ದಾವಣಗೆರೆ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ
DAVANGERE UNIVERSITY

Syllabus for Bachelor of Computer Applications (BCA)

(I & II Semester)

[According to SEP(State Education Policy): 2024-25]

W.E.F 2024-25 and onwards

DEPARTMENT STUDIES IN COMPUTER SCIENCE, DAVANGERE UNIVERSITY,DAVANGERE-07

Bachelor of Computer Applications (BCA) Semester Scheme

Curriculum Structure for Undergraduate Programme for2024-25

Case-3: Single Subject Specialization from the 1st Semester till 6th Semester

(Course Structure, Scheme of Teaching and Evaluation - 2024-25)

Curriculum Framework for UG Programmes as suggested by KSHEC, Government of Karnataka
(As per G.O. No.: ED 166 UNE 2023, Bengaluru, dated: 08-05-2024)

Sl.No.	Subject Category	No. of Credits
1	Major Courses	90
2	Languages	24
3	Compulsory	10
4	Electives/Optional	04
	Total	**128**

Note: *Total Credits required to award Degree as per KSHEC: 128(Minimum) and 150(Maximum) for UG Degree.*

Allocation of credits in Davangere University for UG-BCA programmes
Case-3: Single Subject Specialization from the 1st Semester till 6th Semester

Sl.No.	Subject Category	No. of Credits
1	Major Courses	100
2	Languages	24
3	Compulsory	14
4	Electives/Optional	6
5	**Open Elective**	4
	Total	**148**

Semester-wise allocation of credits in Davangere University for UG-BCA programmes

Year	Semester	Credits	Total Credits
1	I	26	52
	II	26	
2	III	24	48
	IV	24	
3	V	23	48
	VI	25	
Total		**148**	**148**

Davangere University

Bachelor of Computer Applications (BCA)Semester Scheme –CBCS
Course Structure, Scheme of Teaching and Evaluation - 2024-25

BCASemester I

Sl.No	Course Code		Title of the Subject	Teaching hours per week	SEE	CIA	Total Course Marks	Credits
1	Lang 1.1	AEC C	Kan/Hin/San/Urdu - I	4	80	20	100	3
2	Lang 1.2		English - I	4	80	20	100	3
3	BCA 2024 BA 03		Applied Mathematics-I	4	80	20	100	4
4	BCA 2024 BA 04		C Programming	4	80	20	100	4
5	BCA 2024 BA 05	CC	Advanced Digital Electronics	4	80	20	100	4
6	BCA 2024 BA 06		C Programming Lab	3 x 2 = 6	80	20	100	3
7	BCA 2024 BA 07		Office Automation Lab	3 x 2 = 6	80	20	100	3
8	Foundation Course (FC) 1.1	GE	Environmental Science	4	80	20	100	2
	Total			**36**	**640**	**160**	**800**	**26**

BCASemester II

Sl.No	Course Code		Title of the Subject	Teaching hours per week	SEE	CIA	Total Course Marks	Credits
1	Lang 2.1	AEC C	Kan/Hin/San/Urdu - II	4	80	20	100	3
2	Lang 2.2		English - II	4	80	20	100	3
3	BCA 2024 BB 03		Applied Mathematics-II	4	80	20	100	4
4	BCA 2024 BB 04		Data Structure using C	4	80	20	100	4
5	BCA 2024 BB 05	CC	Database Management System	4	80	20	100	4
6	BCA 2024 BB 06		Data Structure using C Lab	3 x 2 = 6	80	20	100	3
7	BCA 2024 BB 07		Database Management System Lab	3 x 2 = 6	80	20	100	3
8	Foundation Course (FC) 1.2	GE	Indian Constitution	4	80	20	100	2
	Total			**36**	**640**	**160**	**800**	**26**

BCA Semester III

Sl.No	Course Code		Title of the Subject	Teaching hours per week	SEE	CIA	Total Course Marks	Credits
1	Lang3.1	AECC	Kan/Hin/San/Urdu - III	4	80	20	100	3
2	Lang 3.2		English - III	4	80	20	100	3
3	BCA 2024 BC 03	CC	Internet Programming	4	80	20	100	4
4	BCA 2024 BC 04		Java Programming	4	80	20	100	4
5	BCA 2024 BC 05		Java Programming Lab	3 x 2 = 6	80	20	100	3
6	BCA 2024 BC 06		Internet Programming Lab	3 x 2 = 6	80	20	100	3
7	BCA 2024 BC 07		Personality Development : Productivity and Time Management	4	40	10	50	2
8	BCA 2024 BC 08	Open Elective/ Interdisc	Computer Science and Programming Fundamentals	4	40	10	50	2
	Total			36	640	160	800	24

BCA Semester IV

Sl.No	Course Code		Title of the Subject	Teaching hours per week	SEE	CIA	Total Course Marks	Credits
1	Lang3.1	AECC	Kan/Hin/San/Urdu - IV	4	80	20	100	3
2	Lang 3.2		English - IV	4	80	20	100	3
3	BCA 2024 BD 03	CC	Python Programming	4	80	20	100	4
4	BCA 2024 BD 04		Operating System & Shell Programming	4	80	20	100	4
5	BCA 2024 BD 05		Python Programming Lab	3 x 2 = 6	80	20	100	3
6	BCA 2024 BD 06		OS Lab	3 x 2 = 6	80	20	100	3
7	BCA 2024 BD07		Elementary Research Methods-I	4	40	10	50	2
8	BCA 2024 BD 08	Open Elective /InterDe	Fundamentals of AI	4	40	10	50	2
	Total			36	640	160	800	24

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BCA Semester V

Sl.No	Course Code		Title of the Subject	Teaching hours per week	SEE	CIA	Total Course Marks	Credits
1	BCA 2024 BE 01	CC	Analysis and Design of Algorithm Using Python	4	80	20	100	4
2	BCA 2024 BE 02		Software Testing	4	80	20	100	4
3	BCA 2024 BE 03		Computer Networks &Data Communications	4	80	20	100	4
4	BCA 2024 BE 04	DSE	ADA Lab using Python	3 x 2 = 6	80	20	100	3
5	BCA 2024 BE 05		Software Testing Lab	3 x 2 = 6	80	20	100	3
6	PROJ	SEC	Elementary Research Methods-II	4	40	10	50	2
Internal Electives (Choose Any 1)								
7	BCA 2024 BE 07	CC Lab	Android Programming	4	80	20	100	3
8	BCA 2024 BE 08		Multimedia	4	80	20	100	3
9	BCA 2024 BE 09		Machine Learning	4	80	20	100	3
Total				**40**	**680**	**170**	**850**	**23**

BCASemester VI

Sl.No	Course Code		Title of the Subject	Teaching hours per week	SEE	CIA	Total Course Marks	Credits
1	BCA 2024 BE 01	CC	Big Data Analytic	4	80	20	100	4
2	BCA 2024 BE 02		R Programming	4	80	20	100	4
3	BCA 2024 BE 03		IoT	4	80	20	100	4
4	BCA 2024 BE 04	DSE	Big Data AnalyticLab	3 x 2 = 6	80	20	100	3
5	BCA 2024 BE 05		R Programming Lab	3 x 2 = 6	80	20	100	3
6	Foundation Course (FC) Non-Core	SEC	Major Project	4 x 2 = 8	80	20	100	4
Internal Electives (Choose Any one)								
7	BCA 2024 BE 07	Electives	Software Engineering	4	80	20	100	3
8	BCA 2024 BE 08		Cloud computing	4	80	20	100	3
9	BCA 2024 BE 09		Mobile Computing	4	80	20	100	3
Total				**44**	**720**	**180**	**900**	**25**
Grand Total(BCA Degree)				**228**	**3960**	**990**	**4950**	**148**

BACHELOR OF COMPUTER APPLICATIONS

BCA courses mainly comprise of subjects like the database, networking, data structure, core programming languages, software engineering, object-oriented programming, web scripting, and development etc. ... The **BCA** course curriculum is somewhat similar to a B. Tech in computer science or information technology.

Career Prospects

The IT industry is growingly rapidly and with this, the demand for BCA graduates too is increasing every passing day. BCA graduates have good job prospects both in the government and private sector companies.

Private Companies

After successfully passing their BCA course, students can easily find lucrative job opportunities in leading IT companies like Oracle, IBM, Infosys and Wipro. Some of the roles that one can bag after completing a BCA programme is that of a System engineer, software tester, junior programmer, web developer, system administrator, software developer etc.

Government Sector

BCA graduates also have good employability opportunities in public sector organizations. Government organizations like the Indian Air Force(IAF), Indian Army, and India Navy hire a large bunch of computer professionals for their IT department.

Some popular job profiles for a BCA graduate are: -

- **System engineer** - A system engineer develops, tests and evaluates software, circuits, and personal computer.
- **Programmer in various software development firms** - The duty of programmer is to write code for software. A programmer is primarily working in the computer language such as Assembly, COBOL, C, C++, C#, Java, Lisp, Python, etc.
- **Web developer** - A web developer is a programmer who specializes in the development of world wide web applications. The role of a web developer is to build and maintain websites. A web developer must have skills in HTML/XHTML, CSS, PHP, JavaScript ,etc.They find good career opportunities in various web designing companies and online digital marketing companies.
- **Software developer** - The sole responsibility of software developer is to develop software that eases the tasks of the people and enable to perform work efficiently. A software developer also installs test and maintains the software.

Program Objectives:
• BCA course strives to create outstanding computer professionals with ethical and human values to reshape the nation's destiny. This program aims to prepare young minds for the challenging opportunities in the IT industry, nourished and supported by experts in the fields.
• The BCA Course aims at inculcating essential skills as demanded by the global software industry through interactive learning process. This also includes team-building skills, audio- visual presentations and personality development programs.

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• The program enhances analytical, managerial and communication skill besides inculcating the virtues c
self-study. The Curriculum has been designed to cater to the ever changing demands of information
technology along with necessary inputs from the Industry.

• The OBJECTIVE of the course is to develop skilled manpower in the various areas of software industry
and Information Technology

• To enable students for pursuing respectable career through Self- Employment, Executive Employment,
Entrepreneurship, Professional Career in the field of service sectors such as eBanking, Marketing,
Investment, Insurance hospitality and other avenues.

• To develop inter-twining competence in the field of Commerce and Management, Computing Skill and
Computational tools.

• To develop the basic programming skills to enable students to build Utility programs.

• To develop the foundation for higher studies in the field of Computer Application.

• To provide specialization in Management with technical, professional and communications skills.

• To train future industry professionals.

• To impart comprehensive knowledge with equal emphasis on theory and practice.

• To keep the students up-to-speed on all the latest and cutting edge technologies.

Programme outcomes

➢ Enabled students to develop problem solving competence while using computer

➢ Skills and analytical abilities in computer based solutions developed in students.

➢ Inculcated various software development practices

➢ Developed awareness about automation

➢ Trained students in professional skills

➢ Developed the skills necessary in career of Computer Applications

Program Specification Outcomes

➢ Focuses on preparing student with knowledgeable and skilled human resources for roles pertaining
to computer applications which employable in IT industry

➢ Start from the basics and in every semester learns each and everything about computers.

➢ Imparted knowledge required for planning, designing and building Complex Application Software
Systems

➢ Develop programming skills, networking skills, learn applications, packages, programming
languages and modern techniques of IT

➢ get skill and info not only about computer and information technology but also in common,
organization and management

➢ Learn programming language such as Java, c++, HTML, SQL, etc…

➢ Information about various computer applications and latest development in IT and communication
system is also provided

➢ Gives overview of the topics in IT like networking, computer graphics, web development and
software skills.

➢ Bachelor in computer applications (BCA) gives a number of opportunities to individuals to go ahead
and shine in their lives and produces entrepreneurs who developed customized solutions for small
and medium Enterprises. It also Provides a support to automated systems or application.

➢ A few of them being like software programmer, system and network administrator, web designer
faculty for computer science and computer applications

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BCA 1st Semester	Applied Mathematics-I

Subject Code:	Total Teaching Hours:56
IA Marks:20	Teaching Hours/Week:04
Exam Marks:80	Examination Hours:03
Credits: 04	

Unit 1:

Symbolic Logic: Proposition and its types, Negation, Disjunction, Conjunction, Tautologies and Contradictions, Logical equivalence, Algebra of propositions, conditional Propositions, Converse, Inverse and Contra Positive Proposition, Bi-conditional Proposition, Arguments (Formation of truth table and simple problems). **[14 Hours]**

Unit 2:

Matrices and Determinants: Matrix, order, types of Matrices, addition, subtraction, scalar multiplication of a matrix, product of two matrices, problems, Determinants of a square matrix and evaluation, minor, cofactor of element of a square matrix, adjoint, singular matrices, inverse of a square matrix, problems. Solution of a system of linear equations by matrix method, characteristic equation and characteristic roots of a square matrix of orders 2 and 3. **[14 Hours]**

Unit 3:

Set Theory: Equivalent sets, identical sets, empty set, union and Intersection of sets, complement of a set, difference of sets and problems. Cartesian product of two sets, relation, domain and range of a Relation, Types of relations, Identities, reflexive, symmetric Transitive, antisymmetric, Inverse Relations and problems. Functions, Into, one-one, onto, Bijective, constant functions, Inverse functions, Inverse of an element, composition of two mappings problems.

Trigonometry: Definitions of Trigonometric functions, Trigonometric ratios of an acute angle, Trigonometric Identities and Problems, Trigonometric Functions of Standards angles (without proof) Problems, Trigonometric functions of allied angles (statement only without proof) and problems. Compound angles, multiple and sub-multiple angles and Transformation formulae (without proof) Simple problems, Inverse trigonometric functions Derivations of standard formulae and problems.

[14 Hours]

Unit 4:

Continuity and Differentiation: Continuity and Differentiability concept, derivatives of standard functions from 1st principle – x^n, e^x, log x, a^x, Sin x, Cos x, Tan x, cot x, sec x and cosec x (with proof). Derivative of composite function, chain rule, derivative of inverse trigonometric functions, derivative of implicit functions. Concepts of exponential and logarithmic functions to base e. Derivatives of exponential and logarithmic functions. logarithmic differentiation, derivatives of functions expressed in parametric forms. Second order derivatives. **Partial Differentiation:** Introduction, partial derivatives, Homogeneous functions and Euler's theorem and problems. **[14 Hours]**

Reference Books:
1. Set Theory and related Topics – S. Lipschutz.
2. Matrices – F. Ayres
3. Matrices – Shantinarayan
4. Real Analysis-N.P.Bali
5. Mathematics text books (NCERT) vol1 and vol 2-Arora
6. Mathematics text books (NCERT) vol1 and vol 2-S.S. Bosco
7. Partial Differentiation Engineering Mathematics: Dr. k S Chandrashekar
8. Higher Engineering Mathematics: Dr. B S Grewal
9. Engineering Mathematics: Bali and Iyengar

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BCA 1st Semester	**C Programming**	
Subject Code: IA Marks: 20 Exam Marks: 80 Credits: 04		Total Teaching Hours:56 Teaching Hours/Week:04 Examination Hours:03

Unit 1:

Introduction to Computer: Block diagram of computer system, Central processing Unit (CPU),ALU,CU, Main memory, Input/output unit.

Brief history of Hardware: Input device, keyboard, Mouse, Light pen, joystick, Scanner, Digitizer.

Output device: various types of printers (dot matrix, laser, inkjet), Plotters.

Secondary storage devices: Hard disk, CD- ROM, Optical disk.

Software: System Software, Operating System, Application software, Machine level language, higher level programming languages, Assemblers, Compilers, and editors, Merits and demerits of all the languages.
[14 Hours]

Unit 2:

Overview of C: Introduction, Importance of 'C', sample 'C' programs, Basic structures of 'C' programs, Programming style, executing a 'C' program,

Constants, variables and Data types: 'C' tokens, keywords and identifiers, constants, variables, data types, declarations of variables, assigning values to variables, defining symbolic constants.

Operators and expressions: Arithmetic operators, Relational operators, Logical operators, Assignment operators, increment and decrement operators, conditional operators, bitwise operators, special operators, some computational problems, type conversions in expressions, operator precedence and associatively, mathematical functions

Managing input and output operators: input and output statements, reading character, writing characters, formatted input, formatted output statements.
[14 Hours]

Unit 3:

Decision making, Branching and looping: Decision making with if statement, simple if statement, the if-else statement, nesting of if else statements, the ladder if-else. The switch statement. The ? : operator, the GOTO statement, the while statement, the do-while statement and for statement, jumps in loops.

Arrays: One dimensional array, two dimensional arrays, initializes two- dimensional array, multidimensional arrays.

Handling of character strings: Declaring and initializing string variables , reading string from terminal , writing string to screen, arithmetic operations on characters, putting strings together, Comparison of two strings, string handling functions like strlen, strcpy, strcat, strcmp, strupr, strlwr.
[14 Hours]

Unit 4:

User Defined functions: Need for user defined functions, a multi-functional program, the form of 'C' function, return values and their types, calling a function, category of functions- No arguments and no return values, argument but no return values, arguments with return values, nesting of functions, recursion, functions with arrays.

Structure and union: Structure definition, giving values to members, structure initialization, comparison of structure variables, arrays of structure, self-referential structures, union.

Pointers: Understanding pointers, accessing the address of variables, Declaring and initializing pointers, accessing a variable through its Pointer.
[14 Hours]

Text Books:
1. E. Balaguruswamy: Programming in ANSI C, 6th edition, Tata McGraw-Hill.
2. YashawantKanetkar: ' Let us C', 2011
3. A M Padma Reddy: Computer Concepts and C Programming Techniques. Sri Nandi
   Publications

References:
1. S.Byron Gottfried: Programming with 'C' Tata McGraw-Hill.
2. Rajesh Hongal : 'Computer Concepts and C Programming, 2008
3. A M Padma Reddy: Computer Concepts and C Programming

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BCA 1st Semester   **Advanced Digital Electronics**

Subject Code:	Total Teaching Hours:56
IA Marks:20	Teaching Hours/Week:04
Exam Marks:80	Examination Hours:03
Credits: 04	

Unit 1:
Number system and Binary Codes: Digital Electronics, Integrate Circuits or chips, Decimal system, Binary system, Octal system, Hexadecimal system, Binary Addition, Binary Multiplication and Division, 1's and 2's complement of a binary number, Binary Coded Decimal numbers (BCD), Excess-3 code, Gray Code, Alphanumeric codes, weighted codes.   **[14Hours]**

Unit 2:
Boolean algebra and logic Gates: Boolean algebra, Gates-NOT gate, OR gate, AND gate, NOR gate, NAND gate, De Morgan's Theorems, Exclusive OR gate, Exclusive NOR gate, Karnaugh Map – Construction and Properties, Don't Care Combinations, Minimization in SOP Form using Karnaugh Map, Minimization in POS Form using Karnaugh Map.   **[14 Hours]**

Unit 3:
Arithmetic and Logic Circuits: Arithmetic and Logic Circuits, Half Adder, Full Adder, BCD Adder, Parallel Binary Adder, 2's Complement Adder, Half-subtractor, Full-subtractor, Parallel Binary Subtractor, 2's Complement Subtractor, Binary Multiplier, Binary Divider.   **[14 Hours]**

Unit 4:
Sequential Circuits, Flip-Flops and Registers: Sequential Circuits, Flip-Flops (RS Flip-Flops, JK Flip-Flops, Master-Slave JK Flip-Flops), Registers, Shift Registers, Shift-Left Register, Shift-Right Register, Decoders, Encoders, Multiplexers, De-multiplexers, Introduction to Counters.   **[14 Hours]**

Text Books:
1. Digital Electronics – by V K Puri, Tata McGraw-Hill.
2. Digital fundamentals   - Bartee

Reference Books:
1. Digital Logic and Computer Design- M. Morris Mono
2. Computer fundamentals - B. Ram

BCA 1st Semester	C Programming Lab	
Subject Code:	Total Teaching Hours:56	
IA Marks:20	Teaching Hours/Week:06	
Exam Marks:80	Examination Hours:03	
Credits: 03		

Part A:

1. Write a 'C' Program to generate and print first N FIBONACCI numbers.
2. Write a 'C' Program to find the GCD and LCM of two integer numbers.
3. Write a 'c' program to find biggest of three numbers.
4. Write a 'C' Program that reverse a given integer number and check whether the number is palindrome or not.
5. Write a 'C' program to construct simple calculator using if statement.
6. Write a 'C' Program to find whether a given number is prime number or not.
7. Write a 'C' Program to input numbers and to find mean variance and standard deviation.
8. Write a 'C' program to print largest number with its position in an array.
9. Write a 'C' program to search an element using linear search method.
10. Write a 'C' program to print string in reverse order using pointers.

Part B:
1. Write a 'C' Program to read two matrices and perform addition and subtractions of two matrices.
2. Write a 'C' Program to read two matrices and perform multiplication of two matrices.
3. Write a 'C' Program to read a string and check whether it is palindrome or not.
4. Write a 'C' Program to find the factorial of a number using function.
5. Write a 'C' program to check whether a character is vowel or consonant using switch case.
6. Write a 'C' Program to find if a character is alphabetic or numeric special character.
7. Write a 'C' program to compute the sum of even numbers and the sum of odd numbers using a function.
8. Write a 'C' program to find trace and norm of a square matrix using functions.
9. Write a 'C' program to accept different goods with the number, price and date of purchase and display those using structures.
10. Write a 'C' Program to find the length of a string without using the built in function.

Examination:
- One program has to be given from the above list mentioned in part A (Carries 35 Marks).
- One program has to be given from the above list mentioned in part B(Carries 35 Marks).
- Viva carries 10 Marks.
- Student has to answer and execute both of the programs.

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BCA 1ˢᵗ Semester   **Office Automation Lab**

Subject Code:	Total Teaching Hours:56
IA Marks:20	Teaching Hours/Week:06
Exam Marks:80	Examination Hours:03
Credits: 03	

The following laboratory exercises should be carried out using latest version of either MS-Office or any of the following Open Source Office suites (Open Office, Star Office, Libre Office) under either Windows or Linux environment.

Exercises in Word Processing:

1. **Page and Character settings**: Create a new document and set its margins, page size and orientation. Type multiple paragraphs of text and perform Character settings like font, size, style by selecting text using different methods. Edit the text (add new text, delete text, modify character settings, cut/copy and paste text). Create new page (Page Break), add new text and save the document in a new folder.

2. **Paragraph settings and Equations**: Open document created in previous exercise, perform Paragraph settings like before spacing, after spacing, line spacing, indents (left, right, first line) on selected text. Align the text using different forms of alignment (left, center, right, justify). Add new page and type some mathematical expressions (Equations). Save and Close the document.

3. **Page numbers, header, footer, find, replace**: Open document saved in previous exercise, add page numbers, Header and Footer to all pages. Search specific text using Find and change specific text using Replace. Protect the document using password. Save and close document.

4. **Bullets and Numbering**: Create a new document, type a various categories of lists under different headings. Format the lists using bullets, numbering and outline numbering. Interchange the order of the lists using cut/paste. Add text to existing lists. Save and Close the document.

5. **Graphic elements and text wrapping**: Open any existing document created previously. Add pictures (photos), shapes, word art and text boxes to the document. Format each of these elements for position, size, colour, effects. Layout the flow of text around these added elements using various text wrapping options. Save the document under a different name using Save As.

6. **Tables**: Create a new document. Type text in the form of a table containing data in rows and columns. Use Insert table or draw table options to create the tabular format. Set row height and column width as desired. Select rows or columns and perform character, paragraph settings and text alignment options. Select individual cells, rows or columns and format for fill colour, border colour and style. Merge cells and split cells as desired. Try formatting the table using inbuilt table styles (quick tables). Save and close document.

7. **Mail Merge**: Create a form letter with common matter and empty spaces for text which will change for each letter (fields). Format and save the letter with a new name. Create another document containing a table with rows and columns. The row headings should be fieldnames and each subsequent row should be containing data under each field name to be used in the form letter (empty spaces) saved previously. Save this document with a different name. Perform Mail Merge with both the saved files.

Exercises on Spreadsheets:

1. **Worksheets and Format Cells:** Create a new workbook and worksheet, type data in cells in various rows and columns. Select cells and perform formatting for number, alignment and font settings. Resize rows and columns. Rename worksheet. Add another worksheet and copy data from first worksheet to new worksheet. Rename new worksheet. Change data in new worksheet. Save and Close workbook.

2. **Autofill, automatic lists, format cells:** Open existing workbook, Fill options on data in rows and columns, series data, days of week, months, filling data by trend in continuous cells. Move and copy blocks of cells from one location to another. Explore view, zoom and page break preview options. Format cells using fill, border and protect options. Save and close workbook.

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3. Page layout, Print preview and Header/footer: Open existing workbook, change page layout. Set margins, page orientation and size as desired. Define print area and use print preview to view result. Set appropriate header and footer in workbook. Save and Close workbook.

4. Basic formula usage: Create new workbook and create a tabular format to display annual result of student. Use basic arithmetic operators and cell numbers in expressions to perform the calculations. Use Auto sum and Logical functions like IF, AND, OR, NOT etc. Save the worksheet. Insert a new worksheet and calculate the IA marks for students using similar basic expressions involving arithmetic operators and cell numbers. Save the workbook.

5. Functions: Create a new workbook and explore the usage of the following groups of inbuilt functions
   a. TEXT- Concatenate, Dollar, Clean, Trim, Find, Replace, Left, Right, Mid
   b. Date & Time – Date, Date Value, Day, Month, Year, Days, Now, Hour, Minute, Second, Time, Today.
   c. Lookup & Reference – Row, Column, Rows, Columns, Match

6. Functions: Create a new workbook and explore the usage of the following groups of inbuilt functions a. Math & Trigonometric = Cos, Sin, Tan, Ceiling, Floor, Decimal, Even, GCD, int, LCM, Log, Round, Roundup, Round down, Sqrt, Sum b. Statistical – Average, Count, Count Blank, Count if, Mean, Stddev c. Info – is even, is odd, is formula, is text

7. Graphs and Charts: Create a new workbook. Feed appropriate tabular data and create column graphs and pie charts using the data. Format the charts for colour, data, numbers, legend, axis, effects and 3d options.

8. Validation, conditional formatting and consolidation: In a new workbook, feed appropriate data and perform data validation on rows and columns, circling invalid data. Also using data fed in multiple worksheets (common tabular structure but different data values) perform consolidation of data using sum, average, min, max. Also conditionally format data in some rows and columns. Save the workbook.

9. What if Analysis: Using appropriate data, explore the use of Goal Seek and Scenario Manager.

10. Group, Sort, Filter: Create a new workbook and feed data in a category wise manner (eg. Individual product's monthly sales figures of different categories of products for a six month period) and group, ungroup, subtotal, sort and filter data according to categories. Also do the same using Advanced filter.

Exercises on Presentations:

1. Basic Presentation creation, themes, and backgrounds: Create a new presentation and set theme and background. Create title slide, and insert new slides of different types like title and content (picture, graphic, clipart, video, audio), blank slide, title and text (bulleted list, two column text etc). Save and close presentation.

2. Editing Presentations: Open existing presentation. Perform Spelling Check. Add Pictures, graphs to existing slides. Change Line spacing and bullet styles. Change the theme and background. Save the presentation under a different name.

3. Tables, Header/Footer, Slide numbers: Create new presentation. Insert slides from previous presentation using reuse slides. Add new slides by using slides from outline option. Insert Tables into slides. Add header, footer and slide number. Use Master slide options to change formatting. Save and Close.

4. Transition and Animation: Open existing presentation. Add Transition effects between slides. Used timed transition and on mouse click. Add Animation effects to elements in each slide and set the order and effect of animation. Save and close.

5. Slideshow: Open existing presentation from previous exercise and set up slide show. Use rehearse timings, custom show and show presentation. Stop show in between and navigate between different slides using context menu (right click), blank screen, use pointer to highlight parts of displayed slide, use pen to write on slide during slide show. Save and close presentation.

6. Hyperlinks and interactivity: Open existing presentation. Add notes to each slide using notes master. Add interactivity to slides by using hyperlinks to other slides, word document, other presentations and set up interactive slideshow controlled by buttons(hyperlinks) on slides. Run the slideshow. Use Print preview command to print slides or notes.

Examination:
- One Question has to be given from the above list (Carries 35 Marks)
- One more question has to be given by the examiner by his choice and that question need not be in the list (Carries 35 Marks).
- Student has to answer and execute both questions.

BCA 2ⁿᵈ Semester	Applied Mathematics-II	
Subject Code:		Total Teaching Hours:56
IA Marks:20		Teaching Hours/Week:04
Exam Marks:80		Examination Hours:03
Credits: 04		

Unit 1:

Complex Numbers: Definition of Complex Number as an ordered pair, real and imaginary parts, modulus and amplitude of a complex number, polar form of a complex number, problems. DeMoire's theorem (statement only) method of finding square roots, cube roots of a complex number and their representation in the Argand diagram and also continued product. **[14 Hours]**

Unit 2:

Standard Integrals: Integration as inverse process of differentiation. Integration of algebraic, logarithmic, exponential and trigonometric functions, Integration by parts and by partial fraction.

Definite Integrals and evaluation of Definite integrals, properties 1) $\int_0^a f(x)dx = \int_0^a f(a-x)dx$,

2) $\int_{-a}^{b} f(x)dx = \int_{-a}^{b} f(a+b-x)\, dx$, 3) $\int_{0}^{b} f(x)dx = 2\int_0^a f(x)dx$, if f(x) is even
if f(x) is odd

4) $\int_{0}^{2a} f(x)dx = \int_0^0 f(x)dx$, if f(2a-x) = f(x)
if f(2a-x) = -f(x)

and problems.

[14 Hours]

Unit 3:

Polar Curves: Introduction, angle between radius vector and tangent, length of the perpendicular from the pole to the tangent, angle between two curves, pedal equations.

Differential Equation: Solutions of First order and first degree equations- variable's separable equations-equations reducible to the variables separable form. Homogenous equations – equations reducible to the homogenous form.

[14 Hours]

Unit 4:

Three dimensional Geometry: Direction cosines and direction ratios of a line joining two points. Cartesian equation of a line, coplanar and skew lines, shortest distance between two lines. Cartesian equation of a plane. Angle between i) Two lines ii) Two planes.

Probability: Random experiments, outcomes, sample spaces (set representation). Events: occurrence of events, 'not', 'and' and 'or' events, exhaustive events, mutually exclusive events. Probability of an event, probability of 'not', 'and' and 'or' events. Addition theorem on probability, Multiplication theorem on probability. **[14 Hours]**

Reference Books:

01. Integral Calculus -Shanthi Narayan
02. Integral Calculus –N.P .Bali
03. Analytical Geometry -Shanthi Narayan
04. Differential Calculus-N.P.Bali
05. Co-ordinate Geometry- Shanthi Narayan
06. Mathematics text books(NCERT) vol1 and vol 2-Arora
07. Mathematics text books(NCERT) vol1 and vol 2-S.S Bosco
08 Higher Engineering Mathematics: Dr. B S Grewal
09.Engineering Mathematics: Dr. K S Chandrashekar
10. Engineering Mathematics: Bali and Iyengar

BCA 2nd Semester	Data Structures Using C	
Subject Code: IA Marks:20 Exam Marks:80 Credits: 04		Total Teaching Hours:56 Teaching Hours/Week:04 Examination Hours:03

Unit I:

File Handling: Introduction, Creating File, accessing a File contents, updating of file contents, Closing a file.

Dynamic memory allocation: Meaning of static and dynamic memory allocation.

Memory allocation functions:malloc(), calloc(), free() and realloc().

Files: Introduction, definition, Basic file operations: Naming a file, opening a file, Reading data from file, writing data to a file and closing a file, Input/Output operations on files, Error Handling in files, Random Access to files.   **[14 Hours]**

Unit II:

Introduction to Data Structures & Stack: Definition, Applications, Classification of data structures: primitive and non-primitive, Operations on data structures Definition, Array Implementation of stack(using structure) and operations on stack, Applications of stacks, Infix, prefix and postfix notations, Conversion of an arithmetic expression from Infix to postfix.   **[14 Hours]**

Unit III:

Queue and Recursion: Definition, Types of queue: Simple queue, circular queue, double ended queue, priority queue, Array Implementations of queue (using structure) and operations on all types of queues. Definition, Recursion in C, Writing Recursive programs – Binomial coefficient, Fibonacci, GCD, towers of Hanoi.   **[14 Hours]**

Unit IV:

Linked List: Definition, components of linked list, Representation of linked list, Advantages and disadvantages of linked list, Types of linked list: singly linked list, doubly linked list, Circular list and circular doubly linked list, operations on all types of linked lists: Creation, insertion, deletion, search and display. **Tree:** Definition: Tree, Binary tree, complete binary tree, And Binary search tree, Tree terminology: root, Node, Degree of a node, ancestors of a node, Binary tree, Array representation of tree, Creation of Binary tree, and Traversal of Binary tree: Preorder, In order and post order.   **[14 Hours]**

Text Books:
1. A M Padma Reddy: Data Structures using C
2. Yashavant P Kanetkar: Data Structures through C
3. Langsam, Augenstein and Tenenbaum, Data structures Using C and C++, Prentice Hall of India, 2nd Edition.
4. Kamthane :Introducation to Data structures in C Pearson Education.

References Books
1. Weiss Data structures and Algorithm Analysis in C II Edition , Pearson Education.
2. LipschutzSchaum's outline series Data structures Tata MgGraw-Hill.

BCA 2nd Semester Database Management System

Subject Code:	Total Teaching Hours:56
IA Marks:20	Teaching Hours/Week:04
Exam Marks:80	Examination Hours:03
Credits: 04	

Unit 1:

Introduction: Application, database system vs. file system, view of data Models-Hierarchical, Relational, database languages, database users and administrators, transaction management, Database system structure, application architecture.   **[14 Hours]**

Unit 2:

E_R Model: Basic-concepts, constraints, keys, Design Issues, E-R diagram, weak entity sets, Extended E-R features, Design of an ER database schema, Reduction of an E-R schema to tables, UML
Relational Model: Structure of Relational Databases, Relational Algebra, Extended Relational Algebra Operations, Modification of the database, Views.   **[14 Hours]**

Unit 3:

SQL: Background, Basic structure, set operation, aggregate functions, NULL values, subqueries, views, Modification of the Database, joined Relations, DDL. Introduction to PL/SQL (brief study).
                                                           [14 Hours]

Unit 4:

Normalization: Introduction, 1NF, 2NF and FDs, 3NF and BCNF, 4NF and MVDs, 5NF and PJNF, Closure of a set of FDs, MVDs, Loss less join.
Transaction Management: Introduction, Transaction concepts and properties, States, concurrent execution, Scheduling of Transactions, Operations Conflicts, Testing for serializability.
                                                           [14 Hours]

Text Books:

1. "Database System Concepts" by Silberchatz-Korth-sudarshan, McGraw Hill-IV Edition.
2. "Database Management Systems", A Practical Approach (DBMS) by Rajiv Chopra.

References:

1. Navathe and Elmarri "Fundamentals of Database Systems"-Addison Wesley-200.
2. C.j. Data "introduction to Database systems" Addison-wesley.
3. Ullman "Principals of Data base systems" computer science press".
4. Bipin C Desai "Introduction to Data base system" Galotia.

BCA 2ⁿᵈ Semester   **Data Structures Using C Lab**

Subject Code:	Total Teaching Hours:56
IA Marks:20	Teaching Hours/Week:06
Exam Marks:80	Examination Hours:03
Credits: 03	

PART A:

1. Write a C program to create a structure Employee that stores empno, name, age, salary and include the following tasks:
i) Accept details of N employees
   ii) Display the details of N employees in the following format

----
Empno   Name   Age   Salary

   1

   2

   3

   .

   .

   .

2. Write a C program to create array of structures.
3. Write a C program to count number of vowels and consonants using pointers.
4. Write a C program to create file of N students, it should contain Rollno, name, marks in two subjects. Using the above created file, create an output file which contains Rollno, name, marks in two subjects, total and average.
5. Write a C program to create a character file and count the number of characters, words and blank spaces present in it.
6. Write a C program to demonstrate Dynamic Memory Allocation functions.
7. Write a C program to demonstrate the working of stack of size N using an array the elements of the stack may be assumed to be of type integer by creating an array, the operations to be supported are 1. PUSH 2. POP 3. DISPLAY. The program should print the appropriate message for stack underflow and overflow.
8. Write a C program to implement operations of stack using structures.
9. Write a C program to convert and print valid fully parenthesized infix arithmetic expression to postfix.
10. Write a C program to simulate the working of a Queue using an array provide the operations QINSERT, QDELETE and QDISPLAY. Check the queue status for empty and full.

PART B:

11. Write a C program to implement operations of Queue using structures.
12. Write a C program to simulate the working of a Circular Queue using an array provide the operations CQINSERT, CQDELETE and CQDISPLAY. Check the queue status for empty and full.
13. Write a C program to demonstrate the working of a dequeue using array and provide for all its basic operations.
14. Write a C program to find the Binomial Coefficient using recursion.
15. Write a C program find the nth Fibonacci number by using recursion.
16. Write a C program to find GCD of two numbers using recursion.
17. Write a C program to simulate working of tower of Hanoi for N disks. Print the total number of moves taken.
18. Using dynamic variables and pointers write a C program to construct a singly linked list consisting of the following information in each node: Rollno(integer), name(string):

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The operations to be supported are:
1. LINSERT – Inserting a node in the front of the list
2. LDELETE – Deleting a node based on rollno
3. LSEARCH – Searching a node on rollno
4. LDISPLAY – Displaying the data in all the nodes

19. Write a C program to create a doubly linked list where each node consists of the following information: left link, data(integer), right link.

The operations to be supported are:
1. INSERT – Insert a node at the end of the doubly linked list
2. DELETE – Delete any node from the doubly linked list
3. DISPLAY – Display the data in all the nodes

20. Using dynamic variables and pointer create a binary search tree of integers and perform the following operations:
1. Given a key perform a search in the binary search tree and insert the key if it is not a duplicate key.
2.Traverse the tree using PREORDER, INORDER & POSTORDER methods

Examination:
- One program has to be given from the above list mentioned in part A (Carries 35 Marks).
- One program has to be given from the above list mentioned in part B(Carries 35 Marks).
- Viva carries 10 Marks.
- Student has to answer and execute both of the programs.

BCA 2nd Semester Database Management System Lab

Subject Code:	Total Teaching Hours:56
IA Marks:20	Teaching Hours/Week:06
Exam Marks:80	Examination Hours:03
Credits: 03	

Consider the following database :

1. employee(emp_id, first_name, last_name, job_id, doj, salary, dept_id, manager_id)
2. departments (dept_id,dept_name,manager_id)
3. customer (cust_id, first_name,last_name,address,city, phone, email)
4. salgrade (grade, highsal, lowsal)

Insert values into tables depending on the requirements for the queries. Each of these Following Subtopics should have 4 Queries Each.

1. Working with Table and data using another table.
2. Modifying table structure and updating data.
3. Queries adding deleting and verifying Keys:
4. Using Where Clause(Comparison, between and set comparison).
5. Using Where Clause(Matching Characters and NULL values).
6. Using Where Clause (Using Logical operators to join more than one conditions).
7. Formatting the output Result by putting Column aliases, using expressions and ordering the Data.
8. Using SubQueries in where Clause. (Set Membership, Set comparison, Test for Empty Relations)
9. Sub Queries in From Clause.
10. Aggregate Functions:
11. Joining Tables using SQL Joins (Inner Join, Outer Joins).
12. Set Operators.
13. Creating and working with views

Examination:

- Any one set of questions may be given to student for examination.
- Required tables have to be created by the student during examination.
- Table creation 20 marks.
- Inserting values 10 marks (Can be awarded only if the rows inserted are able to generate desired output from the queries).
- Viva carries 10 Marks.

Practical Examination I-VI Semesters

Duration: 3Hrs

- Experimentation (Major & Minor/Spotters) -   60 Marks
- Viva Voice   -   20Marks

                                            Total   **80 Marks**

Internal Assessment for Practical Paper I-VI Semesters

- Lab Internal[Write up & Execution] -   10 Marks
- Record/Journal   -   05 Marks
- Attendance   -   05 Marks

                                    Total   **20 Marks**

Examination of Project Work/Internship during V and VI semester

Duration: 3Hrs

- Project work/Dissertation/Internship and preparation of Report/Demo/Publications/Presentations   -   60 Marks
- Viva Voice   -   20Marks

                                        Total   **80 Marks#**

Internal Assessment for Project during V and VI semester

- Attendance/Internship-Attendance Proof   -   10 Marks
- Project Report , Demo, Publications, Execution. etc-   10 Marks
                                                    ----
                                    Total   **20 Marks#**

#Proportionally reduced for 40:10(SEE:IA)

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Continuous Assessment Programme/Internal Assessment/Formative Assessment

Major/Elective Courses

Sl. No	Continuous Assessment Programme/Internal Assessment	Maximum Marks
(1)	(2)	(3)
01	Two Session Tests with proper record for assessment (5+5 = 10)	10
02	Assessment of Skill Development activities/Seminars/Group Discussion/ Assignment etc., with proper record	05
03	Attendance with proper record*	05
TOTAL MARKS		20

*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

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THEORY EXAMINATION QUESTION PAPER PATTERN FOR MAJOR/ELECTIVE SUBJECTS (Semesters I –VI)

BCA 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 of the following questions: **(2×10=20)**

a)

b)

c)

d)

e)

f)

g)

h)

i)

j)

SECTION-B

Answer any **SIX** of the following: **(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/Unit-I
11.   From Unit-II/Unit-II
12.   From Unit-III/Unit-III
13.   From Unit-IV/Unit-IV

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