

KUVEMPU



UNIVERSITY

SEP – 2024

CURRICULUM STRUCTURE AND SYLLABUS

**Bachelor of Computer Applications (BCA)
Programme**

[According to SEP (State Education Policy): 2024]

w.e.f Academic Year 2024-25

Under Graduate Board of Studies

In

**Computer Science and B.C.A.
Kuvempu University, Shankaraghatta,
Shimoga, Karnataka.**

Curriculum Design / Syllabus Framing Committee

Sl. No.	Name	Designation
1.	Dr. Prabhakar C J Professor, Department of P.G Studies and Research in Computer Science, Kuvempu University, Shankaraghatta – 577541, Shimoga(D).	Chairman
2.	Dr. Shoieb Ahamed Assistant Professor, Department of Computer Science, Government First Grade College, Sorab – 577429, Shimoga(D).	Member
3.	Mr. Shashidhara B Assistant Professor, Department of Computer Science, IDSG Government College, Chikkamagaluru(D) – 577101,	Member
4.	Mr. Gopala B Assistant Professor, Department of Computer Science, Government First Grade College Shikaripura - 577427, Shimoga(D).	Member
5.	Mr. Krishnamurthy K Assistant Professor, Department of Computer Science, Government First Grade College, Thirthahalli - 577432, Shimoga(D).	Member
6.	Mr. Prajwal Kumar P Assistant Professor, Department of Computer Science, Government First Grade College, Kadur – 577548, Chikkamagaluru(D).	Member

The objectives of the BCA Programme

1. The primary objective of this program is to provide a foundation of computing principles for effectively using information systems and enterprise softwares.
2. It helps students analyze the requirements for system programming and exposes students for information systems
3. This Programme provides students with options to specialize in various software system.
4. To produce outstanding Computer Scientists who can apply the theoretical knowledge into practice in the real world and develop standalone live projects themselves
5. To provide opportunity for the study of modern methods of information processing and its applications.
6. To develop among students the programming techniques and the problem- solving skills through programming
7. To prepare students who wish to go on to further studies in computer science and related subjects.
8. To acquaint students to Work effectively with a range of current, standard, Office Productivity software applications

Program Outcomes

1. **Discipline knowledge:** Acquiring knowledge on basics of Computer Science and ability to apply to design principles in the development of solutions for problems of varying complexity
2. **Problem Solving:** Improved reasoning with strong mathematical ability to Identify, formulate and analyze problems related to computer science and exhibiting a sound knowledge on data structures and algorithms.
3. **Design and Development of Solutions:** Ability to design and development of algorithmic solutions to real world problems.
4. **Programming a computer:** Exhibiting strong skills required to program a computer for various issues and problems of day-to-day scientific applications.
5. **Application Systems Knowledge:** Possessing a minimum knowledge to practice existing computer application software.
6. **Communication:** Must have a reasonably good communication knowledge both in oral and writing.
7. **Ethics on Profession, Environment and Society:** Exhibiting professional ethics to maintain the integrality in a working environment and also have concern on societal impacts due to computer-based solutions for problems.
8. **Lifelong Learning:** Should become an independent learner. So, learn to learnability.
9. **Motivation to take up Higher Studies:** Inspiration to continue educations towards advanced studies on Computer Science.

Kuvempu University

SEP Based Curriculum Structure for Bachelor of Computer Applications (BCA) Programme 2024-2025

CASE 3 : Single Subject specialization degree in all 6 Semesters (Course Structure, Scheme of Teaching and Evaluation - 2024-25)

Allocation of credits for BCA Programme

Sl.No.	Subject Category	No. of Credits
1	Major Courses	90
2	Languages	24
3	Compulsory	12
4	Electives/Optional	04
Total		130

Semester-wise allocation of credits (Three Subjects combination)

Year	Semester	Total Credits
1	I	46
	II	
2	III	50
	IV	
3	V	34
	VI	
Total		130

1. Credit for the three major courses includes theory, practical (skill enhancement course), and tutorial/assignment/survey-based assignment/internship.
2. Practical paper(s) (Compulsory/Skill enhancement course) should provide practical experience which is complimentary to theory major paper(s).
3. Project Work/Dissertation/Internship/Apprenticeship Embedded Degree Programme (AEDP) should also be considered to be part of the curriculum.

Sem.	Course/ Paper Code	Title of the Paper	Subject Category	Teaching Hour/w eek	Semester End Exam.	Internal Assessment	Total Marks	Credits	Examination Duration
1	2	3	4	5	6	7	8	9	10
Semester-I									
1	24BCA11	Fundamentals of Computers	MC-T	04	80	20	100	04	3 Hrs.
	24BCA12	Programming in C	MC-T	04	80	20	100	04	3 Hrs.
	24BCA13	Mathematical Foundation	MC-T	03	80	20	100	03	3 Hrs.
	24BCA11P	C programming LAB	MC-P	04	40	10	50	02	3 Hrs.
	24BCA12P	Information Technology LAB	MC-P	04	40	10	50	02	3 Hrs.
Total				19	320	80	400	15	---
Semester-II									
2	24BCA21	Data Structures	MC-T	04	80	20	100	04	3 Hrs.
	24BCA22	Java Programming	MC-T	04	80	20	100	04	3 Hrs.
	24BCA23	Operating System	MC-T	03	80	20	100	03	3 Hrs.
	24BCA21P	Data Structures Lab using C	MC-P	04	40	10	50	02	3 Hrs.
	24BCA22P	Java Programming LAB	MC-P	04	40	10	50	02	3 Hrs.
	Total				19	320	80	400	15
Semester-III									
3	24BCA31	Database Management System	MC-T	04	80	20	100	04	3 Hrs.
	24BCA32	Design and Analysis of Algorithms	MC-T	04	80	20	100	04	3 Hrs.
	24BCA33	Computer Communication and Networks	MC-T	03	80	20	100	03	3 Hrs.
	24BCA31P	PL/SQL lab	MC-P	04	40	10	50	02	3 Hrs.
	24BCA32P	Design and Analysis of Algorithms Lab	MC-P	04	40	10	50	02	3 Hrs.
	24BCAE1	Elective I	EL/OP-I	02	40	10	50	02	2 Hrs.
Total				21	360	90	450	17	---
Semester-IV									
4	24BCA41	Python Programming	MC-T	04	80	20	100	04	3 Hrs.
	24BCA42	Computer Multimedia and Animation	MC-T	04	80	20	100	04	3 Hrs.
	24BCA43	Wireless Networks	MC-T	03	80	20	100	03	3 Hrs.
	24BCA41P	Python Lab	MC-P	04	40	10	50	02	3 Hrs.
	24BCA42P	Computer Multimedia and Animation Lab	MC-P	04	40	10	50	02	3 Hrs.

	24BCAE2	Elective II	EL/OP-II	02	40	10	50	02	2 Hrs.
	Total			21	360	90	450	17	---
Semester-V									
5	24BCA51	C# and Dot Net	MC-T	04	80	20	100	04	3 Hrs.
	24BCA52	Artificial Intelligence and Machine Learning	MC-T	04	80	20	100	04	3 Hrs.
	24BCA53	Cyber Security	MC-T	03	80	20	100	03	3 Hrs.
	24BCA51P	DOT NET Lab	MC-P	04	40	10	50	02	3 Hrs.
	24BCA52P	AI and ML Lab	MC-P	04	40	10	50	02	3 Hrs.
	AEDP	MOOC's/Internship		02	40	10	50	02	3 Hrs.
	Total			21	360	90	450	17	---
Semester-VI									
6	24BCA61	PHP and MY SQL	MC-T	04	80	20	100	04	3 Hrs.
	24BCA62	Big Data Analytics	MC-T	04	80	20	100	04	3 Hrs.
	24BCA63	Mobile Application Development	MC-T	03	80	20	100	03	3 Hrs.
	24BCA61P	Web Content Management Lab	MC-P	04	40	10	50	02	3 Hrs.
	24BCA62P	Project	MC-P	04	40	10	50	02	3 Hrs.
	Total			19	320	80	400	15	---
	Grand total			120	2040	510	2550	96	---

Practical Proper Examination I-VI semesters

Duration: 03 Hrs

• Experimentation (Major & Minor/Spotters)	-	30 Marks
• Viva Voice	-	10 Marks

	Total	40 Marks

Internal Assessment for Practical Paper I-VI semesters

• Attendance Marks	-	05
• Record/Journal Marks	-	05

	Total	10 Marks

Project Work/Internship during VI semester

• Project work/Dissertation/Internship and preparation of Report	-	40 Marks
• Viva Voice	-	10 Marks

	Total	50 Marks

Continuous Assessment Programme/Internal Assessment/Formative Assessment

Elective/Optional Papers

Sl. No.	Continuous Assessment Programme/Internal Assessment	Maximum Marks
(1)	(2)	(3)
01	Two Session Tests with proper record for assessment (2+2 = 4)	04
02	Assessment of Seminars/ Assignment with proper record	03
03	Attendance with proper record	03
	TOTAL MARKS	10

• Attendance Marks-breakup

<75% -	00 Marks
75-80% -	01 Mark
85-90% -	02 Marks
90-100% -	03 Marks

Electives in Computer Science

Sl. No.	Semester	Elective	Electives Offered
01	THIRD SEMESTER	Elective I	<u>Any one from the following</u> <ul style="list-style-type: none">• Office Automation• Computer Fundamentals
02	FOURTH SEMESTER	Elective II	<u>Any one from the following</u> <ul style="list-style-type: none">• Internet Basics• Digital Fluency

Course Code: 24BCA11	Course Title: Fundamentals of Computers
Course Credits: 04	Teaching Hours per Week: 04
Total Contact Hours: 52	Internal Assessment : 20
Exam Duration: 03 Hours	Semester end Exam Marks: 80

Contents	hours
Unit-1 : Introduction to Computers - Computer Definition, Characteristics, History of Computers, Anatomy of Computer - Central Processing Unit, Storage units, Input and output Devices. Types of Computers, Types of Software - System Software and Utility Software; Computer Languages - Machine Level, Assembly Level & High Level Languages, Translators - Assembler, Interpreter and Compiler.	14
Unit-2 : Number Systems - Binary, Octal, decimal, hexadecimal, convert binary to decimal, Decimal to binary, Decimal to hexadecimal, hexadecimal to decimal. Binary 1's complement, binary 2's complement. Computer Codes-BCD, Gray Code, ASCII and Unicode. Basic logic gates and operations.	12
Unit-3 Operating Systems - Introduction, Functions of an Operating System, Type of Operating Systems. The User Interface, Using Mouse, Icons, File explorer, Toolbar, Status Bar, Menu bar, Operations on File and Directories. Computer networks- LAN, WAN; Concept of Internet, www, search engines, IP address Applications of Internet.	12
Unit-4 Word Processing - Word Processing GUI, Opening and Closing of documents, Text creation and Formatting, Table handling, Page setup. Presentation - GUI, creating slides, text/content animation, slide transition, slide show. Spreadsheet: Structure of Spreadsheet, Manipulation of cells, Formulas and Functions- sum, avg, min, max, if. charts- bar, pie, line.	14

References

1. Computer Fundamentals, V Rajaraman.
2. Computer System Architecture (3rd edition) Morris Mano PHI.
3. Pradeep K. Sinha and Priti Sinha: Computer Fundamentals (Sixth Edition)
4. Link : Word - ppt - sheet. <https://support.microsoft.com/en-us/office/>

Course Code: 24BCA11P	Course Title: Information Technology LAB
Course Credits: 02	Teaching Hours per Week: 04
Total Contact Hours: 52	Internal Assessment : 10
Exam Duration: 03 Hours	Semester end Exam Marks: 40

Contents
<p>Part - A</p> <ol style="list-style-type: none"> 1.Create biodata using word processor 2.Create timetable in word processor with text formatting 3.Create Content page with header and footer, including page number,date , title using word processor 4.Create Invitation card for College Event using word processor 5.Create a Presentation with content animation 6.Create a Presentation with Slide transition 7.Create student ID card with photo in Presentation <p>PART- B</p> <ol style="list-style-type: none"> 1.Create student marks card in Spreadsheet 2.Plot Bar Chart in Spreadsheet for tabular data 3.Plot Line Chart in Spreadsheet for tabular data 4.Create inventory Bill in Spreadsheet with formulas. 5.Create a Salary slip with Basic,DA,(20% of Basic Salary),HRA(8% of Basic Salary), and Deduction.(10% of Total Salary) using Spreadsheet 6. Demonstrate usage of Filters in Spreadsheet.

Internal Assessment	
Attendance	5 Marks
Record	5 Marks
Total	10 Marks
Attendance Marks breakup < 75 % - 00 Marks , 75- 80% - 01 Mark , 80-85% - 02 Marks 85-90% - 03 Marks , 90-95% - 04 Marks, >95% - 05 Marks	

Practical Examination	
Writing and execution Part-A	5+10 =15 Marks
Writing and execution Part-B	5+10 =15 Marks
Viva voice	10 Marks
Total	40 Marks

Course Code: 24BCA12	Course Title: Programming in C
Course Credits: 04	Teaching Hours per Week: 04
Total Contact Hours: 52	Internal Assessment : 20
Exam Duration: 03	Semester end Exam Marks: 80

Contents	hours
Unit-1 : Problem solving with a Computer - Algorithm and Flowchart- Notations ,Examples- Area of a circle, find largest of 3 numbers ,sum N number. Overview of C - History and Features of C, Structure of a C Program, Creating and Executing a C Program. C Character Set, C tokens - keywords, identifiers, constants, and variables. Data types - Declaration & initialization of variables, Symbolic constants. Header files - stdio, conio, maths, string, ctype.	14
Unit-2 : Input and output with C: Formatted I/O functions - printf and scanf, control stings and escape sequences. Unformatted I/O functions - getchar, putchar, gets and puts functions. Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment & Decrement operators, Bitwise operators, Conditional operator, Special operators, Operator Precedence and Associativity, Evaluation of arithmetic expressions. Control Structures - if, if_else, Switch Case, goto, break & continue statements. Looping Statements - while, do-while, for loops, Nested loops.	14
Unit-3 Arrays - One Dimensional arrays - Declaration, Initialization and Memory representation. Two Dimensional arrays - Declaration, Initialization and Memory representation. Structures - Structure Definition, Advantages of Structure, declaring , initialization accessing structure members. Unions - Union definition, declaration, initialization. difference between Structures and Unions.	12
Unit-4 Pointers in C - Definition, Declaring and initialising pointers, accessing address and value of variables using pointers, Pointer Arithmetic, Advantages and disadvantages of using pointers. User Defined Functions - Need , structure of C user defined functions. Categories of user defined functions - With and without parameters and return type. function call - call by value, call by reference.	12

References

1. E. Balagurusamy: Programming in ANSI C (TMH)
2. V. Rajaraman: Programming in C (PHI – EEE)
3. S. Byron Gottfried: Programming with C (TMH)
4. Yashwant Kanitkar: Let us C 8
5. Kamathane: Programming with ANSI and TURBO C (Pearson Education)

Course Code: 24BCA12P	Course Title: C Programming LAB
Course Credits: 02	Teaching Hours per Week: 04
Total Contact Hours: 52	Internal Assessment : 10
Exam Duration: 03	Semester end Exam Marks: 40

Contents
<p>PART - A</p> <ol style="list-style-type: none"> 1. Write a C Program to read radius and find surface area and volume of a sphere. 2. Write a C Program to read three numbers and find the biggest of three 3. Write a C Program to demonstrate library functions in math.h (at least 5) 4. Write a C Program to read a number, find the sum of the digits, reverse the number and check it for palindrome 5. Write a C Program to read percentage of marks and to display appropriate grade (using switch case) 6. Write a C program to read marks scored in 3 subjects by n students and find the average of marks and result (Demonstration of single dimensional array) 7. Write a C Program to remove Duplicate Element in a single dimensional Array 8. Program to perform addition and subtraction of Matrices <p>PART- B</p> <ol style="list-style-type: none"> 1. Write a C Program to find the length of a string without using built in function 2. Write a C Program to demonstrate string functions (at least 3). 3. Write a C Program to demonstrate pointers in C 4. Write a C Program to generate n prime number 5. Write a C Program to find the trace of a square matrix using function 6. Write a C Program to read, display and multiply two matrices using function 7. Write a C Program to read a string and to find the number of alphabets, digits, vowels, consonants, spaces and special characters. 8. Write a C Program to demonstrate structure to read & display student information.

Internal Assessment	
Attendance	5 Marks
Record	5 Marks
Total	10 Marks
Attendance Marks breakup < 75 % - 00 Marks , 75- 80% - 01 Mark , 80-85% - 02 Marks 85-90% - 03 Marks , 90-95% - 04 Marks, >95% - 05 Marks	
9	

Practical Examination	
Writing and execution Part-A	5+10 =15 Marks
Writing and execution Part-B	5+10 =15 Marks
Viva voice	10 Marks
Total	40 Marks

Course Code: 24BCA13	Course Title: Mathematical Foundation
Course Credits: 03	Teaching Hours per Week: 03
Total Contact Hours: 48	Internal Assessment : 20
Exam Duration: 03 Hours	Semester end Exam Marks: 80

Contents	hours
Unit-1 : Set and Function Definition of set, methods of representation of sets (property method and listing method), set operation (union, intersection, complement, Cartesian product of sets), properties of sets (commutative, associative and distributive), Definition of function, types of function (linear, quadratic, polynomial) with example, exponential and logarithmic function with their properties and related example.	12
Unit-2 : Matrix and Determinants: Introduction-Types of matrices-matrix operations-transpose of a matrix -determinant of matrix - inverse of a matrix, Cramer's rule, finding rank of a matrix – normal form-echelon form, Cayley Hamilton Theorem-Eigenvalues.	12
Unit-3 : Logic, Counting and Proof Propositions and Logical Operations, Conditional Statements, Methods of Proof, Counting-Permutations, Combinations, Pigeonhole Principle, Elements of Probability. Introduction to Proofs, Proof Methods and Strategy.	12
Unit-4 :Graphs Introduction to Graphs and Graph models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, Planar Graphs, Graph Colouring.	12

References

1. Discrete Mathematics and Its Applications, Kenneth H. Rosen: Seventh Edition, 2012.
2. P. R. Vittal-Business Mathematics and Statistics, Margham Publications, Chennai,
3. Discrete Mathematical Structure, Bernard Kolman, Robert C, Busby, Sharon Ross, 2003.
4. Graph Theory with Applications to Engg and Comp. Sci: Narsingh Deo-PHI 1986.
5. Discrete and Combinatorial Mathematics Ralph P. Grimaldi, B. V. Ramatta, Pearson, Education, 5 Edition.
6. Discrete Mathematical Structures, Trembley and Manohar.

Course Code: 24BCA21	Course Title: Data Structures
Course Credits: 04	Teaching Hours per Week: 04
Total Contact Hours: 52	Internal Assessment : 20
Exam Duration: 03 Hours	Semester end Exam Marks: 80

Contents	hours
Unit-1 : Data structures - Definition, Types of data structures - Primitive & Non-primitive, Linear and Nonlinear. Stacks - Definition and Representation of stacks, Operations on stacks.Applications of stacks; Infix, postfix and prefix notations, convert infix to postfix,Evaluation of postfix expression using stack.Recursive function -Definition ,Examples - Fibonacci number, factorial of number.	14
Unit-2 : Queues - Definition and Representation of queues; Types of queues – Simple queue and Operations , Circular queue and Operations. Priority queue (concept only), Double ended queue (concept only). Sorting – Selection sort, Bubble sort,insertion sort, Merge sort, Searching - Sequential Search, Binary search.	12
Unit-3 Linked list: Definition and Representation of linked list, Types of linked lists - Singly linked list, doubly linked list, Circular linked list; Operations on Singly linked lists – Traversing, Searching, Insertion, Deletion; Memory allocation, Garbage collection . Doubly Linked List: Memory Representation of Singly Linked List and Doubly Linked Lists. Applications of Linked List.	12
Unit-4 Trees: Definition; Tree terminologies –node, root node, parent node, ancestors of a node, siblings, terminal & non-terminal nodes, degree of a node, level, edge, path, depth; Binary tree: Type of binary trees - strict binary tree, complete binary tree, binary search tree; Array representation of binary tree. Traversal of binary tree; preorder, inorder and postorder traversal.	14

References

- 1.Ellis Horowitz and Sartaj Sahni: Fundamentals of Data Structures
- 2.Tanenbaum: Data structures using C (Pearson Education)
- 3.Kamathane: Introduction to Data structures (Pearson Education)
- 4.Y. Kanitkar: Data Structures Using C (BPB)
- 5.Kottur: Data Structure Using C
- 6.Padma Reddy: Data Structure Using C

Course Code: 24BCA11P	Course Title: Data Structure LAB
Course Credits: 02	Teaching Hours per Week: 04
Total Contact Hours: 52	Internal Assessment : 10
Exam Duration: 03	Semester end Exam Marks: 40

Contents
<p>Part - A</p> <ol style="list-style-type: none"> 1. Write a C Program to find GCD using recursive function 2. Write a C Program to generate N Fibonacci numbers using a recursive function. 3. Write a C Program to generate Factorial of a given number using a recursive function. 4. Write a C Program to sort the given list using Bubble sort technique. 5. Write a C Program to sort the given list using selection sort technique. 6. Write a C Program to sort the given list using insertion sort technique 7. Write a C Program to sort the given list using merge sort technique - recursive 8. Write a C Program to search an element using linear search technique <p>PART- B</p> <ol style="list-style-type: none"> 1. Write a C Program to implement Stack. 2. Write a C Program to convert an infix expression to postfix. 3. Write a C Program to implement a simple queue. 4. Write a C Program to implement a Circular queue. 5. Write a C Program to implement insert at the beginning of a singly linked list and display. 6. Write a C Program to delete a node at the end of a singly linked list. 7. Write a C Program to search an element using recursive binary search technique. 8. Write a C Program to implement inorder traversal of a binary tree.

Internal Assessment	
Attendance	5 Marks
Record	5 Marks
Total	10 Marks
Attendance Marks breakup < 75 % - 00 Marks , 75- 80% - 01 Mark , 80-85% - 02 Marks 85-90% - 03 Marks , 90-95% - 04 Marks, >95% - 05 Marks	

Practical Examination	
Writing and execution Part-A	5+10 =15 Marks
Writing and execution Part-B	5+10 =15 Marks
Viva voice	10 Marks
Total	40 Marks

Course Code: 24BCA22	Course Title: Java Programming
Course Credits: 04	Teaching Hours per Week: 04
Total Contact Hours: 52	Internal Assessment : 20
Exam Duration: 03 Hours	Semester end Exam Marks: 80

Contents	hours
Unit-1 : Object oriented concepts and paradigm, Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, method Overloading, Math class, Arrays in java. Objects and Classes: Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, String Buffer, File, this reference, I/O streams.	14
Unit-2 : Inheritance - Inheritance in java, Super and subclass, Overriding, Object class, Polymorphism - Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class. Interfaces - Interfaces Vs Abstract classes, defining an interface, implementing interfaces ,extending interfaces. Packages - Defining, creating and accessing a package, Understanding CLASSPATH, importing packages.	14
Unit-3 Exception handling- Dealing with errors, benefits of exception handling, the classification of exceptions- exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally. Multithreading in java: Thread life cycle and methods, Runnable interface, Thread synchronisation, Exception handling with try catch-finally, Collections in java, Introduction to JavaBeans and Network Programming	12
Unit-4 Event and GUI programming: Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing.	12

Reference Books:

1. Programming with Java, By E Balagurusamy – A Primer, Fourth Edition,
2. Core Java Volume I – Fundamentals, By Cay S. Horstmann, Prentice Hall
3. Object Oriented Programming with Java : Somashekara, M.T., Guru, D.S.,Manjunatha, K.S
4. Java 2 - The Complete Reference – Tata McGraw Hill publication.

Course Code: 24BCA22P	Course Title: JAVA LAB
Course Credits: 02	Teaching Hours per Week: 04
Total Contact Hours: 52	Internal Assessment : 10
Exam Duration: 03 Hours	Semester end Exam Marks: 40

Contents
<p>Part - A</p> <ol style="list-style-type: none"> 1. Program to add two integers and two float numbers. When no arguments are supplied, give a default value to calculate the sum. Use function overloading. 2. Program to perform mathematical operations. Create a class called AddSub with methods to add and subtract. Create another class called MulDiv that extends from AddSub class to use the member data of the super class. A main function should access the methods and perform the mathematical operations. 3. Program with class variable that is available for all instances of a class. Use static variable declaration. Observe the changes that occur in the object's member variable values. 4. Program to create a student class with following attributes; Enrollment No: Name, Mark of sub1, Mark of sub2, mark of sub3, TotalMarks. The pass mark for each subject is 50. Using this condition write a constructor for this class. Write separate functions for accepting and displaying student details. In the main method create an array of n student objects and display the details. 5. Create a Class Named College having data members Name of the class (BCA, BCom, BSc), Name of the staff, No of the students in the class, use constructors 6. Program to define a class called employee with the name and date of appointment. Create employee objects as an array and sort them as per their date of appointment. ie, print them as per their seniority. 7. Program to demonstrate interface in java program. 8. Program to Demonstrate exception handling in java. <p>PART- B</p> <ol style="list-style-type: none"> 1. Program to catch Negative Array Size Exception. This exception is caused when the array is initialised to negative values. 2. Program which creates and displays a message on window 3. Program to draw several shapes in the created window 4. Program which creates a frame with two buttons: father and mother. When we click the father button the name of the father, his age and designation must appear. When we click mother, similar details of mother also appear. 5. Program to move any one shape according to the arrow key pressed. 6. Program to create a window when we press M or m the window displays Good Morning, A or a the window displays Good After Noon E or e the window displays Good Evening, N or n the window displays Good Night 7. Demonstrate the various mouse handling events using suitable examples. 8. Program to create menu bar and pull-down menus

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Internal Assessment	
Attendance	5 Marks
Record	5 Marks
Total	10 Marks
Attendance Marks breakup < 75 % - 00 Marks , 75- 80% - 01 Mark , 80-85% - 02 Marks 85-90% - 03 Marks , 90-95% - 04 Marks, >95% - 05 Marks	

Practical Examination	
Writing and execution Part-A	5+10 =15 Marks
Writing and execution Part-B	5+10 =15 Marks
Viva voice	10 Marks
Total	40 Marks

Course Code: 24BCA22	Course Title: Operating System
Course Credits: 03	Teaching Hours per Week: 03
Total Contact Hours: 52	Internal Assessment : 20
Exam Duration: 03 Hours	Semester end Exam Marks: 80

Contents	hours
Unit-1 : Introduction to Operating System: Definition, Early systems – Batch Systems, Multiprogramming, Time Sharing, Real time system, Handheld systems and Distributed systems. Open Source Operating Systems. Process Management: Process Concept- Process Definition, Process State, Process Control Block, Process scheduling- Scheduling Queues, Schedulers, Context switch. Inter process communication (IPC) .	14
Unit-2 : CPU Scheduling - CPU I/O burst cycle, CPU Scheduler, Preemptive scheduling, Dispatcher. Scheduling criteria, Scheduling Algorithms- First-Come-First-Served (FCFS), Shortest Job First (SJF), Priority Scheduling, Round Robin scheduling algorithms. Deadlocks - Definition with example, System Model, Deadlocks Characterization- – Necessary Conditions, Resource Allocation Graph, Methods for Handling Deadlocks - Deadlock Prevention, Deadlock Avoidance.	12
Unit-3 Memory Management - Logical and Physical Address Space, Swapping, Contiguous Allocation, Fragmentation, Paging, Segmentation. Virtual Memory: Definition, Demand Paging, Page Replacement Algorithms -First In First Out (FIFO), Optimal Page replacement. Thrashing.	12
Unit-4 File System - File Concepts, Attributes, Operations and Types of Files. File Access methods, Directory Structure, Protection and consistency semantics. File System Implementation- File System Structure, File Allocation Methods, Free Space Management. Disk Structure, Disk Scheduling-Definition, Algorithms- FCFS, SSTF, SCAN.	14

References :

1. Operating System Concepts, Silberschatz' et al., 10th Edition, Wiley, 2018.
2. Operating System Concepts - Engineering Handbook, Ghosh PK, 2019.
3. Understanding Operating Systems, McHoes A et al., 7th Edition, Cengage Learning, 2014.
4. Operating Systems - Internals and Design Principles, William Stallings, 9th Edition, Pearson.
5. Operating Systems – A Concept Based Approach, Dhamdhare, 3rd Edition, McGrawHill Education India.
6. Modern Operating Systems, Andrew S Tanenbaum, 4th Edition, Pearson

THEORY EXAMINATION QUESTION PAPER PATTERN FOR MAJOR SUBJECTS

(Semesters I –VI)

B.C.A Semester-I Degree Examination; 2024-25

(Semester Scheme; New Syllabus: 2024-25)

SUBJECT: BCA

Paper – _____ : _____

Paper Code: _____

Time: 3 Hours

Max. Marks: 80

Instructions to candidates:

- 1) All sections are compulsory
- 2) Draw neat and labelled diagrams wherever necessary.

SECTION-A

1. Answer all the following questions: (2×10=20)

- a)
- b)
- c)
- d)
- e)
- f)
- g)
- h)
- i)
- j)

SECTION-B

Answer any SIX of the following: (Two Questions From each Unit) (5×6=30)

- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.

SECTION -C

Answer **Any Three** of the following:

(10×3=30)

10. From Unit-I
11. From Unit-II
12. From Unit-III
13. From Unit-IV
-

THEORY EXAMINATION QUESTION PAPER PATTERN FOR ELECTIVE/OPTIONAL PAPERS
(Semesters III & IV)

B.C.A. Semester-I/II/III/IV/V Degree Examination; 2024-25
(Semester Scheme; New Syllabus: 2024-25)

SUBJECT: BCA

Paper – ELECTIVE/OPTIONAL III & IV _____: _____

Paper Code: _____

Time: 2 Hours

Max. Marks: 40

Instructions to candidates:

- 1) All sections are compulsory
- 2) Draw neat and labelled diagrams wherever necessary.

SECTION-A

Answer **all** the following questions:

(2×5=10)

- 1.
- 2.
- 3.
- 4.
- 5.

SECTION-B

Answer any **SIX** of the following:

(5×6=30)

- 6.
 - 7.
 - 8.
 - 9.
 - 10.
 - 11.
 - 12.
 - 13.
-
-

Syllabus Distribution for Question Paper Setting		
Section-A	Ten Questions of each carrying 02 marks	Two questions each from unit-1 and Unit-2. And Three questions each from Unit-3 and unit-4.
Section -B	Eight Questions carrying 06 marks each.	Two questions from each unit.
Section -C	Four Questions carrying 10 marks each	One question from each unit. (There shall be sub-Questions.)