SCHEME AND SYLLABI

3- Year UG Degree (Bachelor of Science in Computer Science)
4-Year UG Degree (Bachelor of Science- Honors in Computer Science)
w.e.f. Session 2024-25

Department of Computer Science and Engineering
Faculty of Computer Science and Engineering
Chaudhary Devi Lal University, Sirsa
(Haryana)-India

Semester I

Course Type	Course Code	Course Title	Level	Credits			Marks		
				L	P	Total	Int	Ext	Total
DSC	BSC/MD/CS/1/DSC/101	Computer Fundamentals and Programming in C	100	2	-	2	15	35	50
DSC	BSC/MD/CS/1/DSC/102	Computer Fundamentals and Programming in C(Lab-Work)	100	-	2	2	-	50	50
MIC	BSC/MD/CS/1/MIC/101	Information Technology Tools	100	2	-	2	15	35	50

Semester II

Course Type	Course Code	Course Title	Level	Credits			Marks		
				L	P	Total	Int	Ext	Total
DSC	BSC/MD/CS/2/DSC/103	Data Structure	100	2	-	2	15	35	50
DSC	BSC/MD/CS/2/DSC/104	Data Structure (Lab-Work)	100	-	2	2	-	50	50
MIC	BSC/MD/CS/2/MIC/102	Problem Solving Techniques	100	2	-	2	15	35	50

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Detailed Syllabi

Semester I

BSC/MD/CS/1/DSC/101 Computer Fundamentals and Programming in C

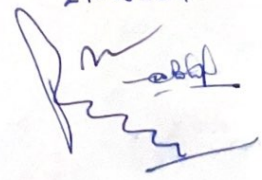| Course Type	Course Credit	Contact Hours/ Week	Delivery Mode	Maximum Marks		Exam Duration	Assessment Methods
				External	Internal		
DSC	02	02	Lecture	35	15	3 Hours	TEE/MTE/ Assignment/ Attendance
					10	2	3		

Instructions to paper setter for Term-End Examination: The Term-End examination shall cover the whole content of the course. The total number of questions shall be five. Question number one will be compulsory and will consist of SEVEN short/objective-type questions from the complete syllabus. In addition to the compulsory first question, there shall be two units in the question paper each consisting of two questions. The student will attempt one question from each unit in addition to the compulsory question. First question will carry seven marks and rest questions will carry equal marks.

Course Objectives: The course is designed to provide a comprehensive understanding of the fundamental concepts of computer science and programming. Students will be able to develop logics which will help them to create programs, applications in C.

Course Outcomes	At the end of this course, the student will be able to:
CO1	**Knowledge:** The concept of machine language, assembly language, and high-level language, and their roles in software development. Knowledge of C language programming constructs
CO2	**Understand:** different types of operators, their hierarchies and also control statements of C.
CO3	**Apply:** Various types of programming constructs such as operators and to understanding their hierarchy and associativity. To implement control statements to control the flow of execution in programs. To apply arrays of strings in various applications, such as handling multiple strings simultaneously.
CO4	**Analyze:** the efficiency and effectiveness of different programming constructs and control statements.
CO5	**Evaluate:** The correctness and performance of implemented algorithms and programs through testing and debugging.
CO6	**Create:** develop programs that incorporate multiple programming constructs, such as loops, arrays, functions, and strings.

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Course Content
BSC/MD/CS/1/DSC/101 Computer Fundamentals and Programming in C

Unit – I

Computer System: Definition, Characteristics of Computer, Block Diagram of Computer and its components and their functions

Memory: Need of Memory, Characteristics of Memory, Introduction to Primary and Secondary Memory, Memory Hierarchy.

Programming Languages: Low Level Language, Assembly Language, and High Level language, Compiler & Interpreter

Number Systems and Binary Arithmetic: Number system and their Conversions, Logic Gates, 1's and 2's Complement of Binary Numbers.

Elements of C: C character set, identifiers and keywords, data types, constants and variables, Structure of a C Program, unformatted & formatted I/O, Operators, Arithmetic expressions, evaluation of arithmetic expressions, operators' precedence and associativity in expression evaluation, type casting and conversion,

Unit – II

Control Statements: Conditional statements, iterative/looping statements, break and continue goto statement. Functions: Prototype, Declaration and Definition of a function, actual and Formal Arguments in Functions, Recursion.

Arrays: Definition, Creating and Using One Dimensional Arrays, Initializing an Array, Accessing individual elements in an Array, Two dimensional Arrays: memory representation schemes: row major, column major..

Understanding Pointers: Variable, Pointer arithmetic. passing pointers as function arguments, Call by Reference, Pointers and Arrays,. Pointers and strings, malloc, calloc, and size of functions

String Handling: String I/O, Array and strings, reading and writing strings, String manipulation functions: String length, copy, compare, concatenate etc.
Introduction to structures, declaring, initializing and using simple structures

Books Recommended:

1. Sukhendra Singh and Hemant Jain, C programming for problem solving
2. Yashavant Kanetkar, Let Us C: Authentic guide to C programming language - 19th Edition
3. Brian W. Kernighan / Dennis Ritchie, The C Programming Language

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BSC/MD/CS/1/DSC/102 Computer Fundamentals and Programming in C
(Lab-Work)

Course Type	Course Credit	Contact Hours/ Week	Delivery Mode	Maximum Marks		Exam Duration	Assessment Methods
				External	Internal		
DSC Practical	02	04	Practical	50	-	3 Hours	Practical/ Viva-voce

Instructions to paper setter for Term-End Examination: The Term-End examination shall be conducted by a panel of one external and one internal examiner. The question paper for practical examination shall be set on the spot.

List of Experiments/ Assignments

Note: Students are advised to do laboratory/practical practice not limited to, but including the following types of problems:

1. Given the values of the variables x, y and z, write a pro-gram to rotate their values such that x has the value of y, y has the value of z, and z has the value of x

2. The distance between two cities (in Km) is input through the keyboard. Write a C program to convert and print this distance in meter, feet, inches and centimeter.

3. If a five-digit number is input through the keyboard, write a C program to calculate the sum of its digits without us-ing loop.

4. If a four-digit number is input through the keyboard, write a C program to obtain the sum of the first and last digit of this number.

5. Program to find the largest and smallest number from four given number.

6. Program to find whether a year is leap or not.

7. Program to find out the grade of a student when the marks of 5 subjects are given.

8. A library charges a fine for every book returned late. For the first 5 days the fine is 50 paise, for 6-10 days fine is one rupee and above 10 days fine is 5 rupees. If you return the book after 30 days your membership will be cancelled.

9. Write a program to access the number of days the member is late to return the book and display the fine or the appropriate message.

10. Write a C program in which enter any number by the user and perform the operation of Sum of digits of entered number.

11. Write a C Program to convert Decimal number to Binary number.

12. WAP to compute the sum of the first n terms of the following series S = 1+1/2+1/3+1/4+……

13.	Write a C program to perform the factorial of given number.
14.	Write a C program to count the number of positive, negative and zero numbers in the given list of numbers.
15.	Suppose you need to generate a result table which consists of student id, student name, marks of three subject and total marks. Write a program which takes input for ten students and displays result table. Also display student information separately who got the highest total. USE STUCTURES.
16.	WAP to enter an integer array of size 10 and perform following operations on it. a) Display the Elements. b) Calculate the Sum and Average of Array. c) Find the largest element. d) Find second largest element. e) Find the Smallest element. f) Display the Array in Reverse order. g) Exit
17.	WAP to display Fibonacci series. a) using recursion b) using iteration
18	Write a menu driven program to perform following operations on strings: a) Show address of each character in string b) Concatenate two strings without using strcat function. c) Concatenate two strings using strcat function. d) Compare two strings e) Calculate length of the string (use pointers) f) Convert all lowercase characters to uppercase g) Convert all uppercase characters to lowercase h) Calculate number of vowels i) Reverse the string
19.	To Swap Two Numbers using Pointers
20.	To demonstrate student structure to read & display records of n students.

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BSC/MD/CS/1/MIC/101 Information Technology Tools

Course Type	Course Credit	Contact Hours/ Week	Delivery Mode	Maximum Marks		Exam Duration	Assessment Methods
				External	Internal		
MIC	02	02	Lecture	35	15	3 Hours	TEE/MTE/ Assignment/ Attendance
					10 | 2 | 3		

Instructions to paper setter for Term-End Examination: The Term-End examination shall cover the whole content of the course. The total number of questions shall be five. Question number one will be compulsory and will consist of SEVEN short/objective-type questions from the complete syllabus. In addition to the compulsory first question, there shall be two units in the question paper each consisting of two questions. The student will attempt one question from each unit in addition to the compulsory question. First question will carry seven marks and rest questions will carry equal marks.

Course Objectives: The course is designed to provide a comprehensive understanding of the fundamental concepts of computer science and programming.

Course Outcomes	At the end of this course, the student will be able to:
CO1	**Knowledge:** the historical development and evolution of computers, the key characteristics and limitations of computers, Number system and Codes, Memory and their types.
CO2	**Understand:** Understand different types of software (system, application, utility, open-source) and their evolution, the need and functions of an operating system.
CO3	**Apply:** Perform conversions between decimal, binary, octal, and hexadecimal number systems. Utilize office applications like word processing, spreadsheet, and database management.
CO4	**Analyze:** nalyze the memory hierarchy and the characteristics of different types of memory, the basic models of networks and identify different network devices and their functions.
CO5	**Evaluate:** the philosophy of open-source software, including licensing and copyright issues, the benefits and drawbacks of using open-source software for different applications.
CO6	**Create:** a small database application with data records, forms, queries, and reports.

Course Content
BSC/MD/CS/1/MIC/101 Information Technology Tools

Unit – I

Introduction: Computer their Origin and Applications Evolution and generations of Computers, Characteristics of computers, Limitations of Computers. Applications of computers Functioning of Computer, Components of a computer and their role, Number system for computers, Decimal to Binary, Octal and Hexadecimal conversions and vice versa. Codes: BCD and ASCII codes, Block diagram of computer, functions of different units of computers.

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Memory System: Type of memories and their characteristics, memory hierarchy,

Software: Evolution Different type of software and its evolution, System and application software, Utility software, Perverse software, Open-Source software.

Operating System: Concepts Need and Functions, Type of OS starting from Batch, Multi-programming and real time Network and distributed OS, Web OS.

Languages: Introduction to High Level Language, Low Level Language and Assembly Language, Compilers, Interpreters, Assemblers.

Unit – II

Computer Applications: Concepts of Open Source Software, Philosophy – licensing, copyright. Project Management Software, Timesheet system, Office Applications, Word Processing – Creating a Memo for a number of people, Spreadsheet – Creating a sheet of Income & deduction and calculation of IT Database – a small application with data records, a form, a query and a report. Email – Sending mail to a few people in a group, downloading an attachment.

Networking and Internet: Basic of Networking Concepts, Advantages of Networking, Basic model of Networks, Network Devices, Web addresses, IP addresses. Web Applications: Browsing, E-mail, Messenger/Chat, Blogging, E-Learning and wiki, Collaboration, Social Networking.

Books Recommended:
1. Sinha, P.K. & Sinha, Priti, Computer Fundamentals, BPB
2. Dromey, R.G., How to Solve it By Computer, PHI
3. Norton, Peter, Introduction to Computer, McGraw-Hill
4. Leon, Alexis & Leon, Mathews, Introduction to Computers, Leon Tech World
5. Rajaraman, V., Fundamentals of Computers, PHI
6. Ram, B., Computer Fundamentals, Architecture & Organization, New Age International (P) Ltd.

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Semester II

BSC/MD/CS/2/DSC/103 Data Structure

Course Type	Course Credit	Contact Hours/ Week	Delivery Mode	Maximum Marks		Exam Duration	Assessment Methods
				External	Internal		
DSC	02	02	Lecture	35	15	3 Hours	TEE/MTE/ Assignment/ Attendance
					10 | 2 | 3		

Instructions to paper setter for Term-End Examination: The Term-End examination shall cover the whole content of the course. The total number of questions shall be five. Question number one will be compulsory and will consist of SEVEN short/objective-type questions from the complete syllabus. In addition to the compulsory first question, there shall be two units in the question paper each consisting of two questions. The student will attempt one question from each unit in addition to the compulsory question. First question will carry seven marks and rest questions will carry equal marks.

Course Objectives: The objective of this course is to get the students familiar with various types of data structure and different techniques to implement the data structures and their real-life applications.

Course Outcomes	At the end of this course, the student will be able to:
CO1	**Knowledge:** Define key concepts related to data structures and algorithms such as arrays, stacks, queues, linked lists, searching, and sorting, the characteristics and implementations of various data structures and algorithms
CO2	**Understand:** time-space tradeoffs in algorithm design, the concepts of recursion and divide and conquer strategy in algorithmic design. Describe the utility and conversion methods of expressions between prefix, infix, and postfix notations using stacks.
CO3	**Apply:** different searching and sorting algorithms (e.g., linear search, binary search, bubble sort, selection sort, insertion sort, merge sort, quick sort) to solve problems efficiently. And to apply single and multi-dimensional arrays, sparse matrices, stacks, queues, and linked lists in code
CO4	**Analyze:** the efficiency and performance of algorithms using time and space complexity analysis. Compare and contrast the characteristics, advantages, and disadvantages of different data structures and algorithms.
CO5	**Evaluate:** the effectiveness and correctness of algorithm implementations through testing and debugging. And the appropriateness of data structures and algorithms for solving real-world problems based on their efficiency and complexity.
CO6	**Creating:** Construct efficient and scalable solutions to problems by applying appropriate data structures and algorithms.

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Course Content
BSC/MD/CS/2/DSC/103 Data Structure

Unit – I

Data structure and Algorithm Preliminaries: Definitions, Operations on Data structures, Algorithms: Algorithmic Notations, Complexity of Algorithms-Big „O" Notation, Arrays: Introduction, Linear Arrays, Representation of Linear Arrays in Memory, Traversing Linear Arrays, Concatenating Two Arrays, Insertion into a Linear Array, Deletion from a Linear Array, Largest/Smallest Element from an Array, Linear Search, Binary Search. Introduction to Multidimensional Arrays, Address Calculation of Elements of Arrays,

Sorting: Bubble Sort, Selection Sort.
Strings: Introduction to Strings, Basic Terminology, Storing Strings, String Operations,
Linked list: Introduction to Linked List, Representation of Linked List in Memory, Traversing a Linked List, Searching a Linked List, Insertion into a Linked List, Deletion from a Linked List, Header Linked Lists, Two way Linked List (Doubly Linked List): Introduction, Inserting a node and Deleting a node from Two way Linked List (only illustrations), Introduction to Circular Linked List.

Unit – II

Stack: Introduction to Stacks, Array Representation of Stacks, Operations on stack,: PUSH and POP, Representation of Stack as Linked List, Polish Notations and Reverse Polish Notation, Evaluation of Postfix Expressions, Transforming Infix Expressions into Postfix Expressions, Transforming Infix Expressions into Prefix Expressions, Introduction to Recursion.
Graphs: Introduction, Graph Theory Terminology, Sequential Representation of Graphs: Adjacency Matrix Path Matrix , Linked Representation of a Graph, Shortest Path Dijkstra Algorithm.

Queues: Introduction to Queues, Operations on the Queues: Enqueue and Dequeue, Circular Queue, Double Ended Queue(DEQUE), Representation of a Queue as an Array, Representation of a Queue as Linked List,
Trees: Introduction, Basic Terminology, Binary Tree, Tree Representations using Array & Linked List, Binary Trees Traversing by Recursive procedures: Preorder In-order, & Post-order Traversal (NLR, LNR and LRN), Introduction to Binary Search Tree (BST), Insertion and Deletion in BST (only illustrations)

Books Recommended:
1. Hemant Jain, Problem Solving in Data Structures & Algorithms Using C
2. Yashavant P. Kanetkar, Data Structure Through C
3. Rajesh K. Shukla, Data Structures using C & C++
4. E Balagurusamy, Data Structures Using C
5. Seymour Lipschutz, Data Structure With C

BSC/MD/CS/2/DSC/104 Data Structure (Lab-Work)

Course Type	Course Credit	Contact Hours/ Week	Delivery Mode	Maximum Marks		Exam Duration	Assessment Methods
				External	Internal		
DSC Practical	02	04	Practical	50	-	3 Hours	Practical/ Viva-voce

Instructions to paper setter for Term-End Examination: The Term-End examination shall be conducted by a panel of one external and one internal examiner. The question paper for practical examination shall be set on the spot.

List of Experiments/ Assignments

Note: Students are advised to do laboratory/practical practice not limited to, but including the following types of problems:

1.	Write a program to insert an element in an array.
2.	Write a program to delete an element from an array.
3.	Write a program for Pattern Matching Algorithm.
4.	Write a program for Bubble Sort/ Selection Sort/ Insertion Sort.
5.	Write a program for Linear Search/ Binary search.
6.	Write a program to insert a node in linked list at beginning, end, after a given node, before a given node.
7.	Write a program to delete the starting node, last node or a given node from a linked list.
8.	Write a program to implement push and pop operation in a stack using array.
9.	Write a program to implement push and pop operation in stack using Linked List.
10.	Write a program to insert and delete an element in Queue using array.
11	Write a program to insert and delete an element in Queue using Linked List.
12.	Write a program for tree traversal.
13.	Write a program for Quick Sort

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BSC/MD/CS/1/MIC/102 Problem Solving Techniques

Course Type	Course Credit	Contact Hours/ Week	Delivery Mode	Maximum Marks					Exam Duration	Assessment Methods
				External	Internal					TEE/MTE/ Assignment/ Attendance
				35	15				2 Hours	
MIC	02	02	Lecture		10	2	3			

Instructions to paper setter for Term-End Examination: The Term-End examination shall cover the whole content of the course. The total number of questions shall be five. Question number one will be compulsory and will consist of SEVEN short/objective-type questions from the complete syllabus. In addition to the compulsory first question, there shall be two units in the question paper each consisting of two questions. The student will attempt one question from each unit in addition to the compulsory question. First question will carry seven marks and rest questions will carry equal marks.

Course Objectives: The course is designed to provide a comprehensive understanding of the fundamental concepts of computer science and programming. Students will be able to develop logics which will help them to create programs, applications in C.

Course Outcomes	At the end of this course, the student will be able to:
CO1	**Knowledge:** problem solving technique, flow chart, algorithm and C programming language
CO2	**Understand:** algorithm complexity data types, operators, arithmetic expression in C
CO3	**Apply:** C language programming constructs to solve real problems.
CO4	**Analyze:** to determine the most efficient approach for given problems.
CO5	**Evaluate:** the performance of C programs and optimize them by choosing appropriate data structures and control flow mechanisms.

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Course Content
BSC/MD/CS/1/MIC/102 Problem Solving Techniques

Unit – I

Problems Solving Techniques: Data, Information , Data v/s Information, Problem definition, Algorithms definition.

Introduction to an algorithm: Features of Algorithm, Criteria to be followed by an Algorithm, Analysis of Algorithm Efficiency, Analysis of Algorithm Complexity, Flowcharts, Basic Symbols used in Flowchart Design.

C language: Structure of a C Program, Variables and Constants, Character Set, Identifiers and Keywords, Rules for Forming Identifiers, Data Types, Data Type Qualifiers, Variables, Declaring Variables, Initializing Variables, Constants, Types of Constants. Assignment Statements, Arithmetic Operators, Relational Operators, Logical Operators, Comma and Conditional Operators, Type casting, Precedence and Associativity of Operators, evaluation of arithmetic expressions.

Unit – II

Decision and Control Statements: Decision Control Statements, if, if-else, ladder else-if and nested if-else Statements, switch Statement, Loop Control Statements: while Loop, do-while Loop, for Loop, The goto Statement, break and continue statements.

Arrays: Definition, Creating and Using One Dimensional Arrays, Initializing an Array, Accessing individual elements in an Array, Two dimensional Arrays: memory representation schemes: row major, column major.

Pointers: Pointer variables, pointer arithmetic, call by value and call by reference, pointers and arrays.

Functions: Introduction to user defined functions.

Books Recommended:
1. Hemant Jain, Problem Solving in Data Structures & Algorithms Using C
2. Yashavant P. Kanetkar, Data Structure Through C
3. Rajesh K. Shukla, Data Structures using C & C++
4. E Balagurusamy, Data Structures Using C
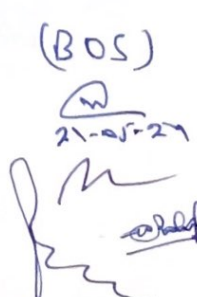
Skill Enhancement Courses (SEC) in Computer Science

Course Type	Course Code	Course Title	Level	Credits			Marks		
				L	P	Total	Int	Ext	Total
SEC (Sem-I)	CDLU/CS/1/SEC/101	IoT and Cloud Computing	100	3	-	3	25	50	75
	CDLU/CS/1/SEC/102	Introduction to Python Programming-I	100	3	-	3	25	50	75
SEC (Sem-II)	CDLU/CS/2/SEC/103	Introduction to R Programming-I	100	3	-	3	25	50	75
	CDLU/CS/2/SEC/104	Web Development	100	3	-	3	25	50	75

Department of Computer Science and Engineering
Faculty of Computer Science and Engineering
Chaudhary Devi Lal University, Sirsa
(Haryana)-India
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CDLU/CS/1/SEC/101 IoT and Cloud Computing

Course Type	Course Credit	Contact Hours/ Week	Delivery Mode	Maximum Marks		Exam Duration	Assessment Methods
				External	Internal		
SEC	03	03	Lecture	50	25	3 Hours	TEE/MTE/ Assignment/ Attendance
					15 5 5		

Instructions to paper setter for Term-End Examination: The Term-End examination shall cover the whole content of the course. The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each will be set unit-wise comprising of two questions from each of the three units. The candidates are required to attempt one compulsory question and three more questions selecting one question from each unit

Course Objectives: the primary objective of a course on cloud computing is to provide students with a comprehensive understanding of the concepts, principles, technologies, and practices related to cloud computing.

Course Outcomes	At the end of this course, the student will be able to:
CO1	**Knowledge:** the basic concepts and terminology of cloud computing, key features of major cloud services
CO2	**Understand:** the principles behind IoT cloud computing architecture.
CO3	**Apply:** IoT and Cloud computing services in different applications.
CO4	**Analyze:** communication challenges, security issues, enabling technologies, application areas, and protocols, service models.
CO5	**Evaluate:** the performance of different IoT and Cloud based services
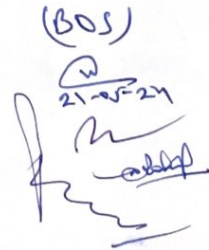
Course Content
CDLU/CS/1/SEC/101 IOT and Cloud Computing

Unit – I

Internet of Things: what is the IOT and why is it important, IoT conceptual framework, IoT architectural view, technology behind IoT, sources of IoT, examples of IoT, M2M communication, layered architecture (3 & 5 Layered) of IoT, physical design and logical design, domain-specific IoTs, security issues of IoT.

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Unit – II

Applications of IoT: home automation, smart cities, social life and entertainment, health & fitness, smart environment and agriculture, supply chain and logistics, energy conservation.

Design principles for web connectivity: web communication protocols for connected devices, message communication protocols for connected devices. Communication challenges related to IoT, enabling technologies for IoT.

Unit – III

Introduction to cloud computing: what is a cloud, definition of cloud computing, evolution of cloud computing, characteristics of cloud computing, how cloud computing works, role of networks in cloud computing.

Service models: IaaS, PaaS, SaaS, public, private and hybrid cloud.

Books Recommended:

1. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, Cloud Computing a Practical Approach, Tata McGraw Hill, New Delhi, 2010
2. Robert Elsenpeter, Toby J. Velte, Anthony T. Velte, Cloud Computing: A Practical Approach, 1e, Tata McGraw Hill Education, 2011.
3. Raj Kamal, Internet of Things-Architectures and Design Principles, McGraw Hill Education, 2017

CDLU/CS/1/SEC/102 Introduction to Python Programming -I

Course Type	Course Credit	Contact Hours/ Week	Delivery Mode	Maximum Marks		Exam Duration	Assessment Methods
				External	Internal		
SEC	03	03	Lecture	50	25	3 Hours	TEE/MTE/ Assignment/ Attendance
					15 | 5 | 5		

Instructions to paper setter for Term-End Examination: The Term-End examination shall cover the whole content of the course. The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each will be set unit-wise comprising of two questions from each of the three units. The candidates are required to attempt one compulsory question and three more questions selecting one question from each unit

Course Objectives: The objective of this course is to get the students familiar with fundamental concepts of python programming, looping, numpy concepts, and file handling system.

Course Outcomes	At the end of this course, the student will be able to:
CO1	**Knowledge:** installations, working, structures, control statements, operators, lists,object oriented programming concepts
CO2	**Understand:** conditional & control statements ,strings, OOPs ,file handling concepts ,libraries
CO3	**Apply:** python programming constructs to solve real world problems..
CO4	**Analyze:** to determine the most efficient approach for given problems.
CO5	**Evaluate:** the performance of Python programs and optimize them by choosing appropriate data structures and control flow mechanisms.

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Course Content
CDLU/CS/1/SEC/102 Introduction to Python Programming -I

Unit – I

Installation and Working with Python: Using Help, Structure of a Python Program, Control flow, Interpreter shell, Tokens, Identifiers, Reserved keywords, Literals, Variables, Python basic Operators, Declaring and using Numeric data types: int, float, complex, using string data type. Python Casting, Scope of a Variable, Working with: String, List, Tuples and Dictionaries.

Unit – II

Conditional blocks: if, else and else if, For loops in python, While loops, Continue, Break and Else, organizing python codes using functions, Modules, Creating Module, using Modules and Built-in Modules.

Packages: Package Types, Importing Package, Viewing Package Content and Documentation. Powerful Lambda Function in python, Programming: Using Functions, Modules and Packages.

Unit – III
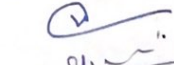
Object Oriented Programming: Concept of Class, Object and Instances, Constructor, Class Attributes and Destructors, Built-in Class Attributes, Inheritance, Method Overriding, Data Encapsulation, Overloading Operators, Data Hiding, Exception Handling, Programming using Oops concepts.

File Handling: Creating, Opening, Closing, Writing & Reading File Content, Deleting a File. Programming using file operations.

Books Recommended:
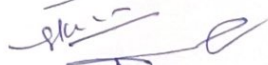
1. E. Balagurusamy, Introduction to Computing and Problem Solving Using Python, McGraw Hill Education, 2016.
2. Chun, J Wesley, Core Python Programming, 2e, Pearson, 2007.
3. Barry and Paul, Head First Python, 2e, O Reilly, 2010.
4. Lutz and Mark, Learning Python, 4e, O Reilly, 2009.

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CDLU/CS/1/SEC/103 Introduction to R Programming -I

Course Type	Course Credit	Contact Hours/ Week	Delivery Mode	Maximum Marks		Exam Duration	Assessment Methods
				External	Internal		
SEC	03	03	Lecture	50	25	3 Hours	TEE/MTE/ Assignment/ Attendance
					15 | 5 | 5		

Instructions to paper setter for Term-End Examination: The Term-End examination shall cover the whole content of the course. The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each will be set unit-wise comprising of two questions from each of the three units. The candidates are required to attempt one compulsory question and three more questions selecting one question from each unit

Course Objectives: he objectives of a course in R programming typically aim to equip students with the knowledge and skills necessary to effectively use R for statistical analysis, data visualization, and programming.

Course Outcomes	At the end of this course, the student will be able to:
CO1	**Knowledge:** data types, functions in R programming, visualization
CO2	**Understand:** the syntax of decision making statements, loops, user defined functions,used define packages
CO3	**Apply:** R programming constructs to solve real world problems.
CO4	**Analyze:** to determine the most efficient approach for given problems.
CO5	**Evaluate:** the performance of R programs and optimize them by choosing appropriate data structures and control flow mechanisms

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Course Content
CDLU/CS/1/SEC/103 Introduction to R Programming -I

Unit – I

Basic of R: Introduction to R, Features of R, Variables in R, In-Built Functions in R (mathematical, trigonometric, logarithmic, Date and Time, Sequence, I/O).
Data Types in R: Vectors, Matrices, Arrays, Lists, Factors, Data Frames.

Unit – II

Programming in R: Decision making structures (if, Switch), Loops (For, while, repeat), User Defined functions (with argument without argument), User Defined Package. Reports using remark down (direct rendering, in-direct rendering).

Unit – III

Data Exploration and Manipulation: Missing Data Management, Data reshaping through melting and casting, special functions across data elements.Import and Export of data: Import and Export of data in text files, excel files and MySQL.
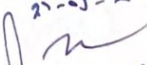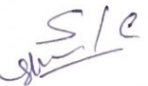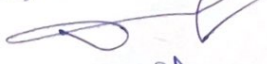
Books Recommended:
1. Christian Heumann, Michael Schomaker and Shalabh, Introduction to Statistics and Data Analysis - with Exercises, Solutions and Applications in R, Springer, 2016.
2. Pierre Lafaye de Micheaux, RémyDrouilhet, Benoit Liquet, The R Software-Fundamentals of Programming and Statistical Analysis, Springer 2013.
3. Alain F. Zuur, Elena N. Ieno, Erik H.W.G. Meesters, Use R - A Beginner's Guide to R, Springer 2009.

CDLU/CS/1/SEC/104 Web Development

Course Type	Course Credit	Contact Hours/ Week	Delivery Mode	Maximum Marks		Exam Duration	Assessment Methods
				External	Internal		
SEC	03	03	Lecture	50	'25	3 Hours	TEE/MTE/ Assignment/ Attendance
					15 5 5		

Instructions to paper setter for Term-End Examination: The Term-End examination shall cover the whole content of the course. The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each will be set unit-wise comprising of two questions from each of the three units. The candidates are required to attempt one compulsory question and three more questions selecting one question from each unit

Course Objectives:. the objectives of a web development course typically revolve around equipping students with the knowledge and skills required to design, develop, and deploy websites and web applications.

Course Outcomes	At the end of this course, the student will be able to:
CO1	**Knowledge:** information architecture, role of architect, collaboration, organizing information, navigation design, designing search interface, indexing, grouping content, conceptual design, html tags, layouts, basics of xml
CO2	**Understand:** information architecture, role of architect, collaboration and organizing information, navigation design, designing search interface, indexing, grouping content, conceptual design, html tags, layouts,
CO3	**Apply:** html and xml tags to development of web applications.
CO4	**Analyze:** to determine the most efficient tags for given problems.
CO5	**Evaluate:** the performance of different HTML and XML tags.

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Unit – I

Information architecture: the role of information architect, collaboration and communication, organization information, organizational challenges, organizing web sites and intranets, creating cohesive organization systems, designing navigation systems, types of navigation systems, integrated navigation elements, remote navigation elements, designing elegant navigation systems, searching your web site, designing the search interface, indexing the right stuff, to search or not to search, grouping content, conceptual design; high-level architecture blueprints, architectural page markups, design sketches

Unit – II

Images & HTML: image preliminaries, image download issues, images as buttons, introduction to layout: backgrounds, colors and text, fonts, layout with tables, advanced layout: frames and layers, and other media types, audio support in browsers, video support, other binary format, style sheets, positioning with style sheets.

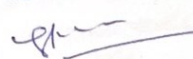**Basic interactivity and HTML:** forms, forms control, new and emerging form elements.
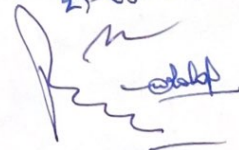
Unit – III

XML: Introduction of XML, features of XML, structure of XML document, the XML declaration, element tags nesting and structure, XML text and text formatting element, table element, mark-up element and attributes, document type definition (DTD), types. XML objects. XML relationship between HTML, SGML, and XML, basic XML, valid documents. ways to use XML, XML for data files, embedding XML into HTML documents, converting XML to HTML as XML, the future of XML..
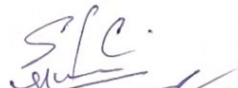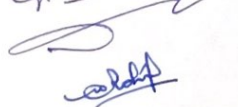
Books Recommended:

1. Steven Holzner,"HTML Black Book", Dreamtech Press India Pvt. Ltd. 2000.
2. Savaliya, Developing Web Applications, 2e, Wiley India Ltd.
3. Web Technologies - Black Book, Dreamtech Press India Pvt. Ltd.
4. Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, ASP.NET, XML and Ajax, Black Book by

Multidisciplinary Courses (MDC) in Computer Science

Course Type	Course Code	Course Title	Level	Credits			Marks		
				L	P	Total	Int	Ext	Total
MDC (Sem-I)	CDLU/CS/1/MDC/101	Computer Fundamentals	100	3	-	3	25	50	75
	CDLU/CS/1/MDC/102	Office Automation	100	3	-	3	25	50	75
MDC (Sem-II)	CDLU/CS/2/MDC/103	Web Designing Tools	100	3	-	3	25	50	75
	CDLU/CS/2/MDC/104	Introduction to Computer Hardware and Maintenance	100	3	-	3	25	50	75

Department of Computer Science and Engineering
Faculty of Computer Science and Engineering
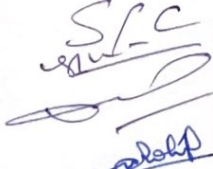**Chaudhary Devi Lal University, Sirsa**
(Haryana)-India
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CDLU/CS/1/MDC/101 Computer Fundamentals

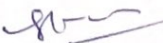| Course Type	Course Credit	Contact Hours/ Week	Delivery Mode	Maximum Marks		Exam Duration	Assessment Methods
				External	Internal		
MDC	03	03	Lecture	50	25	3 Hours	TEE/MTE/ Assignment/ Attendance
					15 | 5 | 5		

Instructions to paper setter for Term-End Examination: The Term-End examination shall cover the whole content of the course. The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each will be set unit-wise comprising of two questions from each of the three units. The candidates are required to attempt one compulsory question and three more questions selecting one question from each unit
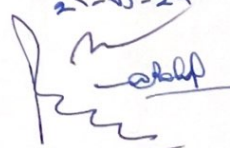
Course Objectives: The objectives of a course on computer fundamentals aim to provide students with a foundational understanding of computer systems, hardware, software, and their applications.

Course Outcomes	At the end of this course, the student will be able to:
CO1	Knowledge: Number system, types of computer system , computer networks, computer peripheral devices and system memories.
CO2	Understand: number system , coding system, network topologies and different hardware devices.
CO3	Apply: To convert one number system to another number system and code conversion.
CO4	Analyze: Different network types and topologies.
CO5	Evaluate: Requirement of memory and peripheral devices.

Unit – I

Introduction to Information Technology: concept of bit and byte, binary, octal, decimal and hexa-decimal number systems and their conversion, data representation, complement form, BCD code, Gray Code,ASCII code, 1's and 2's complements

Unit – II

Types of Computers: mini computer, micro computer, personal computer, super computer, note book/ laptop.
Computer Network: Local Area Network, Metropolitan Area Network, Wide Area Network.
Network Topologies: Bus, Ring, Star, Mesh and Hybrid, Internet and Intranet, modem.

Unit – III

Memory Organisation: Memory hierarchy, RAM, ROM, Primary memory and secondary memory and their characteristics, hard disk drives, cache memory

Peripheral devices: Input and output devices like keyboard, mouse, OMR, OCR, MICR, printers, scanner, joystick, web camera, light pen
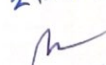
Books Recommended:

1. Sinha, P.K. & Sinha, Priti, Computer Fundamentals, BPB
2. Dromey, R.G., How to Solve it By Computer, PHI
3. Norton, Peter, Introduction to Computer, McGraw-Hill
4. Lexon , Alexis & Leon, Mathews, Introduction to Computers, Leon Tech World
5. Rajaraman Fundamental of Computers , PHI

CDLU/CS/1/MDC/102 Office Automation

Course Type	Course Credit	Contact Hours/ Week	Delivery Mode	Maximum Marks		Exam Duration	Assessment Methods
				External	Internal		
MDC	03	03	Lecture	50	25	3 Hours	TEE/MTE/ Assignment/ Attendance
					15 5 5		

Instructions to paper setter for Term-End Examination: The Term-End examination shall cover the whole content of the course. The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each will be set unit-wise comprising of two questions from each of the three units. The candidates are required to attempt one compulsory question and three more questions selecting one question from each unit

Course Objectives: To provide a comprehensive understanding and practical skills in using Windows, MS-Word, MS-Excel, and MS-PowerPoint for various tasks and applications.

Course Outcomes	At the end of this course, the student will be able to:
CO1	**Knowledge:** the components of the Windows operating system, the features and functions of Microsoft Word, Microsoft Excel and Microsoft PowerPoint, Microsoft Access.
CO2	**Understand:** The purpose and function of each component of the Windows interface, document structure including tables of contents, indexes, and page numbering, various common functions and formulas used for calculations and data manipulation in MS excel and presentation structure including slide organization, text content, and graphical elements.
CO3	**Apply:** knowledge of Windows components to perform tasks such as file management, launching applications, and customizing the desktop environment, formatting techniques to create professional-looking documents with consistent style and layout, Apply spreadsheet skills to organize, analyze, and present data effectively and to create visually appealing and engaging presentations
CO4	**Analyse:** the interrelationship between different components of the Windows interface, document requirements, spreadsheet features presentation requirements to select appropriate options to meet specific objectives
CO5	**Evaluate:** the clarity, readability, and visual appeal, accuracy, completeness, coherence of documents, presentations and customized spreadsheets

Course Content
CDLU/CS/1MDC/102 Office Automation

Unit – I

Introduction to computers: Hardware – Software, Operating System: Windows XP, MS-Paint, Notepad, Word pad, working withMenus – Shortcut keys.
Introduction to MS-Word: Creating Editing And formatting Document Working with Drawing objects – Text Manipulation –Word art, Clipart Inserting symbols, Diagram – Applying effects to Auto shapes – Bullets & Numbering. Creating Columns – Plotting, editing and filling drawing objects – Bookmark, Header & Footer – Hyperlink – Applying backgrounds & Borders, Shading Auto format- Working with tables – Sorting -Applying formula. Checking spelling and Grammar – Creating Labels – Envelopes – Mail merge Letter wizard. ·

Introduction to Internet: intranet and extranet. File sharing and Folder options.

Unit – II

Introduction to Excel: Features Data Entry Formatting cells & columns plotting graphs.
Workbook features: fill series, Functions Applying formula to applications & Data sorting, Auto format.
Data Validation: Conditional formatting, Data consolidation , Sub totals, Filters, Auto Filter, Pivot table chart, checking & correction formula Protecting workbook.
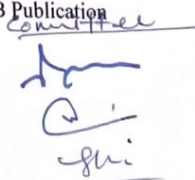
Unit – III

MS Power Point: Introduction – creating – editing and formatting presentation – Applying slide layout. Applying transition and Animation effects– Applying design templates. Viewing and setting up a slide show –rehearse timings – custom show. Presentation through Google Meet or any other service for on-line classes.

MS Access: Introduction to Ms Access, Planning a Database, Creating a New Database, Creating Tables, Working with Forms, Creating queries, Finding Information in Databases, Creating Reports, Types of Reports, Printing & Print Preview – Importing data from other databases viz. MS Excel etc.

Books Recommended:
1. Sinha, P.K. & Sinha, Priti, Computer Fundamentals, BPB
2. Dromey, R.G., How to Solve it By Computer, PHI
3. Microsoft Office – Complete Reference – BPB Publication

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CDLU/CS/2/MDC/103Web Designing Tools

Course Type	Course Credit	Contact Hours/ Week	Delivery Mode	Maximum Marks		Exam Duration	Assessment Methods
				External	Internal		
MDC	03	03	Lecture	50	25	3 Hours	TEE/MTE/ Assignment/ Attendance
					15 | 5 | 5		

Instructions to paper setter for Term-End Examination: The Term-End examination shall cover the whole content of the course. The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each will be set unit-wise comprising of two questions from each of the three units. The candidates are required to attempt one compulsory question and three more questions selecting one question from each unit

Course Objectives: The objective of this course is to get the students familiar with concepts of HTML tags, images, tables and frames. This course give knowledge about cascading style sheets and hyperlinks.

Course Outcomes	At the end of this course, the student will be able to:
CO1	**Knowledge:** History of HTML and its significance in the development of the World Wide Web, Basic structure of an HTML document, different types of HTML tags and their purposes, the basics of cascading style sheets (CSS) and its role in web design.
CO2	**Understand:** the hierarchical structure of HTML documents, the function and significance of HTML forms in collecting user input, the purpose of CSS in separating content from presentation and applying consistent styles across multiple web pages
CO3	**Apply:** appropriate tags and formatting techniques to structure and style content within an HTML document, CSS to control the layout, formatting, and styling of HTML elements.
CO4	**Analyze:** the structure and design of existing web pages to understand how images, forms, frames, and CSS are integrated.
CO5	**Evaluate:** the efficiency of HTML elements, CSS techniques in achieving desired layout and styling effects.

Unit – I

Introduction to computers: Hardware , Software, Operating System, Windows XP, MS-Paint, **Web Programming Introduction:** Architecture of a website, Different technologies in making the website.

Introduction to HTML: History of HTML, Basic structure of an HTML document, introduction to Static and Dynamic Websites, HTML Tag vs Element.

HTML Attributes: HTML basic formatting Tags, Grouping Using Div and Span.

HTML Lists: Unordered Lists, Ordered Lists, Definition list; Image and Image Mapping, Hyperlink.

Unit – II

HTML: Table: < table >, < th >, < tr >, < td >, < caption >, <thead >, < tbody >, < tfoot >, < colgroup >, <col>; Colspan & Rowspan.

HTML Iframe: Iframe attributes, Using Iframe as the Target.

HTML: Form: Form attributes, Form elements: < input >, < textarea >. < button >, < select >, < label >, <fieldset>, <legend> .

Unit – III

CSS: Introduction, Benefits of CSS, CSS Syntax, Types of CSS, CSS Selectors: Element selector, ID Selectors, Class Selectors, Grouping Selectors, Universal Selector; Pseudo Classes, pseudo element.

Text Fonts: color, background-color, text decoration, text-align, vertical-align, text-indent, text-transform, white space, letter-spacing, wordspacing,line-height, font properties, font-family, font-size, font-style, font variant, font weight.

Lists: list-style-type, list,style-position, list-style-image, liststyle Tables: border, width & height, text-align, padding, colour; CSS Box Model: Border, Margin & Padding, width & height; CSS Positioning properties: Static Positioning, Fixed Positioning, Relative Positioning, Absolute Positioning.

Books Recommended:
1. Matthew David, HTML5: Designing Rich Internet Applications (Visualizing the Web)
2. Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics
3. Satish Jain, Web Designing and Development Training Guide
4. Prem Kumar, Web Design With HTML & CSS : HTML & CSS Complete Beginner's Guide
5. HTML 5 Black Book, Covers CSS 3, JavaScript, XML, XHTML, AJAX, PHP and jQuery, 2ed

CDLU/CS/2/MDC/104 Introduction to Computer Hardware and Maintenance

Course Type	Course Credit	Contact Hours/ Week	Delivery Mode	Maximum Marks		Exam Duration	Assessment Methods
				External	Internal		
MDC	03	03	Lecture	50	25	3 Hours	TEE/MTE/ Assignment/ Attendance
					15 5 5		

Instructions to paper setter for Term-End Examination: The Term-End examination shall cover the whole content of the course. The question paper will consist of seven questions in all. The first question will be compulsory and will consist of four short questions of 2 marks each covering the whole syllabus. In addition, six more questions of 14 marks each will be set unit-wise comprising of two questions from each of the three units. The candidates are required to attempt one compulsory question and three more questions selecting one question from each unit.

Course Objectives: The objective of this course is to equip students with fundamental knowledge and skills related to computer hardware components, troubleshooting techniques, and maintenance practices

Course Outcomes	At the end of this course, the student will be able to:
CO1	**Knowledge:** basic components of computer system, software installation, troubleshooting
CO2	**Understand:** motherboard and its various components, fault occurred , diagnosis and is troubleshooting of pc
CO3	**Apply:** to assemble computer system, operating system and application software installation, preventive maintenance , data recovery and troubleshooting.
CO4	**Analyze:** hardware specifications, reason of fault occurrence
CO5	**Evaluate:** hard disk logical and physical management, dual boot OS

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Unit – I

Inside the PC Motherboard: CPU, memory, chipset, Flash ROM, CMOS Battery, BIOS, I/O Connectors, SMPS- AT and ATX power supply connectors; Storage devices- Diskette drive, Hard drive, CDROM, Tape drives, Add-on-cards and other devices, PCI & PCI Express slots, PCMCIA, AGP, Audio and Video ports, WOL (Wake-on-LAN) & WOR (Wake-on-Ring) connection

Unit – II

Assembly of PC: Assembly kit-Mounting of Motherboard & Processor, Connecting the different Ports & Connectors of FDD & IDE-Inserting different I/O cards on the Motherboard- Connecting SMPS to the Motherboard, Connecting RAMs & other devices, Disassembly of PC

Unit – III

System Installation: CMOS Setup, identification of HDD-Master-Slave Operating System installation- MS WindowsXP/Vista/7, Linux-Redhat/ Fedora/ Debian; Installation & Configuration of HDD-logical & physical sections of HDD, Data recovery, Driver Installation-Multimedia Keyboard, Printer, Modem, Sound card, NIC & other Devices (digital/web camera, bluetooth, mobile etc).
Installation of Application software: MS-Office & other Windows/Linux Application Software, Installation of Anti-virus
PC Fault diagnosis, Troubleshooting and Maintenance : Symptoms & remedies of commonly found problems; Troubleshooting tools, Hardware troubleshooting, Component based errors, Setup based errors, Troubleshooting checklist, Software Troubleshooting, Preventive Maintenance, limit the damage, power protection, virus protection, preventive maintenance checklist, System upgrade

Books Recommended:
1. Sinha, P.K. & Sinha, Priti, Computer Fundamentals, BPB
2. Rajaraman, V., Fundamentals of Computers, PHI
3. Ram, B., Computer Fundamentals, Architecture & Organization, New Age International (P) Ltd.
4. James Bernstein, Building Your Own Computer Made Easy, The Step By Step Guide
5. Scott Mueller, Upgrading and Repairing PCs