Final copy

ದಾವಣಗೆರೆ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ

DAVANGERE UNIVERSITY

Syllabus for Bachelor of Computer Science (BSc.)

(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

DAVANGERE UNIVERSITY

Bachelor of Science (B.Sc.) Semester Scheme

Curriculum Structure for Undergraduate Programme for 2024-25 as per SEP-2024

a. 3 Majors with a General degree in all 6 Semesters

(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-Science programmes
Class a: 3 Subjects combination in all 6 Semesters

Sl.No.	Subject Category	No. of Credits
1	Major Courses	110
2	Languages	24
3	Compulsory	10
4	Electives/Optional	04
Total		**148**

Semester-wise allocation of credits in Davangere University for UG-Science programmes (Three Subjects combination)

Year	Semester	Credits	Total Credits
1	I	23	**46**
	II	23	
2	III	25	**50**
	IV	25	
3	V	26	**52**
	VI	26	
Total		**148**	**148**

Semester-wise allocation of credits in Davangere University for UG-Science programmes for framing syllabus ofOne Major Subject in Three Major Subjects combination(Class a stream)

Year	Semester	Credits	Total Credits
1	I	05	**10**
	II	05	
2	III	07*	**14***
	IV	07*	
3	V	08	**18**
	VI	10	
Total		**42***	**42***

**Total number of credits including Major papers (T+P) and Discipline specific Elective/Optional papers*

DAVANGERE UNIVERSITY

Bachelor of Science (B.Sc.) Semester Scheme Curriculum Structure for Undergraduate Programme for 2024-25: Syllabus to be framed by respective Science subjects for One Subject

Sem.	Course/Paper Code	Title of the Paper	Subject Category	Teaching Hours/ week	Semester End Exam.	Internal Assessment	Total Marks	Credits	Examination Duration
1	2	3	4	5	6	7	8	9	10
			Semester-I						
1	24-MC-I	C Programming	**MC-T**	04	80	20	**100**	03	3 Hrs.
	Practical – I	C Programming Lab	**MC-P**	04	40	10	**50**	02	3 Hrs.
	Total			**08**	**120**	**30**	**150**	**05**	---
			Semester-II						
2	24-MC-II	Data Structures Using C	**MC-T**	04	80	20	**100**	03	3 Hrs.
	Practical – II	Data Structures Lab using C	**MC-P**	04	40	10	**50**	02	3 Hrs.
	Total			**08**	**120**	**30**	**150**	**05**	---
			Semester-III						
3	24-MC-III	Data Base Management Systems	**MC-T**	04	80	20	**100**	03	3 Hrs.
	Practical – III	SQL Lab	**MC-P**	04	40	10	**50**	02	3 Hrs.
	Open Elective/Optional – I*	**Semester-III**	**EL/OP-I**	02	40	10	**50**	02	2 Hrs.
	Total			**10**	**160**	**40**	**200**	**07**	---
			Semester-IV						
4	24-MC-IV	Object Oriented Programming with Java	**MC-T**	04	80	20	**100**	03	3 Hrs.
	Practical – IV	Java Programming Lab	**MC-P**	04	40	10	**50**	02	3 Hrs.
	Open Elective/Optional-II*	**Semester-IV**	**EL/OP-II**	02	40	10	**50**	02	2 Hrs.
	Total			**10**	**160**	**40**	**200**	**07**	---
			Semester-V						
5	24-MC-VA	Computer Networks	**MC-T**	04	80	20	**100**	03	3 Hrs.
	24-MC-VB	Python Programming	**MC-T**	04	80	20	**100**	03	3 Hrs.
	Practical – V	Python Programming Lab	**MC-P**	04	40	10	**50**	02	3 Hrs.
	Total			**12**	**200**	**50**	**250**	**08**	---
			Semester-VI						
6	24-MC-VIA	Operating System Concepts	**MC-T**	04	80	20	**100**	03	3 Hrs.
	24-MC-VIB	Web Technologies	**MC-T**	04	80	20	**100**	03	3 Hrs.
	Practical – VI	Web Technologies Lab	**MC-P**	04	40	10	**50**	02	3 Hrs.
	Project	Project/Internship/Dissertation	**MC-P**	04	40	10	**50**	02	3 Hrs.
	Total			**16**	**240**	**60**	**300**	**10**	---
	Grand total			**64**	**1000**	**250**	**1250**	**42**	---

MC: *Major Course*;**MC-T:***Major Course Theory*;**MC-P:***Major Course Practical*;**El/Op:***Elective/Optional*;**AEDP:***Apprenticeship Embedded Degree Programme*. *In Semester-III and Semester-IV Open elective papers are offered. There shall be 02 Open elective papers offered during each semester (Semester-III and Semester-IV) by every major subject offering Department, where a student shall choose/select/opt 01 OE paper out of two to study in each semester (Semester-III and Semester-IV).

BOS Chairman
Dept of Computer Science
Davangere University
Shivagangotri, Davangere

DAVANGERE UNIVERSITY

Bachelor of Science (B.Sc.) Semester Scheme

Curriculum Structure for Undergraduate Programme for 2024-25

Case 1 or a.: 3 Majors with a General degree in all 6 Semesters – Number of courses and credit course-wise in all semesters

Semester	Major Course (Paper) Major 1	Elective/ Optional	AEDP
01 Theory paper and 01 Practical paper in each Major Subject (T+P)			
I	3+2 = **5**	---	
II	3+2 = **5**	---	
III	3+2 = **5**	Elective1- **2**	
IV	3+2 = **5**	Elective2- **2**	
02 Theory papers and 01 Practical paper in each Major Subject (T+T+P)			
V	3+3+2 = **8**	---	
VI	3+3+2 = **8**	---	Project/Internship/ Dissertation **2**
---	---	---	
Total	**36**	**04**	**02**
Grand Total 42 Credits			

Notes:

1. Credit for the three major courses includes theory, practical (skill enhancement course), and tutorial/assignment/survey-based assignment/internship.

2. Practical paper(s) (Compulsory/Skill enhancement course) should provide practical experience which is complimentary to theory major paper(s).

3. Project Work/Dissertation/Internship/Apprenticeship Embedded Degree Programme (AEDP) should also be considered to be part of the curriculum.

4. **Project work/Dissertation/Internship during Semester-VI:** Students for Project work may be allotted as per following formula,

$$Project\ allotment\ to\ Students = \frac{Total\ number\ of\ students\ in\ a\ three\ subjects\ combination}{Number\ of\ subjects\ in\ a\ combination\ (Three)}$$

Registrar
Davangere University
Shivagangotri, Davangere.

Dr. U.S. MAHABALESHW...
M.Sc., M.Phil., Ph.D.
Professor & Dean, Science & Technology
Davangere University, Shivagangotri,
Davangere-577 007, Karnataka, India.

BOS Chairman
Dept. of Computer Science
Davangere University
Shivagangotri, Davangere

Guidelines for Framing the Syllabus for Theory papers of Science subjects

The Board of Studies of respective Science subjects should ensure that,

- Every course or Theory paper (Major Course) from **Semester-I to Semester VI** should have 5 **Course Learning Objectives (CLOs)** marked as (a - e), wherein the first objective highlights about the course or theory paper (over all), while each of the other 4 CLOs should highlight each unit (Unit-1 to Unit-4) of the course or paper.

- Similarly Every course or Theory paper (Major Course) from **Semester-I to Semester VI** should have 4 Course Outcomes (COs) marked as (a - d), wherein each of the 4 COs should highlight outcome of each unit (Units1 to 4) of the course or paper.

- Every course or Theory paper (Major Course) from Semester-I to Semester-VI shall have 04 Units for 56 hrs. of teaching. Each Unit shall be of 14 hrs. of teaching, wherein each unit shall have 3 chapters with chapter sub-headings.

- In Semester-III and Semester-IV elective papers are offered. There shall be 02 elective papers offered during each semester (Semester-III and Semester-IV) by every major subject offering Department, where a student shall choose/select/opt 01 elective paper out of two to study in each semester (Semester-III and Semester-IV).

- At the end of syllabus of every course or Theory paper (Semester-I to VI) List of Reference books or Suggested Readings should be provided.

- List of References under every Theory paper should include both Text books of both older editions and latest editions.

- Title of each Major subject (Theory and Practical papers) should be clear without any duplication and ambiguity.

- Content in each chapter of every unit should not have any repetition or overlaps. Content should have latest updates with relevance.

The Board of Examiners of respective Science subjects should ensure while framing, scrutinizing and approving the question paper(s) for ensuing end-semester examination(s) that, each chapter in every unit of a theory paper is given preference to have questions in the final version of question paper(s).

BSc. I Semester		C Programming	
Subject Code:	**24MC-I**	**Total Teaching Hours:**	**56**
IA Marks:	**20**	**Teaching Hours/Week:**	**04**
Exam Marks:	**80**	**Examination Hours:**	**03**

Course Learning Objectives:

a. **Basic Syntax and Structure**: Understand and use the fundamental syntax of C, including data types, operators, and expressions. Write and run simple programs using basic input and output functions.
b. **Control Structures**:Implement decision-making (if, else if, switch) and looping constructs (for, while, do-while) to control the flow of programs.
c. **Functions**: Define, call, and utilize functions, understanding scope and lifetime of variables. Pass arguments by value and reference.
d. **Pointers and Memory Management**: Understand and use pointers, perform pointer arithmetic, and manage dynamic memory allocation and deallocation using malloc, calloc, realloc, and free.
e. **Arrays and Strings**: Declare, manipulate, and understand arrays (including multi-dimensional arrays) and strings. Use standard library string-handling functions.

Course outcomes:

1. **Basic Syntax and Structure**: **Outcome**: Students will be able to write and execute simple C programs, demonstrating a solid understanding of the basic syntax, data types, operators, and expressions used in C.
2. **Control Structures**: **Outcome**: Students will be proficient in using decision-making constructs (if, else if, switch) and looping constructs (for, while, do-while) to control the flow of their programs.
3. **Functions**: **Outcome**: Students will be able to define and call functions effectively, passing arguments by value and reference, and will understand the concepts of scope and lifetime of variables within functions.
4. **Arrays and Strings**: **Outcome**: Students will be capable of declaring and manipulating arrays (including multi-dimensional arrays) and strings, and will use standard library functions to handle strings efficiently.

Chapters of Course:

Unit 01: **Computer Software:** Introduction, Software – Definition, Relationship between Hardware & Software, Software Categories- System Software, Application Software, Software Terminology Classification of programming languages, Assemble, Complier, Interpreter, linker, loader, operating System.(only Definitions), Algorithms and flow charts. [14 Hours]

Unit 02: **C Programming:** Introduction, features basic program structure, character set, tokens, keywords and identifier. Constants, variables, data types, variables declaration, symbolic constant definition. Operators: Arithmetic, relational, logical, assignment, increment, decrement, conditional, bitwise and special operators, Arithmetic expressions, evaluation of expressing precedence of operators and associativity. Type conversions. Mathematical functions, managing I/O operators – reading and writing a character, formatted I/O. [14 Hours]

Unit 03: **Decision making, Branching and Looping:** Introduction, Sequential and Branching Statements, Simple IF, IF-ELSE, Nested-IF, ELSE-IF ladder , switch statements, the ?: operator, goto statements, while, do-while and for statements, break and continue statements.**Arrays and Strings:** Introduction, one and two dimensional arrays, array declaration and initialization. String:- declaration and initialization of string variable, reading and writing strings, string handling functions. [14 Hours]

Unit 04: **Function:** Introduction, Need, Definition, Syntax of function Declaration, Return Values and Their Type, Function Calls, Nesting of functions, function with arrays.**Pointers and files**:Introduction to pointers, declaration and accessing. Introduction to files basic file operations read and write.

[14 Hours]

Text Books:

(1) Programming in ANSIC – E.Balaguruswamy.
(2) Computer Concepts and C programming Techniques: A. M Padma Reddy.

Reference Books:

(1) Let us C – Yashwantkanetkar.
(2) Computer Concepts and C programming: P B Kottur

BSc. I Semester		C Programming Lab	
Subject Code:	**Practical – I**	**Total Teaching Hours:**	**39**
IA Marks:	**10**	**Teaching Hours/Week:**	**04**
Exam Marks:	**40**	**Examination Hours:**	**03**

PART A(Minor):

1. WAP to find biggest of 3 numbers.
2. WAP to simulate calculator array SWITCH statements.
3. WAP to find sum of first N numbers.
4. WAP to generate prime numbers between two integers M and N.
5. WAP to find the sum of odd positioned digits in the given integer.
6. WAP to generate Fibonacci numbers between two integers P and Q.
7. WAP to cheek whether given number is palindrome or not.
8. WAP to find the biggest and second biggest among N numbers (without using array).
9. WAP to count the numbers of words, vowels, spaces and lines in the given text.
10. WAP to sort the given array in ascending order using linear sort.

PART B(Major):

1. WAP to search an element using binary search.
2. WAP to delete the repeated elements in an array.
3. WAP to add two matrices using Functions.
4. WAP to multiply two matrices using Functions.
5. WAP to find the sum of each row and column in a matrix.
6. WAP to find the norm of trace of a matrix.
7. WAP to transpose the given matrix and check whether the transpose in same as the original matrix.
8. WAP to read an array and count the number of even Nos and odd Nos in an array of size N.
9. WAP to read an array and find the biggest element in an array and with its position.
10. WAP to sort the diagonal element of a square matrix.

Examination:

- One Question has to be given from part A (Carries 15 Marks[write and execute]).
- One Question has to be given from part B (Carries 15 Marks[write and execute]).
- Viva carries 10 Marks.

BSc. II Semester		Data Structures using C	
Subject Code:	24MC-II	Total Teaching Hours:	56
IA Marks:	20	Teaching Hours/Week:	04
Exam Marks:	80	Examination Hours:	03

Course Learning Objectives:

a. Structures, **Pointers, and Unions**: Students will be able to define and manipulate complex data structures in C, such as arrays of structures, nested structures, and unions. They will also understand and utilize advanced C features like register variables, bitwise operators, bit fields, enumerations, command line arguments, macros, preprocessor statements, and dynamic memory allocation.
b. Stacks: Students will understand the concept of stacks and their operations, implement stacks using arrays, and apply stacks to solve problems such as expression conversion (infix to postfix, infix to prefix) and postfix expression evaluation. They will also be able to implement stacks using structures.
c. Queues: Students will grasp the concept of queues and different types of queues, and implement ordinary and circular queues. They will apply these implementations to various scenarios and problems.
d. Linked **Lists**: Students will understand the concepts and linked representation of data structures, implement stacks and queues using linked lists, and comprehend the basic ideas of circular and doubly linked lists. They will appreciate the advantages of linked lists over arrays for certain applications.
e. Trees: Students will learn the fundamentals of trees, including their definitions and storage representations, perform various operations on binary trees using linked representations, and understand tree traversals. They will also implement and manipulate binary search trees, focusing on insertion, searching, and other operations.

Course outcomes:

1. Structures, Pointers, and Unions: Students will demonstrate the ability to define and manipulate advanced data structures such as arrays of structures, nested structures, and unions in C. They will effectively use register variables, bitwise operators, bit fields, enumerations, command line arguments, macros, preprocessor statements, and perform dynamic memory allocation.
2. Stacks and queues: Students will be able to implement stacks and queue data structures using arrays and structures, perform various stack operations, and apply stacks to convert expressions (infix to postfix, infix to prefix) and evaluate postfix expressions.□ Queues: Students will implement and manipulate different types of queues, including ordinary and circular queues, and understand their applications in various scenarios.
3. Linked **Lists and trees**: Students will construct and manipulate linked list data structures and trees, including implementing stacks and queues using linked lists. They will comprehend the concepts of circular and doubly linked lists and appreciate their advantages over arrays in specific contexts.
4. Searching **and Sorting**: Students will implement various searching algorithms (linear search, binary search, indexed sequential search, interpolation search) and sorting algorithms (bubble sort, merge sort, quick sort, selection sort, heap sort, insertion sort, shell sort, radix sort). They will apply these algorithms to efficiently manage and organize data.

Course Chapters:

Unit 01: Structures, Pointers, and Unions: introduction, Arrays of structures, nesting of structures. Introduction to special features of C, Register variable, bitwise operator, bit fields, enumerations, command line arguments, macros, preprocessors statement, Dynamic memory allocation. **Recursion:** Introduction, what is recursion, factorial of a number, Fibonacci series, GCD of two numbers, Tower of Honai, binary search, binomial coefficient, efficiency of recursion, comparison between iterative and recursive functions, properties of recursive functions. [14 Hours]

Unit 02: Stacks: Introduction, definition of a stack with various operations, stack implementation using arrays, applications of stack, conversions of expressions: conversion from infix to postfix, Infix to prefix, evaluation of postfix expression, stacks using structures.**Queues:** Introduction, different types of queues, implementation of ordinary queue, circular queue. [14 Hours]

Unit 03: Linked Lists: Introduction, Definition and linked representation, stack and Queues using Linked list, Other list structure: circular and doubly list(concepts only). **Trees:** Introduction, Definitions, Storage representation of a binary tree, Various operations on a binary tree using linked representation, tree traversals, Binary search tree (Insertion, Searching and other operations) . [14 Hours]

Unit 04: Searching: Introduction, Linear Search, Binary search, searching an ordered table, indexed sequential search, and Interpolation search.**Sorting:** Introduction, Bubble sort, Merge sort, quick sort, Selection sort, Heap sort, Insertion sorts, Shell sort, Radix sort. [14 Hours]

Text Books:

1. Systematic approach to Data structures using C – A.M. Padma Reddy, Revised edition 2007
2. Programming in ANSI C - E. Balagursamy

Reference Books:

1. Datastructures and applications -Trembly and Sorenson
2. Data Structures using C, Aaron M. Fenenbaum, YedidyahLangsam and Moshe J. Augestein, Pearson education/PHI, 2006

BSc. II Semester		Data Structures using C Lab	
Subject Code:	Practical II	Total Teaching Hours:	39
IA Marks:	10	Teaching Hours/Week:	04
Exam Marks:	40	Examination Hours:	03

PART-A(Minor)

1. WAP to Read and Display Employees Information using array of Structure.
2. WAP to implement a structure within a structure.
3. WAP to implement stack operations using structure.
4. WAP to implement queue operation using structure.
5. WAP to convert valid infix expression to valid postfix expression.
6. WAP to convert valid infix expression to valid prefix expression.
7. WAP to evaluate a postfix expression.
8. WAP to search an element in a given list of integers using binary search using recursion.
9. WAP to find sum of elements of the given array using recursion.
10. WAP to sort elements in an array using Bubble sort.

PART-B(Major)

1. WAP to sort elements in an array using Selection sort.
2. WAP to search an element in an array using Interpolation search.
3. WAP to implement a linked list to insert an element at begin and end of the list, delete an element at begin and end of the list and display the list.
4. WAP to implement a stack operations (push, pop, display) using linked list.
5. WAP to implement a queue operations (Qinsert, Qdelete, Qdisplay) using linked list.
6. WAP to create a tree, traverse a tree in preorder, postorder, and inorder and search a node in a tree using binary search tree.
7. WAP to sort elements in an array using Quick sort.
8. WAP to sort elements in an array using Heap sort.
9. WAP to sort elements in an array using Merge sort.
10. WAP to sort elements in an array using Radix sort.

Examination:

- One Question has to be given from part A (Carries 15 Marks[write and execute]).
- One Question has to be given from part B (Carries 15 Marks[write and execute]).
- Viva carries 10 Marks.

Practical Proper Examination I-VI semesters

Duration: 3Hrs

• Experimentation (Major & Minor/Spotters)	-	30 Marks
• Viva Voice	-	10Marks
	Total	**40 Marks**

Internal Assessment for Practical Paper I-VI semesters

• Attendance	-	05 Marks
• Test + Record/Journal	-	05 Marks
	Total	**10 Marks**

Project Work/Internship during VI semester

• Project work/Dissertation/Internship and preparation of Report	-	40 Marks
• Viva Voice	-	10Marks
	Total	**50 Marks**

Continuous Assessment Programme/Internal Assessment/Formative Assessment

Major 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

Continuous Assessment Programme/Internal Assessment/Formative Assessment

Elective/Optional Papers

Sl. No.	Continuous Assessment Programme/Internal Assessment	Maximum Marks
(1)	(2)	(3)
01	TwoSession Tests with proper record for assessment (2+2 = 4)	04
02	Assessment of Skill Development activities/Seminars/Group Discussion/ Assignment etc., with proper record	03
03	Attendance with proper record	03
	TOTAL MARKS	10

- **Attendance Marks-breakup**

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

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

B.Sc. Semester-I Degree Examination;2024-25
(Semester Scheme; New Syllabus: 2024-25)

SUBJECT: SCIENCE COURSES

Paper –_____: _____
Paper Code: _____

Time: 3 Hours **Max. Marks: 80**

Instructions to candidates:

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

SECTION-A

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

a)

b)

c)

d)

e)

f)

g)

h)

i)

j)

SECTION-B

Answer any **SIX** of the following: **(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

THEORY EXAMINATION QUESTION PAPER PATTERN FOR ELECTIVE/OPTIONAL PAPERS

(Semesters III &IV)

B.Sc. Semester-I/II/III/IV/VDegree Examination;2024-25

(Semester Scheme; New Syllabus: 2024-25)

SUBJECT: SCIENCE COURSES

Paper –ELECTIVE/OPTIONAL III&IV _____: _____

Paper Code: _____

Time: 2 Hours **Max. Marks: 40**

Instructions to candidates:

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

SECTION-A

Answer **all** the following questions: **(2×5=10)**

1.
2.
3.
4.
5.

SECTION-B

Answer any **SIX** of the following: **(5×6=30)**

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

Registrar
Davangere University
Shivagangotri, Davangere.

Dr. U.S. MAHABALESHWAR
M.Sc., M.Phil., Ph.D.
Professor & Dean, Science & Technology
Davangere University, Shivagangotri,
Davangere-577 007, Karnataka, India.

BOS Chairman
Dept of Computer Science
Davangere University
Shivagangotri, Davangere