UG Program (4 Years Honors)
CBCS-2020-21

BCA
Bachelor of Computer Applications

Syllabus and Model Question Papers

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1. Resolutions of the Board of Studies

Meeting held on: 22.01.2021,Time:10 A.M at Adikavi Nannaya University,RJY

Agenda: B.C.A Syllabus finalization .
Minutes of the UG-Board of Studies meeting for B.C.A, 22/01/2021 at 10:00 A.M at Adikavi Nannaya University, Convention Centre, Rajamahendravaram.

Members:

Dr. V.Persis	Chairman, Dept. of CSE, ANUR.
Mr.R.Ashok Kumar	Convenor, Dept. of Computer Science, Govt.Degree College,Chintalapudi.
Mr.D.Sunil Kumar	Member, Dept. of Computer Science Govt.College, Rajamahendravaram
Mr.M.Srinivas Rao	Coordinator, Dept. of CSE, ANUR
Mrs.Lakshmi Saroja	Member, Dept. of Computer Science,Aditya Degree College, Rajamahendravaram

Resolutions:
1.The following Computer Science Subjects will be part of the curriculum. Syllabus and Model question papers are prepared and submitted for the below papers

Semester-I:

Paper C1: Computer Fundamentals & Office tools
Paper C1-P:Computer Fundamentals & Office tools-Lab
Paper C2: Programming in C
Paper C2-P: Programming in C –Lab
Paper C3: Numerical and Statistical Methods
Paper C3-P: Numerical and Statistical Methods-Lab

Semester-II

Paper C4: Data Structures
Paper C4-P: Data Structures-Lab
Paper C5: Introduction to Python Programming
Paper C5-P: Introduction to Python Programming-Lab
Paper C6: Database Management Systems
Paper C6-P: Database Management Systems-Lab

Semester-III:

Paper C7: Accounting and Financial Management
Paper C7-P: Accounting and Financial Management-Lab
Paper C8: Object Oriented Programming Through Java
Paper C8-P: Object Oriented Programming Through Java-Lab
Paper C9: Operating Systems
Paper C9-P: Operating Systems-Lab

Semester-IV:

Paper C10: Cyber Laws
Paper C10-P: Cyber Laws-Lab
Paper C11: Data Mining and Data Warehousing
Paper C11-P: Data Mining and Data Warehousing-Lab
Paper C12: Web Programming

paper C12-P: Web Programming-Lab
Paper C13: Data Communications & Networks
Paper C13-P: Data Communications & Networks-Lab
Paper C14: Data Analytics using R
Paper C14-P: Data Analytics using R-Lab
Paper C15: Object Oriented Software Engineering
Paper C15-P: Object Oriented Software Engineering -Lab

2.Paper Setters and Evaluators lists are submitted.
3.Basic Computer Applications-Life Skills Course should not be opted by the student during any Semester.

Members Present:

1.Dr.V.Persis , Dept.of CSE,ANUR

2.Mr.R.Ashok Kumar, Dept.of CS, Govt.Degree College,Chintalapudi

3.Mr.D.Sunil Kumar, Dept. of Computer Science,Govt.College, R.J.Y

4.Mr.M.Srinivas Rao ,Dept.of CSE,ANUR

5.Mrs.Lakshmi Saroja, Dept. of Computer Science,Aditya Degree College,R.J.Y

Signature of the Chairman

DETAILS OF COURSE STRUCTURE

S.No	Semester	Hours/ Week	No of Credits	Max.Marks	Max. Marks University Exam	Total Marks
				Internal assessment		
1	I	30	25	125	625	750
2	II	32	27	125	675	800
3	III	32	27	125	675	800
4	IV	36	30	150	750	900
5	V	36	30	150	750	900
#6	VI					
TOTAL		**166**	**139**	**675**	**3475**	**4150**

Note: It is to be noted that, Basic Computer Applications under Life Skill Courses should not be opted by the student under any semester.

I-Semester

S.No	Paper Code	Subject	Hours/ Week	No of Credits	Max. Marks	Max. Marks University Exam	Total Marks
					Internal assessment		
1.		English – I	4	3	25	75	100
2.		Language(H/T/S) – I	4	3	25	75	100
3.		Life Skill Course – I	2	2	-0-	50	50
4.		Skill Development Course – I	2	2	-0-	50	50
5.	C1	Computer Fundamentals & Office tools	4	4	25	75	100
	C1-P	Computer Fundamentals & Office tools-Lab	2	1	-0-	50	50
6	C2	Programming in C	4	4	25	75	100
	C2-P	Programming in C Lab	2	1	-0-	50	50
7.	C3	Numerical and Statistical Methods	4	4	25	75	100
	C3-P	Numerical and Statistical Methods- Lab	2	1	-0-	50	50
Total			30	25	125	625	750

II Semester

S.No	Paper Code	Subject	Hours/ Week	No of Credits	Max.Marks	Max. Marks University Exam	Total Marks
					Internal assessment		
1.		English – II	4	4	25	75	100
2.		Language(H/T/S) – II	4	3	25	75	100
3.		Life Skill Course – II	2	2	-0-	50	50
4.		Skill Development Course – II	2	2	-0-	50	50
5.		Skill Development Course – III	2	2	-0-	50	50
6.	C4	Data Structures	4	4	25	75	100
	C4-P	Data Structures Lab	2	1	-0-	50	50
7.	C5	Introduction to Python Programming	4	4	25	75	100
	C5-P	Introduction to Python Programming Lab	2	1	-0-	50	50
8.	C6	Database Management Systems	4	4	25	75	100
	C6-P	Database Management Systems Lab	2	1	-0-	50	50
Total			32	28	125	675	800

III Semester

S.No	Paper Code	Subject	Hours/ Week	No of Credits	Max.Marks	Max. Marks University Exam	Total Marks
					Internal assessment		
1.		English –III	4	3	25	75	100
2.		Language(H/T/S) – III	4	3	25	75	100
3.		Life Skill Course – III	2	2	-0-	50	50
4.		Life Skill Course – IV	2	2	-0-	50	50
5.		Skill Development Course – IV	2	2	-0-	50	50
6.	C7	Accounting and Financial Management	4	4	25	75	100
	C7-P	Accounting and Financial Management Lab	2	1	-0-	50	50
7.	C8	Object Oriented Programming Through Java	4	4	25	75	100
	C8-P	Object Oriented Programming Through Java Lab	2	1	-0-	50	50
8.	C9	Operating Systems	4	4	25	75	100
	C9-P	Operating Systems Lab	2	1	-0-	50	50
Total			32	27	125	675	800

IV Semester

S.No	Paper Code	Subject	Hours/ Week	No of Credits	Max.Marks	Max. Marks University Exam	Total Marks
					Internal assessment		
1.	C10	Cyber Laws	4	4	25	75	100
	C10-P	Cyber Laws Lab	2	1	-0-	50	50
2.	C11	Data Mining and Data Warehousing	4	4	25	75	100
	C11-P	Data Mining and Data Warehousing Lab	2	1	-0-	50	50
3.	C12	Web Programming	4	4	25	75	100
	C12-P	Web Programming Lab	2	1	-0-	50	50
4.	C13	Data Communications & Networks	4	4	25	75	100
	C13-P	Data Communications & Networks Lab	2	1	-0-	50	50
5.	C14	Data Analytics using R	4	4	25	75	100
	C14-P	Data Analytics using R Lab	2	1	-0-	50	50
6.	C15	Object Oriented Software Engineering	4	4	25	75	100
	C15-P	Object Oriented Software Engineering Lab	2	1	-0-	50	50
Total			36	30	150	750	900

V Semester

S.No	Paper Code	Subject	Hours/ Week	No of Credits	Max.Marks	Max. Marks University Exam	Total Marks
					Internal assessment		
1.	SEC1		4	3	25	75	100
	SEC1-P		2	2	-0-	50	50
2.	SEC2		4	3	25	75	100
	SEC2-P		2	2	-0-	50	50
3.	SEC3		4	3	25	75	100
	SEC3-P		2	2	-0-	50	50
4.	SEC4		4	3	25	75	100
	SEC4-P		2	2	-0-	50	50
5.	SEC5		4	3	25	75	100
	SEC5-P		2	2	-0-	50	50
6.	SEC6		4	3	25	75	100
	SEC6-P		2	2	-0-	50	50
Total			36	30	150	750	900

DETAILS OF COURSE-WISE SYLLABUS

BCA	Course Code	Semester: I	Credits: 04
	C1	Computer Fundamentals and Office Tools	Hrs/Wk:04

Course Objectives:

- To introduce the concepts of computer fundamentals and their applications for the efficient use of office technology in a business environment.
- To introduce the fundamentals of computing devices and reinforce computer vocabulary, particularly with respect to personal use of computer hardware and software.
- To provide hands-on use of Word, Excel and PowerPoint.

Course Outcomes:

- Describe the usage of computers and why computers are essential components in business and society.
- Identify categories of programs, system software and applications. Organize and work with files and folders.
- Compose, format and edit a word document and working with macros.
- Create work sheets and using various functions.
- Make presentations and inserting multimedia in them.

UNIT – I:

Introduction: Characteristics of Computer, The evolution of Computers, The Computer Generations. **Basic Computer Organization:** Input Unit, Output Unit, Storage Unit, Arithmetic Logic Unit, Control Unit, Central Processing Unit.
Secondary Storage Devices: Magnetic Disk, Optical Disk. Magneto optical Disk, Mass Storage Devices, Flash Drive and Other related Concepts.

UNIT – II:

Computer Software: Types of Software, Logical systems Architecture, Acquiring Software, Software developmental Steps. **Computer Languages:** Machine Language, Assembly Language, High Level Language, Some High Level Languages, Characteristics of good Programming Language. **Number Systems:** Binary, Hexa Decimal, Conversion from one number system to another system.

UNIT –III:

MS-Word: Features of MS-Word, MS-Word Window components, working with formatted text, Shortcut keys, Formatting documents: Selecting text, Copying & moving data, Formatting characters, changing cases, Paragraph formatting, Indents, Drop Caps, Using format painter, Page formatting, Header & footer, Bullets & numbering, Tabs, Forming tables. Finding &replacing text, go to (F5) command, proofing text (Spell check, Auto correct), Reversing actions, Macros, Inserting pictures, Hyperlinks, Equation editor, Mail merging, Printing documents.

UNIT-IV:

MS-Excel: Excel Features, Spreadsheets, workbooks, creating, saving & editing a workbook, Renaming sheet, cell entries (numbers, labels, and formulas), find and replace, Adding and deleting rows and columns Filling series, fill with drag, data sort, Filters, Formatting worksheet, Functions and its parts, Some useful Functions in excel (SUM, AVERAGE, COUNT, MAX, MIN, IF), Cell referencing (Relative, Absolute, Mixed), What-if analysis Introduction to charts: types of charts, creation of charts, printing a chart, printing worksheet.

UNIT V:

MS-PowerPoint: Features of PowerPoint, Uses, components of slide, templates and wizards, using template, choosing an auto layout, using outlines, adding subheadings, editing text, formatting text, using master slide, adding slides, changing color scheme, changing background and shading, adding header and footer, adding clip arts and auto shapes. Various presentation, Working in slide sorter view (deleting, duplicating, rearranging slides), adding transition and animations to slide show, inserting music or sound on a slide, viewing slide show, Printing slides.

TEXT BOOKS:

1. Computer Fundamentals – Pradeep .K.Sinha: BPB Publications. Fundamentals of Computers - ReemaThareja, Oxford University Press India

REFERENCES:

1. Fundamentals of Computers – V. Rajaraman, Prentice Hall of India Introduction to Computers – Peter Norton Mcgraw Hill.

BCA	Course Code	Semester: I	Credits: 01
	C1-P	Computer Fundamentals and Office Tools Lab	Hrs/Wk:02

List of Experiments:

1) Design a visiting card for managing director of a company as per the following specification.
   - Size of visiting card is 3 ½×2
   - Name of the company with big font
   - Phone number, Fax number and E-mail address with appropriate symbols.
   - Office and Residence address separated by a line
2) Create a table with following columns and display the result in separate cells for the following
   - Emp Name, Basic pay, DA, HRA, Total salary.
   - Sort all the employees in ascending order with the name as the key
   - Calculate the total salary of the employee
   - Calculate the Grand total salary of the employee
   - Find highest salary and
   - Find lowest salary
3) Prepare an advertisement to company requiring software professional with the following
   - Attractive page border
   - Design the name of the company using WordArt
   - Use at least one clipart.
   - Give details of the company (use bullets etc)
   - Give details of the Vacancies in each category of employee's (Business manager, Software engineers, System administrators, Programmers, Data entry operators) qualification required.
4) Create a letterhead of a company with the following specifications
   - Name of the company on the top of the page 2 with big font and good style
   - Phone no, Fax no and E-mail address with symbols.
   - Main products manufactured by the company
   - Slogans if any should be specify in bold at the bottom
5) Create two pages of curriculum vitae of a graduate with the following specifications
   - Table to show qualifications with proper headings
   - Appropriate left and right margins
   - Format ½ page using two-column approach about yourself
   - Name on each page at the top right side
   - Page no. in the footer on the right side.
6) Write a macro format document as below
   - Line spacing "2"(double)
   - Paragraph indent of 0.1
   - Justification formatting style
   - Arial font and Bold of 14pt-size
7) Create a letter as the main document and create 10 records for the 10 persons use mail merge to create letter for selected persons among 10.
8) Create an electronic spread sheet in which you enter the following decimal numbers and convert them into octal, Hexadecimal and binary numbers and vice-versa.

   Decimal Numbers: 35,68,95,78,165,225,355,375,465
   Binary Numbers: 101,1101,11101,11111,10001,11101111

9) Calculate the net pay of the employees following the conditions below.

	A	B	C	D	E	F	G	H	I
1	Employee Number	Employee name	Basic pay	DA	HRA	GPF	Gross pay	Income tax	Net pay
2									

DA: - 56% of the basic pay if Basic pay is greater than 20000 or else 44%.
HRA: - 15% of the Basic pay subject to maximum of Rs.4000.
GPF: - 10% of the basic pay.
INCOME TAX: - 10% of basic if Basic pay is greater than 20000. Find who is getting highest salary& who is get lowest salary?

10) The ABC Company shows the sales of different product For 5 years. Create BAR Graph,3D and Pie chart for the following.

A	**B**	**C**	**D**	**E**	**F**
S.No.	Year	Pro 1	Pro 2	Pro 3	Pro 4
1	1989	1000	800	900	1000
2	1990	800	80	500	900
3	1991	1200	190	400	800
4	1992	400	200	300	1000
5	1993	1800	400	400	1200

11) Create a suitable examination database and find the sum of the marks (total) of each student and respective, class secured by the student.

Pass: if marks in each subject >=35
Distinction: if average >=75
First class: if average >=60 but <75
Second class: if average >=50 but less than 60 **Third class:** if average>=35 but less than 50 **Fail:** if marks in any subject <35

12) Enter the following data into the sheet.

Name	**Department**	**Salary**
Anusha	Accounts	12000
Rani	Engineering	24000
Lakshmi	Accounts	9000
Purnima	Marketing	20000
Bindu	Accounts	4500
Tejaswi	Accounts	11000
Swetha	Engineering	15000
Saroja	Marketing	45000
Sunitha	Accounts	5600
Sandhya	Engineering	24000
Harika	Marketing	8000

- Extract records for department in Accounts and Salary>10000
- Sort the data by salary with the department using "sortcommands".
- Calculate total salary for each department using Subtotals

13) Enter the following data into the sheet.

	Raju	Rani	Mark	Rosy	Ismail	Reshma
English	76	89	43	51	76	87
2nd Lang	55	85	78	61	47	33
Maths	65	82	34	58	52	65
Computers	45	91	56	72	49	56
Human Values	51	84	54	64	32	64

Apply the conditional formatting for marks

- 35 belowRed
- 35 to 50Blue
- 51 to 70Green
- 71 to 100 Yellow

14) Create a presentation using templates.
15) Create a Custom layout or Slide Master for professional presentation.
16) Create a presentation with slide transitions and animation effects.
17) Create a table in PPT and apply graphical representation Unit.

BCA	Course Code	Semester: I	Credits: 04
	C2	Programming In C	Hrs/Wk:04

Course Objectives:

- Provides knowledge on Algorithms, Flow chart and different programming languages.
- To train the students with basic concepts of programming using C.
- Provides complete knowledge of C language.
- Helps to develop logics which will help them to create program and applications in C.
- Learning the basic programming constructs, they can easily switch over to any other language in future.

Course Outcomes:

Upon successful completion of this course, students will be able to-

- Understand the basic terminology used in computer programming.
- Write, compile and debug programs in C language.
- Use different data types in a computer program.
- Design programs involving decision structures, loops and functions.
- Understand the dynamics of memory by the use of pointers and Structures.
- Apply different operations in File handling.

UNIT - I:

Introduction to Algorithms and Programming Languages: Algorithm - Key features of Algorithms - examples of Algorithms, Flow Charts– Pseudo code, Programming Languages – Generation of Programming Languages – Structured Programming Language.

Introduction to C: Introduction – Structure of C Program, Writing the first C Program, File used in C Program – Compiling and Executing C Programs, Using Comments – Keywords – Identifiers, Basic Data Types in C, Variables – Constants, I/O Statements in C, Operators in C, Programming Examples, Type Conversion and Type Casting.

UNIT -II:

Control Structures and **Functions: Decision Control and Looping Statements:** Introduction to Decision Control Statements, Conditional Branching Statements, Iterative Statements, Nested Loops, Break and Continue Statement – Goto Statement.

UNIT - III:

Arrays and Strings: *Arrays*: Introduction, Declaration of Arrays, Accessing elements of the Array – Storing Values in Array, Calculating the length of the Array, Operations that can be performed on Array, One dimensional array, Accessing one dimensional array, two dimensional Arrays, Accessing two dimensional arrays. ***Strings:*** Introduction, String Operations using String functions.

UNIT - IV:

Functions: Introduction, Using functions – Function declaration/ prototype – Function definition, Function call – Return statement – Passing parameters, Passing one dimensional array to function, Scope of variables, Storage Classes, Recursive functions.

UNIT – V:

Pointers, Structures and Unions: *Pointers:* Understanding Computer Memory – Introduction to Pointers, Declaring Pointer Variable, Dynamic Memory Allocation, Drawbacks of Pointers. ***Structures***: Introduction to structures, Nested Structures. ***Union***: Introduction to Union – accessing union elements.

File Handling: *Files*: Introduction to Files, Using Files in C, Reading Data from Files, Writing Data from Files.

PRESCRIBED TEXT BOOKS:

1. Computer Fundamentals and Programming in C by REEMA THAREJA from OXFORD UNIVERSITY PRESS

REFERENCE BOOKS:

1. E. Balagurusamy, COMPUTING FUNDAMENTALS &C PROGRAMMING – Tata McGraw-Hill, Second Reprint 2008, ISBN 978-0-07-066909-3.
2. Ashok N Kamthane: Programming with ANSI and Turbo C,Pearson Edition Publ, 2002.
3. Henry Mullish& Huubert L.Cooper: The Sprit of C, Jaico Pub, House,1996.
4. Teach your C Skills-Kanithker

BCA	Course Code	Semester: I	Credits: 01
	C2-P	Programming In C Lab	Hrs/Wk:02

List of Experiments

1. Write a C program to convert hours into seconds.
2. Write a C program to check given number is even or odd
3. Write a C program to check given year is leap year or not.
4. Write a C program to check whether the given number is Prime or Not.
5. Write a C program to find the sum of individual digits of a given number.
6. Write a program to check whether given number is Palindrome or Not.
7. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
8. Write a C program to print the numbers in triangular form.

   1
   1 2
   1 2 3
   1 2 3 4
9. Program to display number of days in given month using Switch –Case.
10. Write a program to find given number in an array (linear search).
11. Write a C program to perform addition of two matrices.
12. Write a C program to determine if the given string is a palindrome or not.
13. Write a C program to find the factorial of a given integer using recursive function.
14. Write a C program to swap two numbers using Call by Value and Call by Reference.
15. Program to display Student Details using Structures.
16. Write a C program to
    i. Write data into a File.
    ii. Read data from a File.

BCA	Course Code	Semester: I	Credits: 04
	C3	Numerical and Statistical Methods	Hrs/Wk:04

Course Objectives:

- To learn how to perform error analysis for arithmetic operations.
- To demonstrate working of various numerical methods.
- To provide a basic understanding of the derivation and use of methods of interpolation and numerical integration.
- To impart knowledge of various statistical techniques.
- To develop students understanding through laboratory activities to solve problems related to above stated concepts.

Course Outcomes:

- Skill to choose and apply appropriate numerical methods to obtain appropriate solutions to difficult mathematical problems.
- Ability to apply various statistical techniques such as Measures of Central Tendency and Dispersion.
- Understanding of relationship between variables using the method of Correlation and Fit Analysis.
- Skill to execute programs of various Numerical Methods and Statistical techniques for solving mathematical problems.

UNIT - I:

Solution of equations (polynomial and transcendental equations) interval having methods, secant, Regula – Falsi, Newton – Raphson methods, Fixed point Iteration method.

UNIT - II:

Solution of system of linear equations: Gauss – Elimination method, Gauss – Jordan, Gauss – Siedel iteration method, LU- Decomposition method, Eigen values and Eigen vectors of a square matrix.

UNIT - III*:*

Interpolation: Forward and backward differences, Newton's forward and backward formula, Lagrange's interpolation and Lagrange's inverse interpolation formula.

Numerical differentiation, integration: Numerical differentiation forward and backward formula, Trapezoidal and Simpsons formulas.*Statistical Methods:*

UNIT- IV*:*

Basic concepts and definition of statistics: Mean, Median, Mode , standard deviation, coefficient of variation ,skewness and kurtosis ,Karl Pearson Correlation coefficient ,Rank Correlation and illustrated examples .

UNIT V:

Probability : Basic concepts and definition of probability , Probability axioms , Conditional probability , Addition and Multiplication theorem of probability (Based on set theory concepts) , Bayes theorem , problems and applications .

TEXT BOOKS:

1) Sunil S .Patil Numerical and Statistical Methods EBPB.
2) S.S.Shastry Introductory methods of Numerical Analysis PHI (New Delhi).

REFERENCE BOOKS:

3) Gupta S.C & Kapuram VK Fundamentals of Mathematical Statistics.
4) Numerical Analysis, Sultan Chand & Sons New Delhi.

BCA	Course Code	Semester: I	Credits: 01
	C3-P	Numerical and Statistical Methods Lab	Hrs/Wk:02

UNIT - I

1) Find the root of the Equation x x = 1.2 by using Regula - Falsi method.
2) Solve the Equation sin x = 5x – 2 by Iteration method.
3) Apply Newton - Raphson method , to find and approximate root , correct to three decimal places , of the Equation $x^3 – 3x – 5 = 0$, which lies near x = 2 .
4) Find the root of the Equation x sin x + cos x = 0 by using Newton – Raphson method.
5) Find the root of the Equation $x^3 + x - 1 = 0$ by Iteration method, given that a root lies near

UNIT - II

1) Solve the system of Equations 3x+y-z = 3 , 2x-8y+z=-5 , x-2y+9z=8 using Gauss – Elimination method.
2) Using Gauss –Jordan method solve the system, 2x+y+z=10, 3x+2y+3z = 18, x+4y+9z=16.
3) Solve the Equations 2x+3y+z=9, x+2y+3z=6, 3x+y+2z=8 by LU – Decomposition method.
4) Solve the system of Equations , 8x-3y+2z=20 , 4x+11y-z=33, 6x+3y+12z=35 by using Gauss- Seidel method.
5) Find the Eigen values & Eigen vectors of a square matrix A=[8 − 62 − 67 − 42 − 43].

UNIT - III:

1) Using Newton's forward interpolation formula ,the given table of values ,

X	1.1	1.3	1.5	1.7	1.9
f(x)	0.21	0.69	1.25	1.89	2.61

Obtain the value of f(x) when x = 1.4

2) Using Lagrange's Interpolation formula , find the value of y , corresponding to x = 10

3) from the following table

X	5	6	9	11
Y	12	13	14	16

4) From the following table of values of x & y , obtain $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ for x = 1.5

X	1.5	2.0	2.5	3.0	3.5	4.0
Y	3.375	7.0	13.625	24.0	38.875	59.0

5) Evaluate $\int_0^1 x^3 dx$ with five sub-intervals by Trapezoidal rule.
6) Evaluate $\int_0^1 \frac{1}{1+x} dx$ using Simpson's 3/8 rule taking h = 1/6.

UNIT - IV

1) Find the Karl Pearson's coefficient of skewnwss for the following data :

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No.of students	10	12	18	25	16	14	8

2) Find Bowley's coefficient of skewness for the following data :

Salary	500-600	600-700	700-800	800-900	900-1000	1000-1100	1100-1200	1200-1300
No.of persons	10	28	40	64	25	18	9	6

3) Find the standard deviation from Assumed mean method for the following data :

Class interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	1	4	17	45	26	5	2

4) Find the coefficient of skewness for the following data :

Variable	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Frequency	2	5	7	13	21	16	8	3

5) Find the rank correlation coefficient for the following data:

X 65	45	67	38	48	50	26	47	70	62
Y 64	40	58	46	52	49	38	47	59	60

UNIT - V

1) Three dice are tossed together. Find the probability that exactly two of the three numbers that show on them are equal.
2) What is the probability that a card drawn at random from the pack of playing cards may be either a Queen or a Jack?
3) If two cards are drawn from a well shuffled pack, find the probability that at least one of the two is Hearts.
4) A bag contains 4 Red, 6 Blue balls and a second bag contains 4 Blue & 6 Green balls. A ball is taken out from each bag. Find the probability that one ball is red and the other ball is Green. The probability that an event A happens in one trail of an experiment is 0.4. Three independent trails of the experiment are performed. Find the probability that the event A happens at least once

BCA	Course Code	Semester: II	Credits: 04
	C4	Data Structures	Hrs/Wk:04

Course Objectives

To introduce the fundamental concept of data structures and to emphasize the importance of data structures in developing and implementing efficient algorithms. In addition, another objective of the course is to develop effective software engineering practice, emphasizing such principles as decomposition, procedural abstraction, and software reuse.

Course Outcomes:

After completing this course satisfactorily, a student will be able to:

1. Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms.
2. Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs.
3. Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs
4. Demonstrate different methods for traversing trees
5. Compare alternative implementations of data structures with respect to performance
6. Compare and contrast the benefits of dynamic and static data structures implementations
7. Describe the concept of recursion, give examples of its use, describe how it can be implemented using a stack.
8. Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing.

UNIT- I:

Concept of Abstract Data Types (ADTs)- Data Types, Data Structures, Primitive and Non- primitive Data Structures, Linear and Non-linear Structures.

Linear Lists - ADT, Array and Linked representations (Single and Double Linked lists), Pointers.

UNIT- II:

Stacks: Definition, Stacks using Array and Linked representations, expressions, notations.

Queues: Definition, Queue using Array and Linked representations, Circular Queues, Dequeues.

UNIT- III:

Trees: Binary Tree, Definition, Properties, Trees using Array and Linked representations, Implementations and Applications, Heaps Trees.

Binary Search Trees (BST) - Definition, Operations and Implementations. B Trees, B+ Trees Implementation

UNIT IV:

Graphs – Graph and its Representation, Graph Traversals, Connected Components, Basic Searching Techniques, Minimal Spanning Trees.

UNIT- V:

Sorting and Searching: Selection, Insertion, Bubble, Merge, Quick, Sequential and Binary Searching.

REFERENCE BOOKS:

1. SamanthaD, Classic Data Structures, Prentice-Hall of India,2001
2. Sahani S, Data Structures, Algorithms and Applications in C++, McGraw-Hill,2002.
3. D S Malik, Data Structures Using C++, Thomson, India Edition 2006
4. Heilman G I,. Data Structures, Algorithms andObject-OrientedProgramming, Tata McGraw-l lill. 2002. (Chapters I and14).
5. Tremblay .1 P, and Sorenson P G, Introduction to Data Structures and Applications, Tata McGraw-Hill,
6. Drozdek A, Data Structures and Algorithms in C++), 2nd edition, Vikas Publishing House,2002.
7. Kanetkar Y P, Data Structures through C ++, BPB Publications. 2003.
8. Data Structures by AllenWeiss

BCA	Course Code	Semester: II	Credits: 01
	C4 - P	Data Structures Lab	Hrs/Wk:02

List of Lab Experiments

1. Write Programs to implement the Stack operations using an array.
2. Write Programs to implement the Queue operations using an array.
3. Write Programs to implement the Stack operations using Linked lists.
4. Write Programs to implement the Queue operations using Linked lists.
5. Write a program for postfix expression evaluation.
6. Write a program to convert prefix to postfix.
7. Write a program for Binary search Tree Traversals
8. Write a program to implement dequeue using a doubly linked list.
9. Write a program to search an item in a given list using
   (i) LinearSearch
   (ii) BinarySearch.
10. Write a program for
    (i) BubbleSort
    (ii) Quick Sort
    (iii) Merge Sort.

BCA	Course Code	Semester: II	Credits: 04
	C5	Introduction to Python Programming	Hrs/Wk:04

Objective:

To introduce the student to the basic features of python programming and impart skills in an Industry standard programming language

Outcomes: On the completion of this course, the student will be able to

- Understand the concepts of python programming
- Students should be able to develop logic for Problem Solving.
- Students should be able to apply the problem solving skills using syntactically simple language
- Create new GUI based programming to solve industry standard problems

UNIT-I:

Introduction to Python - Features of Python - Executing python program using command line window and IDLE graphics window, Python Virtual Machine - Identifiers - Reserved Keywords – Variables, Comments in Python – Input , Output and Import Functions - Operators – Data Types and Operations – int, float, complex, Strings, List, Tuple, Set, Dictionary - Mutable and Immutable Objects – Data Type Conversion, Illustrative programs

UNIT-II:

Decision Making -conditional (if), alternative (if-else), if..elif..else -nested if - Loops for, range(), while, break, continue, pass; **Functions, Arrays**- Fruitful functions- return values, parameters, local and global scope, function composition, recursion; **Strings:** string slices, immutability, string functions and methods, string module; Python arrays, Access the Elements of an Array, array methods.

UNIT-III:

LISTS, TUPLES, DICTIONARIES- Lists: List operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters, list comprehension; **Tuples:** Tuple assignment, tuple as return value, tuple comprehension; **Dictionaries**: operations and methods, comprehension;

UNIT-IV:

FILES, EXCEPTIONS, MODULES, PACKAGES- Built-in Modules - Creating Modules - Import statement - Locating modules - Namespaces and Scope - The dir() function - The reload function – Some useful Packages in Python (datetime, time, OS , calendar, math module)

Files and exception: text files, reading and writing files Renaming and Deleting files Exception handling exceptions, Exception with arguments, Raising an Exception - User defined Exceptions - Assertions in

UNIT-V:

GUI Programming- Introduction – Tkinter Widgets – Label – Message Widget – Entry Widget – Text Widget – tk Message Box – Button Widget – Radio Button- Check Button – List box Frames – Top level Widgets – Menu Widget

TEXT BOOKS:

1. “Taming PYTHON By Programming”, Jeeva Jose Khanna Publications
2. Allen B. Downey, “Think Python: How to Think Like a Computer Scientist‘”, 2nd edition,

REFERENCE BOOKS:

1. Kenneth A. Lambert, “Fundamentals of Python: First Programs”, CENGAGE Learning, 2012.
2. Learning Python, Mark Lutz, Orielly
3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson.

BCA	Course Code	Semester: II	Credits: 01
	C5 - P	Introduction to Python Programming Lab	Hrs/Wk:02

List of Lab Experiments

1. Enter the number from the user and depending on whether the number is even or odd, print out an appropriate message to the user.
2. Write a program to generate the Fibonacci series.
3. Write a program that prints out all the elements of the given list list that are less than 5.
4. Write a program that takes two lists and returns True if they have at least one common member.
5. Write a Python program to clone or copy a list
6. Write a Python program to demonstrate arrays with list comprehension
7. Write a Python script to sort (ascending and descending) a dictionary by value.
8. Write a Python program to sum all the items in a dictionary
9. Write a program with a function that accepts a string and returns number of vowels, consonants and special symbols in it.
10. Write a Python program to read an entire text file.
11. Write a Python program to append text to a file and display the text.
12. Write a program to implement exception handling.
13. Write a GUI program that converts Celsius to fahrein heat temperature using widgets

BCA	Course Code	Semester: II	Credits: 04
	C6	Data Base Management System	Hrs/Wk:04

Course Objective:

The objective of the course is to introduce the design and development of databases with special emphasis on relational databases.

Course Learning Outcomes:

On completing the subject, students will be able to:

1. Gain knowledge of Database and DBMS.
2. Understand the fundamental concepts of DBMS with special emphasis on relational data model.
3. Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database
4. Model databaseusing ER Diagrams and design database schemas based on the model.
5. Create a small database using SQL.
6. Store, Retrieve data in database.

UNIT -I:

Overview of Database Management System: Introduction to data, information, database, database management systems, file-based system, Drawbacks of file-Based System, database approach, Classification of Database Management Systems, advantages of database approach, Components of Database Management System, three schema architecture of database.

UNIT -II:

Data Models, Entity-Relationship Model: Introduction, the building blocks of ER model, classification of entity sets, attribute classification, relationship degree, relationship classification. Enhanced entity-relationship model (EER model), generalization and specialization, Inheritance - IS A relationship, constraints on specialization and generalization, advantages of EER modelling.

UNIT -III:

Relational Model: Introduction, CODD Rules, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra, limitations of relational algebra. **Normalization:** Functional dependencies and normal forms upto 3NF.

UNIT -IV:

Structured Query Language: Introduction, History of SQL Standard, Commands in SQL (DDL, DML, DCL, TCL), Data Types in SQL, Aggregate functions, Join Operation, Set Operations, View, Sub Query.

UNIT -V:

PL/SQL: Introduction, Structure of PL/SQL, Data Types, Operators Precedence, Control Structure, Program, Iterative Control, Cursors, Procedure, Function, Database Triggers, Types of Triggers.

TEXT BOOKS:

1. Database System Concepts by Abraham Silberschatz, Henry Korth, and S. Sudarshan, McGrawhill
2. Database Management Systems by Raghu Ramakrishnan, McGrawhill
3. Principles of Database Systems by J. D. Ullman
4. Fundamentals of Database Systems by R. Elmasri and S. Navathe
5. SQL: The Ultimate Beginners Guide by Steve Tale.

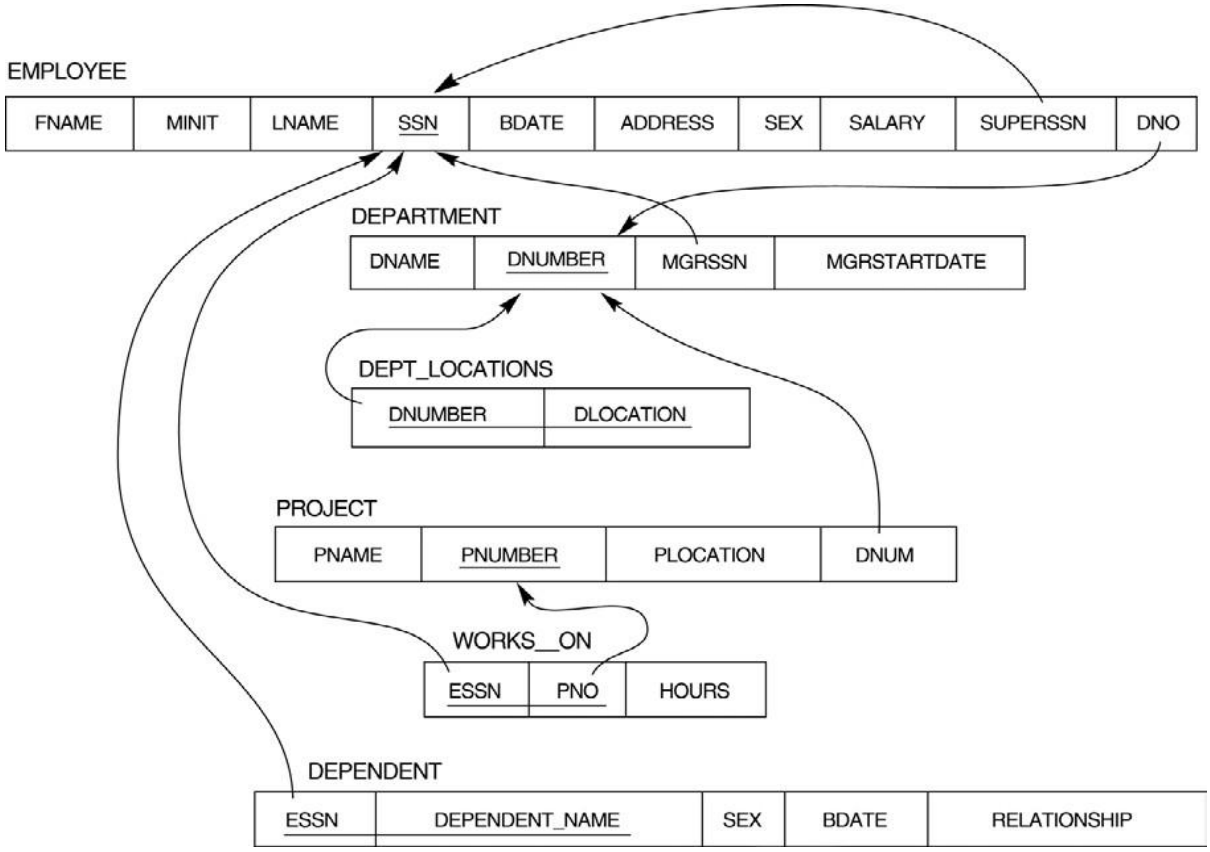
REFERENCES BOOKS:

1. Database Principles, Programming, and Performance, P.O'Neil, E.O'Neil,2nd ed.,ELSEVIER.
2. Database Systems, A Practical approach to Design implementation and Management Fourth edition, Thomas Connolly, carolynBegg, Pearson education.
3. Database Systems Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.

BCA	Course Code	Semester: II	Credits: 01
	C6 - P	Data Base Management System Lab	Hrs/Wk:02

1. Draw ER diagram for hospital administration
2. Creation of college database and establish relationships between tables
3. Relational database schema of a company is given in the following figure.

Relational Database Schema - COMPANY



Questions to be performed on above schema

1. Create above tables with relevant ***Primary Key, Foreign Key and other constraints***
2. Populate the tables with data
3. Display all the details of all employees working in the company.
4. Display ssn, lname, fname, address of employees who work in department no 7.
5. Retrieve the Birthdate and Address of the employee whose name is 'Franklin T. Wong'

6. Retrieve the name and salary of every employee
7. Retrieve all distinct salary values
8. Retrieve all employee names whose address is in 'Bellaire'
9. Retrieve all employees who were born during the 1950s
10. Retrieve all employees in department 5 whose salary is between 50,000 and 60,000(inclusive)
11. Retrieve the names of all employees who do not have supervisors
12. Retrieve SSN and department name for all employees
13. Retrieve the name and address of all employees who work for the 'Research' department
14. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birth date.
15. For each employee, retrieve the employee's name, and the name of his or her immediate supervisor.
16. Retrieve all combinations of Employee Name and Department Name
17. Make a list of all project numbers for projects that involve an employee whose last name is 'Narayan' either as a worker or as a manager of the department that controls the project.
18. Increase the salary of all employees working on the 'ProductX' project by 15%. Retrieve employee name and increased salary of these employees.
19. Retrieve a list of employees and the project name each works in, ordered by the employee's department, and within each department ordered alphabetically by employee first name.
20. Select the names of employees whose salary does not match with salary of any employee in department 10.
21. Retrieve the employee numbers of all employees who work on project located in Bellaire, Houston, or Stafford.
22. Find the sum of the salaries of all employees, the maximum salary, the minimum salary, and the average salary. Display with proper headings.
23. Find the sum of the salaries and number of employees of all employees of the 'Marketing' department, as well as the maximum salary, the minimum salary, and the average salary in this department.
24. Select the names of employees whose salary is greater than the average salary of all employees in department 10.
25. Delete all dependents of employee whose ***ssn is '123456789'***.
26. Perform a query using alter command to drop/add field and a constraint in Employee table.

BCA	Course Code	Semester: III	Credits: 04
	C7	Accounting and Financial Management	Hrs/Wk:04

Course Objectives:

- This paper is designed to impart knowledge regarding concepts of Financial Accounting. This course is useful for Students to get placements in different offices as well as companies in Accounts departments.

Course Outcomes:

- Company Setup &Configurations.
- Recording Financial Transactions.
- Financial Reports Analysis.

UNIT - I:

Fundamentals of Accounting: Meaning of Accounting, its scope; Objects and limitations; Meaning and application of double entry system , Books of Accounts , Ledgers -Debtors ledger, Creditors ledgers and General ledger; Cash Book and Bank Reconciliation Statement.

UNIT - II:

Financial Statements: Meaning and Components of Financial statements, Preparation of Financial Statements, Trading Account, Profit and loss Account, Meaning and Purpose of Balance Sheet, Steps for preparation of Balance Sheet, Marshalling of Balance Sheet, Format of Balance Sheet

UNIT - III:

Accounting Ratio and Cash Flow Statement: Ratio Analysis, Objectives of Ratio Analysis, Classification of Accounting Ratios, Advantages of Ratio Analysis, Analysis of Financial Statement through Ratios, Cash Flow Statement, Meaning of Cash Flow Statement, Importance of Cash Flow Statement, Cash Flow Statement as per as 3, Illustration Preparation of Cash Flow Statement.

UNIT -IV:

Cost Concepts and Cost Sheet: Meaning of Cost, Classification of Cost, Various Cost Concepts, Cost Centre, Types of Cost Centres, Cost Unit, Elements of Costs, Cost Sheet.

UNIT - V:

Budgetary Control and Marginal Costing: Meaning of Budget, Purpose of Budget, Budgetary Control: Meaning and Essentials, Merits OF budgetary Control system, Steps in preparation of budgets, Classification of budgets, Standard cost and standard costing, Variance analysis, Marginal cost and marginal costing, Advantages of marginal costing, Managerial Application of marginal costing, Break Even Analysis. **Capital and Working Capital:** Meaning of capital, cost of capital, shares, debentures, capitalisation and capital structure; Meaning of working capital, its components and estimation

SUGGESTED READINGS:

1. Financial Accounting, Ashis Bhattacharya, prentice-Hall India Publication.
2. Financial Accounting, S.N. Maheshwari, Vikas Publication House Pvt. Ltd., New Delhi.
3. Theory and Practice of Accountancy By B. B. Dam, R. A. Maheswari, R. Barman and BKalita

BCA	Course Code	Semester: III	Credits: 01
	C7 - P	Accounting and Financial Management Lab	Hrs/Wk:02

List of Lab Experiments

1) Create Company using Accounts only.

2) Alter a Company, Shut a Company and Delete a Company in Tally?

3) Splitting Company Data.

4) Creation of Group Companies.

5) Single Ledger Creation with Interest parameters setting.

6) Multi Ledger creation any Ten Accounts.

7) Bank Reconciliation Statement in Tally.

8) Creation of Tally Vault & Change Tally vault Password.

9) Creating Contra voucher.

10) Creating Payment voucher.

11) Creating Receipt voucher.

12) Creating Journal voucher.

13) Creating Sales voucher.

14) Creating Credit Note voucher.

15) Creating Purchases voucher.

16) Creating Debit Note voucher.

17) Displaying Day Book.

18) Displaying Trial Balance.

19) Displaying Profit and Loss Account.

20) Displaying Balance Sheet.

BCA	Course Code	Semester: III	Credits: 04
	C8	Object Oriented Programming through Java	Hrs/Wk:04

Course Objectives:

To make the students understand fundamentals of Java programming.

- To expose the students to develop OOPs Concepts
- To make the students to design appropriate Exception Handling in Java
- To make the students to understand the concepts of Threads, Files and
- I/O Streams, Applets, Servlets in java.

Course Outcomes:

The student would become competent enough to write, debug, and document well-structured java applications

- Demonstrate good object-oriented programming skills in Java
- Able to describe, recognize, apply and implement selected design patterns in Java
- Understand the capabilities and limitations of Java
- Be familiar with common errors in Java and its associated libraries
- Develop excellent debugging skills

UNIT -I:

Object Oriented Programming: Introduction to OOP, Objects and Classes, Characteristics of OOP, Difference between OOP and Procedure Oriented Programming. **Introduction to Java Programming:** Introduction, Features of Java, Comparing Java and other languages (C & C++), Java Development Kit, Structure of Java Program, Prerequisites for Compiling and Running Java Programs.

UNIT - II:

Java Language Fundamentals: Data types, variable declarations, Operators and Assignment, Control structures, Arrays, Strings, The String Buffer Class. **Java as an OOP Language:** Defining classes, Constructors, Overloading, Modifiers, Packages.

UNIT - III:

Inheritance, Interfaces, Exception Handling: Inheritance, Types of Inheritance, Interfaces, Interface Implementation, Exception Handling in Java, Throwing User-defined Exceptions, Advantages of Exception. **Multithreading:** An Overview of Threads, Creating Threads, Thread Life–cycle, Thread Priorities, Thread Synchronization, Daemon Threads, Communication of Threads.

UNIT - IV:

Files and I/O Streams: An Overview of I/O streams, Java I/O, File Streams, FileInputStream and File Output Stream, Filter streams, Random Access File, Serialization. **Applets:** Introduction, Java applications versus Java Applets, Applet Life-cycle, Working with Applets, The HTML Applet Tag.

UNIT - V:

Database Handling Using JDBC: An Overview of DBMS, JDBC Architecture, Working with JDBC

Servlets: Introduction, How to run servlets, The Life–cycle of the servlet, servlet API, Multitier Applications using JDBC from a servlet.

TEXT BOOKS:

1. **Object Oriented Programming through Java,** Universities Press (2008),by P. Radha Krishna.

REFERENCE BOOKS:

1. Learn Object Oriented Programming using Java, Venkateswarlu, EVPrasad, S. Chand
2. Programming in Java2, DrKSoma Sundaram, JAICO Publishing house
3. JAVA8, R Nageswararao, Core Java Black Book. An Integrated approach

BCA	Course Code	Semester: III	Credits: 01
	C8 - P	Object Oriented Programming through Java Lab	Hrs/Wk:02

List of Lab Experiments

1. Write a Java program that prints all roots of quadratic equation ax2 +bx + c = 0.
2. Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.
3. Write a Java program to create a Student class with following fields
   i. Hall ticket number
   ii. Student Name
   iii. Department
   Create 'n' number of Student objects where 'n' value is passed as input to constructor
4. Write Java program to implement Hierarchical Inheritance
5. Write Java program to implement multiple inheritance through interface
6. Write a Java program to demonstrate String comparison using == and equals method.
7. Write a Java program that creates three threads. First thread displays "Good Morning" everyone second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds
8. Write a Java program to demonstrate Exception Handling
9. Write a Java program that displays the number of characters, lines and words in a text file
10. Write a Java Program to create Applet for timer
11. Write a Java program to connect to Database using JDBC
12. Write a Java program to demonstrate Servlet life cycle

BCA	Course Code	Semester: III	Credits: 04
	C9	Operating Systems	Hrs/Wk:04

Course Objectives:

1. To know the basic Structure, Components and Organization of Operating System.
2. To learn the notation of a Process-a Program in Execution, Management, Scheduling and Classic Problems of Synchronization.
3. To gain knowledge in various Memory Management Techniques.
4. To understand Unix Operating System and Various File operations.

Course Outcomes:

The students will be able to:

1. Understand the main components and Structure of Operating System& their functions.
2. Analyze various ways of Process Management& CPU Scheduling Algorithms.
3. Evaluate various device and resources like Memory, Time and CPU Management techniques in distributed systems.
4. Apply different methods for Preventing Deadlocks in a Computer System.
5. Create and build an Application/Service over the UNIX operating system.

UNIT - I:

Introduction: What Operating Systems do, Computer system organization, Computer system architecture, Operating system structure. **System Structure:** Operating system services, User operating system interface, System Calls, Types of System Calls, Overview of UNIX Operating System, Basic features of Unix operating System.

UNIT - II:

Process Concept: Process Concept, Process Scheduling, Operation on Process. **Process Scheduling:** Basic Concepts, Scheduling Criteria, Scheduling Algorithms, CPU Scheduling in UNIX.

UNIT - III:

Synchronization: Background, The critical section problem. **Semaphores:** Usage, Implementation, Deadlocks and Starvation, Classic problems of synchronization. **Deadlocks:** System Model, Deadlock Characterization, Deadlock Prevention.

UNIT - IV:

Memory Management: Background, Basic hardware, Address Binding, Swapping, Contiguous memory allocation, **Paging:** Basic Method, Hardware Support, Protection, Memory Management in UNIX.

UNIT - V:

Files and Directories in UNIX, File Structure, File System Implementation of Operating System Functions, File permission, Basic Operation on Files, Changing Permission Modes, Standard files, Processes Inspecting Files, Operating On Files

TEXT BOOKS

1. Operating system Concepts: Abraham Silberschatz, Peter B. Galvin, Greg Gagne, 8th Edition,Wiley.
2. Unix and shell Programming by B.M Harwani, OXFORD University Press

REFERENCE BOOKS:

1. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8thEdition, Wiley Student Edition.
2. Principles of Operating Systems by Naresh Chauhan, OXFORD University Press
3. Unix Concept and application-Sumitabha das
4. Unix Shell Programming-Yashwant Kanetkar

BCA	Course Code	Semester: III	Credits: 01
	C9 - P	Operating Systems Lab	Hrs/Wk:02

List of Experiments

1. Introduction to UNIX Operating System, Compare with Windows OS. Writing and executing simple Hello World C Program in UNIX Environment.
2. Working with vi editor: Creating and editing a text file using the standard commands.
3. Getting hands-on on basic UNIX Commands.
4. Execute of various file/directory handling commands.
5. Write a Simple shell script for basic arithmetic and logical calculations.
6. Write Shell scripts to check various attributes of files and directories.
7. Write Shell scripts to perform various operations on give n strings.
8. Write Shell scripts to explore system variables such as PATH, HOME etc.
9. Use seed instruction to process /etc/password file.
10. Write a shell script to display list of users currently logged in.
11. Write a shell script to delete all the temporary files.
12. Write a shell script to search an element from an array using binary searching.
13. Write C programs to implement the following Scheduling Algorithms:
    i. First Come First Serve.
    ii. Shortest Job First.
    iii. Round Robin.

Reference Text Books:

1. Brian W. Kernighan and Rob Pike, "The UNIX Programming Environment" Prentice Hall India (Edition available in LRC and in the form of E Book on student resource).
2. Yashwant Kanetkar, "UNIX Shell Programming" BPB Publications (First Edition).

BCA	Course Code	Semester: IV	Credits: 04
	C10	Cyber Laws	Hrs/Wk:04

Course Objectives:

- Enable learners to understand, explore, and acquire a critical understanding of CyberLaw.
- Develop competencies for dealing with frauds and deceptions (confidence tricks, scams) and other cyber-crimes for example, child pornography etc. that are taking place via the Internet.
- Make learners conversant with the social and intellectual property issues emerging from 'Cyberspace'.
- Explore the legal and policy developments in various countries to regulate Cyberspace.
- Develop the understanding of relationship between commerce and cyberspace; and give learners in depth knowledge of Information Technology Act and legal frame work of Right to Privacy, Data Security and Data Protection.

Course Outcomes:

At the end of the course, students should be able to:

- Critically evaluate ongoing developments in law relating to information technologies.
- Display an understanding of how these developments relate to one another.
- Examine areas of doctrinal and political debate surrounding rules and theories;
- Evaluate those rules and theories in terms of internal coherence and practical outcomes.
- Draw on the analysis and evaluation contained in primary and secondary sources.

UNIT - I:

Introduction: Computers and its Impact in Society, Overview of Computer and Web Technology, Need for Cyber Law, *Cyber Jurisprudence* at International and Indian Level.

UNIT II:

Cyber Law- International Perspectives: UN &International Telecommunication Union (ITU)Initiatives, Council of Europe -Budapest Convention on Cybercrime, Asia-Pacific Economic Cooperation(APEC), Organization for Economic Co-operation and Development(OECD), World Bank, Commonwealth of Nations.

UNIT -III: Constitutional& Human Rights Issues in Cyberspace: Freedom of Speech and Expression in Cyberspace, Right to Access Cyberspace – Access to Internet, Right to Privacy, Right to Data Protection.

UNIT - IV: cyber Crimes& Legal Framework: Cyber Crimes against Individuals, Institution and State, Hacking,DigitalForgery,CyberStalking/Harassment,CyberPornography,IdentityTheft&Fraud, Cyber terrorism, Cyber Defamation, Different offences under IT Act,2000.

UNIT - V:

Cyber Torts: Cyber Defamation, Different Types of Civil Wrong sunder the IT Act, 2000, Intellectual Property Issues in Cyber Space, Interface with Copyright Law, Interface with Patent Law, Trade marks &Domain Names Related issues

Reference Books

1. Chris Reed& John Angel, *Computer Law*, OUP, NewYork,(2007).
2. Justice Yatindra Singh, *Cyber Laws*, Universal Law Publishing Co, New Delhi, (2012).
3. VermaK,MittalRaman, *LegalDimensionsofCyberSpace*,IndianLawInstitute,NewD elhi,(2004)
4. JonthanRosenoer, *Cyber Law*, Springer, New York,(1997).
5. SudhirNaib,TheInformationTechnologyAct,2005:AHandbook,OUP,NewYork,(20 11)
6. S.R.Bhansali, *Information TechnologyAct,2000*, UniversityBookHousePvt.Ltd.,Jaipur (2003).
7. Vasu Deva, *Cyber Crimes and Law Enforcement*, Commonwealth Publishers, New Delhi,(2003).

BCA	Course Code	Semester: IV	Credits: 01
	C10 - P	Cyber Laws Lab	Hrs/Wk:02

Lab Experiments

1. Write a program for recovering deleted files from a hard disk.
2. Write a program for gathering evidence.
3. Write a program for viewing files of various formats.
4. Write a program for locating files needed for a forensics investigation.
5. Write a program for performing image and file conversions.
6. Write a program for handling evidence data.
7. Write a program for creating a disk image file of a hard disk partition.
8. Give at least ten cyber crime scenarios to students and make them analyse the scenario and submit report citing cyber laws which are violated.

BCA	Course Code	Semester: IV	Credits: 04
	C11	Data Mining and Ware Housing	Hrs/Wk:04

Course Objectives:

- Be familiar with mathematical foundations of data mining tools.
- Understand and implement classical models and algorithms in data warehouses and data mining
- Characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.
- Master data mining techniques in various applications like social, scientific and environmental context. Develop skill in selecting the appropriate data mining algorithm for solving practical problems.

Course Outcomes:

At the end of the course, the student will demonstrate the following. The students will be able to:

- Examine the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system.
- Apply preprocessing statistical methods for any given raw data
- Discover interesting patterns from large amounts of data to analyze and extract patterns to solve problems, make predictions of outcomes
- Comprehend the roles that data mining plays in various fields and manipulate different data mining techniques
- Select and apply proper data mining algorithms to build analytical applications.
- Evaluate and implement a wide range of emerging and newly-adopted methodologies and technologies to facilitate the knowledge discovery.

UNIT -I:

Introduction: Data Mining and Importance, Relational Databases, Data Warehouses, Transactional Databases. Data Mining Functionalities, Kinds of Patterns.Data Preprocessing: Why Preprocess the Data?, Descriptive Data Summarization: Measuring the Central Tendency, Measuring the Dispersion of Data, Data Cleaning, Data Integration and Transformation, Data Reduction.

UNIT - II:

Data Warehouse and OLAP Technology: An Overview, What Is a Data Warehouse? , A Multidimensional Data Model, From Tables and Spreadsheets to Data Cubes, Stars, Snowflakes, and Fact Constellations: Schemas for Multidimensional databases, Examples, Measures: Their Categorization and Computation, Concept Hierarchies, OLAP Operations in the Multidimensional Data Model.

Data Warehouse Architecture: Steps for the Design and Construction of Data Warehouses, A Three-Tier Data Warehouse Architecture, Data Warehouse Back-End Tools and Utilities. Data Warehouse Implementation.

UNIT - III:

Mining Frequent Patterns, Associations, and Correlations: Basic Concepts, Mining Methods: The Apriori Algorithm: Finding Frequent Itemsets Using Candidate Generation, Generating Association Rules from Frequent Itemsets, Improving the Efficiency of Apriori, Mining Frequent Itemsets without Candidate Generation. Mining various kinds of Association Rules: Mining Multilevel Association Rules, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses.

UNIT - V:

Tree Induction, Attribute Selection Measures. Bayesian Classification**:** Naïve Bayesian Classification **Classification and Prediction:** Classification, Prediction, Regarding Classification and Prediction, Decision, **Rule-Based Classification**: Using IF-THEN Rules for Classification, Rule Extraction from a Decision Tree, Rule Induction Using a Sequential Covering Algorithm.

UNIT V:

Cluster Analysis: Cluster Analysis, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods Hierarchical Methods: Agglomerative and Divisive Hierarchical Clustering, Density-Based Methods, Outlier Analysis.

PRESCRIBED TEXT BOOK:

1. Data Mining: Concepts and Techniques Second Edition Jiawei Han University of Illinois at Urbana-Champaign Micheline KambeR.

REFERENCES:

1. Data Mining by VikramPudi, P. Radha Krishna, Oxford UniversalPress
2. Data Warehousing by ReemaThareja, Oxford UniversityPress
3. J. Han, M. Kamber and J. Pei, Data Mining: Concepts and Techniques, 3rd.Edition Morgan Kaufmann,2011
4. Introduction to data mining –G. K. Gupta,PHI
5. Data mining, Data warehouse &Olap-Berson, Tata McGrawHill

STUDENT ACTIVITY:

1. Predict the course taken by a student based on his activities and way of learning
2. Learn visual patterns of any real time data

BCA	Course Code	Semester: IV	Credits: 01
	C11 - P	Data Mining and Ware Housing Lab	Hrs/Wk:02

List of Experiments

1. Demonstration of preprocessing on datasetstudent.arff.
2. Demonstration of preprocessing on datasetlabor.arff.
3. Demonstration of Association rule process on dataset contactlenses.arff using Apriori algorithm.
4. Demonstration of Association rule process on dataset test.arff using Apriori algorithm.
5. Demonstration of classification rule process on dataset student.arff using j48algorithm.
6. Demonstration of classification rule process on dataset employee.arff using j48 algorithm.
7. Demonstration of classification rule process on dataset employee.arff using id3 algorithm.
8. Demonstration of classification rule process on dataset employee.arff using naïve bayes algorithm.
9. Demonstration of clustering rule process on dataset iris.arff using simple k-means.
10. Demonstration of clustering rule process on dataset student.arff using simple k-means.

BCA	Course Code	Semester: IV	Credits: 04
	C12	Web Programming	Hrs/Wk:04

Course Objectives:

- To learn about the Building Blocks of PHP, Arrays.
- To learn about PHP functions and file handling.
- To learn about working with Forms, Sessions, Cookies.
- To learn about Java Script basics.

Course Outcomes:

- Able to use Building Blocks of PHP, Access array elements.
- Able to use various functions and handle data using files..
- Able to use working with Forms, Sessions, Cookies.
- Able to implement JavaScript.

UNIT - I:

Basics of HTML & Java Script: Basic structure of an HTML document, HTML Tags, Lists, Tables and Frames, Forms and controls. **Java Script**: Introduction – Basic commands – Variables – Operators – Control structures – Arrays - Window and document object – Forms and form elements – String, math and dates – multiple windows.

UNIT -II:

Basics of PHP : Introduction to PHP, Identifiers, Variables, Constants, Data Types, Operators, Conditional Statements, PHP Loops.

Working with **Arrays:** Arrays, Creating Arrays, some Array-Related Functions. Working with Objects: Creating Objects, Object Instance. Working with Strings, Dates and Time: Formatting Strings with PHP), Investigating Strings with PHP , Manipulating Strings with PHP, Using Date and Time Functions in PHP.

UNIT - III:

Advanced PHP: Functions, Advantages of Using functions, Types of functions, creating and invoking functions, returning values, recursive functions Object Oriented Concepts, File handling and Data Storage: creating, open/close a file, file operations: read, write, append. File truncate, file uploading, EOF in PHP.

UNIT IV: Working with Forms in PHP:

Creating Forms, Accessing Form - Input with User defined Arrays, Combining HTML and PHP code on a single Page, Using Hidden Fields to save state, Redirecting the user.

PHP with MySQL: Creating Database in MySQL, Connecting to MYSQL, Reading and Writing form data from MYSQL

UNIT - V:

Working with Cookies and User Sessions*:* Introducing Cookies, Setting a Cookie with PHP, Session Function Overview, Starting a Session, Working with session variables, passing session IDs in the Query String, Destroying Sessions and Unsettling Variables, Using Sessions in an Environment with Registered Users.

REFERENCE BOOKS:

1. Fundamentals Of Open Source Software, Mn Rao, Phi,2015.
2. Julie C. Meloni, PHP MySQL and Apache, SAMS Teach Yourself, Pearson Education (2007).
3. Web Technologies, A. a. Puntambekar, 2013, Technical Publications

BCA	Course Code	Semester: IV	Credits: 01
	C12 - P	Web Programming Lab	Hrs/Wk:02

Lab experiments

1. Create a basic student registration form and add validations using JavaScript
2. Create a PHP program to find odd or even number from given number.
3. Write a PHP program to find maximum of three numbers.
4. Demonstrating while loop in PHP for accessing array elements.
5. Demonstrating for each loop in PHP.
6. Write a PHP program to demonstrate various string functions.
7. Write a PHP program to demonstrate Date and Time functions.
8. Write a PHP program to perform read and write operations on a file.
9. Creating user login form in PHP with MYSQL.
10. Demonstrating File Uploads.
11. Demonstrating Working with Cookies.
12. Demonstrating User Sessions.

BCA	Course Code	Semester: IV	Credits: 04
	C13	Data Communications & Networking	Hrs/Wk:04

Course Objectives:

This course will enable the students to

1. Appreciate the use of computer networking in various walks of life, describe the types of networks, network configurations and network topologies. Also Write the OSI and TCP/IP reference models for networking.
2. Explain responsibilities of data link layer, its implementation and associated protocols, algorithms/pseudo codes.
3. Explain the various techniques used to access a shared channel in the network and IEEE specifications for LANs.
4. List types of networking devices, backbone networks and Internet Protocol (IP) addressing.
5. Explain the responsibilities of network, transport and application layers.

Course Outcomes:

At the end of the course the student will be able to

1. Define computer networks, list network configurations, types, topologies, the applications of computer networks in different fields, network models and description of physical layer.
2. Reason the need for flow and error control at the data link layer and explain the associated protocols.
3. Enumerate the shared channel access methods, associated protocols and Wired & Wireless LAN standards and implementations.
4. List the types of networking devices / equipments and also explain the addressing scheme used at the network layer.
5. Explain how network layer, transport layer and application layer facilitates the transfer of message from one node to another in a global network

UNIT - I:

Introduction toData communications, Network Criteria, point-to-point and multi point connection, physical topology, Local Area Networks, Metropolitan Area Networks, Wide Area Networks, Wireless Networks, protocols and standards.

Network Models: Layered tasks, Connection-Oriented and Connectionless Services, Service Primitives, The OSI Reference Model, The TCP/IP Reference Model, Comparison of the OSI and TCP/IP Reference Models, addressing.

UNIT – II:

Physical Layer: Basis for Data Communication: Transmission of digital signals: Bit rate, bit length, baseband and broadband transmission, transmission impairment, data rate limits, performance, Guided Transmission Media Twisted Pair Coaxial Cable and Fiber Optics

Data Link Layer: Framing, Error Control, Flow Control, Error-Detection and correction: Introduction, Error detection using CRC. Data Link Protocols: Simplest Protocol, Stop-and-Wait Protocol, Stop-and-Wait ARQ, GoBack-N ARQ, Selective Repeat ARQ, HDLC.

UNIT – III*:*

Multiple Accesses. Random Access: ALOHA, Carrier Sense Multiple Access (CSMA) Protocols, CSMA with Collision Detection, CSMA with Collision Avoidance. Controlled Access: Reservation, Polling and Token Passing. Channelization: FDMA, TDMA, CDMA.

Wired LAN: Ethernet, IEEE standards, Standard Ethernet.Changes in the standards, Fast Ethernet, Gigabit Ethernet, **Wireless LAN (802.11).**

UNIT - IV:

Connecting LANs, Backbone and Virtual LANs: Connecting devices, Back bone Networks, Virtual LANs. Network Layer: Need for network layer, Logical addressing, Ipv4 addresses, Ipv6 addresses, Ipv4 and Ipv6 datagrams, Transition from Ipv4 to Ipv6.

UNIT - V:

Network Layer: Delivery, Forwarding, Types of Routing protocols, Unicast Routing Protocols, The **Transport Layer**: Process to process Delivery, User Datagram Protocol (UDP) and TCP. **Application layer:** Domain name space, Distribution of name space, Resolution.

TEXT BOOKS:

1. Data communications and Networking-4th edition BeharouzA.Forouzan, TMH

REFERENCE BOOKS:

1. Data Communications and Computer Networks By Prakash C. Gupta, PHI Publishers.
2. Computer Networks By Andrew S.Tanenbaum, Pearson Education.
3. Wireless Technologies Circuits, Systems and Devices by Krzysztof Iniewski CRC Press.
4. Wireless Networking Technology: From Principles to Successful Implementationby Stephen A. Rackley.

BCA	Course Code	Semester: IV	Credits: 01
	C13 - P	Data Communications & Networking Lab	Hrs/Wk:02

List of Experiments

1) Study of different types of Network cables
2) Study of various Network connecting devices
3) Configure Host IP, Subnet Mask and Default Gateway in a System in LAN (TCP/IP Configuration)
4) Configure Internet connection and use IPCONFIG, PING / Tracer and Net stat utilities to debug the network issues.
5) Study of basic network command and Network configuration commands
6) Implementation of character stuffing and destuffing
7) Implementation of parity checker
8) Implementation of CRC
9) Implementation of checksum.
10) Implementation of shortest path protocol
11) Implementation of string encryption and decryption
12) To find out details of network from IP addressing scheme using ‘C’ code

BCA	Course Code	Semester: IV	Credits: 04
	C14	**Data Analytics Using R**	Hrs/Wk:04

Course Objectives:

This course will cover all the fundamental algorithms and techniques used in Data Analytics and provide exposure to theory as well as practical knowledge through R used in data analytics.

After completing the course, student will learn,

- Fundamental basics of statistics used in analysing the data
- How to find the pattern in the given dataset
- How to interpret the data graphically
- How to apply different types of algorithms for the given dataset

Course Outcomes:

- Data-Visualization tools and techniques offer executives and other knowledge workers new approaches to dramatically improve their ability to grasp information hiding in their data.
- Data visualization is a general term that describes any effort to help people understand the significance of data by placing it in a visual context.
- Patterns, trends and correlations that might go undetected in text-based data can be exposed and recognized easier with data visualization software.
- It isn't just the attraction of the huge range of statistical analyses afforded by R that attracts data people to R. The language has also developed a rich ecosystem of charts, plots and visualizations over the years.
- ggplot2 is a data visualization package for the statistical programming language R.

UNIT - I:

Introduction: Introducing to R Data Structures –Help functions in R –Vectors –Scalars –Declarations –recycling –Common Vector operations –Using all and any –Vectorized operations –NA and NULL values –Filtering – Vectorised if-then else –Vector Equality –Vector Element names **Matrices, Arrays and Lists:** Creating matrices –Matrix operations –Applying Functions to Matrix Rows and Columns – Adding and deleting rows and columns –Vector/Matrix Distinction –Avoiding Dimension Reduction –Higher Dimensional arrays –lists –Creating lists –General list operations – Accessing list components and values –applying functions to lists –recursive lists

UNIT - II:

Data Frames & Packages in R: Creating Data Frames –Matrix-like operations in frames –Merging Data Frames –Applying functions to Data frames –Factors and Tables –factors and levels –Common functions used with factors –Working with tables -Other factors and table related functions -Control statements –Arithmetic and Boolean operators and values –Default values for arguments -Returning Boolean values **Packages :** Tidyr, ggplot2, ggraph, dplyr, tidyquant, dygraphs.

UNIT - III:

Introduction to Data analytics: Overview of Bigdata, Need of Data Analytics, Applications of Data Analytics, Datasets, tools for data analytics **Basic Statistics**: Mean, Median, Standard Deviation, Variance, Correlation, Covariance. **Basic Analysis Techniques:** Chi-Square Test, t-Test, Analysis of Variance, Corrleation Analysis.

UNIT - IV:

Data Analysis Techniques: Linear Regression, Logistic Regression, Classification Techniques, Clustering Techniques, Ensemble model.

UNIT V:

Data Visualization Using R: Data Visualization, Libraries used for Data Visualization in R, Bar chart, Histogram, Heatmap, Scatter plot, Box Plot, Correlogram, Area Chart

TEXT BOOK:

1. Data Analytics using R, McGrawHill Publications,Seema Acharya
2. R for Data Science: Import, Tidy, Transform, Visualize, and Model DatabyHadley Wickham ,O'Reilly
3. Rumset D. J. (2010): Statistical Essentials for Dummies. Hoboken: Wiley Publishing

BCA	Course Code	Semester: IV	Credits: 04
	C15	**Object Oriented Software Engineering**	Hrs/Wk:04

Course Objective

- To develop background knowledge as well as core expertise in object oriented system.
- To provide the importance of the software design process.
- To assess the unified process and Unified Modeling Language

Course Outcomes

- To describe the three pillars of object-orientation methodologies and explain the benefits of each.
- To create use case documents that capture requirements for a software system.
- To create class diagrams that model both the domain model and design model of a software system.
- To create interaction diagrams that models the dynamic aspects of asoftware system.
- To understand the facets of the Unified Process approach to designing and building a software system.
- To build a model for the user interface (UI) of a software application

UNIT –I:

Software Engineering: Software engineering process paradigms, Process Models – Waterfall Model, Iterative Model, RAD Model, Prototype Model. Requirement Analysis, Analysis Model.

UNIT -II:

Introduction to OOAD – What is OOAD? – What is UML? What are the United process(UP) phases - Inception -Use case Modeling - Relating Use cases – include, extend and generalization.

UNIT -III:

Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams. Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

UNIT -IV:

Basic Behavioral Modeling-I: Interactions, Interaction diagrams, Activity Diagrams. UML state diagrams and modeling, UML deployment and component diagrams

UNIT -V:

Object Oriented Testing: Overview of Testing, object oriented Testing, Types of Testing, Object oriented Testing strategies, Test case design for OO software.

REFERENCE BOOKS:

1. Object Oriented Analysis and Design By GradyBooch.
2. Craig Larman,"Applying UML and Patterns: An Introduction to object-oriented Analysis and Design and iterative development", Third Edition, Pearson Education,2005
3. Mike O'Docherty, "Object-Oriented Analysis & Design: Understanding SystemDevelopment with UML 2.0", John Wiley & Sons,2005.
4. James W- Cooper, Addison-Wesley, "Java Design Patterns – A Tutorial",2000.
5. Micheal Blaha, James Rambaugh, "Object-Oriented Modeling and Design withUML", Second Edition, Prentice Hall of India Private Limited,2007
6. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides,"Design patterns: Elements of Reusable object-oriented software", Addison-Wesley,1995.

STUDENT ACTIVITY:

1. Develop a class diagram for the flight services available in your nearby airport
2. Develop a sequence diagram of activities of any automated device.

BCA	Course Code	Semester: IV	Credits: 01
	C15 - P	**Object Oriented Software Engineering Lab**	Hrs/Wk:02

List of Experiments

Case Studies:

Design Following Systems in Object Oriented Approach using UML with open source tools (Eclipse UML2 or any other Open source tools):

1. Online Examination System.
2 Online Railway Reservation.
3 Library Maintenance System.
4 Any E-Commerce Portal.
5 Biometric Attendance System.

Note: Student is expected to analyze the system in object oriented manner and design the system in object oriented approach using UML with open source tools

MODEL QUESTION PAPER

BCA DEGREE EXAMINATIONS

Semester: I.

Paper C1: COMPUTER FUNDAMENTALS AND OFFICE TOOLS

Time: 3 hours Max Marks: 75M

SECTION – A

Answer any 5 questions. Each question carries 5 marks 5 X 5M = 25M

(Total 8 questions and at least two questions should be given from each unit)

1. Write about the characteristics of computer.
2. Write about various output units.
3. What are the various types of software?
4. Convert the following numbers from decimal to binary number system.
   a) 461 b)105
5. What are headers and footers in MS word?
6. Write about macros in MS Word.
7. Define cell referencing. What are the various types of cell referencing in MS Excel?
8. What is slide sorter view in MS Powerpoint?

SECTION-B

Answer all of the following. 5X10=50M

9. a)Explain computer organization.

   (Or)

   b)Explain any two secondary storage devices.
10. a)Explain software development steps.

    (Or)

    b)Write about any three high level languages.
11. a)Write about the features of MS Word.

    (Or)

    b)Explain mail merge in MS Word.
12. a)Explain Data sorting and filtering in MS Excel.

    (Or)

    b)Explain the types of charts in excel
13. a)Explain templates in MS Power point.

    (Or)

    b)Write about Master slide, adding of slides and its steps in MS Powerpoint.

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MODEL QUESTION PAPER

BCA DEGREE EXAMINATIONS

Semester: I.

Course C2 : PROGRAMMING IN C

Time: 3 hours Max Marks: 75M

SECTION – A

Answer any 5 questions. Each question carries 5 marks (5 X 5M = 25M) (Total 8 questions and at least two questions should be given from each unit)

1. Explain various symbols used in Flow Chart Design
2. Write about Structure of C Program
3. Brief the difference between break and continue with example
4. Write a C program to find factorial of a given number
5. How to create and access arrays in C?
6. Write a short note on Recursion
7. List out various drawbacks of pointers
8. Write about nested structures

SECTION – B

Answer all the questions. Each question carries 10 marks (5 X 10M = 50M)

9. a)What are the various operators used in C

   (OR)

   b)Discuss various Built in Data Types available in C
10. a)Clarify different iterative control statements in C with suitable examples

    (OR)

    b)Explain the switch statement with syntax and example.
11. a)Write a short notes on various String handling functions

    (OR)

    b)Write a C program to multiply two user input matrices
12. a)Briefly discuss about storage classes

    (OR)

    b)What is Function? Write about Call by value and Call by reference in detail with example

    (OR)
13. a)Compare and contrast Structures with Unions

    (OR)

    b)List out various file handling functions and write a C program to read data from a text file

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MODEL QUESTION PAPER

BCA DEGREE EXAMINATIONS

Semester: II.

Course C4 : Data Structures

Time: 3 hours Max Marks: 75M

SECTION – A

Answer any 5 questions. Each question carries 5 marks (5 X 5M = 25M)

1. Explain about Abstract Data Type (ADT)?
2. Explain about Dequeues?
3. Explain STACK applications?
4. What are the applications of Binary search trees?
5. Explain about B-tress?
6. Explain about graph representation?
7. Explain about sequential search?
8. Explain selection sort procedure?

SECTION – B

Answer all the questions. Each question carries 10 marks (5 X 10M = 50M)

9. a)What is a Data Structure and Explain various types of Data structure?

(OR)

b)Explain various operations performed on Double Linked List (DLL)?

10. a)Discuss about implementation of STACK ADT using arrays

(OR)

b)Explain Circular Queue ADT operations?

11. a)What is BST (Binary Search Tree) ? Discuss various operations of BST?

(OR)

b)What is a Heap Tree and Explain type of Heap Tree (Max heap or Min heap) with examples?

12. a)What is Minimum Spanning Tree and Explain Kruskal's and Prim's algorithm?

(OR)

b) Explain DFS graph traversal algorithm?

13.a) Brief the implementation of Insertion sort Mechanism with Example?

(OR)

b)Explain Binary search mechanism with example?

MODEL QUESTION PAPER

BCA DEGREE EXAMINATIONS

Semester: II.

Course C5 : Introduction to Python Programming

Time: 3 hours Max Marks: 75M

SECTION – A

Answer any 5 questions. Each question carries 5 marks (5 X 5M = 25M) (Total 8 questions and at least two questions should be given from each unit)

1. How to read Input from Keyboard in python
2. What is the difference between Break, Continue and Pass
3. Write a python script for Factorial of a number using recursion
4. What is a Fruitful function? Give an example
5. What is a Dictionary in Python
6. Write a short note on Frames
7. What is a Lambda Function
8. Write about List Comprehension

SECTION – B

Answer all the questions. Each question carries 10 marks (5 X 10M = 50M)

9. a)Explain various Data types in Python

(OR)

b)Discuss about various operators available in python

10.a)Explain various Iterative Statements in python

(OR)

b)Write a python script to check weather given number in prime or not

11.a)Explain List Data Structure in Detail with various operations performed on lists

(OR)

b)Compare and Contrast Tuples and Lists in Python

12.a)Write short notes on file handling in python.

(OR)

b)Write about exception handling with an example

13.a)Briefly Discuss various Tkinter widgets

(OR)

b)Create a GUI based simple calculator using the Python Tkinter module

MODEL QUESTION PAPER

BCA DEGREE EXAMINATIONS

Semester: II.

Course C6 : DATA BASE MANAGEMENT SYSTEM

Time: 3 hours Max Marks: 75M

SECTION – A

Answer any 5 questions. Each question carries 5 marks (5 X 5M = 25M) (Total 8 questions and at least two questions should be given from each unit)

1. Write about the components of data base management system.
2. Write about three schema architecture of data base.
3. What are the relationship classifications?
4. Explain inheritance.
5. What are the various types of keys?
6. Write about any five CODD's rules.
7. Explain various data types in SQL.
8. What is cursor in PL/SQL?

SECTION – B

Answer all the questions. Each question carries 10 marks (5 X 10M = 50M)

9. a)Explain the drawbacks of file-based system.

(Or)

b)Explain the classification of data base management system.

10. a)Write about hierarchical and network data models.

(Or)

b)Write about specialization and generalization.

11. a)Explain relational algebra apparatus.

(Or)

b)Explain Normalization.

12. a)Explain various commands in SQL.

(Or)

b)Explain Join operators.

13. a)Explain procedures and functions with examples.

(Or)

b)Write about data base triggers and its types

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MODEL QUESTION PAPER

BCA DEGREE EXAMINATIONS

Semester: III.

Course C8 : Object Oriented Programming through Java

Time: 3 hours Max Marks: 75M

SECTION – A

Answer any 5 questions. Each question carries 5 marks (5 X 5M = 25M) (Total 8 questions and at least two questions should be given from each unit)

1. Distinguish the features of Procedure Oriented and Object Oriented Languages
2. Write the Structure of Java program
3. Discuss about Access Modifiers
4. Write about String Buffer Class
5. Explain the Tread priority concept with example
6. List any five HTML tags
7. Write short notes on Serialization
8. How to run Servlets

SECTION – B

Answer all the questions. Each question carries 10 marks (5 X 10M = 50M)

9. a)Explain various Features of Java

(OR)

b)Discuss about Concepts of OOPs with real time examples

10. a)Explain various Decision control Statements in python

(OR)

b)What is Constructor? Explain the concept of Constructor overloading with an example

11. a)Explain how to achieve multiple inheritance in Java with interfaces

(OR)

b)Explain Life Cycle of Threads

12. a)Briefly Discuss File Handling in Java

(OR)

b)What is an Applets? How to create Applets in Java with an example

13. a)Briefly Discuss JDBC Architecture and various components of JDBC

(OR)

b)Explain the Servlet Life Cycle

MODEL QUESTION PAPER

BCA DEGREE EXAMINATIONS

Semester: III.

Paper C9 : Operating Systems

Time: 3 hours Max Marks: 75M

SECTION – A

Answer any 5 questions. Each question carries 5 marks (5 X 5M = 25M) (Total 8 questions and at least two questions should be given from each unit)

1. Write the definition of Operating System with examples.
2. Write about various types of system calls.
3. What is Scheduling Criteria? Explain.
4. Explain Process Scheduling briefly.
5. What is Critical Section problem?
6. Write about Swapping briefly.
7. Explain various file permissions.
8. What are the operations on files?

SECTION – B

Answer all the questions. Each question carries 10 marks (5 X 10M = 50M)

9. a)Explain the drawbacks of file-based system.

   (Or)

   b)Explain the classification of data base management system.
10. a)Write about hierarchical and network data models.

    (Or)

    b)Write about specialization and generalization.
11. a)Explain relational algebra apparatus.

    (Or)

    b)Explain normalization.
12. a)Explain various commands in SQL.

    (Or)

    b)Explain join operators.
13. a)Explain procedures and functions with examples.

    (Or)

    b)Write about data base triggers and its types

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MODEL QUESTION PAPE

BCA DEGREE EXAMINATIONS

Semester: IV.

Paper C10 : Cyber Law

Time: 3 hours Max Marks: 75M

SECTION – A

Answer any 5 questions. Each question carries 5 marks (5 X 5M = 25M) (Total 8 questions and at least two questions should be given from each unit)

1. Define Cyber Crime in Cyber Space
2. Discuss the need of Cyber Law
3. Write about Budapest Convention
4. Write about String Buffer Class
5. Explain the Tread priority concept with example
6. List any five HTML tags
7. Write short notes on Serialization
8. How to run Servlets

SECTION – B

Answer all the questions. Each question carries 10 marks (5 X 10M = 50M)

9. a)Explain various modes and Methods of committing Cyber Crimes

   (OR)

   b)Discuss about various types groups of Cyber Criminals in detail
10. a)Explain UN and ITU initiatives in Cyber Crimes

    (OR)

    b)Write a short notes on various organization initiatives towards Cyber laws
11. a)Discuss various Constitutional& Human Rights Issues in Cyberspace

    (OR)

    b)Explain various possibilities of Cyber Crimes may appear and also discuss about rules to handle those crimes.
12. a)Discuss about different offense under IT Act, 2000.

    (OR)

    b)Explain about Cyber Defamation and issues on Defamation.
13. a)Discuss about Copyright Law and Cyber Terrorism

    (OR)

    b)Explain various Intellectual Property Issues in Cyber Space

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MODEL QUESTION PAPER

BCA DEGREE EXAMINATIONS

Semester: IV.

Course C11 : DATA MINING & WARE HOUSING

Time: 3 hours Max Marks: 75M

SECTION – A

Answer any 5 questions. Each question carries 5 marks (5 X 5M = 25M) (Total 8 questions and at least two questions should be given from each unit)

1. What is Data Mining and explain its importance?
2. Explain Data Mining Functionalities?
3. What is Multidimensional Data Model?
4. Define Data Cube?
5. Explain Mining Frequent Item sets without Candidate Generation?
6. Explain about Mining Multilevel Association Rules?
7. Explain Decision Tree Induction?
8. Explain Partitioning Methods in Cluster Analysis?

SECTION – B

Answer all the questions. Each question carries 10 marks (5 X 10M = 50M)

9. a)Explain different kinds of patterns in Data Mining?

(OR)

b) Explain Data Pre-processing Steps in Data Mining?

10.a) Briefly discuss Three- Tier Data Warehouse Architecture?

(OR)

b)Explain OLAP operations in Multidimensional Data Model?

11.a) Explain how the efficiency of Apriori algorithm is improved?

(OR)

b) Illustrate with example in detail, the process of generating association rules from frequent item sets.

12.a) Explain how Bayesian method is used for classification in data mining process?

(OR)

b). Explain how Rule Based method is used for classification in data mining process?

13. a) Define cluster analysis. List and explain applications of cluster analysis?

(OR)

b)Explain in detail hierarchical clustering algorithm?

***

MODEL QUESTION PAPER

BCA DEGREE EXAMINATIONS

Semester: IV.

Course C12 : Web Programming

Time: 3 hours Max Marks: 75M

SECTION – A

Answer any 5 questions. Each question carries 5 marks (5 X 5M = 25M)

(Total 8 questions and at least two questions should be given from each unit)

1. Explain structure of HTML Document?
2. Explain type's lists in HTML using examples?
3. Explain Data Types in PHP?
4. Explain Date and Time Functions in PHP?
5. What is function and advantages of functions in PHP?
6. How to Redirecting the user in PHP?
7. How to use Hidden Fields to save state in HTML forms and PHP?
8. What is a PHP Session?

SECTION – B

Answer all the questions. Each question carries 10 marks (5 X 10M = 50M)

9. a)Explain Table creation in html document?

(OR)

b)Explain Control structures in java script?

10. a)Explain Strings functions in PHP?

(OR)

b)What is an array and Explain types of arrays in PHP?

11. a)Explain file handling in PHP?

(OR)

b)What is recursive function and create recursive function in PHP?

12. a)Explain PHP with MySQL Database connectivity?

(OR)

b)How to combine HTML and PHP code in a single page?

13. a)How to pass session IDs in the Query String with an example in PHP?

(OR)

b)Explain Cookies and Setting a Cookie with PHP?

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MODEL QUESTION PAPER

BCA DEGREE EXAMINATIONS

Semester: IV.

Course C13 : Data Communication and Networking

Time: 3 hours Max Marks: 75M

SECTION – A

Answer any 5 questions. Each question carries 5 marks (5 X 5M = 25M) (Total 8 questions and at least two questions should be given from each unit)

1. What is Local Area Network and Explain advantages and disadvantages of LAN?
2. Explain flow control mechanism in data link layer?
3. Explain error detection mechanism CRC?
4. What is High-level Data Link Control (HDLC)?
5. Explain about ALOHA?
6. Explain Polling and Token passing?
7. Write about VLAN?
8. Explain Unicast routing protocols?

SECTION – B

Answer all the questions. Each question carries 10 marks (5 X 10M = 50M)

9. a)Explain OSI reference model?

   (OR)

   b)Explain TCP/IP reference model?

10. a)Explain different types of transmission media used in physical layer?

    (OR)

    b)Explain Data Link Protocols Stop-and-Wait Protocol and Stop-and-Wait ARQ?

11. a)Explain Carrier Sense Multiple Access (CSMA) Protocols?

    (OR)

    b)Explain about channelization FDMA, TDMA and CDMA?

12. a)What is a Logical addressing and Explain types of IPv4 addresses?

    (OR)

    b)Explain Ethernet and Wireless LAN (802.11)?

13. a)Explain User Datagram Protocol (UDP)?

    (OR)

    b)Discuss about Domain name space?

MODEL QUESTION PAPER

BCA DEGREE EXAMINATIONS

Semester: IV.

Course C14 : Data Analytics using R

Time: 3 hours Max Marks: 75M

SECTION – A

Answer any 5 questions. Each question carries 5 marks (5 X 5M = 25M) (Total 8 questions and at least two questions should be given from each unit)

1. Discuss about help functions in R programming?
2. Explain Higher Dimensional arrays in R programming?
3. Explain table related functions in R programming?
4. Explain Arithmetic and Boolean operators in R programming?
5. What is big data and Explain need of data analytics?
6. Explain Mean, Median, Standard Deviation, Variance, Correlation functions in R programming?
7. Explain Ensemble model?
8. What is Data Visualization and List Libraries used for Data Visualization in R?

SECTION – B

Answer all the questions. Each question carries 10 marks (5 X 10M = 50M)

9. a)Discuss about vector operations in R with examples?

(OR)

b)How to create matrices and how to perform matrix operations in R programming?

10. a)What is data frames and Explain applying functions to data frames?

(OR)

b)What is package and explain packages Tidyr, ggplot2?

11. a)What are the Applications of Data Analytics?

(OR)

b)Explain Basic Analysis Techniques - Chi-Square Test, t-Test?

12. a)Explain Linear Regression from data analysis techniques?

(OR)

b)Explain about Clustering Techniques?

13. a)Explain data visualization using bar chart in R programming?

(OR)

b)Explain data visualization using Scatter plot in R programming?

MODEL QUESTION PAPER

BCA DEGREE EXAMINATIONS

Semester: IV.

Course C15 : Object Oriented Software Engineering

Time: 3 hours Max Marks: 75M

SECTION – A

Answer any 5 questions. Each question carries 5 marks (5 X 5M = 25M) (Total 8 questions and at least two questions should be given from each unit)

1. Explain about waterfall model and its advantages, disadvantages?
2. What is importance of feasibility study report in requirement analysis?
3. What is object oriented analysis design and list out its benefits?
4. Explain classes and object in Basic Structural Modeling?
5. What is UML and explain its importance in design?
6. Explain Common Mechanisms in Basic Structural Modeling?
7. Explain about Activity Diagrams in UML?
8. What is object oriented testing and its importance?

SECTION – B

Answer all the questions. Each question carries 10 marks (5 X 10M = 50M)

9. a)Explain Software engineering process paradigms?

(OR)

b)Explain about Analysis model?

10. a)Explain Use case Modelling with an example?

(OR)

b)Explain united process (UP) modelling and its phases?

11. a)Explain Relationships in Basic Structural Modelling?

(OR)

b)Explain modelling techniques for Object Diagrams?

12. a)Explain about interactions diagrams in UML?

(OR)

b)Explain about UML deployment and component diagrams?

13. a)Explain Object oriented Testing strategies?

(OR)

b)Explain different types of testing performed in object oriented systems?