JSS Mahavidyapeetha

JSS Science and Technology University
Mysuru - 570 006

Bachelor of Computer Applications
Scheme (I to VI Semesters)

&

Syllabus (1 & II Semester)

2018-2021

Scheme of Teaching and Examination

First Semester BCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	BCA110	Indian Language - I	BCA	2	0	0	2.0	2	50	50	50	1.5
2.	BCA120	English Language - I	BCA	2	0	0	2.0	2	50	50	50	1.5
3.	BCA130	Mathematics – I	BCA	4	0	0	4.0	4	50	50	100	3
4.	BCA140	Programming Language	BCA	4	0	0	4.0	4	50	50	100	3
5.	BCA150	Computer Fundamentals and Problem Solving	BCA	4	0	0	4.0	4	50	50	100	3
6.	BCA 160	Soft Skills I – (Professional Ethics)	BCA	2	0	0	2.0	2	50	50	50	1.5 Hrs
7.	BCA 170	Indian Constitution	BCA	2	0	0	2.0	2	50	50	50	1.5 Hrs
8.	BCA12L	English Laboratory	BCA	0	0	1	1.0	3	50	00	50	-
9.	BCA 13L	Mathematics-I Laboratory	BCA	0	0	1	1.0	3	50	00	50	-
10.	BCA 14L	Programming Language Laboratory	BCA	0	0	1	1.0	3	50	00	50	-
11.	BCA 15L	Computer Fundamentals Laboratory	BCA	0	0	1	1.0	3	50	00	50	-
Total				18	0	6	24	32	550	350	700	-

Scheme of Teaching and Examination

Second Semester BCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	BCA210	Indian Language -II	BCA	2	0	0	2.0	2	50	50	50	1.5
2.	BCA220	English Language - II	BCA	2	0	0	2.0	2	50	50	50	1.5
3.	BCA230	Mathematics-II	BCA	4	0	0	4.0	4	50	50	100	3
4.	BCA240	Object Oriented Programming with C++	BCA	4	0	0	4.0	4	50	50	100	3
5.	BCA250	Data Structures	BCA	4	0	0	4.0	4	50	50	100	3
6.	BCA260	Soft Skills – II (Professional Communication)	BCA	2	0	0	2.0	2	50	50	50	1.5 Hrs
7.	BCA270	Environmental Studies	BCA	2	0	0	2.0	2	50	50	50	1.5 Hrs
8.	BCA22L	English Laboratory	BCA	0	0	1	1.0	3	50	00	50	-
9.	BCA23L	Mathematics-II Laboratory	BCA	0	0	1	1.0	3	50	00	50	-
10.	BCA24L	Object Oriented Programming Laboratory	BCA	0	0	1	1.0	3	50	00	50	-
11.	BCA25L	Data Structures Laboratory	BCA	0	0	1	1.0	3	50	00	50	-
Total				20	0	4	24	32	550	350	700	-

Scheme of Teaching and Examination

Third Semester BCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	BCA310	Database Management System	BCA	4	0	0	4.0	4	50	50	100	3
2.	BCA320	Computer Organization and System Software	BCA	4	0	0	4.0	4	50	50	100	3
3.	BCA330	Mathematics – III (Probability and Statistics)	BCA	4	0	0	4.0	4	50	50	100	3
4.	BCA340	Java Programming	BCA	4	0	0	4.0	4	50	50	100	3
5.	BCA350	Analysis and Design of Algorithms	BCA	4	0	0	4.0	4	50	50	100	3
6.	BCA360	Soft Skills – III (Leadership)	BCA	2	0	0	2.0	2	50	50	50	1.5
6.	BCA32L	Database Management System Laboratory	BCA	0	0	1	1.0	3	50	00	50	-
7.	BCA33L	Java Programming Laboratory	BCA	0	0	1	1.0	3	50	00	50	-
8.	BCA34L	Algorithms Laboratory	BCA	0	0	1	1.0	3	50	00	50	-
Total				22	0	3	25	31	600	300	700	-

Scheme of Teaching and Examination

Fourth Semester BCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	BCA410	Accountancy & Financial Management	BCA	4	0	0	4.0	4	50	50	100	3
2.	BCA420	Operating System	BCA	4	0	0	4.0	4	50	50	100	3
3.	BCA430	Management Information System	BCA	4	0	0	4.0	4	50	50	100	3
4.	BCA440	Python Programming	BCA	4	0	0	4.0	4	50	50	100	3
5.	BCA45X	STREAMS	BCA	4	1	0	5.0	4	50	50	100	3
6.	BCA460	Soft Skills – IV (Entrepreneurship)	BCA	2	0	0	2.0	2	50	50	50	1.5
6.	BCA42L	Operating System Laboratory	BCA	0	0	1	1.0	2	50	00	50	-
7.	BCA43L	Management Information System Laboratory	BCA	0	0	1	1.0	2	50	0	50	-
8.	BCA44L	Python Laboratory	BCA	0	0	1	1.0	2	50	00	50	-
Total				22	1	3	26	28	450	300	700	-

Streams :

Stream-1		Stream-2		Stream-3		Stream – 4	
Machine Learning Stream		Big Data		Applications Stream		Network & Applications	
BCA451	Digital Image Processing	BCA452	Data Mining	BCA453	E-Commerce	BCA454	Computer Networks

Scheme of Teaching and Examination

Fifth Semester BCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	BCA510	.NET Programming	BCA	4	0	0	4.0	4	50	50	100	3
2.	BCA520	Mobile Applications	BCA	4	0	0	4.0	4	50	50	100	3
3.	BCA530	Web Programming	BCA	4	0	0	4.0	4	50	50	100	3
4.	BCA540	Software Engineering	BCA	4	0	0	4.0	4	50	50	100	3
4.	BCA55X	STREAMS	BCA	4	1	0	5.0	5	50	50	100	3
5.	BCA51L	.NET Laboatory	BCA	0	0	1	1.0	2	50	-	50	-
6.	BCA52L	Android Development Laboratory	BCA	0	0	1	1.0	2	50	-	50	-
7.	BCA53L	Web Programming Laboratory	BCA	0	0	1	1.0	2	50	-	50	-
8.	BCA54P	Mini Project	BCA	0	0	2	2.0	2	50	-	50	-
Total				20	1	5	26	29	450	250	700	-

Streams :

Stream-1		Stream-2		Stream-3		Stream - 4	
Machine Learning Stream		Big Data Stream		Applications Stream		Network & Applications	
BCA551	Pattern Recognition	BCA552	Information warehousing	BCA553	ERP	BCA554	Network Security

Scheme of Teaching and Examination

Sixth Semester BCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Weekly Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	BCA61P	Project Work	BCA	0	0	25	25.0	3	100	150	250	1
Total				0	0	25	25.0	3	100	150	250	-

Credit Pattern for BCA Course

Semester	Credits
1	24
2	24
3	25
4	26
5	26
6	25
Total	150

Syllabus

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	I	Theory	04	04	00	00	52
Course No		**Course Title**				**Pre Requisites**	
BCA110		Other Language - I					
TOPICS COVERED: Will be prepared by concerned department faculty							

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	I	Theory	04	04	00	00	52
Course No		**Course Title**				**Pre Requisites**	
BCA120		English - I					
TOPICS COVERED: Will be prepared by concerned department faculty							

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	I	Theory	04	04	00	00	52

Course No	Course Title	Pre Requisites
BCA130	Mathematics-I	

TOPICS COVERED:

Unit I [12 Hrs]

Recapitulation of Limit and Continuity, Differentiability of functions. Successive differentiation: Leibnitz Theorem (with proof)-Problems, increasing and decreasing functions, Concavity, convexity of functions, points of inflexion.

Unit II [08 Hrs]

Polar Coordinates- angle between the radius vector and the tangent, polar sub tangent and polar sub normal, perpendicular from pole on the tangent & pedal equations.

Unit III [10 Hrs]

Derivative of an arc in Cartesian, polar and parametric forms. Formula for radius of curvature in Cartesian, polar, parametric and in pedal forms, centre of Curvature, evolutes, asymptotes and envelopes. Reduction formulae for Sin^nx, Cos^nx, Tan^nx, Sec^nx, Cot^nx, $Cosec^nx$ & Sin^mxCos^nx. Differentiation under the integral sign.

Unit IV [10 Hrs]

Functions of two or more variables – Explicit and implicit functions, Partial derivatives– Homogeneous functions – Euler's theorem, total derivatives, Differentiation of implicit functions and composite functions, Jacobians – Some illustrative examples. Taylor's and maclaurin's series for functions of two variables, maxima-minima of function of two variables.

Unit V [12 Hrs]

Elementary row and column operations, equivalent matrices, invariance of rank under elementary operations, determination of rank of a matrix by reducing it to the echelon form. Homogeneous and non-Homogeneous systems of 'm' linear equations in 'n' unknowns, criterion for uniqueness of solutions. Eigen values and Eigen vectors of a square matrix, standard properties, reduction of matrix to diagonal form, Cayley-Hamilton theorem (with proof), and applications.

TEXT BOOKS / REFERENCES:

1. H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons, Inc., 2002.

2. G.B. Thomas and R.L. Finney, Calculus, Pearson Education, 2007.
3. Serge Lang – First Course in Calculus
4. LipmanBers – Calculus, Volumes 1 and 2
5. N. Piskunov – Differential and Integral Calculus
6. R Vasista, Differential Calculus, Krishna Series, 2003
7. S. Vatssa, Theory of Matrices, 2nd ed., New Delhi: New Age International Publishers,2007.
8. S. Narayan and P.K. Mittal, Text book of Matrices, 10th ed. New Delhi: S Chand and Co. Ltd, 2004.
9. A R Vashista, Matrices, Krishna PrakashanaMandir, 2003

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	I	Theory	04	04	00	00	52

Course No	Course Title	Pre Requisites
BCA140	Programming Language	

TOPICS COVERED:

Unit - I [10 Hrs]

Introduction to Programming Concepts:
Software, Classification of Software, Modular Programming, Structured Programming, Algorithms and Flowcharts with examples. Overview of C Language: History of C, Character set, C tokens, Identifiers, Keywords, Data types, Variables, Constants, Symbolic Constants , Operators in C, Hierarchy of Operators, Expressions, Type Conversions and Library Functions.

Unit - II [12 Hrs]

Managing Input and Output Operation:
Formatted and Unformatted I/O Functions, Decision making, branching and looping: Decision Making Statements - if Statement, if–else statement, nesting of if-else statements, else–if ladder, switch statement,?: operator, Looping - while, do-while, for loop, Nested loop, break, continue, and goto statements. Functions: Function Definition, prototyping, types of functions, passing arguments to functions, Nested Functions, Recursive functions.

Unit - III [08 Hrs]

Arrays:
Declaring and Initializing, One Dimensional Arrays, Two Dimensional Arrays, Multi Dimensional Arrays - Passing arrays to functions. Strings: Declaring and Initializing strings, Operations on strings, Arrays of strings, passing strings to functions. Storage Classes - Automatic, External, Static and Register Variables.

Unit-IV [10 Hrs]

Structures-Declaring and Initializing, Nested structure, Array of Structure, Passing Structures to functions, Unions, typedef, enum, Bit fields. Pointers – Declarations, Pointer arithmetic, Pointers and functions, Call by value, Call by reference, Pointers and Arrays, Arrays of Pointers, Pointers and Structures. Meaning of static and dynamic memory allocation, Memory allocation functions.

Unit-V [12 Hrs]

Files - File modes, File functions, and File operations, Text and Binary files, Command Line arguments. C Preprocessor directives, Macros – Definition, types of Macros, Creating and implementing user defined header files.

TEXT BOOKS / REFERENCES:

1. E. Balaguruswamy, "Programming In ANSI C", 4th edition, TMH Publications,2007
2. Ashok N. Kamthane, "Programming with ANSI and Turbo C", Pearson Education,2006.
3. Ashok N. Kamthane et. al., "Computer Programming and IT", Pearson Education,2011
4. Mahapatra, " Thinking In C ", PHI Publications, 1998.
5. Yashwant Kanetkar, "Let Us C", 13th Edition, PHP, 2013

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	I	Theory	04	04	00	00	52

Course No	Course Title	Pre Requisites
BCA150	Computer Fundamentals and Problem Solving	

TOPICS COVERED:

Unit-I [12 Hrs]

Introduction to Computers: History of development of Computers Computer as multipurpose tool - Overview of the Computer system — looking inside the machine - Software brings machine to life - shapes of Computer today .
Processing Data : Transforming data into information - How a Computer processes data - factors affecting processing speed - CPU's used in personal Computers.
Interacting with Computer :The Keyboard - the mouse - other input devices - The monitor - Printers - Sound systems - Connecting I/O devices to the Computer.
Storing information in a Computer: Types of storage devices - Magnetic storage devices, Optical Storage devices, measuring device performance.

Unit-II [06 Hrs]

Operating System and the user interface: What is an Operating System - the use interface - running programs - managing files - managing hardware - Enhancing the operating system with utility Software - typical operating systems in use.

Unit-III [12 Hrs]

Introduction to Problem Solving and Programming : Problem Solving Concepts – Problem Solving in everyday life, types of problems, problem solving concepts for computers, Algorithms and Flow charts; Programming Concepts.

Unit-IV [10 Hrs]

Logic Structures : Introduction to Programming structure – Modules and their functions – Local and Global Variables – Four Logic structures – Problems solving with Sequential and Decision Logic Structures.

Unit-V [12 Hrs]

Loop & Case Logic Structure : Loop Logic structure – While/While Wend Structure, Repeat / Until Structure, Automatic Counter loop, Nested Loops and Recursion.
Array Data Structure & File Concepts : Processing Arrays – Arrays, one dimensional arrays, 2D arrays, Multidimensional arrays – Searching and Sorting Techniques. Definition – Record, File – Primary and Secondary Keys – Sequential Access File Applications.

TEXT BOOKS / REFERENCES:

1. Computer Fundamentals - P K Sinha,BPB
2. Introduction to Computers - N Subramanian,TMH
3. Understanding Computers - R Rajagopalan. TMH
4. Computers Today - Donald Sanders, MGH
5. Computers Today - Suresh K Basandra, Galgotia. Maureen Sprankle, Problem solving and Programming Concepts, Pearson Education, New Delhi.
6. Compilation Notes, Department of Information Technology, SRM University.
7. Elizabeth A. Dickson, Computer Program Design, Tata McGraw Hill.
8. Kenneth C. Louden, Programming Languages – Principles and Practice, Thomson Asia Pvt. Ltd.
9. Yuskel Uckan, Problem Solving Using C, McGraw Hill.
10. Peter Norton's 'Introduction to Computers', Second edition, TMH.
11. Dromey – How to solve it by computer –PHI
12. Computer Concepts and C Programming – P.B.KOTUR
13. Computer Fundamentals - P K Sinha, BPB

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	I	Theory	02	02	00	00	25

Course No	Course Title	Pre Requisites
BCA160	Soft skills –I (Professional Ethics)	-

COURSE ASSESSMENT METHOD:

1. Internal Assessment [3 Tests Best of 2] Total Marks: 50
2. Semester End examination Total marks: 50

TOPICS COVERED:

Unit:1: **05 Hours**

What are Ethics: Definition of ethics, Importance of Integrity, Ethics in the Business world, and Ethics in Information Technology (IT).

Unit:2: **05 Hours**

Professional, The ethics behavior of IT professionals, IT users: Common ethical issues for IT users, Supporting the ethical practices of IT users.

Unit:3: **05 Hours**

Privacy protection and the law: The right of privacy and recent history of privacy protection, Key privacy and anonymity issues.

Unit:4: **05 Hours**

What is intellectual property: copy rights, patents, trade secret laws, Key intellectual property issues: plagiarism, reverse engineering, open source code, competitive intelligence, cyber squatting.

Unit:5: **05 Hours**

Strategies to Engineer Quality Software, Key issues in software development, Use of non-traditional workers, Whistle blowing. Case Studies and Discussion.

TEXT BOOKS / REFERENCES:

1. George Reynolds: Ethics in Information Technology, CENAGE Learning, 2014
2. Mike W Martin, Roland Schinzinger, Ethics in Engineering, Tata McGraw Hill Edition 2007.

*** Latest editions of all the suggested books are recommended.**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	I	Theory	04	04	00	00	52

Course No	Course Title	Pre Requisites
BCA170	Indian Constitution	

TOPICS COVERED:

Unit I [12 Hrs]

Meaning of the term ―Constitution‖-Its importance-making of the Indian Constitution 1946-49-Dr.Ambedkar's contribution-Preamble-Method of amending the constitution and its limitation-An over view of
constitutional developments.

Unit II [10 Hrs]

The democratic institutions created by the Constitution-bicameral system of legislature and cabinet form of government at the Center and States-Role and Position of President and Prime Minister-Adult Franchise System-Election Commission, Panchayat Raj System.

Unit III [08 Hrs]

Fundamental Rights and Duties- Their content and significance-Special, rights created in the constitution for Dalits, Backwards, Women, Children and the Religious and Linguistic Minorities.

Unit IV [10 Hrs]

Enforcing rights through writs: Certiorari, Mandamus,Quo Warranto and Habeas Corpus-public interest Litigation-Directive Principles of State Policy-The need to balance Fundamental Rights with Directive Principles-Constitution and sustainable development.

Unit V [12 Hrs]

Doctrine of Separation of Powers-Legislative, Executive and Judicial and their composition and functioning in India-Features of Indian Federalism-Center State relations. Measures for national Unit-Public Service Commissions.

TEXT BOOKS / REFERENCES:

1. J.C. Johari, The constitution of India- A Politico-Legal Study-Sterling Publications, Pvt.Ltd.New Delhi.
2. J.N.Pandey:Constitutional Law of India, Allahabad, Central Law Agency, 2002.
3. 3. Granville Austin:The Indian Constitution-Corner Stone of a Nation-Oxford, NewDelhi.2000.

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	I	Lab	01	00	03	00	48

Course No	Course Title	Pre Requisites
BCA13L	Mathematics-I Laboratory	--

LIST OF PROGRAMS TO BE COVERED:

Using Free and open Source Software (FOSS) tools for computer programs

1. Introduction to Scilab and commands related to the topics
2. Introduction to Maxima and commands related to the topics
3. Verification of Euler's theorem, its extension
4. nth derivative with &without Leibnitz rule.
5. Scilab and Maxima commands for plotting functions.
6. Plotting of standard Cartesian curves using Scilab/Maxima.
7. Plotting of standard parametric and Polar curves using Scilab/Maxima.
8. Computations with matrices.
9. Row reduced echelon form.
10. Establishing consistency or otherwise and solving system of linear equations.
11. Cayley-Hamilton theorem
12. Maxima commands for reduction formula with or without limits.

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	I	Lab	01	00	03	00	48

Course No	Course Title	Pre Requisites
BCA14L	Programming Laboratory	--

LIST OF PROGRAMS TO BE COVERED:

Part A:

1. C program to accept radius and to find area of a circle.
2. C program to check whether the given number is positive or negative.
3. C program to print biggest of two number using if else statement.
4. C program to check whether the given number is odd or even.
5. C program to exchange values of two variable using a temporary variable.
6. C program to print ASCII code for the given character.
7. C program to print the character for the given ASCII code.
8. C program to find the sum of n natural numbers using the formula S=n(n+1)/2.
9. C program for given two numbers to perform arithmetic operations using switch statement.
10. C program to find biggest of three number using nested if statement.
11. C program to find biggest of three number using ladder if statement or else if statement.
12. C program to find sum of the S=1+2+3+……+n series by indirect method using looping statement
13. C program to find sum of the $S=1^2+2^2+3^2+.....+n^2$ indirect method using looping statement
14. C program to find sum of the S=2+4+6+……+n series by indirect method using looping statement
15. C program to find sum of the S=1-2+3-4+5…….+n series by indirect method using looping statement
16. C program to find sum of the S=1-3+5-7+……+n series by indirect method using looping

17. C program to find sum of the $S=1+1/x+1/x^2.....+1/x^n$ series by indirect method using looping
18. C program to generate prime numbers using for loop
19. C program to check whether the given number is prime or not.
20. C program to generate Fibonacci series up to n numbers
21. C program to check whether the given number is factorial of a number or not
22. C program to convert binary number to decimal number.
23. C program to convert decimal number to binary number.

Part B:

24. C program to find the roots of the quadratic equation using else if statement.
25. C program to find the reverse of the given number. Also sum & count the number of digits and check whether the given number is palindrome or not palindrome.
26. C program to find largest and smallest of n numbers
27. C program to find second largest and second smallest of n numbers
28. C program for sorting given set of numbers using bubble sort technique.
29. C program to search given number using linear search technique
30. C program to accept two square matrix of square order. To find sum of two matrix
31. C program to print difference or subtraction of two matrices.
32. C program to accept two matrices of order m*n and p*q. to find product of two matrix using function
33. C program to check whether given number is Fibonacci or not.
34. C program to check whether the given number is factorial or not
35. C program to accept m*n matrix. To find trace and norm of square matrix. to print principle diagonal elements
36. C program to accept m*n matrix to find sum of upper diagonal and lower diagonal elements.
37. C program to find factorial of a number using recursive function
38. C program to find NCR and NPR using function.
39. C program to find LCM and GCD of two numbers.
40. C program to display transpose of given m*n matrix using function
41. C program to swap two numbers using function and pointers
42. C program to accept an employee information and display the same using structure
43. C program to create simple marks card assuming appropriate condition

44. C program to read and write information of an employee using a file.

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	I	Laboratory	01	00	03	00	48

Course No	Course Title	Pre Requisites
BCA15L	Computer Fundamentals Laboratory	--

LIST OF PROGRAMS TO BE COVERED:

1. Using Ms-Word with suitable examples, write the steps and execute the following with respect to table handling
    a. Creating a table (At least 4 Columns and 6 Rows).
    b. Entering appropriate data into the table.
    c. Sort the table.
    d. Apply the formulas on table numeric values.

2. Using Ms-Word, write the steps and execute for creating "Mail Merge" document for "FORM LETTERS".

3. Using Ms-Excel spread sheet, with suitable example, write steps and create worksheet called "Employee" and calculate the following using formulas
    a. Enter Employee Code, Name and Basic Salary.
    b. Calculate DA (20% of Basic Salary).
    c. Calculate HRA (10% of Basic Salary).
    d. Calculate CCA (8.5% of Basic Salary).
    e. Calculate Total Salary (Basic Salary + DA + HRA + CCA)
    f. Calculate Deductions (10% of Total Salary).
    g. Calculate Net Salary (Total Salary – Deductions).

4. Using Ms-Excel draw X-Y Line Chart and Bar Charts based on the following worksheet data and write the steps

ITEM	MONTHLY SALES (in Thousands)
Cotton	2,750
Wool	3,100
Yarn	2,975
Jute	2,100
Fiber	3,010

5.Using Ms-Excel spreadsheet write the steps and execute the following:

Roll No	Stud Name	Marks1	Marks2	Mark3	Total	Percentage	Result

a. Create appropriate records
b. Calculate total and marks using formula.
c. Update result column using IF function. (Result: Distinction, First Class, Second Class, Pass, Fail).

6.Using Ms-Access with suitable examples write steps and execute the following.

a. Create STUDENT database table.
b. Create appropriate records.
c. Add two more records to the table.
d. Delete 2nd record to the table.
e. View the records.

7.Using Ms-Access with suitable examples write steps and execute the following.

a. Create EMPLOYEE database table.
b. Create appropriate records.
c. Sort the records in ascending order of name.
d. Sort the records in descending order of salary.

e. View the records

8. Using Ms-PowerPoint with suitable examples write steps and execute the following:
   a. Create presentation slides with Titles, Sub Titles and Charts choosing different slide layouts.
   b. Use Design templates for background.
   c. Format the slide design.

9.Using Ms-PowerPoint with suitable examples write steps and execute the following:
   a. Create presentation table slides using an organization chart.
   b. Use different views such as slide view, slide sorter view and slide show view.

TEXT BOOKS / REFERENCES:

1. Computer Fundamentals - P K Sinha,BPB
2. Introduction to Computers - N Subramanian,TMH
3. Understanding Computers - R Rajagopalan. TMH
4. Computers Today - Donald Sanders, MGH
5. Computers Today - Suresh K Basandra, Galgotia
6. Peter Norton's 'Introduction to Computers', Second edition, TMH.
7. Dromey – How to solve it by computer –PHI
8. Computer Concepts and C Programming – P.B.KOTUR
9. Computer Fundamentals - P K Sinha, BPB

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	II	Theory	04	04	00	00	52

Course No	Course Title	Pre Requisites
BCA230	Mathematics-II	

TOPICS COVERED:

Unit I [12 Hrs]

Recapitulation of differential equations-Linear Equations and equations reducible to linear equation. Exact differential equations and equations reducible to exact form with standard integrating factors. Equations of First order and higher degree- equations solvable for p, x and y. Clairaut's equations, singular solutions- geometrical meaning. Orthogonal trajectories (Cartesian and Polar).

Unit II [10 Hrs]

Basic theory of linear differential equations(second and Higher order) , Wronskian and its properties. Second and higher order linear differential equations with constant coefficients, complementary functions, particular integrals (standard types)

Unit III [10 Hrs]

Cauchy-Euler differential equations. Solutions of second order ordinary differential equations with variable coefficients by the following methods:
(1) When a part of complementary function is given
(2) Variation of parameters
(3) Change of independent variables

Unit IV [10 Hrs]

Total differential equations – Necessary and sufficient condition for the equation Pdx + Qdy + Rdz = 0 to be exact (proof only for the necessary part) – Simultaneous equations of the form $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$.

Unit V [12 Hrs]

Formation of partial differential equations, equations of first order, Lagrange's linear equations Pp+Qq=R, Standard types of first order non-linear PDEs and Equations reducible to standard form, Charpit's method. Solution of second order linear partial differential equations in two variables with constant coefficients by finding complimentary function and particular integral, Equations reducible to homogeneous form.

TEXT BOOKS / REFERENCES:

1. M D Raisinghania, Ordinary Differential Equations (S. Chand, Delhi)
2. F Ayres: Differential Equations (Schaum Series)
3. Daniel Murray: Introductory Course in Differential Equations(Orient Longman)
4. William E Boyce and Richard C Diprima: Elementary Differential equations and BVP
5. (John Willy and Sons)
6. B S Grewal: Engineering Mathematics
7. M D Raisinghania, Advanced Differential Equations, S Chand and Co. Pvt. Ltd., 2013
8. G F Simmons, Differential equation with Applications and historical notes, 2nd ed.:
9. McGraw-Hill Publishing Company, Oct 1991.

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	II	Theory	04	04	00	00	52

Course No	Course Title	Pre Requisites
BCA240	Object Oriented Programming with C++	C

TOPICS COVERED:

Unit-I [12 Hrs]

Introduction: Procedure-oriented programming, Concepts of Object-oriented programming, Structure of C++ program.
Fundamentals: Tokens, Keywords, Identifiers and constants, Basic Data Types, User-defined data types, Derived data Types, Symbolic constants, Type compatibility, Declaration of variables, Dynamic initialization of variables, Reference variables, Operators in C++, Scope resolution operator, Member dereferencing operators, Memory management operators, Manipulators, Type cast operator, Expressions and their types, Special assignment expressions, Implicit conversions, Operator overloading, Operator precedence, Control structures.

Unit-II [08 Hrs]

Functions: The main function, Function prototyping, Call by Reference, Return by Reference, Inline functions, Default arguments, const arguments, Function overloading, Friend and Virtual functions.

Unit-III [10 Hrs]

Classes and Objects: Specifying a Class, Defining member functions, Making an Outside function Inline, Nesting of member functions, Private member functions, Arrays within a Class, Static data members, Static member functions, Arrays of Objects, Objects as function arguments, friendly functions, Returning Objects, const member functions, Pointers to members.

Unit-IV [12 Hrs]

Constructors and Destructors: Constructors, Parameterized constructors, Multiple constructor in a class, Constructors with default arguments, Dynamic initialization of objects, Copy constructor, Dynamic constructor, Constructing Two-dimensional arrays, const Objects, Destructors.

Operator Overloading and Type Conversions: Defining operator overloading, Overloading unary operators, Overloading Binary operators, Rules for overloading operators, Type conversions.

Unit-V [10 Hrs]

Inheritance and Polymorphism: Programming concepts and types. Console I/O Operations: C++ streams, C++ stream classes, Unformatted I/O operations, Formatted I/O operations, managing output with manipulators.

Files: Classes for file stream operations, opening, reading, writing, closing, detecting end of file.
TEXT BOOKS / REFERENCES:
1. Object Oriented Programming with C++ - E. Balagurusamy 2. OOPS and C++ by Robert Lafore. 3. C++ by Stephen Prata. 4. Teach yourself c++ by Al Stevens. 5. C++ Primer by Stanley B Lippman

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	II	Theory	04	04	00	00	52

Course No	Course Title	Pre Requisites
BCA250	Data Structures	

TOPICS COVERED:

Unit-I [12 Hrs]

Linear Data Structure and their sequential storage representation

Algorithmic notation, Concept and terminology for non-primitive Data structures, Storage structures for arrays, Structures and arrays of structures, Stacks,

Unit-II [10 Hrs]

Definitions and Concepts, Operations on stacks, Applications of stacks, Recursion, Infix to postfix, Evaluating postfix expressions, Queues & Priority Queues.

Unit-III [08 Hrs]

Linear Data Structure and their Linked storage representation

Pointers and Linked Allocation, Linked linear lists, Operations on Linear lists using singly linked storage structures, Circularly linked linear lists & Doubly linked linear lists.

Unit-IV [10 Hrs]

Nonlinear Data Structures

Trees - Definition and concepts, Operations on Binary Trees, Linked Storage Representations of Binary Trees, Tree creation and Traversal

Unit-V [12 Hrs]

Sorting and searching

Sorting, Selection sort, Bubble sort, Merge sort, Quick sort, Radix sort, Searching, Sequential searching & Binary searching Tree.

TEXT BOOKS / REFERENCES:

1. An Introduction to Data Structures with Applications 2nd edition - J.P.Trembly and Sorenson, McGraw Hill 2001.
2. Data structures using C & C++ by Yedidyah Langsun, Moshe J Augenstein, Teneinbaum published by Prentice Hall of India Ltd.
3. Algorithms + Data Structures = Programs by Niklaus Wirth Prentice Hall 1976.
4. Data structures and algorithms by Aho, A.V.,Hopcroft and Ullman,J.E., Addison Wesley, 1980.
5. Fundamentals of data structures by Horowitze,E and Sahni,S., Galgotia bookstore.

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	II	Theory	02	02	00	00	25

Course No	Course Title	Pre Requisites
BCA260	Soft skills –II (Professional Communication)	-

COURSE ASSESSMENT METHOD:

1. Internal Assessment [3 Tests Best of 2] Total Marks: 50
2. Semester End examination Total marks: 50

TOPICS COVERED:

Unit:1: 05 Hours

Introduction, Process of Communication, Language as a Tool, Levels of Communication, Communication Networks, Importance of Technical Communication. Definition of Noise, Classification of Barriers.

Unit:2: 05 Hours

Impact of Technology, Software for Creating Messages, Software for Writing Documents, Software for Presenting Documents, Transmitting Documents, Effective use of Available Technology.

Unit:3: 05 Hours

Introduction, Types of Listening, Traits of good Listener, Active versus passive listening, implications of effective listening.

Unit:4: 05 Hours

Effective Presentation: Introduction, Defining purpose, Analyzing Audience and Locale, Organizing Contents, preparing outline, Visual Aids, Understanding Nuances of Delivery, Kinesics, Proxemics, Paralinguistic's, Chronemics, Sample speech.

Unit:5: 05 Hours

Group discussion: Introduction, Group Discussion types, Organizational Group discussion, Group discussion as part of selection process.

TEXT BOOKS / REFERENCES:

3. Meenakshi Raman and Sangeeta Sharma: Technical Communication - Principles and Practices, Oxford University Press, 2010.
4. M.Ashraf Rizivi: Effective Technical Communication, Tata McGraw Hill, 2009.

*** Latest editions of all the suggested books are recommended**

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	II	Theory	04	04	00	00	52

Course No	Course Title	Pre Requisites
BCA270	Environmental Studies	

TOPICS COVERED:

Unit I [12 Hrs]

I. The Multidisciplinary nature of Environmental Resources. Definition, Scope and Importance, Need for Public awareness.

II. Natural Resources and associated problems.

a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining dames and their effects on forests and tribal people.
b) Water Resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
d) Food Resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case study.
e) Energy Resources: Growing energy needs, renewable and non-renewable energy resources use of alternate energy sources. Case studies.
f) Land Resources: land as a resource, land degradation, man induced landslides, soil erosion and desertification.

Unit II [10 Hrs]

Ecosystems: concept, structure and function, producers, consumers, decomposers, Energy flow , Ecological succession, Food chains, food webs and ecological pyramids. Introduction, types , characteristics, structure and function of following ecosystems:

a) Forest Ecosystem
b) Grassland Ecosystem
c) Desert Ecosystem
d) Aquatic Ecosystems(pond, streams, lakes, rivers, oceans, estuaries)

Unit III [08 Hrs]

Biodiversity and its conservation: Introduction, Definition: genetic, species and ecosystem diversity, Biogeographically classification of India, value of Biodiversity, Biodiversity at Global, National and local levels. India as a mega-diversity nation. Hot-spots of biodiversity. Threat to biodiversity, Endangered and endemic species of India. Conservation of bio-diversity.

Environmental Pollution: Definition, causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards.

Unit IV [10 Hrs]

Social Issues and the Environment: From Unsustainable to sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management, Resettlement and rehabitilization of people; its problems and concerns. Case studies. Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. Wasteland reclamation, Consumerism and waste products, Environment protection Act, Air(prevention and control of pollution) Act, Water (Prevention and control of pollution)Act, Wildlife protection Act, Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness.

Unit V [12 Hrs]

Human population and Environment: Population growth, variation among nations. Population explosion Family Welfare Programme. Environment and human health. Human Rights. Value Education.HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and human health. Case studies.
Field work: visit to a local area to document environmental assets-river/forest/grassland/hill/mountain. Visit to locate polluted site, study of common plants, insects, birds, study of simple ecosystems.

TEXT BOOKS / REFERENCES:

1. Agarwal, K.C.2001 Environmental Biology, Nidi publications Ltd.Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt.Ltd.,Ahmedabad-380013
3. Brunner R.c>,1989,Hazardous Waste Incineration,k McGraw Hill Inc.480 p.
4. Trivedi R.K. and P.K.Goel, Introduction to Air pollution. Techno-science publications.
5. Wagner K.D.1998. Environmental Management, W.B.Saunders Co.Philadelphia, USA.

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	II	Lab	01	00	03	00	48

Course No	Course Title	Pre Requisites
BCA23L	Mathematics-II Laboratory	--

LIST OF PROGRAMS TO BE COVERED:

1. Solution of Differential equation using Scilab/Maxima and plotting the solution-I.
2. Solution of Differential equation using Scilab/Maxima and plotting the solution-II.
3. Solution of Differential equation using Scilab/Maxima and plotting the solution-III.
4. Solution of Differential equations using Scilab/Maxima and plotting the solution-IV.
5. Finding complementary function of constant coefficient second and higher order ordinary differential equations.-1
6. Finding complementary function of constant coefficient second and higher order ordinary differential equations.-2
7. Finding particular integral of constant coefficient second and higher order ordinary differential equations.
8. Verification of Cauchy-Euler differential equations.
9. Verification of Lagrange's linear equations
10. Solving second order linear partial differential equations in two variables with constant coefficient.
11. Solutions to the problems on total and simultaneous differential equations.
12. Solutions to the problems on different types of Partial differential equations.

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	II	Lab	01	00	03	00	48

Course No	Course Title	Pre Requisites
BCA24L	Object Oriented Programming Laboratory	C

TOPICS COVERED:

PART-A

1. Write a c++ program to calculate the average of three numbers.
2. Write a c++ program to find the biggest of three numbers.
3. Write a c++ program to find minimum and maximum of two numbers using fuctions.
4. Write a c++ program to check the given number is palindrome or not
5. Write a c++ program to sum of all even and odd numbers.
6. Write a c++ program to perform arithmetic operations using classes and objects.
7. Write a c++ program to define a student class with user name, to name, total, average for "n" students.
8. Write a c++ program to illustrate the use of static member function.
9. Write a c++ program to find the mean value using friend function..
10. Write a c++ program to show the use of copy constructor.
11. Write a c++ program to implement multiple inheritance.
12. Write a c++ program to illustrate pointers to objects.
13. Write a c++ program to read a string with get line function.
14. Write a c++ program to display string with write() function.
15. Write a c++ program to specify field size with using width function.

PART-B

1. Write a c++ program to accept two times (hh:mm:ss) to find subtraction of two times.
2. Write a c++ program to implement processing shopping list using a class with arrays as data members.
3. Write a c++ program to implement banking scheme.
4. Write a c++ program to show the use of over loaded constructor.
5. Write a c++ program to construct variables at run time using dynamic initialization.
6. Write a c++ program to find the largest value among the set of parameters using overloaded function.
7. Write a c++ program to add two complex number using operator overloading.
8. Write a c++ program to demonstrate single inheritance.
9. Write a c++ program to implement multilevel inheritance.
10. Write a c++ program to illustrate the implementation of virtual base class.
    1. Write a c++ program to illustrate the use of array of pointer to objects.
    2. Write a c++ program to implement reading and writing class objects using files.

TEXT BOOKS / REFERENCES:

6. Object Oriented Programming with C++ - E. Balagurusamy
7. OOPS and C++ by Robert Lafore.
8. C++ by Stephen Prata.
9. Teach yourself c++ by Al Stevens.
10. C++ Primer by Stanley B Lippman.

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
I	II	Lab	01	00	03	00	48

Course No	Course Title	Pre Requisites
BCA25L	Data Structures Laboratory	

TOPICS COVERED:

PART – A

1. Write an interactive program to search an element in the given linear array using linear and binary searching technique.
2. Write a program to arrange numbers in ascending order using insertion sort.
3. Write a program to arrange numbers in ascending order using merge sort.
4. Write a program to arrange numbers in ascending order using selection sort
5. Write a program to arrange numbers in ascending order using quick sort
6. Write an interactive program to insert an element at the given position and delete an element at the specified position in the given array.
7. Write an interactive program to implement the following operations on stack
8. Program to implement Tower of Hanoi problem.
9. Write program to evaluate a postfix expression.
10. Write a program to convert an expression from infix to postfix.
11. Write an interactive program to perform insertion and deletion operations in Linear Queue.

PART - B

12. Write an interactive program to perform insertion and deletion operations in Circular Queue.
13. Write a program to create a linked list .
14. Write a program which finds the location of an item in the unsorted linked list.
15. Write a program to insert a node in a linked list at the front end.(beginning)
16. Write a program to insert a node in a linked list anywhere in between
17. Write a program to delete an item from the linked list.

18. Write a an interactive program to implement stack operations using singly linked list.
19. Write a an interactive program to implement queues operations using singly linked list.
20. Program to create a binary tree and also print the preorder values.
21. Program to create a binary tree and also print the inorder values.
22. Program to create a binary tree and also print the postorder values.

TEXT BOOKS / REFERENCES:

6. An Introduction to Data Structures with Applications 2nd edition - J.P.Trembly and Sorenson, McGraw Hill 2001.
7. Data structures using C & C++ by Yedidyah Langsun, Moshe J Augenstein, Teneinbaum published by Prentice Hall of India Ltd.
8. Algorithms + Data Structures = Programs by Niklaus Wirth Prentice Hall 1976.
9. Data structures and algorithms by Aho, A.V.,Hopcroft and Ullman,J.E., Addison Wesley, 1980.
10. Fundamentals of data structures by Horowitze,E and Sahni,S., Galgotia bookstore.