

ST JOSEPH ENGINEERING COLLEGE

AN AUTONOMOUS INSTITUTION

Vamanjoor, Mangaluru - 575028

Affiliated to VTU-Belgaum & Recognized by AICTE NBA-
Accredited: B.E. (CSE, ECE, EEE, ME, CIV) & MBA, MCA

NAAC – Accredited with grade A+

Bachelor of Computer Applications

(BCA)

SCHEME & SYLLABUS

(2026 Onwards)

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AUTONOMY AND ACCREDITATION

St Joseph Engineering College (SJEC) is an Autonomous Institute under Visvesvaraya Technological University (VTU), Belagavi, Karnataka State, and is recognized by the All - India Council for Technical Education (AICTE), New Delhi. SJEC is registered under the trust “Diocese of Mangalore, Social Action Department”.

The SJEC has been conferred Fresh Autonomous Status from the Academic Year 2021-22. The college was granted autonomy by the University Grants Commission (UGC) under the UGC Scheme for Autonomous Colleges 2018 and conferred by VTU. The UGC Expert Team had visited the college on 28-29 November 2021 and rigorously assessed the college on multiple parameters. The fact that only a handful of engineering colleges in the state have attained Autonomous Status adds to the college’s credibility that has been on a constant upswing. Autonomy will make it convenient for the college to design curricula by recognizing the needs of the industry, offering elective courses of choice and conducting the continuous assessment of its students.

At SJEC, the Outcome-Based Education (OBE) system has been implemented since 2011. Owing to OBE practiced at the college, SJEC has already been accredited by the National Board of Accreditation (NBA). Five of the UG programs, namely Computer Science & Engineering, Mechanical Engineering, Electronics and Communication Engineering, Electrical & Electronics Engineering and Civil Engineering and also MBA and MCA programs, have accreditation from the NBA. Also, SJEC has been awarded the prestigious A+ grade by the National Assessment and Accreditation Council (NAAC) for five years. With a Cumulative Grade Point Average (CGPA) of 3.39 on a 4-point scale, SJEC has joined the elite list of colleges accredited with an A+ grade by NAAC in its first cycle. The fact that only 5 per cent of the Higher Education Institutions in India have bagged A+ or higher grades by NAAC adds to the college’s credibility that has been on a constant upswing.

The college is committed to offering quality education to all its students, and the accreditation by NAAC and NBA reassures this fact. True to its motto of “Service and Excellence”, the college’s hard work has resulted in getting this recognition, which has endorsed the academic framework and policies that the college has been practicing since its inception. The college has been leveraging a flexible choice-based academic model that gives students the freedom to undergo learning in respective disciplines and a transparent and continuous evaluation process that helps in their holistic development.

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SJEC MCA

The Master of Computer Applications (MCA) program, established in 2008 with an intake of 60 students, offers a two-year course approved by the All India Council for Technical Education (AICTE) and is an Autonomous Institution affiliated to Visvesvaraya Technological University (VTU), Belgaum, Karnataka. The MCA program is accredited by National Board of Accreditation (NBA) in the year 2024.

The Computer Applications department at St. Joseph Engineering College, Vamanjoor, Mangaluru emphasizes core courses that delve into design and analysis techniques for the software development across diverse application domains. Additionally, students gain insights into the workings of computers and networks. The program also offers elective courses from emerging fields technologies, such as Artificial Intelligence, Cloud Technologies, Cyber Security, Big Data Analytics, Internet of Things, and Drone Technologies etc, allowing students to explore their individual interests. Greater emphasis will be given on application development to better prepare the students for the industry. Currently the department works with an intake of 120 students.

Department Vision

To be recognized as a department with research environment empowering computer professionals with a strong sense of service and human values at the core.

Department Mission

- Inculcate professional behavior with strong ethical values and innovative research capabilities among faculty and students.
- To meet the global needs and challenges through training of professionals who can work with interest to support the society.
- Encourage faculty to have continuous progress in their teaching skills and self-development.

Programme Educational Objectives (PEOs)

Graduates will be able to:

- Have appreciation for, Professional and Ethical responsibilities through strong commitment to values.
- Acquire essential fundamentals and adopt techniques and skills to critically identify, formulate and solve computational problems
- Effectively design, develop and manage computer applications, using modern tools and techniques.

- Develop confidence for self-education and innovative entrepreneurship.

Programme Outcomes (POs)

Graduates will have the ability to:

- **PO1 Foundation Knowledge:** Apply knowledge of mathematics, programming logic and coding fundamentals for solution architecture and problem solving.
- **PO2 Problem Analysis:** Identify, review, formulate and analyse problems for primarily focussing on customer requirements using critical thinking frameworks.
- **PO3 Development of Solutions:** Design, develop and investigate problems with as an innovative approach for solutions incorporating ESG/SDG goals.
- **PO4 Modern Tool Usage:** Select, adapt and apply modern computational tools such as development of algorithms with an understanding of the limitations including human biases.
- **PO5 Individual and Teamwork:** Function and communicate effectively as an individual or a team leader in diverse and multidisciplinary groups. Use methodologies such as agile.
- **PO6 Project Management and Finance:** Use the principles of project management such as scheduling, work breakdown structure and be conversant with the principles of Finance for profitable project management.
- **PO7 Ethics:** Commit to professional ethics in managing software projects with financial aspects. Learn to use new technologies for cyber security and insulate customers from malware.
- **PO8 Life-long learning:** Change management skills and the ability to learn, keep up with contemporary technologies and ways of working.

SEMESTER I

Sl. No.	Course And Course Code		Course Title	Teaching Hours / week			Examination			Credits
				L	T	P	CIE	SEE	Total	
01	BSC	BBCA101	Language 1	2			50	50	100	2
02	BSC	BBCA102	Language 2	2			50	50	100	2
03	PCC	BBCA103	Programming in C	3			50	50	100	3
04	PCC	BBCA104A	Mathematical Foundation	3			50	50	100	3
05	PCC	BBCA105	Computer Essentials	3			50	50	100	3
06	PCC	BBCAL106	Information Technology LAB			2	50	50	100	2
07	BSC	BBCA107	Environmental Studies		2		50	50	100	1
08	PCC	BBCAL108	C Programming LAB			2	50	50	100	2
09	PCC	BBCA109B	Fundamentals of Accountancy	2			50	50	100	2
			TOTAL	15	2	4	450	450	900	20

SEMESTER II

Sl. No.	Course And Course Code		Course Title	Teaching Hours / week			Examination			Credits
				L	T	P	CIE	SEE	Total	
01	BSC	BBCA201	Language 1	2			50	50	100	2
02	BSC	BBCA202	Language 2	2			50	50	100	2
03	PCC	BBCA203	Fundamentals of Data Structures	3			50	50	100	3
04	PCC	BBCA204	Discrete Mathematical Structures	3			50	50	100	3
05	PCC	BBCA205	Unix and Shell Scripting	3			50	50	100	3
06	PCC	BBCA206A	Fundamentals of Fintech	2			50	50	100	2
07	BSC	BBCA207	Constitution of India		2		50	50	100	1
08	PCC	BBCAL208	Data Structure LAB			2	50	50	100	2
09	SDC	BBCAL209	Unix and Shell Scripting Lab	2			50	50	100	2
			TOTAL	15	2	4	450	450	900	20

SEMESTER III

Sl. No.	Course And Course Code		Course Title	Teaching Hours / week			Examination			Credits
				L	T	P	CIE	SEE	Total	
01	PCC	BBCA301	Fundamentals of JAVA	2		2	50	50	100	4
02	PCC	BBCA302	Database Management Systems	3			50	50	100	3
03	PCC	BBCA303	Computer Communication and Networks	3			50	50	100	3
04	PCC	BBCA304	Operating System Concepts	3			50	50	100	3
05	PCC	BBCA305	Introduction to Python	3			50	50	100	3
06	PCC	BBCAL306	Python LAB			2	50	50	100	2
07	SDC	BBCAM307	Online Course E-Business		2					PP
08	PCC	BBCAL308	DBMS LAB			2	50	50	100	2
			TOTAL	14	2	6	450	450	900	20

SEMESTER IV

Sl. No.	Course And Course Code		Course Title	Teaching Hours / week			Examination			Credits
				L	T	P	CIE	SEE	Total	
01	PCC	BBCA401	Introduction to Data Analytics using Python	3			50	50	100	3
02	PCC	BBCA402	Introduction to Web Technologies	3			50	50	100	3
03	PCC	BBCA403	Software Engineering	3			50	50	100	3
04	BSC	BBCA404	Digital Entrepreneurship	3			50	50	100	3
05	PCC	BBCA405	C# and DOTNET FRAMEWORK	2		2	50	50	100	4
06	PCC	BBCAL406	Data Analytics using Python LAB			2	50	50	100	2
07	SDC	BBCA407	Yoga for a Healthy Life		2					PP
08	PCC	BBCAL408	IWT LAB			2	50	50	100	2
			TOTAL	14	2	6	450	450	900	20

SEMESTER V										
Sl. No.	Course And Course Code		Course Title	Teaching Hours / week			Examination			Credits
				L	T	P	CIE	SEE	Total	
01	PCC	BBCA501	Introduction to AI	3			50	50	100	3
02	PCC	BBCA502	Mobile Application Development	3			50	50	100	3
03	PCC	BBCA503	Cloud Computing	3			50	50	100	3
04	PEC	BBCA504X	Professional Elective 1	2			50	50	100	2
05	PCC	BBCA505	Design and Analysis of Algorithms	2		2	50	50	100	4
06	PCC	BBCAL506	Mobile Application Development Lab			2	50	50	100	2
07	SDC	BBCA507	Technical Seminar		2					1
08	SDC	BBCAP508	Mini Project			2	50	50	100	2
			TOTAL	13	2	6	450	450	900	20

Professional Electives - 1

1. Digital Marketing
2. Advanced Java
3. Object Oriented Modelling and Design
4. NoSQL

5. Wireless Communication
6. Computer Graphics with OpenGL

SEMESTER VI										
Sl. No.	Course And Course Code		Course Title	Teaching Hours / week			Examination			Credits
				L	T	P	CIE	SEE	Total	
01	PCC	BBCA601	Data mining and Data ware housing	3			50	50	100	3
02	PEC	BBCA602X	Professional Elective 2	2			50	50	100	2
03	PEC	BBCA603X	Professional Elective 3	2			50	50	100	2
04	SDC	BBCA604	Industry Internship			6	50	50	100	6
05	SDC	BBCA605	Project Lab			7	50	50	100	7
			TOTAL	7		13	450	450	900	20

Professional Elective- 2

- A. Digital Image Processing
- B. Web Content Management
- C. Cybersecurity
- D. Cryptography and Network Security
- E. Internet of Things
- F. Gaming Application Development

Professional Elective- 3

- G. Software Testing
- H. ERP
- I. Full stack Development
- J. Data Science
- K. Ethical Hacking
- L. Business Intelligence

SEMESTER I - SYLLABUS

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PROGRAMMING IN C

Course Code	BBCA101	CIE Marks	50
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50
Credits	03	Exam Hours	03

COURSE OBJECTIVES:

- To develop skills in solving problem.
- To obtain knowledge about the structure of the programming language C.
- To develop the program writing and logical thinking skill.

Module - 1

Problem Solving techniques: Introduction, Problem solving procedure, **Algorithm:** Steps involved in algorithm development. Algorithms for simple problems: To find largest of three numbers, factorial of number, check for prime number, check for palindrome, Count no. of odd, even and zeros in list of integers.

Flowcharts: Definition, advantages, Symbols used in flow charts. Flowcharts for simple problems mentioned in algorithms. Pseudocode.

Module - 2

Introduction to C: Overview of C Program, Importance of C Program, Basic structure of a C- program, Execution of C Program.

Constants, Variables & Data types: Character set, C token, Keywords & identifiers, Constants, Variables, datatypes, Declaration of variables, assigning values to variables, defining symbolic constants.

Operators and Expression: Arithmetic, Relational, logical, assignment, increment & decrement, conditional, bit wise & special operators, evaluation of expressions, Precedence of arithmetic operators, type conversions in expressions, operator precedence & Associativity, built in mathematical functions.

Module - 3

Managing Input and Output operations: Reading & writing a character, formatted input and output.

Decision Making and Branching: Decision making with if statement, simple if statement, the if else statement, nesting of if ... else statements, the else if ladder, the switch statement, the ?: operator, the goto statement.

Decision making and looping: The while statement, the do statement, for statement, exit, break, jumps in loops.

Module - 4

Arrays: Declaration, initialization & access of one dimensional & two-dimensional arrays.

Programs using one- and two-dimensional arrays- sorting and searching arrays.

Handling of Strings: Declaring & initializing string variables, reading strings from terminal, writing strings to screen, Arithmetic operations on characters, String Handling functions, table of strings.

User defined functions: Need for user defined functions, Declaring, defining and calling C functions return values & their types, Categories of functions: With/without arguments, with/without return values. Nesting of functions

Module - 5

Structures, union and Pointers: Structure definition, giving values to members, structure initialization, comparison of structure variables, arrays of structures, arrays within structures, Structure and functions, structures within structures. **Unions. Pointers:** Understanding pointers, accessing the address of a variable, declaring & initializing pointers, accessing a variable through its pointer, pointer expression, pointer increments & scale factor, passing pointer variables as function arguments.

Teaching Methodology: Chalk and talk method / PowerPoint Presentation.

COURSE OUTCOMES:

- CO 1. Describe the C Programming language which includes the structure of a C program, Tokens, Expressions, Operators etc.
- CO 2. Demonstrate conditional and iterative statements to write C programs.
- CO 3. Construct the C programs that use pointers to access arrays and strings.
- CO 4. Illustrate the user defined functions to solve real time problems.

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MATHEMATICAL FOUNDATION			
Course Code	BBCA102A	CIE Marks	50
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50
Credits	03	Exam Hours	03
COURSE OBJECTIVES:			
<ul style="list-style-type: none"> • The Curriculum supports the prerequisites to enhance their Mathematical knowledge towards understanding mathematical Concepts in the concerned fields. • Enhance problem-solving skills using mathematical models and algorithms. • Develop logical reasoning and analytical thinking. • Understand the mathematical foundations of computer science, including discrete mathematics and graph theory. • Apply mathematical concepts to computer science problems, such as algorithm design and analysis. 			
Module - 1			
Introduction to Number System: Overview of number systems: Binary numbers, Number based conversion, Octal and hexadecimal numbers, Complements.			
Module - 2			
Propositional Logics: Mathematical logic introduction-statements Connectives-negation, conjunction, disjunction- statement formulas and truth tables- conditional and bi Conditional statements- tautology contradiction.			
Module - 3			
Set Theory: Operations on sets, power set, Venn diagram, Cartesian product, relations, functions- types of functions - composition of functions.			
Module - 4			
Matrix algebra: Introduction, Types of matrices-matrix operations, transpose of a matrix, determinant of matrix, inverse of a matrix, Cramer's rule.			
Module - 5			
Differential calculus: Functions and limits - Simple Differentiation of Algebraic Functions – Evaluation of First and Second Order Derivatives – Maxima and Minima.			
Teaching Methodology: Chalk and talk method / PowerPoint Presentation			
COURSE OUTCOMES:			
CO1. Understand and convert between binary, octal, and hexadecimal number systems.			
CO2. Apply propositional logic to create and interpret truth tables.			
CO3. Perform operations on sets and analyze functions using Venn diagrams.			
CO4. Conduct matrix operations and solve linear equations using matrices.			
CO5. Differentiate algebraic functions and apply calculus to find maxima and minima.			

COMPUTER ESSENTIALS			
Course Code	BBCA103	CIE Marks	50
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50
Credits	03	Exam Hours	03
COURSE OBJECTIVES:			
<ul style="list-style-type: none"> To provide foundational knowledge of computer systems, including their history, architecture, and essential operations. To equip students with practical skills in operating systems, networking, office applications, and file system management. 			
Module - 1			
Introduction to computers: History of Computing, Data Storage: Bits and Their Storage, Main Memory, Mass Storage, Representing Information as Bit Patterns, The Binary System. Data Manipulation: Computer Architecture, Machine Language, Program Execution Arithmetic/Logic Instructions.			
Module - 2			
Operating System Fundamentals: The History of Operating Systems, Operating System Architecture, Types of Operating System, Coordinating the Machine's Activities, Handling Competition Among Processes, Security.			
Module - 3			
Data Communications & Computer Networks: Components, Data Representation, Data Flow, Network Criteria, Physical Structures, network types, internet history.			
Module - 4			
Office Tools: Using office tools, Creating, Saving, Closing, and Opening Office Files, Working with Files, Using the Ribbon, Tabs, and Quick Access Toolbar, Using Context Menus, the Mini Toolbar, and Keyboard Shortcuts, Organizing and Customizing Folders and Files. Usage of office tools			
Module - 5			
File-System Interface: File Concept, Access Methods, Directory and Disk Structure, File - System Mounting, File Sharing, Protection, File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance, Recovery.			
Teaching Methodology: Chalk and talk method / PowerPoint Presentation			
COURSE OUTCOMES:			
CO 1. Understand basic computer concepts including history, data storage, and data manipulation techniques.			
CO 2. Learn the fundamentals of operating systems and their role in managing computer resources and security.			
CO 3. Gain knowledge of data communication principles and computer networking basics.			
CO 4. Develop proficiency in using office tools for document creation, data management, and presentation.			
CO 5. Explore the structure and management of file systems including file operations, directory structures, and storage management.			

INFORMATION TECHNOLOGY LAB

Course Code	BBCAL104	CIE Marks	50
Teaching Hours/Week (L:T:P)	(0:0:2)	SEE Marks	50
Credits	02	Exam Hours	03

Practice Lab

1. Identification of the peripherals of a computer, components in a CPU and their functions.
2. Assembling and disassembling the system hardware components of personal computer.
3. Basic Computer Hardware Trouble shooting.
4. LAN and WiFi Basics.
5. Operating System Installation – Windows OS, UNIX/LINUX, Dual Booting.
6. Activities using word processing, presentation and spreadsheet software
7. Tasks involving Internet Browsing

Part A: Word Processing & Presentation

I. Word Processing

1. Prepare a document using different formatting tools

Highlights of the National Education Policy (NEP) 2020



Note4Students

From UPSC perspective, the following things are important :

Prelims level : National Education Policy

Mains level : Need for imbuing competitiveness in Indian education system

New Policy aims for **universalization of education** from pre-school to secondary level with 100% Gross Enrolment Ratio (GER) in school education by 2030. NEP 2020 will bring 2 crores out of school children back into the mainstream through the open schooling system.

- ❖ The current 10+2 system to be replaced by a new 5+3+3+4 curricular structure corresponding to ages 3-8, 8-11, 11-14, and 14-18 years respectively. **This will bring the hitherto uncovered age group of 3-6 years under the school curriculum, which has been recognized globally as the crucial stage for the development of mental faculties of a child.**
- ❖ The new system will have 12 years of schooling with three years of Anganwadi/ pre-schooling.
 - Emphasis on Foundational Literacy and Numeracy, no rigid separation between academic streams, extracurricular, vocational streams in schools; Vocational Education to start from Class 6 with Internships
 - Teaching up to at least Grade 5 to be in mother tongue/ regional language. No language will be imposed on any student.
- Assessment reforms with 360° **Holistic Progress Card**, tracking Student Progress for achieving Learning Outcomes
- A new and comprehensive National Curriculum Framework for Teacher Education, NCFTE 2021, will be formulated by the NCTE in consultation with NCERT.
- By 2030, the minimum degree qualification for teaching will be a 4-year integrated B.Ed. degree.
- Gross Enrolment Ratio in higher education to be raised to **50% by 2035; 3.5 crore seats to be added in higher education.**
- The policy envisages broad-based, multi-disciplinary, holistic Under Graduate Program with flexible curricula, creative combinations of subjects, integration of vocational education and multiple entries and exit points with appropriate certification.
- **Academic Bank of Credits to be established to facilitate Transfer of Credits**

Multidisciplinary Education and Research Universities (MERUs), at par with IITs, IIMs, to be set up as models of best multidisciplinary education of global standards in the country.

Affiliation of colleges is to be **phased out in 15 years** and a stage-wise mechanism is to

be established for granting graded autonomy to colleges.

Over a period of time, it is envisaged that every college would develop into either an Autonomous degree-granting College or a constituent college of a university.

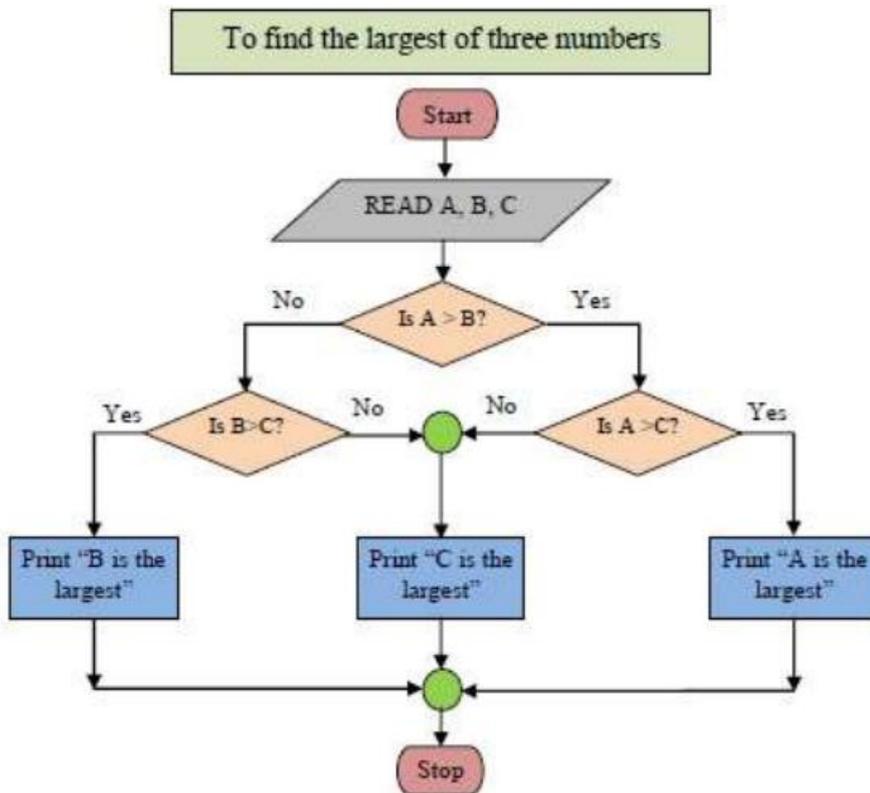
$$\frac{df}{dt} = \lim_{h \rightarrow 0} \frac{f(t+h) - f(t)}{h}$$

$$(a + b)^2 = a^2 + 2ab + b^2$$

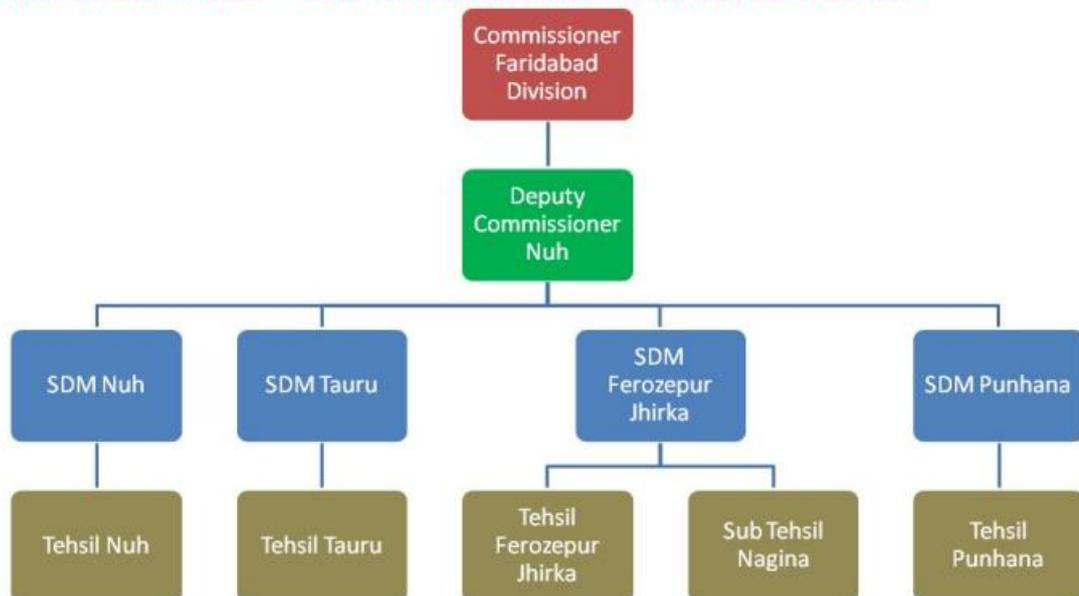
$$(a - b)^2 = (a + b)^2 - 4ab$$

$$a^2 + b^2 = (a - b)^2 + 2ab$$

2. Prepare a document using SmartArt and Shapes tools



Organization Chart – Administration Faridabad Division



3. Prepare a document with table to store sales details of a company for different quarters and calculate total, average and find maximum, minimum sales value.

Interview call Letter Format

Date:
[Name of the candidate]
[Address]

Dear [name of the candidate]

This is to the reference of your application for the job [name of the job] indicating interest in seeking employment in our organisation. We thank you for the same.

We would like to inform you that your profile is being shortlisted for the job role and is best suited for it. Therefore, we would like to take a face to face interview with you on [date of interview] at [venue details].

We hope that the venue is suitable for you. If not please get in touch with us, so that we can arrange the date and venue according to your availability.

The company will reimburse you all the expenses incurred by you for this interview. This letter has an attachment in which you need to fill the details and carry it along on the date of interview. Please carry your CV also along with you.

Kindly confirm your availability for the date and venue. If there are any changes to be done, please contact us at phone number: [999xxxx999] and email id: abcnd@mail.com.

We look forward to seeing you.

Regards,
Name of the Manager
Designation Name
Company name

5. II. Presentation

1. Create a presentation (minimum 5 slides) about your college. It should contain images, chart, Bulleted text,
2. Create a presentation (minimum 5 slides) to advertise a product. The slides should be displayed automatically in a loop. Make use of Transition and Animations.
3. A simple quiz program. Use hyperlinks to move to another slide in the presentation to display the result and correct answer/wrong answer status. Use at least four questions.

Part B: Spreadsheet

(Note: Give proper titles, column headings for the worksheet. Insert 10 records for each exercise in such a way to get the result for all the conditions. Format the numbers appropriately wherever needed).

1. Create a worksheet to maintain student information such as RollNo, Name, Class, Marks in three subjects of 10 students. Calculate total marks, average and grade. Find grade for Distinction, First class, Second class, Pass and Fail using normally used conditions.
 - Using custom sort, sort the data according to class: - Distinction first, FirstClass next, and so on. Within each class, average marks should be in descending order.
 - Also draw the Column Chart showing the RollNo versus Average scored.

(Note: Worksheet creation and formatting 4 marks, calculations: 5 marks, sorting: 3 marks, chart: 3 marks)

2. Prepare a worksheet to store details of Electricity consumed by customers. Details are Customer No, Customer Name, Meter No, Previous meter reading, Current meter reading of 10 customers. Calculate total number of units consumed and total amount to be paid by each consumer using following conditions:
 - If unit consumed is up to 30, charge is 100.
 - 31 to 100 units, 4.70 per unit
 - 101 to 200 units, 6.25 per unit
 - Above 200 units, 7.30 per unit.
 - Use Data validation to see that current reading is more than previous reading.
 - Arrange the records in the alphabetic order of names.
 - Filter the records whose bill amount is more than Rs.1500.

(Note: Worksheet creation and formatting 4 marks, Data validation: 2 marks, calculations: 5 marks, sorting: 2 marks, filtering: 2 marks)

3. Create Employee worksheet having EmpNo, EmpName, DOJ, Department, Designation and Basic Pay of 8 employees. Calculate DA, HRA, Gross Pay, Profession Tax, Net Pay, Provident Fund as per the rule:
 - DA = 30% of basic pay
 - HRA = 10% of basic pay if basic pay is less than 25000, 15% of basic pay otherwise.
 - Gross = DA + HRA + Basic pay
 - Provident fund = 12% of Basic pay or Rs.2000, whichever is less.
 - Profession Tax = Rs.100 if Gross pay is less than 10000, Rs.200 otherwise.
 - NetPay = Gross - (Professional tax + Provident Fund)
 - Using Pivot table, display the number of employees in each department and represent it using Pie chart.

(Note: Worksheet creation and formatting 4 marks, calculations: 5 marks, Pivot table: 3 marks, Chart: 3 marks)

4. Create a table COMMISSION containing the percentage of commission to be given to salesmen in different zones as follows:

Zone	Percentage
South	10
North	12.5
East	14
West	13

Create another table SALES in the same worksheet to store salesman name, zone name, place, name of the item sold, rate per unit, quantity sold. Calculate total sales amount of each salesman. Referring the COMMISSION table, write the formula to compute the commission to be given. (Hint: Use if function and absolute cell addresses)

Using advanced filtering show the result in other parts of the worksheet.

- Show the records of various zones separately.
- Show the records of only East and West zones.
- Display the details of the items sold more than 50, in South or North zones.

(Note: Worksheet creation and formatting: 4 marks, calculations: 5 marks, filtering: 6 marks)

Teaching Methodology: Chalk and talk method / PowerPoint Presentation / Installation Videos

COURSE OUTCOMES:

CO 1. Understand the identification, assembly, disassembly, and basic troubleshooting of computer hardware components, including peripherals, CPU, and system hardware.

CO 2. Gain hands-on experience with networking basics, including LAN and WiFi setup and

configuration.

CO 3. Develop practical skills in installing and configuring various operating systems, including Windows, UNIX/Linux, and dual booting, along with system maintenance using BIOS settings, Registry Editor, and third-party tools.

CO 4. Enhance proficiency in using office productivity software, including word processors, spreadsheets, presentation tools, and multimedia editing software.

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C PROGRAMMING LAB

Course Code	BBCAL105	CIE Marks	50
Teaching Hours/Week (L:T:P)	(0:0:2)	SEE Marks	50
Credits	02	Exam Hours	03

COURSE OBJECTIVES:

- Write C programs to perform basic operations such as calculations, comparisons, and data manipulation.
- Implement and demonstrate control structures like loops, conditionals, and switch-case statements in C.
- Manipulate arrays and strings, including operations like finding duplicates, reversing, and applying string functions.
- Demonstrate the use of pointers for advanced operations like swapping numbers and matrix manipulation, and work with structures to manage complex data types.

PART - A

1. Program to read marks of five subjects, calculate percentage of marks and to display appropriate grade declaration message (using else-if ladder).
2. Program to find the greatest of three numbers (using nested if statement).
3. Program to read two integer values & a operator as character and perform basic arithmetic operations on them using switch case (+, -, *, / operations)
4. Program to reverse a number and find the sum of individual digits. Also check for palindrome.
5. Program to read numbers from keyboard continuously till the user presses 999 and to find the sum of only positive numbers
6. Program to count occurrences of a character in a string.
7. Program to calculate and display the first 'n' Fibonacci numbers
8. Program to find given number is a prime or not.
9. Program to read a string and find a) length b) reverse of it c) check palindrome string d) merge original & reversed string (using built in string library functions)
10. Program to search for a number in a list of numbers using one-dimensional array.

PART - B

1. Program to find the largest and smallest elements with their position in a one-dimensional array
2. Program to read 'n' integer values into a single dimension array and arrange them in ascending order using bubble sort method.
3. Program to perform addition and subtraction of two Matrices
4. Program to display factorial of first 'n' integers using recursive function.
5. Program to read a string and count number of letters, digits, vowels, consonants present in it.
6. Program sort a list of strings in ascending order using Pointers
7. Program to enter the information of a student like name, register number, marks in three subjects into a structure and display total, average and grade Display details in a neat form.
8. Program to input Name of the branches, Total sales of company into an array of structures. Display branch details in a tabular format. Also display the branch name that recorded the highest sales.

Teaching Methodology: Chalk and talk method / PowerPoint Presentation

COURSE OUTCOMES:

- CO 1. Develop the C Program which includes the structure of a C program, Tokens, Expressions, Operators etc.
- CO 2. Demonstrate conditional and iterative statements to write C programs.
- CO 3. Construct C programs that use arrays and strings.
- CO 4. Design user defined functions to solve real time problems.
- CO 5. Demonstration of Structure concepts & Pointers.

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FUNDAMENTALS OF ACCOUNTANCY			
Course Code	BBCA106B	CIE Marks	50
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50
Credits	03	Exam Hours	03
COURSE OBJECTIVES:			
<ul style="list-style-type: none"> • Understand Core Accounting Concepts: Equip students with foundational knowledge of accounting principles, processes, and standards, enabling them to accurately record and report financial transactions. • Apply Practical Accounting Skills: Develop students' ability to manage various accounting tasks, such as journalizing, ledger posting, and bank reconciliation, ensuring they can effectively handle real-world financial data. 			
Module - 1			
Meaning and scope of accounting: History and Development of Accounting, Meaning, Objectives and functions of Accounting, Book keeping V/s Accounting, Users of accounting data, systems of book keeping and accounting, branches of accounting, advantages and limitations of accounting.			
Module - 2			
Accounting principles: Meaning of accounting principles, accounting concepts, account, conventions, accounting principles and the institute of chartered accounts of India, Statements of accounting standards.			
Module - 3			
Financial accounting process: Journalising transactions: Journals, Rules of Debit and Credit, Compound Journal Entry, Opening Entry. Ledger posting and trial balance: Ledger, Posting, Relationship between journal and ledger, Rules regarding posting, Trial Balance.			
Module - 4			
Sub-division of journals & negotiable instruments			
Sub-division of journals: Cash Journal, Petty Cash Book, Purchase Journal, Sales Journal, Sales Return Journal.			
Negotiable Instruments: Promissory Note, Specimen of Promissory note, Bill of Exchange, Cheque, Some Important Terms, Accounting Entries, Billes sent for collection, Accommodation Bills, Bills receivable and payable books.			
Module - 5			
Bank reconciliation statement: Advantages of keeping a bank account, causes of difference, Meaning and Objectives of bank reconciliation statement, Importance of bank reconciliation statement, Technique of preparing bank reconciliation statement, where cash book balance has to be adjusted, Where the abstract from the Cash Book and Pass Book are given.			
Teaching Methodology: Chalk and talk method / PowerPoint Presentation			
COURSE OUTCOMES:			
CO 1. Explain the key functions of accounting and differentiate between bookkeeping and accounting.			
CO 2. Describe core accounting principles and apply relevant accounting standards.			
CO 3. Record transactions in journals and post them to ledgers accurately.			

CO 4. Manage different types of journals and understand the accounting of negotiable instruments.

Prepare a bank reconciliation statement and identify discrepancies between bank and cash records.

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ENVIRONMENTAL STUDIES			
Course Code	BBCA107	CIE Marks	50
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50
Credits	03	Exam Hours	03
COURSE OBJECTIVES:			
<ul style="list-style-type: none"> • Understand Core Accounting Concepts: Equip students with foundational knowledge of accounting principles, processes, and standards, enabling them to accurately record and report financial transactions. • Apply Practical Accounting Skills: Develop students' ability to manage various accounting tasks, such as journalizing, ledger posting, and bank reconciliation, ensuring they can effectively handle real-world financial data. 			
Module - 1			
<p>Introduction to Environmental Studies: Multidisciplinary nature of environmental studies. Scope and importance; Concept of sustainability and sustainable development.</p> <p>Ecosystems: What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems:</p> <ol style="list-style-type: none"> a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) <p>Natural Resources: Renewable and Non-Renewable Resources</p> <ol style="list-style-type: none"> e) Land resources and land-use change; Land degradation, soil erosion and desertification. f) Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. g) Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (International & Inter-state). h) Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies. 			
Module - 2			
<p>Biodiversity and Conservation</p> <ol style="list-style-type: none"> i) Levels of biological diversity: Genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hotspots. j) India as a mega-biodiversity nation; Endangered and endemic species of India. k) Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. l) Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value. 			
Module - 3			
<p>Environmental Pollution</p> <ol style="list-style-type: none"> m) Environmental Pollution: Types, causes, effects and controls; Air, water, soil and noise pollution. n) Nuclear hazards and human health risks. o) Solid waste management, Control measures of urban and industrial waste. 			

- p) Pollution case student system; Banking complaints and Ombudsman
- q) Pollution case student system; Banking complaints and Ombudsman

Module - 4

Environmental Policies and Practices

- r) Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture.
- s) Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and Control of Pollution) Act; Wildlife (Protection) Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).
- t) Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context.

Module - 5

Human Communities and the Environment

- u) Human population growth: Impacts on environment, human health and welfare.
- v) Resettlement and rehabilitation of project affected persons; case studies.
- w) Disaster management: Floods, Earthquake, Cyclones and Landslides.
- x) Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan.
- y) Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.
- z) Environmental communication and public awareness, case studies (e.g., CNG vehicles in cities).

Teaching Methodology: Chalk and talk method / PowerPoint Presentation

COURSE OUTCOMES:

- CO 1. To understand the roles and responsibilities of various stakeholders in environmental management and policy-making.
- CO 2. To teach the principles and practices of natural resource conservation and management.
- CO 3. To provide an understanding of the structure and function of natural ecosystems and the relationships between organisms and their environment.
- CO 4. To analyze the impact of human activities on the environment, including urbanization, industrialization, deforestation, and climate change.

SEMESTER II - SYLLABUS

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FUNDAMENTALS OF DATA STRUCTURE			
Course Code	BBCA201	CIE Marks	50
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50
Credits	03	Exam Hours	03
COURSE OBJECTIVES:			
<ul style="list-style-type: none"> • Fundamentals of data structures • Basic concepts related to stacks, queues, linked list • Fundamentals of trees and binary tree traversals 			
Module - 1			
INTRODUCTION TO DATA STRUCTURES: Definition; Types of data structures - Primitive & Non primitive, Linear and Non-linear; Operations on data structures. Dynamic memory allocation: Static & Dynamic memory allocation; Memory allocation and de-allocation functions - malloc, calloc, realloc and free. Algorithm Specification, Performance Analysis, Performance Measurement Recursion: Definition; Types of recursions; Recursion Technique Examples - GCD, Factorial, Binomial coefficient nCr, Towers of Hanoi; Comparison between iterative and recursive functions.			
Module - 2			
ARRAYS: Operations on arrays; Arrays as abstract data types (ADT); Representation of Linear Arrays in memory. Traversing linear arrays; Inserting and deleting elements; Sorting – Selection sort, Bubble sort, Quick sort, Merge sort, Insertion sort; Searching - Sequential Search, Binary search; Iterative and Recursive searching;			
Module - 3			
STACKS: Basic Concepts – Definition and Representation of stacks; Operations on stacks; Applications of stacks; Infix, postfix and prefix notations; Conversion from infix to postfix using stack; Evaluation of postfix expression using stack; Application of stack in function calls. QUEUES: Basic Concepts – Definition and Representation of queues; Types of queues - Simple queues, Circular queues, Double ended queues, Priority queues; Operations on Simple queues.			
Module - 4			
LINKED LIST: Basic Concepts – Definition and Representation of linked list, Types of linked lists- Singly linked list, doubly linked list, Circular linked list, doubly circular linked list; Representation of Linked list in Memory; Operations on Singly linked lists – Traversing, Searching, Insertion, Deletion;			
Module - 5			
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 and heap tree; Array representation of binary tree. Traversal of binary tree; preorder, inorder and postorder traversal.			
Teaching Methodology: Chalk and talk method / PowerPoint Presentation			
COURSE OUTCOMES:			
CO 1. Know the types of data structure. Describe the implementation of dynamic memory allocation and recursion.			
CO 2. Describe the implementation of various methods of searching and sorting elements using array.			
CO 3. Describe the concepts and implement stack and queue. Understand basic operations			

involved, types and applications.

CO 4. Describe basic concepts of linked list. Understand types of linked list and implement basic operations on singly linked list.

CO 5. Describe the concepts of tree data structure and traversal techniques on binary tree.

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DISCRETE MATHEMATICAL STRUCTURE			
Course Code	BBCA201	CIE Marks	50
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50
Credits	03	Exam Hours	03
COURSE OBJECTIVES:			
<ul style="list-style-type: none"> The objective of this course is to better understanding on the concepts of Sets, Relations and Functions, Laplace transformations and multiple integrals. 			
Module - 1			
PROPOSITIONAL LOGICS: Propositional Logic, Applications of Propositional Logic, Propositional Equivalences, Predicates and Quantifiers, Nested Quantifiers, Rules of Inferences, Introduction to Proofs, Proof methods and Strategy.			
Module - 2			
SETS, RELATIONS AND FUNCTIONS: Operations on sets, power set, Venn diagram, Cartesian product, Relations and their properties, Closures of Relations, Equivalence Relations, Partial Orderings. Functions, Types of Functions, Inverse and Compositions, The Graphs of Functions.			
Module - 3			
INDUCTION AND RECURSION: Mathematical Induction, Strong Induction and Well Ordering, Recursive Definitions and Structural Induction, Recursive Algorithms, Program Correctness.			
Module - 4			
COUNTING: The Basics of Counting, The Pigeonhole Principle, Permutations and Combinations, Binomial Coefficients and Identities.			
Module - 5			
GRAPHS: 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 Coloring.			
Teaching Methodology: Chalk and talk method / PowerPoint Presentation			
COURSE OUTCOMES:			
CO 1. Understand and Apply Propositional Logic: Grasp the fundamentals of propositional logic, including logical connectives, equivalences, and proof methods.			
CO 2. Analyze Sets and Relations: Perform operations on sets, visualize relationships using Venn diagrams, and explore various types of relations and functions.			
CO 3. Develop skills in mathematical induction, recursive definitions, and algorithms, ensuring program correctness.			
CO 4. Apply counting principles, permutations, combinations, and binomial coefficients to solve combinatorial problems.			
CO 5. Study graph models, terminology, connectivity, and algorithms for paths, planarity, and coloring.			

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UNIX AND SHELL SCRIPTING			
Course Code	BBCA202	CIE Marks	50
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50
Credits	03	Exam Hours	03
COURSE OBJECTIVES:			
<ul style="list-style-type: none"> • Understand UNIX history, architecture, and basic commands. Gain proficiency in navigating the UNIX environment, managing files and directories, and using essential commands for system interaction. • Learn to write and execute shell scripts, manage file permissions, and handle system processes. Utilize shell scripting for automation, data entry, and process management. 			
Module - 1			
Introduction of UNIX - Introduction, History, Architecture, Experience the Unix environment, Basic commands ls, cat, cal, date, calendar, who, printf, tty, sty, uname, passwd, echo, tput, and bc			
Module - 2			
UNIX File System- The file, what's in a filename? The parent-child relationship, pwd, the Home directory, absolute pathnames, using absolute pathnames for a command, cd, mkdir, rmdir, Relative pathnames, The UNIX file system.			
Module - 3			
Basic File Attributes - ls - l, the -d option, File Permissions, chmod, Security and File Permission, users and groups, security level, changing permission, user masks, changing ownership and group, File Attributes, More file attributes: hard link, symbolic link, umask, find.			
Module - 4			
Introduction to the Shell Scripting - Introduction to Shell Scripting, Shell Scripts, read, Command Line Arguments, Exit Status of a Command, The Logical Operators && and , exit, if, and case conditions, expr, sleep and wait, while, until, for, \$, @, redirection. The here document, set, trap, Sample Validation and Data Entry Scripts			
Module - 5			
Introduction to UNIX System process: Mechanism of process creation. Parent and child process. The ps command with its options. Executing a command at a specified point of time: at command. Executing a command periodically: cron command and the crontab file Signals			
Teaching Methodology: Chalk and talk method / PowerPoint Presentation			
COURSE OUTCOMES:			
CO 1. To help the students to understand effective use of Unix concepts, commands and terminology.			
CO 2. Understand the UNIX file system.			
CO 3. Understand UNIX command syntax and semantics and identify, access, and evaluate file permissions.			
CO 4. Ability to read and understand specifications, scripts and programs.			
CO 5. Analyze Facility with UNIX Process			

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FUNDAMENTALS OF FINTECH			
Course Code	BBCA203A	CIE Marks	50
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50
Credits	03	Exam Hours	03
COURSE OBJECTIVES:			
<ul style="list-style-type: none"> • Understand evolution of FinTech and role in digital payments and mobile banking • Understand blockchain and crypto currency and identify lending and crowd funding platforms • Understand Robo-advisory and their role in wealth management. 			
Module - 1			
Introduction to Financial Technology (FinTech): Overview of Financial Technology (History and evolution of FinTech); Role and importance fintech in modern finance ; Traditional vs digital financial system; Key FinTech sectors (Payments, Lending, Blockchain, Robo-Advisors, InsurTech, RegTech, etc.)			
Module - 2			
Digital Payments and Mobile Banking: Introduction to digital payments: Types, methods, and platforms ; Mobile payment systems (UPI, PayPal, Google Pay, etc.) ; Cryptography in payment systems Security issues in digital payments; Regulatory frameworks and compliance (e.g., GDPR, PCI-DS)			
Module - 3			
Blockchain Technology and Crypto currencies: Introduction to Blockchain technology: Concepts and structure; Blockchain use cases in financial services ; Crypto currencies: Bitcoin, Ethereum, and Altcoins; Crypto currency exchanges and wallets Smart contracts and Decentralized Finance (DeFi) Regulatory challenges and future trends			
Module - 4			
Lending and Crowd funding Platforms: Peer-to-peer (P2P) lending platforms; Crowdfunding models (Equity-based, Reward-based, etc.); Alternative credit scoring models; Risk assessment and mitigation in lending ; Role of Artificial Intelligence (AI) and Machine Learning (ML) in lending			
Module - 5			
Robo-Advisory and Wealth Management: Introduction to Robo-advisors and their role in wealth management; Algorithmic trading and investment strategies; Risk management and portfolio diversification using technology; Regulatory environment for Robo-advisory services; Comparison of traditional vs digital wealth management; Future of FinTech: Trends, challenges, and opportunities			
Teaching Methodology: Chalk and talk method / PowerPoint Presentation			
COURSE OUTCOMES:			
CO 1. Understanding the key sectors and evolution of FinTech in modern finance.			
CO 2. Gaining knowledge of digital payment systems, security, and regulatory compliance.			
CO 3. Understanding blockchain applications in finance and the role of cryptocurrencies.			
CO 4. Learning about alternative lending models and risk assessment in digital lending.			
CO 5. Exploring Robo-advisors and their impact on wealth management and investment strategies.			

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CONSTITUTION OF INDIA			
Course Code	BBCA204	CIE Marks	50
Teaching Hours/Week (L:T:P)	(3:0:0)	SEE Marks	50
Credits	03	Exam Hours	03
COURSE OBJECTIVES:			
<ul style="list-style-type: none"> • To know about the basic structure of Indian Constitution. • To know the Fundamental Rights (FR's), DPSP's and Fundamental Duties (FD's) of our constitution. • To know about our Union Government, political structure & codes, procedures. • To know the State Executive & Elections system of India. • To learn the Amendments and Emergency Provisions, other important provisions given by the constitution. 			
Module - 1			
Indian Constitution: Necessity of the Constitution, Societies before and after the Constitution adoption. Introduction to the Indian constitution, Making of the Constitution, Role of the Constituent Assembly.			
Module - 2			
Salient features of India Constitution. Preamble of Indian Constitution & Key concepts of the Preamble. Fundamental Rights (FR's) and its Restriction and limitations in different Complex Situations. building.			
Module - 3			
Directive Principles of State Policy (DPSP's) and its present relevance in Indian society. Fundamental Duties and its Scope and significance in Nation, Union Executive : Parliamentary System, Union Executive – President, Prime Minister, Union Cabinet.			
Module - 4			
Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Judicial System of India, Supreme Court of India and other Courts, Judicial Reviews and Judicial Activism			
Module - 5			
State Executive and Governer, CM, State Cabinet, Legislature - VS & VP, Election Commission, Elections & Electoral Process. Amendment to Constitution, and Important Constitutional Amendments till today. Emergency Provisions.			
Teaching Methodology:			
<ol style="list-style-type: none"> 1. Chalk and talk method / PowerPoint Presentation 2. Contents related activities (Activity-based discussions) 3. Quizzes and Group discussions 			
COURSE OUTCOMES:			
CO 1. Analyse the basic structure of Indian Constitution.			
CO 2. Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.			
CO 3. Know about our Union Government, political structure & codes, procedures.			
CO 4. Understand our State Executive & Elections system of India.			
CO 5. Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.			

DATA STRUCTURE USING C LABORATORY			
Course Code	BBCAL205	CIE Marks	50
Teaching Hours/Week (L:T:P)	(0:0:2)	SEE Marks	50
Credits	02	Exam Hours	03
COURSE OBJECTIVES:			
<ul style="list-style-type: none"> Equip students with the skills to implement and manipulate fundamental data structures like arrays, stacks, queues, and linked lists. Enable students to solve complex problems using recursion, matrix operations, and tree traversal techniques. 			
PART - A			
<ol style="list-style-type: none"> Write a program to implement and demonstrate the following operations on an array: Insertion, Deletion, Traversing, and Searching. Write a recursive program to solve Towers of Hanoi problem for n disks. Write a recursive program to calculate the Greatest Common Divisor (GCD) of two numbers. Write a recursive program to calculate the factorial of a number. Write a program to implement linear searching technique on an array. Write a program to implement binary searching technique on an array. Write a program to implement a stack using an array. Include the operations Push, Pop, and display the current stack. 			
PART - B			
<ol style="list-style-type: none"> Write a program to implement bubble sort technique. Write a program to implement selection sort technique. Write a program to implement insertion sort technique. Write a program to convert an infix expression to a postfix expression using stack. Write a program to implement an ordinary queue using an array. Include the operations Enqueue, Dequeue, and Display. Write a program to create a singly linked list and perform the following operations: Insertion at the beginning, Deletion from the beginning, and Traversal of the linked list. Write a program to represent a binary tree and implement Preorder, Inorder, and Postorder traversal methods. 			
Teaching Methodology: Chalk and talk method / PowerPoint Presentation			
COURSE OUTCOMES:			
CO 1. Develop programs to perform insertion, deletion, traversing, searching and sorting operations on arrays.			
CO 2. Solve problems like Towers of Hanoi, factorial and GCD calculation using recursive programming.			
CO 3. Implement and manipulate stacks and queues using array			
CO 4. Represent linked lists and implement insertion and deletion of elements.			
CO 5. Represent binary trees and implement traversal methods such as Preorder, Inorder, and Postorder.			

UNIX AND SHELL SCRIPTING LABORATORY			
Course Code	BBCAL206	CIE Marks	50
Teaching Hours/Week (L:T:P)	(0:0:2)	SEE Marks	50
Credits	02	Exam Hours	03
COURSE OBJECTIVES:			
<ul style="list-style-type: none"> • Learn to write and execute shellscriptsfor basic decision-making, loops,string manipulation, and file operations. • Apply shell scripting to real-world tasks, such as sorting data, generating sequences, and managing file systems efficiently. 			
PART - A			
<ol style="list-style-type: none"> 1. Write a shell script to check positive or negative number. 2. Write a shell script to find largest of three numbers. 3. Write a shell script to generate mark-sheet of a student by reading five subject marks, calculate and display total marks, percentage and Class obtained by the student. 4. Write a shell script to accept a natural number and check for prime or not. 5. Write a shell script which will generate first n Fibonacci numbers. 6. Write a shell script to find the factorial of a given number. 			
PART - B			
<ol style="list-style-type: none"> 1. Write a shell script to read n numbers as command arguments & sort them in ascending order. 2. Write a shell script to display all executable files, directories and zero sized files from current directory. 3. Write a shell script to check entered string is palindrome or not. 4. Write a shell script to reverse a given string. 5. Demonstration of shell programming using filters (including grep, egrep, fgrep) 6. Write a shell script to count the number of lines, words, and characters in a file. 			
Teaching Methodology: Chalk and talk method / PowerPoint Presentation			
COURSE OUTCOMES:			
CO 1. Create scripts for checking conditions, like positive/negative numbers and finding the largest number.			
CO 2. Write scripts for generating Fibonacci sequences, identifying prime number and calculating factorials.			
CO 3. Perform string operations, including palindrome checks and reversals.			
CO 4. Develop scripts for identifying file types and counting file contents.			
CO 5. Create scripts for sorting numbers and handling student mark sheets.			