM-SOLVING SKILL
LESSON SIX (PROSE)	**TEXT**	**HOW SHOULD ONE READ A BOOK BY VIRGINIA WOOLF**
	PRONUNICIATION	AFFRICATES & NASALS
	GRAMMAR	VOICE & DEGREES OF
	VOCABULARY	PHRASAL VERBS
	SPELLING	USE OF 'ABLE' & 'IBLE'
	CONVERSATIONS	ORGANIZING A MEETING/INVITING
	READING	RAMAPPA
	LIFE SKILLS	EFFECTIVE COMMUNICATION SKILL
LESSON SEVEN (POETRY)	**TEXT**	**AFTER BLENHEIM by ROBERT SOUTHEY**
	PRONUNICIATION	LATERALS, SEMI-VOWELS
	GRAMMAR	REPORTING SPEECH & QUESTION
	VOCABULARY	LEXIS/WORD-BUILDING
	SPELLING	USE OF PREFIXES & SUFFIXES
	CONVERSATIONS	ORGANIZING A MEETING/PROPOSING A VOTE OF THANKS
	READING	BONALU
	LIFE SKILLS	INTER-PERSONAL RELATIONSHIPS
LESSON EIGHT (DRAMA)	**TEXT**	**THE INFORMER by BERTOLT BRECHT**
	PRONUNICIATION	SYLLABIC STRUCTURE
	GRAMMAR	COMMON ERRORS
	VOCABULARY	COLLOCATIONS
	SPELLING	
	CONVERSATIONS	
	READING	KINNERASANI
	LIFE SKILLS	COPING WITH STRESS AND

OBJECT ORIENTED PROGRAMMING WITH C++

Unit I

Algorithm and its characteristics, pseudo code / flow chart, program.

Object Oriented Programming: Introduction, Generation of programming Languages, Programming Paradigms, Features of Object Oriented Programming, Merits and Demerits of Object Oriented Programming Language.

Basics of C++ Programming: Introduction, History, Structure, Writing the First C++ Program, Files used in a C++ Program, Compiling and Executing, Using Comments, Tokens, Characters Set, Keywords, Identifier, Data Types, Variables, Constants, Input and Output, Statements , Operators, Type Conversion and Type Casting,

Decision Control and Looping Statements: Introduction to Decision Control Statements, Conditional Branching Statements, Iterative Statements, Nested Loops, Break Statement, Continue Statement, Goto Statement, Avoiding Usage of Break, Continue, and Goto Statements

Unit II

Functions: Introduction, Need for Functions, Using Functions, Function Declaration or function, Prototype, Function Definition, Function Call, Return Statement, Passing Parameters to the Function, Default Arguments, Return by Reference, Passing Constants as Arguments, Variables Scope, Storage Classes, Inline Functions, Function Overloading, Recursive Functions, Recursion Versus Iteration, Function with Variable Number of Arguments

Arrays: Introduction, Declaration of Arrays, Accessing Elements of the Array, Storing Values in Arrays, Calculating the Length of Array, Operations that can be Performed on Arrays, One Dimensional Arrays for Inter Function Communication, Two Dimensional Arrays, Multi Dimensional Arrays,

Pointers: Defining Pointers, Declaring Pointer Variables, Pointer Expressions and Pointer Arithmetic, Null Pointers, Generic Pointers, Passing Arguments to Function Using Pointer, Pointer and Arrays, Passing Array to Function, Differences Between Array Name and Pointer, Pointer to function, Arrays of Function Pointers, Memory Allocation in C++, Dynamic Memory Allocation,

Unit III

Structure, Union, and Enumerated Data Types: Structure Declaration, Typedef Declaration, Initialization the Structures, Accessing the Members of a Structures, Union, Union Inside Structures, Enumerated Data Types.

Classes and Objects : Specifying a Class, Creating Objects, Accessing Object Members, Nested Member Functions, Making a Memory Function Inline, Memory Allocation for Class and Objects, Returning Objects, this Pointer, Constant Parameters and Members, Pointers within a Class, Local Classes, Nested Classes in C++, Empty Classes, Friend Function, Friend Class, Bit-Field in Classes, Pointers and Class Members.

Constructors and Destructors: Constructor, Types of Constructors, Constructor with Default Arguments, Constructor Overloading, Destructors.

Unit IV

Operator overloading and Type Conversions : Scope of Operator Overloading, Syntax for Operator Overloading, Operators that can and cannot be Overloaded, Implementing Operator Overloading, Overloading Unary Operators, Overloading Binary Operators, Overloading Special Operators, Type Conversions.

Inheritance and Run-Time Polymorphism : Defining Derived Classes, Access Specifiers, Type of Inheritance, Single Inheritance, Constructors and Destructors in Derived Classes, Multi level Inheritance, Constructor in Multi Level Inheritance, Multiple Inheritance, Constructor and Destructor in Multiple Inheritance, Ambiguity in Multiple Inheritance, Hierarchical Inheritance, Constructors and Destructors in Hierarchical Inheritance, Hybrid Inheritance, Multi-path Inheritance, Virtual Base Classes, Object Slicing, Pointer to Derived Class, Run time Polymorphism, Virtual Functions, Pure Virtual Functions, Abstract Base Classes, Concept of Vtables, Virtual Constructor and Destructor.

Templates: Introduction, Use of templates, Function templates, Class templates.

Text Book:

1. Reema Thareja “Object Oriented Programming with C++” Oxford university Press, 2015

Recommended Books

1. E. Balagurusamy “Object Oriented Programming with C++” TMH, 6th edition, 2013.
2. Richard Johnson, *An Introduction to Object-Oriented Application Development*, Thomson Learning, 2006
3. B. Stroupstrup, *The C++ Programming Language*, Addison Wesley, 2004.
4. Spoken Tutorial on “C++” as E-resource for Learning:- http://spoken-tutorial.org

PROBABILITY AND STATISTICS

UNIT I

Introduction to Statistics: Data Collection and Tabulation, Graphical Representation of Data
Measures of Central Tendency and Dispersion, Moments, Skewness and Kurtosis.

Unit II

Probability: Introduction to Probability, Mutually Exclusive and Independent Events,
Dependent Events and Conditional Probability. Addition and multiplication theorem of probability

UNIT III

Discrete Probability Distributions: Binomial Distribution, The Hyper Geometric
Distribution, The Poisson Distribution, The Trinomial Distribution.

Unit IV

The Normal Distribution: Introduction to the Normal Distribution, Applications of The
Normal Distribution, The Normal Approximation to the Binomial Distribution.

TEXT BOOKS:

1. Contemporary Statistics A Computer Approach, S.P.Gordan And F.S.Gordan(Mcgraw Hill1994)
2. Theory And Problems Pf Probability By Seymour Lipschutz(Schaum Series Tmh)
3. Stastical Methods By S.P.Gupta(Shand & Co).Op.

OPERATING SYSTEMS

Unit I

OPERATING SYSTEM: Introduction, The Operating System As A Resource Manager, History Of Operating Systems, The Operating System Zoo(Classifications), Operating System Concepts, System Calls, Operating System Structure(Architecture).

PROCESS- Creation , Hierarchies, States, THREADS- Usage, The Classical Thread Model, POSIX Threads, Pop-Up Threads.

Unit II

SCHEDULING: Introduction, Scheduling in Batch Systems, Scheduling in Interactive Systems, Scheduling in Real-Time Systems, Policy versus Mechanism, Thread Scheduling.

MEMORY MANAGEMENT: No Memory Abstraction, Memory Abstraction-Address Spaces, Virtual Memory, Page Replacement Algorithms, Design Issues for Paging Systems, Segmentation.

Unit III

FILE SYSTEMS: Files, Directories, File System Implementation, File-System Management and Optimization, Example File Systems.

INPUT/OUTPUT: Principles Of I/O Hardware, Principles Of I/O Software, I/O Software Layers, Disks, Clocks, User Interfaces: Keyboard, Mouse, Monitor, Thin Clients, Power Management.

Unit IV

DEADLOCKS: Resources, Introduction to Deadlocks, Deadlock Detection and Recovery, Deadlock Avoidance, Deadlock Prevention.
SECURITY: The Security Environment, Operating Systems Security, Formal Models of Secure Systems, Authentication, Insider Attacks, Malware, Defenses.

Text book:

1. A.S. Tanenbaum, and Herbert Bos, "Modern *Operating Systems",* 4th Ed., Prentice-Hall of India, 2015.

Recommended Books

1. William Stallings, *Operating Systems: Internals and Design Principles*, 5th Ed., Prentice-Hall of India, 2006.
2. Gary Nutt, *Operating Systems: A Modern Approach,* 3rd Ed., Addison Wesley, 2004.
3. D.M. Dhamdhere, *Operating Systems: A Concept Based Approach,* 2nd Ed., Tata McGraw-Hill, 2007.

COMPUTER ORGANIZATION

UNIT I

Introduction Logic gates and circuits: Gates (OR, AND, NOR, NAND, XOR & XNOR); Demogran‟s laws; Boolean laws, Circuit designing techniques (SOP, POS, K-Map).

Data representation: Representation of Number, Binary, Octal, Hexadecimal number and its
Arithmetic, Representation of Integers, Representation of Fractions, Representation of Character, Characters codes (ASCII), Binary Multiplication Division, Conversation of number in Decimal, Binary, Octal, and Hexadecimal.

UNIT II

Instructions and Flow of Control: Instruction formats, Types of Instruction, Types of
operands, Addressing modes & Their Importance, Flow of Control.

UNIT III

Processing Unit and Processors: Instruction Execution and Parallel Instruction Execution, CPU organization.
Processors: RISC vs CISC, The Motorola 680X0 Family, The Intel 80X86 Family, The Power PC Family

UNIT IV

Computer Memory and Buses: Introduction to Computer Memory, RAM, ROM, Types of
RAM and ROM, Memory Hierarchical structure, Cache Memory and Virtual Memory, Introduction to buses, Types of buses.

Text Book:

1. Computer Organization, TMH (IV Edition) By V.C. Hamacher

REFERENCE BOOKS:

1. Computer Organization, (Phi) By Moris Mano
2. Computer Architecture & Organisation By Hayes, (Tmh)
3. Computer Systems Organisation & Architecture By.Arpinelli,(Addison Wesley)
4. The Architecture Of Computer Hardware And Sytems Hardware By I Englander (Wiley)
5. Computer Sytems Design And Architecture By Vp Heuring, Hf Jordan (Pearson)

PRACTICAL: OBJECT ORIENTED PROGRAMMING WITH C++

NOTE:

- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25 – 30.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

Example programs:

1) Write a program to test Arithmetic operators.
2) Write a program to Swap two numbers.
3) Write a program to demonstrate Switch statement.
4) Write a program to find roots of a quadratic equation.
5) Write a program to check whether the given number is palindrome or not.
6) Write a program to convert binary number to decimal number.
7) Write a program to print the following format.

   1

   2 3

   4 5 6

   7 8 9 10

8) Write a program to search an element in a given list.
9) Write a program to perform addition of two Matrices.
10) Write a program to perform multiplication of two Matrices.
11) Write a program to find factorial of a given number using recursion.
12) Write a program to demonstrate Pointer arithmetic
13) Write a program to demonstrate Call-By-Value, Call-By-Address,Call-By-Reference.
14) Write a program to demonstrate Structure data type.
15) Write a program to demonstrate Enumerated data type.
16) Write a program to demonstrate inline functions.
17) Write a program to demonstrate Function Overloading.
18) Write a c++ program to demonstrate Class concept.
19) Write a c++ program on Constructor overloading.
20) Write a c++ program on Destructor.

21) Write a c++ program for copy constructor.

22) Write a c++ program to demonstrate Friend function.

23) Write a c++ program for Unary operator overloading (Friend function/Member function).

24) Write a c++ program for Binary operator overloading (Friend function/Member function).

25) Write a c++ program for Member Function overloading within a class

26) Write a c++ program for Single and Multilevel Inheritance.

27) Write a c++ program for Overriding of member functions.

28) Write a c++ program to demonstrate constructor calling mechanism in inheritance.

29) Write a c++ program for Multiple and Hybrid inheritance.

30) Write a c++ program to demonstrate pure virtual function implementation.

PRACTICAL: OPERATING SYSTEM

NOTE:

- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25 – 30.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

Example programs:

1. Simulate the following CPU Scheduling algorithms a) Round Robin b) SJF c) FCFS d) Priority
2. Simulate all file allocation strategies. a) Sequential b) Indexed c) Linked
3. Simulate MVT and MFT
4. Simulate all File organization techniques. a) Single level directory b) Two level c) Hierarchical d) DAG
5. Simulate Bankers Algorithm for Dead Lock Avoidance 6. Simulate Bankers Algorithm Dead Lock Prevention.
6. Simulate all Page replacement algorithms. a) FIFO b) LRU c) LFU d) Etc….
7. Simulate Paging Techniques of memory management.

BCA II YEAR I SEMESTER

Code	Subject	Workload Per Week	Marks			Credit
			External	Internal	Total	
BCA31	Data Structures With C++	T (4)	70	30	100	4
BCA32	Operation Research	T (4)	70	30	100	4
BCA33	Web Programming	T (4)	70	30	100	4
BCA34	Software Engineering	T (4)	70	30	100	4
BCA35	Computer Networks	T (4)	70	30	100	4
BCA36	Data Structures - Lab	L (4)	50	0	50	2
BCA37	Web Programming - Lab	L (4)	50	0	50	2
				Total credits		24

DATA STRUCTURES WITH C++

Unit I

Basic data Structure: Introduction to Data Structures, Types of Data Structures, and Introduction to Algorithms, Pseudocode, and Relationship among data, data structures, and algorithms, Implementation of data structures, Analysis of Algorithms.

Stacks: Concept of Stacks and Queues, Stacks, Stack Abstract Data Type, Representation of Stacks Using Sequential Organization (Arrays), Multiple Stacks, Applications of Stack, Expression Evaluation and Conversion, Polish notation and expression conversion, Processing of Function Calls, Reversing a String with a Stack, Recursion.

Memory Management: Garbage collection algorithms for equal sized blocks, storage allocation for objects with mixed size, buddy systems

Unit II

Recursion: Introduction, Recurrence, Use of Stack in Recursion, Variants of Recursion, Recursive Functions, Iteration versus Recursion.

Queues: Concept of Queues, Queue as Abstract Data Type, Realization of Queues Using Arrays, Circular Queue, Multi-queues, Deque, Priority Queue, Applications of Queues,

Linked Lists: Introduction, Linked List, Linked List Abstract Data Type, Linked List Variants, Doubly Linked List, Circular Linked List, Representation of Sparse Matrix Using Linked List, Linked Stack, Linked Queue, Generalized Linked List, More on Linked Lists.

Unit III

Trees: Introduction, Types of Trees, Binary Tree, Binary Tree Abstract Data Type, Realization of a Binary Tree, Insertion of a Node in Binary Tree, Binary Tree Traversal, Other Tree Operations, Binary Search Tree, Threaded Binary Tree, Applications of Binary Trees.

Searching and Sorting: Searching, Search Techniques, Sorting, Multiway Merge and Polyphase Merge, Comparison of All Sorting Methods, Search Trees: Symbol Table, Optimal Binary Search Tree, AVL Tree (Height-balanced Tree).

Unit IV

Hashing: Introduction, Key Terms and Issues, Hash Functions, Collision Resolution Strategies, Hash Table Overflow, Extendible Hashing, Dictionary, Skip List, Comparison of Hashing and Skip Lists.

Heaps: Basic Concepts, Implementation of Heap, Heap as Abstract Data Type, Heap Applications,

Indexing and Multiway Trees: Introduction, Indexing, Types of Search Trees Files: Introduction, External Storage Devices, File Organization, Sequential File Organization, Direct Access File Organization, Indexed Sequential File Organization, Linked Organization.

Text books:

1. Varsha H. Patil " Data structures using C++" Oxford university press, 2012
2. M.T. Goodrich, R. Tamassia and D. Mount, *Data Structures and Algorithms in C++*, John Wiley and Sons, Inc., 2011.

Recommended Books

1. Adam Drozdek "Data structures and algorithm in C++" Second edition, 2001
2. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, *Introduction to Algorithms,* 2nd Ed., Prentice-Hall of India, 2006.
3. Robert L. Kruse and A.J. Ryba, *Data Structures and Program Design in C++*, Prentice Hall, Inc., NJ, 1998.
4. B. Stroupstrup, *The C++ Programming Language*, Addison Wesley, 2004
5. D.E. Knuth, *Fundamental Algorithms* (Vol. I), Addison Wesley, 1997

OPERATION RESEARCH

UNIT I

Linear Programming Problems: Formulation of Linear programming problem, Graphical solution and sensitivity analysis of a L.P.P. With two variables. Simplex method, Big-M method, Two Phase Method.

UNIT II

Transportation Problem: Principle of duality in linear programming problem, Dual simplex method. Transportation Problem, Initial Basic Feasible Solution by N-W corner rule, matrix minima method, Vogel"s approximation method, optimal transportation solution, Balanced and unbalanced degenerate cases.

UNIT III

Assignment Problem: Definition and application of assignment problem, Hungarian Assignment Algorithm, unbalanced assignment problem, maximization case in assignment problem.

UNIT IV

Queuing Models: Concepts, applicability, classification, exponential distribution, Birth and Death process, poisson queues, single server, multiple server queuing models.

TEXT BOOKS:

1. Operations Research: An Introduction - Hamdy. A Taha Phi.
2. Operations Research by Kanthi Swaroop. P.K. Gupta, Manmohan.
3. An Introduction to Optimization: Operations Research By J.C. Pant. (4th Edition) Jain Brothers New Delhi (1998)

REFERENCE BOOKS:

1. Operations Research By P.K. Guptha, Manmohan,S.Chand & Company, Delhi-6
2. Introduction to Operations Research: A Computer Oriented Algorithmic Approach by Billy E.Gilett.
3. Engineering Optimisation By S.S.Rao New Age Internation (P) Limited.
4. Operation Research By G.V. Shenoy Etc., New Age International.

WEB PROGRAMMING

Unit – I

HTML- Basic HML, The document body, Text, Hyperlinks, Adding More Formatting, Lists, Using Color and Images, Images, Tables, Frames, Forms-Toward Interactivity . Cascading Stylesheets - Introduction, Inline Styles, Embedded Style Sheets, Linking external sheets, Backgrounds, text flow and box model.

Unit - II

JavaScript- Introduction, simple programming, Obtaining User Input with prompt Dialogs, Operators (arithmetic, Decision making, assignment, logical, increment and decrement). Control Structures - if... else selection statement, while, do... while repetitions statement, for statement, switch statement, break and continue statements.

Unit - III

Functions - program modules in JavaScript, programmer defined functions, function definition, Random-number generator, scope rules, global functions, recursion.

Unit IV

JavaScript: Arrays, JavaScript: Objects - Math Object, String Object, Date Object, Boolean & Number Object, document and window Objects. Event Model - on click, on load, on error, onmouseover, onmouseout, on focus, on blur, on submit, on reset, more DHTML events.

Text Book:

1. Internet& World Wide Web- H. M. Deitel, P.J. Deitel, A. B. Goldberg-Third Edition

SOFTWARE ENGINEERING

Unit I

Introduction to Software Engineering: The Evolving Role of Software, Changing Nature of Software, Software Myths. A Generic View of Process: Software Engineering- A Layered Technology, a Process Framework, the Capability Maturity Model Integration (CMMI), Process Patterns, Process Assessment, Personal and Team Process Models.

Process Models: The Waterfall Model, Incremental Process Models, Evolutionary Process Models, the Unified Process.

UNIT II

Software Requirements: Functional and Non-Functional Requirements, User Requirements, System Requirements, Interface Specification, The Software Requirements Document.

Requirements Engineering Process: Feasibility Study, Requirements Elicitation and Analysis, Requirements Validation, Requirements Management.

UNIT III

System Models: Context Models, Behavioral Models, Data Models, Object Models, Structured Methods.

Object-Oriented Design: Objects and Object Classes, An Object-Oriented Design Process, Design Evolution. Performing User Interface Design: Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation.

UNIT IV

Testing Strategies: A Strategic Approach to Software Testing, Test Strategies for Conventional Software, Black-Box and White-Box Testing, Validation Testing, System Testing, The Art of Debugging.

Product Metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for Source Code, Metrics for Testing, Metrics for Maintenance.

Text books:

1. Software Engineering, A Practitioner's Approach- Roger S. Pressman,
2. Software Engineering- Somerville, Pearson Education

COMPUTER NETWORKS

Unit I

Introduction: data communication- components, Networks, Protocols and Standards, Line configuration, topology, transmission mode, categories of networks.
OSI and TCP/IP Models: Layers and their functions, comparison of models.
Multiplexing: Many To One/One To Many, Frequency-Division Multiplexing (FDM), Wave-Division Multiplexing (WDM), Time-Division Multiplexing (TDM),

Unit II

Error Detection and Correction: Types of Errors, Detection, Vertical Redundancy Check (VRC), Longitudinal Redundancy Check (LRC), Cyclic Redundancy Check (CRC), Checksum, Error Correction.

Unit III

Data Link Control: Line Discipline, Flow Control, Error Control, Asynchronous Protocols, Synchronous Protocols, Character-Oriented Protocols, Bit-Oriented Protocols, Link Access Procedures
Switching: Circuit Switching, Packet Switching, Message Switching.

UNIT IV

Transport Layer: Duties of the Transport Layer, Connection, the OSI Transport Protocol.
Upper OSI Layers: Session Layer, Presentation Layer, Application Layer.
TCP/IP Protocol Suite: Overview of TCP/IP, Network Layer, Addressing, Subnetting, Other Protocols in the Network Layer, Transport Layer

Text Book:

1. Behrouz A. Forouzan, *Data Communication and Networking*, 2nd Ed., Tata McGraw Hill.

Books Recommended

1. A.S. Tenanbaum, *Computer Networks*, 4th Ed., Pearson Education Asia, 2003.
2. D. E. Comer, *Internetworking with TCP/IP*, Pearson Education Asia, 2001.
3. William Stallings, *Data and Computer Communications*, 7th Ed., Pearson education Asia, 2002.

PRACTICAL: DATA STRUCTURES WITH C++

NOTE:

- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25 – 30.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

Example programs:

1. Write C++ programs to implement the following using an array

   a) Stack ADT

   b) Queue ADT

2. Write a C++ program to implement Circular queue using array.

3. Write C++ programs to implement the following using a single linked list.

   a) Stack ADT

   b) Queue ADT

4. Write a C++ program to implement Circular queue using Single linked list.

5. Write a C++ program to implement the double ended queue ADT using double linked list.

6. Write a C++ program to solve tower of hanoi problem recursively

7. Write C++ program to perform the following operations:

   a) Insert an element into a binary search tree.

   b) Delete an element from binary search tree.

   c) Search for a key in a binary search tree.

8. Write C++ programs for the implementation of BFS and DFS.

9. Write a C++ program that uses non-recursive functions to traverse a binary tree.

   a)Pre-order

   b)In-order

   c)Post-order

10. Write a C++ program to find height of a tree.

11 Write a C++ program to find MIN and MAX element of a BST.

12 Write a C++ program to find Inorder Successor of a given node.

13. Write C++ programs to perform the following operations on B-Trees and AVL Trees.

   a)Insertion b)Deletion

14 Write C++ programs for sorting a given list of elements in ascending order using the following sorting methods.

a)Quick sort

b)Merge sort

15. Write a C++ program to find optimal ordering of matrix multiplication.

16. Write a C++ program that uses dynamic programming algorithm to solve the optimal binary search tree problem

17. Write a C++ program to implement Hash Table

18. Write C++ programs to perform the following on Heap

a)Build Heap

b)Insertion

c)Deletion

19. Write C++ programs to perform following operations on Skip List

a)Insertion

b)Deletion

20. Write a C++ program to Heap sort using tree structure.

PRACTICAL: WEB PROGRAMMING

NOTE:

- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25 – 30.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

Example programs:

Practical exercises based on concepts listed in theory using HTML.

1. Create HTML document with following formatting – Bold, Italics, Underline, Colors, Headings, Title, Font and Font Width, Background, Paragraph, Line Brakes, Horizontal Line, Blinking text as well as marquee text.

2. Create HTML document with Ordered and Unordered lists, Inserting Images, Internal and External linking

3. Create HTML document with Table:

<table>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="3"></td><td colspan="2" rowspan="2">Some image here</td></tr>
<tr><td colspan="3"></td></tr>
</table>

4. Create Form with Input Type, Select and Text Area in HTML.

5. Create an HTML containing Roll No., student's name and Grades in a tabular form.

6. Create an HTML document (having two frames) which will appear as follows:

<table>
<tr><td colspan="2">About department</td></tr>
<tr><td>Department1</td><td rowspan="3">This frame would show the contents according to the link clicked by the user on the left Frame.</td></tr>
<tr><td>Department1</td></tr>
<tr><td>Department1</td></tr>
</table>

7. Create an HTML document containing horizontal frames as follows:

<table>
<tr><td>Department Names (could be along with Logos)</td></tr>
<tr><td>Contents according to the Link clicked</td></tr>
</table>

8. Create a website of 6 – 7 pages with different effects as mentioned in above problems.

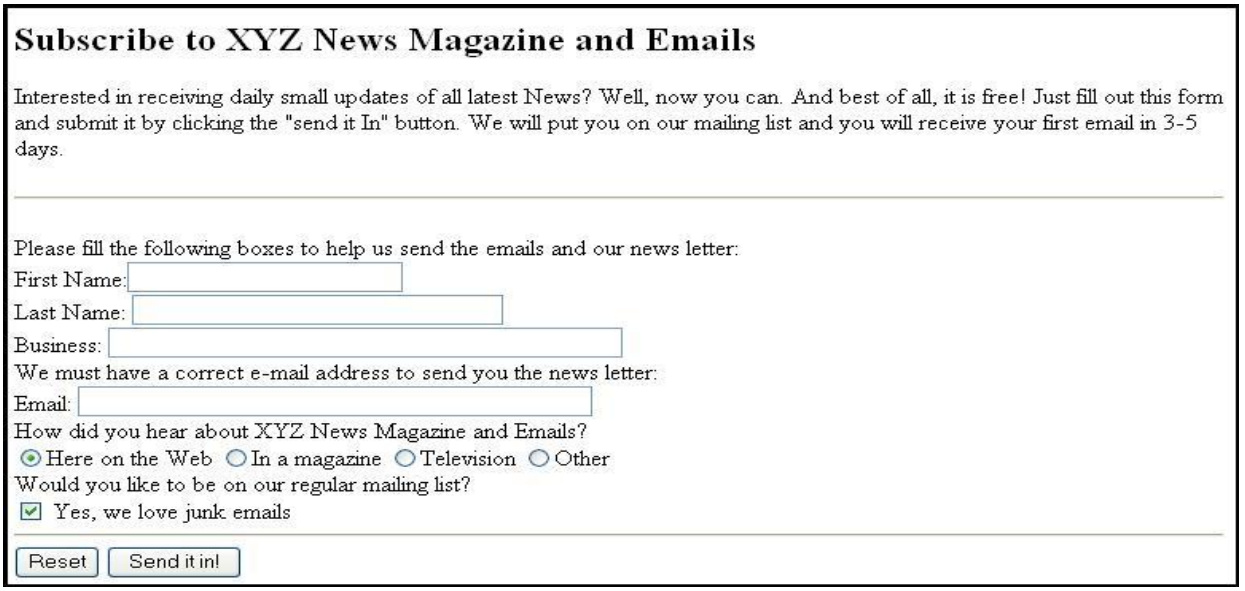
9. Create HTML documents (having multiple frames) in the following three formats:

<table>
<tr><td>rame1</td></tr>
<tr><td>ame2</td></tr>
</table>

<table>
<tr><td colspan="2">Frame1</td></tr>
<tr><td>Frame 2</td><td>Frame 3</td></tr>
</table>

10. Create a form using HTML which has the following types of controls:

    I. Text Box
    II. Option/radio buttons
    III. Check boxes
    IV. Reset and Submit buttons



11. Create a student Bio-Data, using forms.

12. Create a web page using following style sheets

    i. Inline style sheets. ii. Embedded style sheets. iii. External style sheets

13. Create a web page using “class” style sheets with different “border-width” property values like thick, medium, thin, grove, inset, and outset, red & blue.

JavaScript:

Create event driven program for following:

1. Print a table of numbers from 5 to 15 and their squares and cubes using alert.
2. Print the largest of three numbers.
3. Find the factorial of a number n.
4. Enter a list of positive numbers terminated by Zero. Find the sum and average of these numbers.
5. A person deposits Rs 1000 in a fixed account yielding 5% interest. Compute the amount in the account at the end of each year for n years.
6. Read n numbers. Count the number of negative numbers, positive numbers and zeros in the list.
7. Write a JavaScript program to accept two values from form and apply any 5 mathematical functions.
8. Display the current date and time in both GMT and local form.
9. Write a JavaScript program on MouseOver, MouseOut, blur events.

BCA II YEAR II SEMESTER

Code	Subject	Workload Per Week	Marks			Credit
			External	Internal	Total	
BCA41	Design And Analysis Of Algorithms	T (4)	70	30	100	4
BCA42	Database Management Systems	T (4)	70	30	100	4
BCA43	Java Programming	T (4)	70	30	100	4
BCA44	System Approach To Management	T (4)	70	30	100	4
BCA45	Computer Graphics	T (4)	70	30	100	4
BCA46	Database Management Systems - Lab	L (4)	50	0	50	2
BCA47	Java Programming - Lab	L (4)	50	0	50	2
				Total credits		24

DESIGN AND ANALYSIS OF ALGORITHMS

Unit I

Fundamentals of the Analysis of Algorithm Efficiency: The Analysis Framework, Asymptotic Notations and Basic Efficiency Classes.

Divide-and-Conquer: maximum-subarray problem, Strassen's algorithm for matrix multiplication, The substitution method for solving recurrences, The recursion-tree method for solving recurrences, The master method for solving recurrences.

Dynamic Programming: Rod cutting, Matrix-chain multiplication, Elements of dynamic programming, longest common subsequence, Optimal binary search trees.

Greedy Algorithms: An activity-selection problem, Elements of the greedy strategy, Huffman codes, Matroids and greedy methods, task-scheduling problem as a matroid.

Unit II

Searching and Sorting Techniques: Review of elementary sorting techniques-selection sort, Bubble sort, insertion sort, more sorting techniques-quick sort, heap sort, merge sort, shell sort, external sorting.

Limitations of Algorithm: Lower-Bound Arguments, Decision Trees, *P*, *NP*, and *NP*-Complete Problems.

Polynomials and the FFT: Representing polynomials, The DFT and FFT, Efficient FFT implementations.

Number-Theoretic Algorithms: Elementary number-theoretic notions, Greatest common divisor(GCD), Modular arithmetic, Addition and Multiplication of two large numbers.

Unit III

String Matching: The naive string-matching algorithm, The Rabin-Karp algorithm, String matching with finite automata, The Knuth-Morris-Pratt algorithm.

NP-Completeness: Polynomial time, Polynomial-time verification, NP-completeness and reducibility, NP-completeness proofs, NP-complete problems.

Approximation Algorithms: The vertex-cover problem, The traveling-salesman problem, The set-covering problem, Randomization and linear programming, The subset-sum problem.

Unit IV

Elementary Graph Algorithms: Representations of graphs, Breadth-first search, Depth-first search, Topological sort, strongly connected components.

Minimum Spanning Trees: Growing a minimum spanning tree, the algorithms of Kruskal and Prim.

Single-Source Shortest Paths: The Bellman-Ford algorithm, Single-source shortest paths in directed acyclic graphs, Dijkstra's algorithm, Difference constraints and shortest paths, Proofs of shortest-paths properties.

Text book:

1. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, *Introduction to Algorithms*, MIT press, 3rd edition, 2009.

2. Anany Levitin, Introduction to the design and analysis of algorithms, 3rd edition, 2012.

References:

1. J. Kleinberg and E. Tardos, *Algorithms Design,* Pearson Education, 2006.

2. S. Baase, *Computer Algorithms: Introduction to Design and Analysis*, Addison Wesley, 1999.

3. A.V. Levitin, *Introduction to the Design and Analysis of Algorithms*, Pearson Education, 2006.

DATABASE MANAGEMENT SYSTEM

Unit I

Introduction: Database-System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Database Users and Administrators.

Introduction to the Relational Model: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations.

Unit II

Database Design and the E-R Model: Overview of the Design Process, The Entity-Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues, Extended E-R Features, Alternative Notations for Modeling Data, Other Aspects of Database Design.

Relational Database Design: Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional-Dependency Theory, Decomposition Using Multivalued Dependencies, More Normal Forms, Database-Design Process.

Unit III

Database-System Architectures: Centralized and Client –Server Architectures, Server System Architectures, Parallel Systems, Distributed Systems, Network Types.

Introduction to SQL: Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Subqueries, Modification of the Database.

Unit IV

Intermediate SQL: Join Expressions, Views, Transactions, Integrity Constraints, SQL Data Types and Schemas, Authorization.

Advanced SQL: Accessing SQL From a Programming Language, Functions and Procedures, Triggers, Recursive Queries.

Text book:

1. A. Silberschatz, H. Korth and S. Sudarshan, *Database System Concepts,* 6th Ed., Tata McGraw Hill, 2011

References:

1. J. Morrison, M. Morrison and R. Conrad, *Guide to Oracle 10g*, Thomson Learning, 2005.

2. Loney and Koch, *Oracle 10g: The Complete Reference*, Tata McGraw Hill, 2006.

3. David Flanagan, Java Script, *The Definitive Guide*, O'Reilly Media, 2006.

4. Marty Hall, Larry Brown, and Yaakov Chaikin, *Core Servlets and Java Server Pages: Core Technologies* (Vol. II), 2nd Ed., Sun Microsystems Press, 2006.

5. S.K. Singh, *Database Systems Concepts, Design and Applications*, Pearson Education 2006.

6. Spoken Tutorial on “MySQL” as E-resource for Learning:- http://spoken-tutorial.org

JAVA PROGRAMMING

Unit 1

Introduction to Java: Features of Java, JDK Environment

Object Oriented Programming Concept: Overview of Programming, Paradigm, Classes, Abstraction, Encapsulation, Inheritance, Polymorphism, Difference between C++ and JAVA

Unit II

Java Programming Fundamental :Structure of java program, Data types, Variables, Operators, Keywords, Naming Convention, Decision Making (if, switch),Looping(for, while) ,Type Casting

Classes and Objects: Creating Classes and objects, Memory allocation for objects, Constructor, Implementation of Inheritance, Implementation of Polymorphism, Method Overloading, Method Overriding, Nested and Inner classes

Unit III

Arrays and Strings: Arrays, Creating an array, Types of Arrays, String class Methods, String Buffer methods.

Abstract Class, Interface and Packages: Modifiers and Access Control, Abstract classes and methods, Interfaces, Packages Concept, Creating user defined packages

Unit IV

Exception Handling: Exception types, Using try catch and multiple catch, Nested try, throw throws and finally, Creating User defined Exceptions.

File Handling: Byte Stream, Character Stream, File IO Basics, File Operations, Creating file, Reading file, Writing File

Applet Programming: Introduction, Types Applet, Applet Life cycle, Creating Applet, Applet tag

Books Recommended:

1. Ivan Bayross, Web Enabled Commercial Application Development Using Html, Dhtml,javascript, Perl Cgi , BPB Publications, 2009.
2. Cay Horstmann, BIG Java, Wiley Publication , 3rd Edition., 2009
3. Herbert Schildt , Java 7, The Complete Reference, , 8th Edition, 2009.
4. E Balagurusamy , Programming with JAVA, TMH, 2007

SYSTEM APPROACH TO MANAGEMENT

UNIT I

Principles of Management: Management, Nature, Definition, Scope and Importance of Management. Evolution of Management Thought, Traditional Approach, Scientific Management, Behavioral Aspects, Systems Theory Of Organization, Functions Of Management – Planning, Organizing, Staffing, Directing, Coordinating, Controlling.

UNIT II

Principles of Financial Accounting: Book-Keeping And Accountancy, Definition Of Accounting, Principles And Practices, Classification Of Accounts, Double Entry System, Books Of Prime Entry, Subsidiary Books, Recording Of Cash And Bank Transactions, Preparation Of Ledger Accounts, Preparation Of Trial Balance.

UNIT III

BRS and Final Accounts: Bank Reconciliation Statement, Problems Relating To Bank Reconciliation Statement. Bills Of Exchange, Drawing, Accepting, Renewal and Retainment of Bills Capital, Revenue And Differed Revenue Expenditure, Preparation of Trading And Profit And Loss Account And Balance Sheet of Sole Trading Concern.

UNIT IV

Financial Management: Financial Management, Nature, Scope And Objectives, Profit Maximization Vs. Wealth Maximization, Financial Analysis, Meaning and Objectives, Types And Techniques Of Financial Analysis.

BOOKS:

1. Bushan Y.K : Business Organization & Management
2. Prasad L.M : Principles Of Management
3. Koontz & O" Donell : Management A System Approach
4. Grawal T.S. : Introduction To Accountancy.
5. Jain&Narang : Financial Accounting.

COMPUTER GRAPHICS

Unit I

Computer Graphics: Graphs and Charts, Computer-Aided Design, Virtual-Reality Environments, Data Visualizations, Education and Training, Computer Art, Entertainment, Image Processing, Graphical User Interfaces.

Computer Graphics Hardware: Video Display Devices, Raster-Scan System, GraphicsWorkstations and Viewing Systems, Input Devices, Hard-Copy Devices, Graphics Networks, Graphics on the Internet.

Unit II

Computer Graphics Software: Coordinate Representations, Graphics Functions, Software Standards, Other Graphics Packages, Introduction to OpenGL.

Graphics Output Primitives: Coordinate Reference Frames, Specifying A Two-Dimensional World-Coordinate Reference Frame in OpenGL, OpenGL Point Functions, OpenGL Line Functions, OpenGL Curve Functions, Fill-Area Primitives, Polygon Fill Areas, OpenGL Polygon Fill-Area Functions, OpenGL Vertex Arrays, Pixel-Array Primitives, OpenGL Pixel-Array Functions, Character Primitives, OpenGL Character Functions, Picture Partitioning, OpenGL Display Lists, OpenGL Display-Window Reshape Function.

Unit III

Attributes of Graphics Primitives: OpenGL State Variables, Color and Grayscale, OpenGL Color Functions, Point Attributes, OpenGL Point-Attribute Functions, Line Attributes, OpenGL Line-Attribute Functions, Curve Attributes, Fill-Area Attributes, OpenGL Fill-Area Attribute Functions, Character Attributes, OpenGL Character-Attribute Functions, openGL Antialiasing Functions, OpenGL Query Functions, OpenGL Attribute Groups.

Algorithms for Graphics Primitives and Attributes: Line-Drawing Algorithms, Circle-Generating Algorithms, Ellipse-Generating Algorithms.

Two-Dimensional Geometric Transformations: Basic Two-Dimensional Geometric Transformations, Matrix Representations, Inverse Transformations, Two-Dimensional Composite Transformations, Raster Methods for Geometric Transformations, OpenGL Raster Transformations, Transformations between

Unit- **IV**

Two-Dimensional Coordinate Systems, OpenGL Functions for Two-Dimensional Geometric Transformations.

Two-Dimensional Viewing: The Two-Dimensional Viewing Pipeline, The ClippingWindow, Normalization and Viewport Transformations, OpenGL Two-Dimensional Viewing Functions, Clipping Algorithms, Two-Dimensional Point Clipping, Two-Dimensional Line Clipping, Polygon Fill-Area Clipping, Curve Clipping, Text Clipping.

Text Book:

1. Donald D. Hearn, M. Pauline Baker, Warren Carithers “Computer Graphics with Open GL” 4th Edition, 2011.

References:

1. J.D. Foley, A van Dam, S.K. Feiner and J.F. Hughes, *Computer Graphics: Principals and Practices,* 2nd Ed., Addison-Wesley, MA, 1990.

2. D.F. Rogers, *Procedural Elements in Computer Graphics,* 2nd Ed., McGraw Hill Book Company, 2001.

3. D.F. Rogers and A.J. Admas, *Mathematical Elements in Computer Graphics*, 2nd Ed., McGraw Hill Book Company, 1990.

PRACTICAL: DATABASE MANAGEMENT SYSTEM

NOTE:

- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25 – 30.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

Example programs:

1. Create a database having two tables with the specified fields, to computerize a library system of a Delhi University College.

   LibraryBooks (Accession number, Title, Author, Department, PurchaseDate, Price) IssuedBooks (Accession number, Borrower)

   a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
   b) Delete the record of book titled "Database System Concepts".
   c) Change the Department of the book titled "Discrete Maths" to "CS".
   d) List all books that belong to "CS" department.
   e) List all books that belong to "CS" department and are written by author "Navathe".
   f) List all computer (Department="CS") that have been issued.
   g) List all books which have a price less than 500 or purchased between "01/01/1999" and "01/01/2004".

2. Create a database having three tables to store the details of students of Computer Department in your college.

   Personal information about Student (College roll number, Name of student, Date of birth, Address, Marks(rounded off to whole number) in percentage at 10 + 2, Phone number)
   Paper Details (Paper code, Name of the Paper)
   Student's Academic and Attendance details (College roll number, Paper code, Attendance, Marks in home examination).

   a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
   b) Design a query that will return the records (from the second table) along with the name of student from the first table, related to students who have more than 75% attendance and more than 60% marks in paper 2.
   c) List all students who live in "Delhi" and have marks greater than 60 in paper 1.
   d) Find the total attendance and total marks obtained by each student.
   e) List the name of student who has got the highest marks in paper 2.

3. Create the following tables and answer the queries given below:

   Customer (CustID, email, Name, Phone, ReferrerID)
   Bicycle (BicycleID, DatePurchased, Color, CustID, ModelNo)
   BicycleModel (ModelNo, Manufacturer, Style)
   Service (StartDate, BicycleID, EndDate)

   a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
   b) List all the customers who have the bicycles manufactured by manufacturer "Honda".
   c) List the bicycles purchased by the customers who have been referred by customer "C1".
   d) List the manufacturer of red colored bicycles.
   e) List the models of the bicycles given for service.

4. Create the following tables, enter at least 5 records in each table and answer the queries given below.

   EMPLOYEE (Person_Name, Street, City)
   WORKS (Person_Name, Company_Name, Salary)
   COMPANY (Company_Name, City)
   MANAGES (Person_Name, Manager_Name)
   a) Identify primary and foreign keys.
   b) Alter table employee, add a column "email" of type varchar(20).
   c) Find the name of all managers who work for both Samba Bank and NCB Bank.
   d) Find the names, street address and cities of residence and salary of all employees who work for "Samba Bank" and earn more than $10,000.
   e) Find the names of all employees who live in the same city as the company for which they work.
   f) Find the highest salary, lowest salary and average salary paid by each company.
   g) Find the sum of salary and number of employees in each company.
   h) Find the name of the company that pays highest salary.

5. Create the following tables, enter at least 5 records in each table and answer the queries given below.

   Suppliers (SNo, Sname, Status, SCity)
   Parts (PNo, Pname, Colour, Weight, City)
   Project (JNo, Jname, Jcity)
   Shipment (Sno, Pno, Jno, Qunatity)
   a) Identify primary and foreign keys.
   b) Get supplier numbers for suppliers in Paris with status>20.
   c) Get suppliers details for suppliers who supply part P2. Display the supplier list in increasing order of supplier numbers.
   d) Get suppliers names for suppliers who do not supply part P2.
   e) For each shipment get full shipment details, including total shipment weights.
   f) Get all the shipments where the quantity is in the range 300 to 750 inclusive.
   g) Get part nos. for parts that either weigh more than 16 pounds or are supplied by suppliers S2, or both.
   h) Get the names of cities that store more than five red parts.
   i) Get full details of parts supplied by a supplier in Delhi.
   j) Get part numbers for part supplied by a supplier in Allahabad to a project in Chennai.
   k) Get the total number of project supplied by a supplier (say, S1).
   l) Get the total quantity of a part (say, P1) supplied by a supplier (say, S1).

PRACTICAL: JAVA PROGRAMMING

NOTE:

- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25 – 30.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

Example programs:

1. WAP to find the largest of n natural numbers.
2. WAP to find whether a given number is prime or not.
3. Write a menu driven program for following:
    a. Display a Fibonacci series
    b. Compute Factorial of a number
    c. WAP to check whether a given number is odd or even.
    d. WAP to check whether a given string is palindrome or not.
4. WAP to print the sum and product of digits of an Integer and reverse the Integer.
5. Write a program to create an array of 10 integers. Accept values from the user in that array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
6. Write a program that will prompt the user for a list of 5 prices. Compute the average of the prices and find out all the prices that are higher than the calculated average.
7. Write a program in java to input N numbers in an array and print out the Armstrong numbers from the set.
8. Write java program for the following matrix operations:
    a. Addition of two matrices
    b. Summation of two matrices
    c. Transpose of a matrix
    d. Input the elements of matrices from user.
9. Write a java program that computes the area of a circle, rectangle and a Cylinder using function overloading.
10. Write a Java for the implementation of Multiple inheritance using interfaces to calculate the area of a rectangle and triangle.
11. Write a java program to create a frame window in an Applet. Display your name, address and qualification in the frame window.
12. Write a java program to draw a line between two coordinates in a window.
13. Write a java program to display the following graphics in an applet window.
    a. Rectangles
    b. Circles
    c. Ellipses
    d. Arcs
    e. Polygons
14. Write a program that reads two integer numbers for the variables a and b. If any other character except number (0-9) is entered then the error is caught by NumberFormatException object. After that ex.getMessage() prints the information about the error occurring causes.
15. Write a program for the following string operations:
    a. Compare two strings
    b. Concatenate two strings
    c. Compute length of a string
16. Create a class called Fraction that can be used to represent the ratio of two integers. Include appropriate constructors and methods. If the denominator becomes zero, throw and handle an exception.

BCA III YEAR I SEMESTER

Code	Subject	Workload Per Week	Marks			Credit
			External	Internal	Total	
BCA51	Multimedia Systems And Applications	T (4)	70	30	100	4
BCA52	Object Oriented Design in UML	T (4)	70	30	100	4
BCA53	Visual Programming	T (4)	70	30	100	4
BCA54	E-Commerce Technologies	T (4)	70	30	100	4
BCA55	Cryptography and Network Security	T (4)	70	30	100	4
BCA56	Multimedia Systems And Applications- lab	L (4)	50	0	50	2
BCA57	Visual Programming- Lab	L (4)	50	0	50	2
				Total credits		24

MULTIMEDIA SYSTEMS AND APPLICATIONS

Unit I

Multimedia: Introduction, Definitions, Where to Use Multimedia- Multimedia in Business, Schools, Home, Public Places, Virtual Reality; Delivering Multimedia.

Text: Meaning, Fonts and Faces, Using Text in Multimedia, Computers and Text, Font Editing and Design Tools, Hypermedia and Hypertext.

Images: Before You Start to Create, Making Still Images, Color.

Unit II

Sound: The Power of Sound, Digital Audio, MIDI Audio, MIDI vs. Digital Audio, Multimedia System Sounds, Audio File Formats. Adding Sound to Your Multimedia Project.

Animation: The Power of Motion, Principles of Animation, Animation by Computer, Making Animations.

Unit III

Video: Using Video, How Video Works and Is Displayed, Digital Video Containers, Obtaining Video Clips, Shooting and Editing Video.

Making Multimedia: The Stages of a Multimedia Project, the Intangibles, Hardware, Software, Authoring Systems

Planning and Costing: The Process of Making Multimedia, Scheduling, Estimating; Designing and Producing.

Unit IV

The Internet and Multimedia: Internet History, Internetworking, Multimedia on the Web.

Designing for the World Wide Web: Developing for the Web, Text for the Web, Images for the Web, Sound for the Web, Animation for the Web, Video for the Web.

Delivering: Testing, Preparing for Delivery, Delivering on CD-ROM, DVD and World Wide Web, Wrapping.

Text book:

1. Tay Vaughan, “Multimedia: Making it work”, TMH, Eighth edition.

Reference books:

1. Ralf Steinmetz and Klara Naharstedt, “Multimedia: Computing, Communications Applications”, Pearson.
2. Keyes, “Multimedia Handbook”, TMH.
3. K. Andleigh and K. Thakkar, “Multimedia System Design”, PHI.
4. Spoken Tutorial on “GIMP”as E-resource for Learning:-http://spoken-tutorial.org
5. Spoken Tutorial on “Blender” as E-resource for Learning:-http://spoken-tutorial.org

OBJECT ORIENTED DESIGN IN UML

UNIT - I

Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

Unit II

Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.

Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

UNIT - III

Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

Basic Behavioral Modeling-I: Interactions, Interaction diagrams.

UNIT-IV

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

Case Study: The Unified Library application

TEXT BOOKS

1. Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modeling Language User Guide, Pearson Education.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

REFERENCES

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.
3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
4. Mark Priestley: Practical Object-Oriented Design with UML,TATA McGrawHill
5. Craig Larman Appling UML and Patterns: An introduction to Object - Oriented Analysis and Design and Unified Process, Pearson Education.

VISUAL PROGRAMMING

Unit – I

Introduction: Visual Basic, Visual Studio Integrated Development Environment, Test-Driving the Visual Basic. Overview of the Visual Studio 2012 IDE, Menu Bar and Toolbar, Navigating the Visual Studio IDE, Using Help, Using Visual App Development to Create a Simple App that Displays Text and an Image.

Introduction to Visual Basic Programming: Introduction, Programmatically Displaying Text in a Label, Addition Program, Building the Addition Program, Memory Concepts, Arithmetic,Decision Making-Equality and Relational Operators.

Introduction to Problem Solving and Control Statements: Introduction, Algorithms, Pseudocode Algorithm, Control Structures, If ... Then Selection Statement, If ... Then ... Else Selection Statement, Nested If ... Then ... Else Selection Statements, Nested Control Statements, Using the Debugger: Locating a Logic Error.

Unit – II

Problem Solving and Control Statements: Introduction, For ... Next Repetition Statement, Examples Using the For ... Next Statement, Nested Repetition Statements, Select ... Case Multiple-Selection Statement, Do ... Loop While and Do ... Loop Until Repetition Statements, Using Exit to Terminate Repetition Statements, Using Continue in Repetition Statements, Logical Operators,

Methods: Introduction, Classes and Methods, Subroutines - Methods That Do Not Return a Value, Functions - Methods That Return a Value, Implicit Argument Conversions, Option Strict and Data-Type Conversions, Passing Arguments - Pass-by-Value vs. Pass-by-Reference, Scope of Declarations, Method Overloading, Optional Parameters, Using the Debugger – Debugging Commands

Arrays: Introduction, Arrays, Declaring and Allocating Arrays, Initializing the Values in an Array, Summing the Elements of an Array, Passing an Array to a Method, For Each ... Next Repetition Statement, Rectangular Arrays, Resizing an Array with the ReDim Statement.

Unit – III

Windows Forms GUI: A Deeper Look: Introduction, Controls and Components, Creating Event Handlers, Control Properties and Layout, GroupBoxes and Panels, ToolTips, Mouse-Event Handling, Keyboard-Event Handling, Menus, MonthCalendar Control, DateTimePicker Control, LinkLabel Control, ListBox and CheckedListBox Controls, Multiple Document Interface (MDI) Windows, Visual Inheritance, Animation with the Timer Component. Exception Handling: A Deeper Look (Appendix)

Object-Oriented Programming - Classes and Objects: Introduction, Classes, Objects, Methods and Instance Variables, Account Class, Value Types and Reference Types, Class Scope, Object Initializers, Auto-Implemented Properties, Using Me to Access the Current Object, Garbage Collection, Shared Class Members, Const and ReadOnly Fields, Shared Methods and Class Math, Object Browser.

Unit – IV

Object-Oriented Programming - Inheritance and Polymorphism : Introduction, Base Classes and Derived Classes, Class Hierarchy, Constructors in Derived Classes, Protected Members, Introduction to Polymorphism - A Polymorphic Video Game, Abstract Classes and Methods,

Databases and LINQ : Introduction, Relational Databases, A Books Database, LINQ to Entities and the ADO.NET Entity Framework, Querying a Database with LINQ, Dynamically Binding Query Results, Retrieving Data from Multiple Tables with LINQ, Creating a Master/Detail View App.

Text Books:

1. Visual Basic 2012: How to Program by Paul Deitel, Harvey Deitel, Abbey Deitel, Sixth Edition, 2014.

E-COMMERCE TECHNOLOGIES

Unit I

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

Unit II

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

Unit III

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

Unit IV

Planning for Electronic Commerce: Planning Electronic Commerce initiates, Linking objectives to business strategies, Measuring cost objectives, Comparing benefits to Costs, Strategies for developing electronic commerce web sites
Internet Marketing: The PROS and CONS of online shopping, The cons of online shopping, Justify an Internet business, Internet marketing techniques, The E-cycle of Internet marketing, Personalization e-commerce.

Books Recommended:

1. G.S.V.Murthy, E-Commerce Concepts, Models, Strategies- :- Himalaya Publishing House, 2011.
2. Kamlesh K Bajaj and Debjani Nag , E- Commerce , 2005.
3. Gray P. Schneider , Electronic commerce, International Student Edition, 2011,
4. Henry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang E-Commerce, Fundamentals And Applications, Wiely Student Edition, 2011

CRYPTOGRAPHY AND NETWORK SECURITY

Unit I

Introduction: Security Trends, Security Attacks, Security Services, Security Mechanisms, Model for Network Security,

Symmetric Ciphers: Classical Encryption Techniques, Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography.

Unit II

Data Encryption Standard: Block Cipher Principles, The Data Encryption Standard, The Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles. Advanced Encryption Standard: Evaluation Criteria For AES, The AES Cipher.

Unit III

Public-Key Cryptography and RSA: Principles of Public-Key Cryptosystems, the RSA Algorithm,

Public-Key Cryptosystems: Key Management, Diffie-Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.

Unit IV

Message Authentication and Hash Functions: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions and Macs.

Digital Signatures and Authentication Protocols: Digital Signatures, Kerberos, X.509 Authentication Service, Public-Key Infrastructure.

Text book:

1. W. Stallings, *Cryptography and Network Security Principles and Practices,* 4th Ed., Prentice-Hall of India, 2006.

Book Recommended

1. C. Pfleeger and S.L. Pfleeger, *Security in Computing,* 3rd Ed., Prentice-Hall of India, 2007.

2. M.Y. Rhee, Network Security, John Wiley and Sons, NY, 2002.

PRACTICAL: MULTIMEDIA SYSTEMS AND APPLICATIONS

NOTE:

- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25 – 30.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

Example programs:

Practical exercises based on concepts listed in theory using Presentation tools in office automation tool/ GIMP/Blender / Audacity/ Animation Tools/ Image Editors/ Video Editors.

Implement the followings using Blender -

1. Create an animation using the tools panel and the properties panel to draw the following – Line, pe , oval, circle, rectangle , square, pencil , brush , lasso tool
2. Create an animation using text tool to set the font , size , color etc.
3. Create an animation using **Free transform tool** that should use followings-

   Move Objects

   Skew Objects

   Stretch Objects

   Rotate Objects

   Stretch Objects while maintaining proportion

   Rotate Objects after relocating the center dot
4. Create an animation using layers having following features-

Insert layer, Delete layer, guide layer, Mask layer.

5. Modify the document (changing background color etc.)Using the following tools

   Eraser tool

   Hand tool

   Ink bottle tool

   Zoom tool

   Paint Bucket tool

   Eyedropper tool
6. Create an animation for bus car race in which both starts from the same point and car wins the race.

7. Create an animation in which text Hello gets converted into GoodBye (using motion/shape tweening).
8. Create an animation having five images having fade-in fade-out effect.
9. Create an scene to show the sunrise (using multiple layers and motion tweening)
10. Create an animation to show the ripple effect.
11. Create an animation (using Shape tweening and shape hints) for transforming one shape into another.
12. Create an animation for bouncing ball (you may use motion guide layer).

PRACTICAL: VISUAL PROGRAMMING

NOTE:

- All the concepts of programs from Text Book including exercises must be practice, execute and write down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25 – 30.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps are necessary.
- External Viva-voce is compulsory.

Example programs:

1. Print a table of numbers from 5 to 15 and their squares and Cubes.
2. Print the largest of three numbers.
3. Find the factional of a number n.
4. Enter a list of positive numbers terminated by zero. Find the sum and average of these numbers.
5. A person deposits Rs. 1000 in a fixed account yielding 5% interest. Complete the amount in the account at the end of each year for n years.
6. Read n numbers. Count the number of negative numbers, positive numbers and zeros in the list.
7. Read n numbers. Count the number of negative numbers, positive numbers and zeroes in the list.use arrays.
8. Read a single dimension array. Find the sum and average of these numbers.
9. Read a two dimension array. Find the sum of two 2D Array.
10. Create a database Employee and Make a form to allow data entry to **Employee Form** with the following command buttons:

Employee Form

Employee Name: ☐

Employee Id: ☐

Date of Joining: ☐

Designation: ☐

Department: ☐

Address: ☐

Basic Pay: ☐

PREV	NEXT	FIRST	LAST	ADD	SAVE	DELETE	CANCEL

BCA III YEAR II SEMESTER

Code	Subject		Workload Per Week	Marks			Credit
				External	Internal	Total	
BCA61	Elective A1/B1/C1		T(4)	70	30	100	4
	A1	Artificial Intelligence					
	B1	Theory of Computation					
	C1	Digital Image Processing					
BCA62	Elective A2/B2/C2		T(4)	70	30	100	4
	A2	Data mining					
	B2	Android Programming					
	C2	Unix programming					
BCA63	Major project (including Seminars)			300	100	400	16
					Total credits		24

Elective A1: ARTIFICIAL INTELLIGENCE

Unit I

Introduction: Introduction to Artificial Intelligence, Background and Applications, Turing Test and Rational Agent approaches to AI, Introduction to Intelligent Agents, their structure, behavior and environment.

Unit II

Problem Solving and Searching Techniques: Problem Characteristics, Production Systems, Control Strategies, Breadth First Search, Depth First Search, Hill climbing and its Variations, Heuristics Search Techniques: Best First Search, A* algorithm, Constraint Satisfaction Problem, Means-End Analysis, Introduction to Game Playing, Min-Max and Alpha-Beta pruning algorithms.

Unit III

Knowledge Representation: Introduction to First Order Predicate Logic, Resolution Principle, Unification, Semantic Nets, Conceptual Dependencies, Frames, and Scripts, Production Rules, Conceptual Graphs.
Programming in Logic (PROLOG)

Unit IV

Dealing with Uncertainty and Inconsistencies: Truth Maintenance System, Default Reasoning, Probabilistic Reasoning, Bayesian Probabilistic Inference, Possible World Representations.
Understanding Natural Languages: Parsing Techniques, Context-Free and Transformational Grammars, Recursive and Augmented Transition Nets.

BOOKS RECOMMENDED:

1. DAN.W. Patterson, Introduction to A.I and Expert Systems – PHI, 2007.

2. Russell &Norvig, Artificial Intelligence-A Modern Approach**,** LPE, Pearson Prentice Hall, 2nd edition, 2005.

3. Rich & Knight, Artificial Intelligence – Tata McGraw Hill, 2nd edition, 1991.

4. W.F. Clocksin and Mellish, Programming in PROLOG, Narosa Publishing House, 3rd edition, 2001.

5. Ivan Bratko, Prolog Programming for Artificial Intelligence, Addison-Wesley, Pearson Education, 3rd edition, 2000.

ELECTIVE B1: THEORY OF COMPUTATION

Unit I

Computer Hardware And System Software: Introduction, Computer Hardware and Types of System Software, Man-machine Communication Spectrum.

INTRODUCTION TO COMPILERS: Introduction, Theory of Computer Languages, Design of a Language, Evolution of Compilers, Stages of Compilation.

Unit II

LEXICAL ANALYSIS: Introduction, Alphabets and Tokens in Computer Languages, Representation of Tokens and Regular Expression, Token Recognition and Finite State Automata, Lexical Analysis Tool

SYNTAX ANALYSIS: Introduction, Context-free Grammar and Structure of Language, Parser and its Types, Top-down Parser, Bottom-up Parser, Parser Generator Tool (Yacc),

Unit III

INTERMEDIATE CODE GENERATION: Introduction, Need for Intermediate Code, Types of Intermediate Code, Semantic Analysis.

OPTIMIZATION: Introduction, Hints on Writing Optimized Code at User Level, Construction of Basic Blocks and Processing.

Unit IV

CODE GENERATION: Introduction, Issues in Code Generation, Target Machine Architecture

COMPILER WRITING TOOLS: Introduction, Lexical Tools, Syntactic Tools,

Test Book:

1. K. Muneeswaran, Compiler Design (with CD), Oxford university press, 2012

Reference Books

1. Santanu Chattopadhyaya, Systems Programming, PHI, 2011.
2. Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, Compilers: Principles, Techniques, and Tools, 2nd edition, Prentice Hall, 2006.
3. D. M. Dhamdhere, Systems Programming, Tata McGraw Hill, 2011.
4. Leland Beck, D. Manjula, System Software: An Introduction to System Programming, 3rd edition, Pearson Education, 2008.
5. Grune D, Van Reeuwijk . K, Bal H. E, Jacobs C J H, Langendoen K, Modern Compiler Design, 2nd edition, Springer, 2012

ELECTIVE C1: DIGITAL IMAGE PROCESSING

UNIT - I

DIGITAL IMAGE FUNDAMENTALS: What is Digital Image Processing. fundamental Steps in Digital Image Processing, Components of an Image processing system, elements of Visual Perception. Image Sensing and Acquisition, Image Sampling and Quantization, Some Basic Relationships between Pixels, Linear and Nonlinear Operations.

UNIT - II

IMAGE TRANSFORMS: Two-dimensional orthogonal & unitary transforms, properties of unitary transforms, two dimensional discrete Fourier transform. Discrete cosine transform, sine transform, Hadamard transform, Haar transform, Slant transform, KL transform.

Unit III

ENHANCEMENT: Image Enhancement in Spatial domain, Some Basic Gray Level Trans -formations, Histogram Processing, Enhancement Using Arithmetic/Logic Operations.

Basics of Spatial Filtering Image enhancement in the Frequency Domain filters, Smoothing Frequency Domain filters, Sharpening Frequency Domain filters, homomorphic filtering.

UNIT - IV

Model of image degradation/restoration process, noise models, Restoration in the Presence of Noise, Only-Spatial Filtering Periodic Noise Reduction by Frequency Domain Filtering, Linear Position-Invariant Degradations, inverse filtering, minimum mean square error (Weiner) Filtering, Color Fundamentals. Color Models, Pseudo color Image Processing., processing basics of full color image processing

TEXT BOOK:

1. “Digital Image Processing”, Rafael C. Gonzalez, Richard E. Woods, et.al, TMH, 2nd Edition 2010.

REFERENCE BOOKS:

1. “Fundamentals of Digital Image Processing”, Anil K. Jain, Pearson Education, 2001.
2. “Digital Image Processing and Analysis”, B. Chanda and D. Dutta Majumdar, PHI, 2003.

ELECTIVE A2: DATA MINING

Unit I

Data Mining and Knowledge Discovery Process: data mining, Data Mining Differ from Other Approaches - The Knowledge Discovery Process-Introduction, Knowledge Discovery Process, Knowledge Discovery Process Models.

Data Understanding: data, Concepts of Learning, Classification, and Regression

Unit II

Data Mining: Methods for Constructing Data Models: Unsupervised Learning: Clustering-From Data to information Granules or Clusters, Categories of Clustering Algorithms, Hierarchical Clustering, Objective Function-Based Clustering, Cluster Validity, random Sampling and Clustering as a Mechanism of Dealing with large datasets.

Unit III

Association Rules – Introduction, Association Rules and transactional Data , Mining Single Dimensional , Single-Level Boolean Association Rules, Mining Other Types of Association Rules.

Supervised Learning: Bayesian Methods, Regression- Decision Trees, Rule and Hybrids Algorithms.

Unit IV

Text Mining: Introduction, Information Retrieval Systems, Improving Information Retrieval Systems.

Data Security, Privacy and Data Mining: Privacy in Data Mining, Privacy Versus Levels of Information Granularity, Distributed Data Mining, Collaborative Clustering.

Text Books:

1. Data mining A knowledge discovery approach , Pedrycz, Kurgan, Springer , 2007

References:

1. Data mining Concepts and Techniques , Micheline Kamber, third edition, MK Elsevier publications
2. Principles of data mining , David hand Heikki Mannila , PHI publications-2004

ELECTIVE B2: ANDROID PROGRAMMING

Unit I

Introduction: History of Android, Introduction to Android Operating Systems, Android Development Tools, Android Architecture.

Unit II

Development Tools: Installing and using Eclipse with ADT plug-in, Installing Virtual machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools, creating a android project – Hello Word, run on emulator, Deploy it on USB-connected Android device.

Unit III

User Interface Architecture: Application context, intents, Activity life cycle, multiple screen sizes.

User Interface Design: Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners (Combo boxes), Images, Menu, and Dialog.

UNIT IV

Database: Understanding of SQLite database, connecting with the database.

Book Recommended:

1. Android application development for java programmers. By James C. Sheusi. Publisher: Cengage Learning, 2013.

ONLINE READING / SUPPORTING MATERIAL:

1. http://www.developer.android.com
2. http://developer.android.com/about/versions/index.html
3. http://developer.android.com/training/basics/firstapp/index.html
4. http://docs.oracle.com/javase/tutorial/index.htm (Available in the form of free downloadable ebooks also).
5. http://developer.android.com/guide/components/activities.html
6. http://developer.android.com/guide/components/fundamentals.html
7. http://developer.android.com/guide/components/intents-filters.html.
8. http://developer.android.com/training/multiscreen/screensizes.html
9. http://developer.android.com/guide/topics/ui/controls.html
10. http://developer.android.com/guide/topics/ui/declaring-layout.html
11. http://developer.android.com/training/basics/data-storage/databases.html

ELECTIVE C2: UNIX PROGRAMMING

UNIT I

Introduction: Introduction to UNIX, Different Flavours of UNIX, Features of UNIX, Architecture of UNIX. Understanding the UNIX Command: Locating Commands, Internal and External Commands, Command Structure, Flexibility of Command Usage, man: Browsing the Manual Pages On-Line.

General Purpose Utilities: cal, date, echo, printf, bc, script, passwd, who, uname, tty, sty.

The File System: The File, What"s in a (File)name?, The Parent-Child Relationship, pwd, cd, mkdir, rmdir, Absolute Pathnames, Relative Pathnames, ls.

UNIT II

Handling Ordinary Files: cat, cp, rm, mv, more, file, wc, od, cmp, comm., diff, gzip, gunzip, tar, zip, unzip.

Basic File Attributes: ls-l, The –d option, File Ownership, File Permissions, chmod, Directory Permissions.

The VI Editor: vi Basics, Input Mode, Saving Text and Quitting, Navigation, Editing Text, Undoing Last Editing Instructions, Repeating the Last Command, Searching for a pattern, Substitution.

The Shell: The shells Interpretive Cycle, Shell offerings, Pattern Matching- The Wild Cards, Escaping and Quoting, Redirecton: The Three standard Files, /dev/nul and /dev/tty: Two Special Files, Pipes, tee, Command Substitution, Shell Variables.

UNIT III

Simple Filters, Regular Expressions and Grep Family: The sample Database, pr, head, tail, cut, paste, sort, uniq, tr. grep, egrep, sed.

Shell Programming: Shell Scripts, Read: Making Scripts Interactive, Command Line Arguments, Exit status of a command, The Logical Operators, Conditional Execution, Exit,, The if Conditional, The Case Conditional, expr: Computation, While, until, for, trap, Sample Validation.

UNIT IV

awk – An Advanced Filter: Simple awk filtering, Splitting a line into fields, printf, The comparison operators, Number Processing, Variables, The –f Option, The BEGIN and END Sections, Built in Variables, Arrays, Functions, Control Flow Statements.

File Management: File Structures, System Calls for File Management – create, open, close, read, write.

TEXT BOOK:

1. Unix System Concepts And Applications By Sumithaba Das (Tata Mcgraw Hill)
2. Unix Net Work Programming By W.Richard Stevens(Phi/Addision Wesley Two Columes)

REFERENCE BOOK

1. Unix The Complete Reference By Rosen ,Host Farber And Rosinski-Tatamcgraw Hill
2. The Unix Programming Environment By Brian W. Kernigham& Rob Pike -Phi

PROJECT GUIDE LINES

1. Maximum 2 students shall be allowed to take up a project.
2. Guiding one project shall be considered as 4 hours of practical per week as the work load for the concerned internal guide.
3. Each student shall submit his/her project synopsis to the concerned guide within 15days in consultation with internal guide from the commencement of the respective semester.
4. Each student has to carry out 2 project seminars compulsorily in project duration.
5. Each seminar will be considered for their internal assessment (IA).

Scheme of valuation - 400 Marks

- IA – 100 Marks
    - Synopsis - 20 Marks
    - Seminar 1 - 40 Marks
    - Seminar 2 - 40 Marks
- Dissertation – 300 Marks
    - Documentation - 150 Marks
    - Presentation / Demonstration - 100 Marks
    - Viva- 50 Marks

FACULTY OF SCIENCES
Bachelor of Computer Application (BCA)
CBCS Pattern in Semester System (*with effect from 2016-17*)

SCHEME OF QUESTION PAPER

BCA (Faculty of Sciences)
I/II/III/IV/V/VI Semesters
I-Internal Assessment Examination*
Code: Name of the Paper
(Under CBCS Scheme)

Time: 90 Min] **[Marks: 30**

Answer ALL questions.

1.	From Unit-I	6.	From Unit-II
2.	From Unit-I	7.	From Unit-II
3.	From Unit-I	8.	From Unit-II
4.	From Unit-I	9.	From Unit-II
5.	From Unit-I	10.	From Unit-II

SCHEME OF QUESTION PAPER

BCA (Faculty of Sciences)
I/II/III/IV/V/VI Semesters
II-Internal Assessment Examination*
Code: Name of the Paper
(Under CBCS Scheme)

Time: 90 Min] **[Marks: 30**

Answer ALL questions.

1.	From Unit-III	6.	From Unit-IV
2.	From Unit-III	7.	From Unit-IV
3.	From Unit-III	8.	From Unit-IV
4.	From Unit-III	9.	From Unit-IV
5.	From Unit-III	10.	From Unit-IV

****The internal marks will be calculated on the average of two internal tests***

FACULTY OF SCIENCES
Bachelor of Computer Application (BCA)
CBCS Pattern in Semester System (with effect from 2016-17)

SCHEME OF QUESTION PAPER

BCA (Faculty of Sciences)
I/II/III/IV/V/VI Semesters
KAKATIYA UNIVERSITY, WARANGAL
Code: Name of the Paper
(Under CBCS Scheme)

Time: 3 hrs] **[Total Marks: 70**

Section - A

1. Answer any six from the following **(6 X 5 = 30)**

a. from unit I
b. from unit I
c. from unit II
d. from unit II
e. from unit III
f. from unit III
g. from unit IV
h. from unit IV

Section – B

Answer all questions **(4 X 10 = 40)**

2.	(a)	(OR)	(b)	from UNIT –I
3.	(a)	(OR)	(b)	from UNIT –II
4.	(a)	(OR)	(b)	from UNIT -III
5.	(a)	(OR)	(b)	from UNIT -IV