

# DAVANGERE UNIVERSITY

Shivagangothri Campus, Tolahunase, Davangere -577 007

Proposed Curricular and Credits Structure under Choice Based Credit System [CBCS] of Computer Science Major & One Minor Discipline Scheme for the Four Years Computer Science B.Sc. Undergraduate Honors Programme with effect from 2021-22

SEMESTER-I										
Category	Course code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exams (Hrs)
			IA	SEE	Total	L	T	P		
L1	21BSC1L1LK1	Kannada	40	60	100	4	-	-	3	3
	21BSC1L1LFK1	Functional Kannada								
L2	21BSC1L2LEN2	English	40	60	100	4	-	-	3	3
	21BSC1L2LHI2	Hindi								
	21BSC1L2LSN2	Sanskrit								
	21BSC1L2LTE2	Telugu								
	21BSC1L2LUR2	Urdu								
DSC1	21BSC1C1CS1L	Computer Fundamentals and Programming in C	40	60	100	4	-	-	4	3
	21BSC1C1CS1P	C Programming Lab	25	25	50	-	-	4	2	3
DSC1	Another Department Code	Another Department Course Title	40	60	100	4	-	-	4	3
			25	25	50	-	-	4	2	3
SEC1	21BSC1SE1CS1	Digital Fluency*	25	25	50	1	-	2	2	2
VBC1	21BSC1V1PE1	Physical Education- Yoga	25	-	25	-	-	2	1	-
VBC2	21BSC1V2HW1	Health & Wellness	25	-	25	-	-	2	1	-
OEC1	21BSC1O1CS1	C Programming Concepts	40	60	100	3	-	-	3	3
Total Marks					700	Semester Credits			25	

# **SEMESTER-II**

Category	Course code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exams (Hrs)
			IA	SEE	Total	L	T	P		
L3	21BSC2L3LK2	Kannada	40	60	100	4	-	-	3	3
	21BSC2L3FKL2	Functional Kannada								
L4	21BSC2L4EN2	English	40	60	100	4	-	-	3	3
	21BSC2L4HI2	Hindi								
	21BSC2L4SN2	Sanskrit								
	21BSC2L4TE2	Telugu								
	21BSC2L4UR2	Urdu								
DSC2	21BSC2C2CS2L	Data Structures using C	40	60	100	4	-	-	4	3
	21BSC2C2CS2P	Data structures Lab	25	25	50	-	-	4	2	3
DSC2	Another Department Code	Another Department Course Title	40	60	100	4	-	-	4	3
			25	25	50	-	-	4	2	3
AECC1	21BSC2AE1ES2	Environmental Studies	20	30	50	1	-	2	2	2
VBC3	21BSC2V3PE2	Physical Education- Sports	25	-	25	-	-	2	1	-
VBC4	21BSC2V4NC1	NCC/NSS/R&R(S&G) / Cultural	25	-	25	-	-	2	1	-
OEC2	21BSC2O2CS2	Web Designing	40	60	100	3	-	-	3	3
Total Marks					700	Semester Credits			25	

SECOND YEAR; SEMESTER-III										
Category	Course code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exams (Hrs)
			IA	SEE	Total	L	T	P		
L5	21BSC3L5LK3	Kannada	40	60	100	4	-	-	3	3
	21BSC3L5LFK3	Functional Kannada								
L6	21BSC3L6EN3	English	40	60	100	4	-	-	3	3
	21BSC3L6HI3	Hindi								
	21BSC3L6SN3	Sanskrit								
	21BSC3L6TE3	Telugu								
	21BSC3L6UR3	Urdu								
DSC3	21BSC3C3CS1L	Object Oriented Programming in JAVA	40	60	100	4	-	-	4	3
	21BSC3C3CS1P	JAVA Lab	25	25	50	-	-	4	2	3
DSC3	Another Department Code	Another Department Course Title	40	60	100	4	-	-	4	3
			25	25	50	-	-	4	2	3
SEC2	21BSC3SE2ES2	Artificial Intelligence	25	25	50	1	-	2	2	2
VBC5	21BSC3V5PE3	Physical Education- Sports	25	-	25	-	-	2	1	-
VBC6	21BSC3V6NC2	NCC/NSS/R&R(S&G) / Cultural	25	-	25	-	-	2	1	-
OEC3	21BSC3O3CS5	E-Commerce	40	60	100	3	-	-	3	3
Total Marks					700	Semester Credits			25	

  
**Registrar**  
 Davangere University  
 Gulvaganotri, Davangere.



SEMESTER-IV										
Category	Course code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exams (Hrs)
			IA	SEE	Total	L	T	P		
L7	21BSC4L7LK4	Kannada	40	60	100	4	-	-	3	3
	21BSC4L7LFK4	Functional Kannada								
L8	21BSC4L8EN4	English	40	60	100	4	-	-	3	3
	21BSC4L8HI4	Hindi								
	21BSC4L8SN4	Sanskrit								
	21BSC4L8TE4	Telugu								
	21BSC4L8UR4	Urdu								
DSC4	21BSC4C2CS2L	Database Management Systems	40	60	100	4	-	-	4	3
	21BSC4C2CS2P	DBMS Lab	25	25	50	-	-	4	2	3
DSC4	Another Department Code	Another Department Course Title	40	60	100	4	-	-	4	3
			25	25	50	-	-	4	2	3
AECC2	21BSC4AE1ES2	Constitution of India	25	25	50	1	-	2	2	2
VBC7	21BSC4V5PE4	Physical Education- Sports	25	-	25	-	-	2	1	-
VBC8	21BSC4V6NC3	NCC/NSS/R&R(S&G) / Cultural	25	-	25	-	-	2	1	-
OE4	21BSC4O3CS7	Office Automation	40	60	100	3	-	-	3	3
Total Marks					700	Semester Credits			25	

SEMESTER-V										
Category	Course code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exams (Hrs)
			IA	SEE	Total	L	T	P		
Computer Science as Major Discipline										
DSC5	21BSC5C5CSMJ1L	Programming in PYTHON	40	60	100	3	-	-	3	3
	21BSC5C5CSMJ1P	PYTHON Programming lab	25	25	50	-	-	4	2	3
DSC6	21BSC5C5CSMJ2L	Computer Networks	40	60	100	3	-	-	3	3
	21BSC5C5CSMJ2P	Computer Networks Lab	25	25	50	-	-	4	2	3
DSC5	Another Department Code as a Minor Subject	Another Department Course Title	40	60	100	3	-	-	3	3
			25	25	50	-	-	4	2	3
VC1	21BSC5VC1US	Unix & Shell Programming	40	60	100	3	-	-	3	3
	21BSC5VC1FD	Fundamentals of Data Science								
VBC9	21BSC5V5PE5	Physical Education-Sports	25	-	25	-	-	2	1	-
VBC10	21BSC5V6NC4	NCC/NSS/R&R(S&G) / Cultural	25	-	25	-	-	2	1	-
SEC3	21BSC5SE3CS3	Cyber Security	25	25	50	1	-	2	2	2
Total Marks					700	Semester Credits			22	

  
**Registrar**  
**Davangere University**  
**Shivagangotri, Davangere.**





SEMESTER-VI										
Category	Course code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exams (Hrs)
			IA	SEE	Total	L	T	P		
Computer Science as Major Discipline										
DSC7	21BSC6C6CSMJ1L	Internet Technologies	40	60	100	3	-	-	3	3
	21BSC6C6CSMJ1P	Internet Technology Lab	25	25	50	-	-	4	2	3
DSC8	21BSC6C6CSMJ2L	Operating System Concepts	40	60	100	3	-	-	3	3
	21BSC6C6CSMJ2P	C# Programming Lab	25	25	50	-	-	4	2	3
DSC6	Another Department Code as a Minor Subject	Another Department Course Title	40	60	100	3	-	-	3	3
			25	25	50	-	-	4	2	3
VC2	21BSC6VC2HT	Health Care Technologies	40	60	100	3	-	-	3	3
	21BSC6VC2DM	Digital Marketing								
INT1	21BSC6 INT1L	Internship	25	25	50	-	-	2	2	2
VBC1	21BSC6V5PE5	Physical Education- Sports	25	-	25	-	-	2	1	-
VBC2	21BSC6V6NC4	NCC/NSS/R&R(S&G) / Cultural	25	-	25	-	-	2	1	-
SEC4	21BSC6SE4CS4	Professional Communication	25	25	50	1	-	2	2	2
Total Marks					700	Semester Credits			24	
Total Marks for BSC Program					4200	Total Credits for BSC Program			146	

## Computer Science Subject as a Minor Discipline

SEMESTER-V										
Category	Course code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exams (Hrs)
			IA	SEE	Total	L	T	P		
DSC5 As a Minor Subject	21BSC5C5CSMN1L	Programming in PYTHON	40	60	100	3	-	-	3	3
	21BSC5C5CSMN1P	PYTHON Programming lab	25	25	50	-	-	4	2	3

SEMESTER-VI										
Category	Course code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exams (Hrs)
			IA	SEE	Total	L	T	P		
DSC6 As a Minor Subject	21BSC6C6CSMN1L	Internet Technologies	40	60	100	3	-	-	3	3
	21BSC6C6CSMN1P	Internet Technologies Lab	25	25	50	-	-	4	2	3

  
**Registrar**  
**Davangere University**  
**Shivangotri, Davangere.**



**Exit Option**  
**Choice Based Credit System [CBCS] of Computer Science Major & One Minor**  
**Discipline Scheme for the Four Years Computer Science B.Sc. Undergraduate Honors**  
**Programme with effect from 2021-22**

Sl. No	Years	After completion of	Exit Option
1.	First	I and II Semesters	UG Certificate Course in Computer Science
2.	Second	III and IV Semesters	UG Diploma in Computer Science
3.	Third	V and VI Semesters	B.Sc in Computer Science
4.	Fourth	VII and VIII Semesters	B.Sc. (Hons.) in Computer Science

Digitized by eGangotri  
 www.egangotri.in  
 2021-22



## Concept Note, Abbreviation Explanation and Coding:

### Concept Note:

1. **CBCS** is a mode of learning in higher education which facilitates a student to have some freedom in selecting his/her own choices, across various disciplines for completing a UG/PG program.
2. A credit is a unit of study of a fixed duration. For the purpose of computation of workload as per UGC norms the following is mechanism be adopted in the University:  
One credit (01) = One Theory Lecture (L) period of one (1) hour.  
One credit (01) = One Tutorial (T) period of one (1) hour.  
One credit (01) = One practical (P) period of two (2) hours.
3. Course: paper/subject associated with AECC, DSC, DSEC, SEC, VBC, OEC, VC, IC and MIL
4. In case of **B.Sc. Once a candidate chose two courses/subjects of a particular two department in the beginning, he/she shall continue the same till the end of the degree, then there is no provision to change the course(s) and Department(s).**
5. A candidate shall choose **one of the Department's courses as major and other Department course as minor in fifth and sixth semester and major course will get continued in higher semester.**
6. Wherever there is a practical there will be no tutorial and vice-versa
7. A major subject is the subject that's the main focus of Core degree/concerned.
8. A minor is a secondary choice of subject that complements core major/ concerned.
9. Vocational course is a course that enables individual to acquire skills set that are required for a particular job.
10. Internship is a designated activity that carries some credits involving more than **25 days** of working in an organization (either in same organization or outside) under the guidance of an identified mentor. Internship shall be an integral part of the curriculum.
11. **OEC: For non- computer science students. Computer Science students have to opt for OEC from departments other than major and minor disciplines.**

  
**Registrar**  
**Davangere University**  
**Shivagangotri, Davangere.**

### Abbreviation Explanations:

1. AECC: Ability Enhancement Compulsory Course.
2. DSC: Discipline Specific Core Course.
3. DSEC: Discipline Specific Elective Course.
4. SEC: Skill Enhancement Course.
5. VBC: Value Based Course.
6. OEC: Open/Generic Elective Course.
7. VC: Vocational Course.
8. IC: Internship Course.
9. L1: Language One.
10. L2: MIL .
11. L= Lecture; T= Tutorial; P=Practical.
12. MIL= Modern Indian Language; English or Hindi or Telugu or Sanskrit or Urdu.

### Program Coding:

1. Code 21: Year of Implementation.
2. Code BSC: BSC Program under the faculty of Applied Science of the University.
3. Code 1: First Semester of the Program, (2 to 6 represent higher semesters).
4. Code AE: AECC, (C for DSC, S for SEC, V for VBC and O for OEC).
5. Code 1: First "AECC" Course in semester, similarly in remaining semester for such other courses.
6. Code LK: Language Kannada, similarly Language English, Language Hindi, Language Telugu, Language Sanskrit, &Language Urdu.
7. Code 1: Course in that semester.
8. CS: Computer Science.

ಮಾನ್ಯತೆ  
ವಿಶ್ವವಿದ್ಯಾಲಯ  
ಮಾನ್ಯತೆ, ಬೆಂಗಳೂರು

## Evaluation Scheme for Lab Examination

Assessment Criteria		25 marks
Program – 1 from Part A	Writing the Program	05
	Execution and Formatting	05
Program -2 from Part B	Writing the Program	05
	Execution and Formatting	05
Viva Voice		05
Total		25

## ASSESSMENT METHODS

### Evaluation Scheme for Internal Assessment:

#### Theory:

Assessment Criteria	40 marks
1 <sup>st</sup> Internal Assessment Test for 30 marks 1 hr 30 min after 8 weeks and 2 <sup>nd</sup> Internal Assessment Test for 30 marks 1 hr 30 min after 15 weeks. Average of two tests should be considered.	30
Attendance >75%	05
Assignment	05
<b>Total</b>	<b>40</b>

#### Practical:

Assessment Criteria	25 marks
Semester End Internal Assessment Test for 15 marks 2 hrs	15
Attendance >75%	05
Journal (Practical Record)	05
<b>Total</b>	<b>25</b>

Handwritten signature/initials at the bottom of the page.

## BSc Question Paper Pattern

Time: 3 Hrs

### PART-A

Max Marks. 60

Answer any Five questions.

5X2=10

- 1.
- 2.
- 3.
- 4
- 5
- 6
- 7
- 8

Note: Two questions from each unit.

### PART-B

Answer any Five of the following questions.

5X4=20

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8

Note: Two questions from each unit.

### PART-C

Answer any Three of the following questions.

3X10=30

- 1
- 2
- 3
- 4
- 5

Note: Minimum One question from each unit.

-----

  
Registrar  
Davangere University  
Shivangotri, Davangere.



## COURSE-WISE SYLLABUS

## Semester I

Year	I	Course Code: 21BSC1C1CS1L			Credits	04
Sem.	I	Course Title: Computer Fundamentals and Programming in C			Hours	52
Course Pre-requisites, if any		NA				
Formative Assessment Marks: 40		Summative Assessment Marks: 60		Duration of ESA:.03 hrs.		
Course Outcomes		After completing this course satisfactorily, a student will be able to: <ul style="list-style-type: none"><li>• Confidently operate Desktop Computers to carry out computational tasks</li><li>• Understand working of Hardware and Software and the importance of operating systems</li><li>• Understand programming languages, number systems, peripheral devices, networking, multimedia and internet concepts</li><li>• Read, understand and trace the execution of programs written in C language</li><li>• Write the C code for a given problem</li><li>• Perform input and output operations using programs in C</li><li>• Write programs that perform operations on arrays</li></ul>				
Unit No.	Course Content				Hours	
Unit I	<b>Fundamentals of Computers:</b> Introduction to Computers - Computer Definition, Characteristics of Computers, Evolution and History of Computers, Types of Computers, Basic Organisation of a Digital Computer; Number Systems – different types, conversion from one number system to another; Computer Codes – BCD, Gray Code, ASCII and Unicode; Boolean Algebra – Boolean Operators with Truth Tables; Types of Software – System Software and Utility Software; Computer Languages - Machine Level, Assembly Level & High Level Languages, Translator Programs – Assembler, Interpreter and Compiler; Planning a Computer Program - Algorithm, Flowchart and Pseudo code with Examples. <b>Introduction to C Programming:</b> Over View of C; History and Features of C; Structure of a C Program with Examples; Creating and Executing a C Program; Compilation process in C.				13	
Unit II	<b>C Programming Basic Concepts:</b> C Character Set; C tokens - keywords, identifiers, constants, and variables; Data types; Declaration & initialization of variables; Symbolic constants. <b>Input and output with C:</b> Formatted I/O functions - printf and scanf, control stings and escape sequences, output specifications with printf functions; Unformatted I/O functions to read and display single character and a string - getchar, putchar, gets and puts functions. <b>C Operators &amp; Expressions:</b> Arithmetic operators; Relational operators; Logical operators; Assignment operators; Increment & Decrement operators; Bitwise operators; Conditional				13	

	operator; Special operators; Operator Precedence and Associativity; Evaluation of arithmetic expressions; Type conversion.	
Unit III	<p><b>Control Structures:</b> Decision making Statements - Simple if, if_else, nested if_else, else_if ladder, Switch-case, goto, break &amp; continue statements; Looping Statements - Entry controlled and Exit controlled statements, while, do-while, for loops, Nested loops.</p> <p><b>Arrays:</b> One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays - Declaration, Initialization and Memory representation.</p> <p><b>Strings:</b> Declaring &amp; Initializing string variables; String handling functions - <i>strlen</i>, <i>strcmp</i>, <i>strcpy</i> and <i>strcat</i>; Character handling functions - <i>toascii</i>, <i>toupper</i>, <i>tolower</i>, <i>isalpha</i>, <i>isnumeric</i> etc.</p>	13
Unit IV	<p><b>Pointers in C:</b> Understanding pointers - Declaring and initializing pointers, accessing address and value of variables using pointers; Pointers and Arrays; Pointer Arithmetic; Advantages and disadvantages of using pointers;</p> <p><b>User Defined Functions:</b> Need for user defined functions; Format of C user defined functions; Components of user defined functions - return type, name, parameter list, function body, return statement and function call; Categories of user defined functions - With and without parameters and return type.</p> <p><b>User defined data types:</b> Structures - Structure Definition, Advantages of Structure, declaring structure variables, accessing structure members, Structure members initialization, comparing structure variables, Array of Structures; Unions - Union definition; difference between Structures and Unions.</p>	13
<b>Recommended Learning Resources</b>		
Print Resources	<p><b>Text Books</b></p> <ol style="list-style-type: none"> <li>1. Pradeep K. Sinha and Priti Sinha: Computer Fundamentals (Sixth Edition), BPB Publication</li> <li>2. E. Balgurusamy: Programming in ANSI C(TM)</li> </ol> <p><b>References</b></p> <ol style="list-style-type: none"> <li>1. Kamthane: Programming with ANSI and TURBO C (Pearson Education)</li> <li>2. V. Rajaraman: Programming in C (PHI –EEE)</li> <li>3. S. Byron Gottfried: Programming with C(TM)</li> <li>4. Kernighan &amp; Ritchie: The C Programming Language(PHI)</li> <li>5. Yashwant Kanitkar: Let us C</li> </ol>	



Year	I	Course Code: 21BSC1C1CS1P			Credits	02
Sem.	I	Course Title: C Programming Lab			Hours	52
Course Pre-requisites, if any:		Knowledge of Programming				
Formative Assessment Marks: 25		Summative Assessment Marks: 25		Duration of ESA: 03 hrs.		
		<p><b><u>Practice Labs</u></b></p> <p>1. The following activities be carried out/ discussed in the lab during the initial period of the semester.</p> <ol style="list-style-type: none"><li>1. Basic Computer Proficiency<ol style="list-style-type: none"><li>a. Familiarization of Computer Hardware Parts</li><li>b. Basic Computer Operations and Maintenance.</li><li>c. Do's and Don'ts, Safety Guidelines in Computer Lab</li></ol></li><li>2. Familiarization of Basic Software – Operating System, Word Processors, Internet Browsers, Integrated Development Environment (IDE) with Examples.</li><li>3. Type Program Code, Debug and Compile basic programs covering C Programming fundamentals discussed during theory classes.</li></ol>				
		<p><b><u>Part A:</u></b></p> <ol style="list-style-type: none"><li>1. Write a C Program to read radius of a circle and to find area and circumference</li><li>2. Write a C Program to read three numbers and find the biggest of three</li><li>3. Write a C Program to demonstrate library functions in <i>math.h</i></li><li>4. Write a C Program to check for prime</li><li>5. Write a C Program to generate n primes</li><li>6. Write a C Program to read a number, find the sum of the digits, reverse the number and check it for palindrome</li><li>7. Write a C Program to read numbers from keyboard continuously till the user presses 999 and to find the sum of only positive numbers</li><li>8. Write a C Program to read percentage of marks and to display appropriate message (Demonstration of else-if ladder)</li><li>9. Write a C Program to find the roots of quadratic equation (demonstration of switch-case statement)</li><li>10. Write a C program to read marks scored by n students and find the average of marks (Demonstration of single dimensional array)</li><li>11. Write a C Program to remove Duplicate Element in a single dimensional Array</li><li>12. Program to perform addition and subtraction of Matrices</li></ol>				
		<p><b><u>PART B:</u></b></p> <ol style="list-style-type: none"><li>1. Write a C Program to find the length of a string without using built in function</li><li>2. Write a C Program to demonstrate string functions.</li><li>3. Write a C Program to demonstrate pointers in C</li><li>4. Write a C Program to check a number for prime by defining <i>isprime()</i> function</li><li>5. Write a C Program to read, display and to find the trace of a square matrix</li><li>6. Write a C Program to read, display and add two m x n matrices using functions</li><li>7. Write a C Program to read, display and multiply two m x n matrices using functions</li><li>8. Write a C Program to read a string and to find the number of alphabets, digits,</li></ol>				

- vowels, consonants, spaces and special characters.
9. Write a C Program to Reverse a String using Pointer
  10. Write a C Program to Swap Two Numbers using Pointers
  11. Write a C Program to demonstrate student structure to read & display records of n students.
  12. Write a C Program to demonstrate the difference between structure & union.

**Note:** Student has to execute a minimum of 10 programs in each part to complete the Lab course

## **Open Elective Courses offered by the Department of Computer Science for other discipline**

### **Open Elective 1: C Programming Concepts**

<b>Year</b>	I	<b>Course Code:</b> 21BSC1O1CS1	<b>Credits</b>	03
<b>Sem.</b>	1	<b>Course Title:</b> C Programming Concepts	<b>Hours</b>	42
Course Pre-requisites, if any		NA		
Formative Assessment Marks: 40		Summative Assessment Marks: 60	Duration of ESA: 03 hrs.	

### **Course Outcomes (COs):**

After completing this course satisfactorily, a student will be able to:

- Confidently operate Desktop Computers to carry out computational tasks
- Understand working of Hardware and Software and the importance of operating systems
- Understand programming languages, number systems, peripheral devices, networking, multimedia and internet concepts
- Read, understand and trace the execution of programs written in C language
- Write the C code for a given problem
- Perform input and output operations using programs in C
- Write programs that perform operations on arrays

## Course Content

Content	Hours
<b>Unit - 1</b>	
<b>Fundamentals of Computers:</b> Introduction to Computers -Hardware, software- System software, Application software, Utility software, Operating System; Computer Languages - Machine Level, Assembly Level & High-Level Languages, Translator Programs - Assembler, Interpreter and Compiler; Planning a Computer Program - Algorithm and Flowchart with Examples.	6Hrs
<b>Unit - 2</b>	
<b>Introduction to C Programming:</b> Over View of C; History and Features of C; Structure of a C Program with Examples; Creating and Executing a C Program; Compilation process in C.  <b>C Programming Basic Concepts:</b> C Character Set; C tokens - keywords, identifiers, constants, and variables; Data types; Declaration & initialization of variables; Symbolic constants.  <b>Input and output with C:</b> Formatted I/O functions - <i>printf</i> and <i>scanf</i> , control stings and escape sequences, output specifications with <i>printf</i> functions; Unformatted I/O functions to read and display single character and a string - <i>getchar</i> , <i>putchar</i> , <i>gets</i> and <i>puts</i> functions.	10 Hrs
<b>Unit - 3</b>	
<b>C Operators &amp; Expressions:</b> Arithmetic operators; Relational operators; Logical operators; Assignment operators; Increment & Decrement operators; Bitwise operators; Conditional operator; Special operators; Operator Precedence and Associativity; Evaluation of arithmetic expressions; Type conversion.  <b>Control Structures:</b> Decision making Statements - <i>Simple if</i> , <i>if_else</i> , <i>nested if_else</i> , <i>else_if ladder</i> , <i>Switch-case</i> , <i>goto</i> , <i>break</i> & <i>continue</i> statements; Looping Statements - Entry controlled and Exit controlled statements, <i>while</i> , <i>do-while</i> , <i>for</i> loops, Nested loops.	8 Hrs
<b>Unit - 4</b>	
<b>User Defined Functions:</b> Need for user defined functions; Format of C user defined functions; Components of user defined functions - return type, name, parameter list, function body, return statement and function call; Categories of user defined functions - With and without parameters and return type.	8 Hrs
<b>Unit 5:</b>	

  
**Registrar**  
**Davangere University**  
**Shivangotri, Davangere.**

<p>Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays - Declaration, Initialization and Memory representation. Strings: Declaring &amp; Initializing string variables; String handling functions - <i>strlen</i>, <i>strcmp</i>, <i>strcpy</i> and <i>strcat</i>; Character handling functions - <i>tolower</i>, <i>toupper</i>, <i>isalpha</i>, <i>isnumeric</i> etc.</p> <p><b>Basics of Pointers in C:</b> Understanding pointers - Declaring and initializing pointers, accessing address and value of variables using pointers; Pointer Arithmetic; Advantages and disadvantages of using pointers;</p>	10Hrs
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------

### Text Books:

1. Pradeep K. Sinha and Priti Sinha: Computer Fundamentals (Sixth Edition), BPB Publication
2. E. Balgurusamy: Programming in ANSI C (TMH)

### References:

1. Kamthane: Programming with ANSI and TURBO C (Pearson Education)
2. V. Rajaraman: Programming in C (PHI –EEE)
3. S. ByronGottfried: Programming with C (TMH)
4. Kernighan & Ritchie: The C Programming Language (PHI)
5. Yashwant Kanitkar: Let us C
6. P.B. Kottur: Programming in C (Sapna Book House)

## Semester: II

Year	I	Course Code: 21BSC2C2CS2L		Credits	04
Sem.	2	Course Title: Data Structures using C		Hours	52
Course Pre-requisites, if any			NA		
Formative Assessment Marks: 40			Summative Assessment Marks: 60	Duration of ESA: 03 hrs.	
Course Outcomes		After completing this course satisfactorily, a student will be able to: <ul style="list-style-type: none"><li>Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms</li><li>Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs</li><li>Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs</li><li>Demonstrate different methods for traversing trees</li><li>Compare alternative implementations of data structures with respect to performance</li><li>Describe the concept of recursion, give examples of its use</li><li>Discuss the computational efficiency of the principal algorithms for sorting and searching</li></ul>			
Unit No.	Course Content			Hours	
Unit I	Introduction to data structures: Definition; Types of data structures - Primitive & Non-primitive, Linear and Non-linear; Operations on data structures. Algorithm Specification, Performance Analysis, Performance Measurement  Recursion: Definition; Types of recursions; Recursion Technique Examples - Fibonacci numbers,GCD, Binomial coefficient ${}^nC_r$ , Towers of Hanoi; Comparison between iterative and recursive functions. Arrays: Basic Concepts – Definition, Declaration, Initialisation, Operations on arrays; Types of arrays; Arrays as abstract data types (ADT); Representation of Linear Arrays in memory;			13	
Unit II	Traversing linear arrays; Inserting and deleting elements; Sorting– Selection sort, Bubble sort, Quick sort, Selection sort, Insertion sort; Searching - Sequential Search, Binary search; Iterative and Recursive searching; 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;			13	
Unit III	Queues: Basic Concepts – Definition and Representation of queues;			13	

**Registrar**

**Davangere University**  
Shivangotri, Davangere.



	Types of queues - Simple queues, Circular queues, Double ended queues, Priority queues; Operations on Simple queues; Dynamic memory allocation: Static & Dynamic memory allocation; Memory allocation and de- allocation functions - malloc, calloc, realloc and free. Linked list: Basic Concepts – Definition and Representation of linked list, Types of linked lists - Singly linked list, Doubly linked list, Header linked list, Circular linked list; Representation of Linked list in Memory; Operations on Singly linked lists – Traversing, Searching, Insertion, Deletion; Memory allocation; Garbage collection	
Unit IV	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; <i>preorder</i> , <i>inorder</i> and <i>Postorder</i> traversal; Reconstruction of a binary tree when any two of the traversals are given.	13
<b>Recommended Learning Resources</b>		
Print Resources	<b>Reference Books:</b> <ol style="list-style-type: none"> <li>1. Ellis Horowitz and Sartaj Sahni: Fundamentals of Data Structures</li> <li>2. Tanenbaum: Data structures using C (Pearson Education)</li> <li>3. Kamathane: Introduction to Data structures (Pearson Education)</li> <li>4. Y. Kanitkar: Data Structures Using C(BPB)</li> <li>5. Kottur: Data Structure Using C</li> <li>6. Padma Reddy: Data Structure Using C</li> <li>7. Sudipa Mukherjee: Data Structures using C – 1000 Problems and Solutions (McGraw Hill Education,2007)</li> </ol>	



Year	I	Course Code: 21BSC2C2CS2P		Credits	02
Sem.	I	Course Title: Data Structure Lab		Hours	52
Course Pre-requisites, if any:		Knowledge of Programming			
Formative Assessment Marks: 25		Summative Assessment Marks: 25	Duration of ESA: 03 hrs.		
		<b>Part A:</b> 1. Write a C Program to find GCD using recursive function 2. Write a C Program to display Pascal Triangle using binomial function 3. Write a C Program to generate n Fibonacci numbers using recursive function. 4. Write a C Program to implement Towers of Hanoi. 5. Write a C Program to implement dynamic array, find smallest and largest element of the array. 6. Write a C Program to create two files to store even and odd numbers. 7. Write a C Program to create a file to store student records. 8. Write a C Program to read the names of cities and arrange them alphabetically. 9. Write a C Program to sort the given list using selection sort technique. 10. Write a C Program to sort the given list using bubble sort technique.			
		<b>PART B:</b> 1. Write a C Program to sort the given list using insertion sort technique. 2. Write a C Program to sort the given list using quick sort technique. 3. Write a C Program to sort the given list using merge sort technique. 4. Write a C Program to search an element using linear search technique. 5. Write a C Program to search an element using recursive binary search technique. 6. Write a C Program to implement Stack. 7. Write a C Program to convert an infix expression to postfix. 8. Write a C Program to implement simple queue. 9. Write a C Program to implement linear linked list. 10. Write a C Program to display traversal of a tree.			

  
 Registrar  
 Davangere University  
 Shivangotri, Davangere.



## Open Elective Courses offered by the Department of Computer Science for other discipline

### Open Elective 2: Web Designing

Year	I	Course Code: 21BSC2O2CS2	Credits	03
Sem.	II	Course Title: Web Designing	Hours	42
Course Pre-requisites, if any		NA		
Formative Assessment Marks: 40		Summative Assessment Marks: 60	Duration of ESA.:03 hrs.	

### **Course Outcomes (COs):**

- Be familiar with different web design theories and terminology.
- Analyze a web page and identify its elements and attributes.
- Create web pages using XHTML and Cascading Style Sheets.
- Build dynamic web pages using JavaScript (Client-side programming).

<b>Unit – 1</b>		
Fundamentals: Internet, WWW, Web Browsers and Web Servers, URLs, MIME, HTTP, Security, the Web Programmers Toolbox. Introduction to XHTML: Basic syntax, Standard structure, Basic text markup, Images, Hypertext Links, Lists, Tables, Forms, Frames		8 Hrs
<b>Unit-2</b>		
<b>Cascading Style Sheet (CSS):</b> Introduction, Levels of style sheets, Style specification formats, Selector forms, Property value forms, Font properties, List properties, Color, Alignment of text, The box model, Background images, The <span> and <div> tags, Conflict resolution.		8 Hrs
<b>Unit-3</b>		
<b>The Basics of JavaScript:</b> Overview of JavaScript, Object orientation and JavaScript, Syntactic characteristics, Primitives, operations, and expressions, Screen output and keyboard input, Control statements, Object creation and modification, Arrays, Functions, Constructors, Pattern matching using regular expressions, Errors in scripts, Examples.		10Hrs
<b>Unit-4</b>		
<b>JavaScript and HTML Documents:</b> The JavaScript execution environment, The Document Object Model, Element access in JavaScript, Events and event handling, handling events from the Body elements, Button elements, Text box and Password elements, The DOM 2 event model, the navigator object, DOM tree traversal and modification.		8 Hrs

<b>Unit-5</b>	
<b>Dynamic documents with JavaScript:</b> Introduction, positioning elements, Moving elements, Element visibility, Changing colors and fonts, Dynamic content, Stacking elements, locating the mouse cursor, Reacting to a mouse click, slow movement of elements, Dragging and dropping elements.	8 Hrs

**Text Books:**

1. Robert W. Sebesta: Programming the World Wide Web, 4<sup>th</sup> Edition, Pearson Education, 2008.

**References:**

1. M. Deitel, P.J. Deitel, A. B. Goldberg: Internet & World Wide Web How to Program, 4<sup>th</sup> Edition, Pearson Education, 2004.
2. Chris Bates: Web Programming Building Internet Applications, 3<sup>rd</sup> Edition, Wiley India, 2007.
3. Xue Bai et al: The web Warrior Guide to Web Programming, Cengage Learning, 2003.
4. M Srinivasan: Web

  
**Registrar**  
**Davangere University**  
**Shivangotri, Davangere.**

