

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: 02 hrs.		
Course Outcomes	After completing this course satisfactorily, a student will be able to: <ul style="list-style-type: none">Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithmsDescribe common applications for arrays, records, linked structures, stacks, queues, trees, and graphsWrite programs that use arrays, records, linked structures, stacks, queues, trees, and graphsDemonstrate different methods for traversing treesCompare alternative implementations of data structures with respect to performanceDescribe the concept of recursion, give examples of its useDiscuss the computational efficiency of the principal algorithms for sorting and searching					
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, Initialization, 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				13	

	to postfix using stack; Evaluation of postfix expression using stack;	
Unit III	<p>Queues: Basic Concepts – Definition and Representation of queues; 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;</p> <p>Operations on Singly linked lists – Traversing, Searching, Insertion, Deletion; Memory allocation; Garbage collection</p>	13
Unit IV	<p>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;</p> <p>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.</p>	13
Recommended Learning Resources		
Print Resources	<p>Reference Books:</p> <ol style="list-style-type: none"> 1. Ellis Horowitz and Sartaj Sahni: Fundamentals of Data Structures 2. Tanenbaum: Data structures using C (Pearson Education) 3. Kamathane: Introduction to Data structures (Pearson Education) 4. Y. Kanitkar: Data Structures Using C (BPB) 5. Kottur: Data Structure Using C 6. Padma Reddy: Data Structure Using C 7. Sudipa Mukherjee: Data Structures using C – 1000 Problems and Solutions (McGraw Hill Education, 2007) 	

Year	I	Course Code: 21BSC2C2CS2P		Credits	02
Sem.	I	Course Title: Data Structure Lab		Hours	45
Course Pre-requisites, if any:		Knowledge of Programming			
Formative Assessment Marks: 25		Summative Assessment Marks: 25	Duration of ESA: 03 hrs.		
		Part A: <ol style="list-style-type: none">1. Write a C Program to find GCD using recursive function2. Write a C Program to display Pascal Triangle using binomial function3. 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.			
		PART B: <ol style="list-style-type: none">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.			

Evaluation Scheme for Lab Examination

Assessment Criteria		Marks
Activity – 1 from Part A	Write up on the activity/ task	3
	Demonstration of the activity/ task	07
Activity-2 from Part B	Write up on the activity/ task	3
	Demonstration of the activity/ task	07
Viva based on Lab Activities		05
Total		25

OPEN-ELECTIVE SYLLABUS:

Year	I	Course Code: 21BSC2O2CS2			Credits	03
Sem.	II	Course Title: Web Designing			Hours	40
Course Pre-requisites, if any		NA				
Formative Assessment Marks: 40		Summative Assessment Marks: 60		Duration of ESA:.02 hrs.		
Course Outcomes	At the end of the course the student should be able to: 1. Read, understand and trace the execution of programs 2. Write the code for a given problem 3. Perform input and output operations using programs 4. Write user defined functions to perform a task					
Unit No.	Course Content				Hours	
Unit I	History of Internet, The World Wide Web, Web Browser, Web Server, URL, Working of Web, Web Page, Types of Web Pages, Web Content, Websites, Home Pages, Building Website, Website building tools; Web graphics design, basic tips for graphics design, Web Designing tools: Gimp-image resize, crop, edit background, save with different file types. Introduction to web programming: what is web programming? , web programming languages.				10	
Unit II	Introduction to XHTML- Basic Syntax, Standard structure, Basic text markup, Images, Hypertext, Links, Lists, Tables, Forms- <form>,<input>,<label>,<select>,<textarea> tags and action buttons(submit and reset). CSS- Introduction, Levels of style sheets, Selector forms, Property value forms, Font properties, List properties, Color, Alignment of text, The box model, Background images, The and <div>tags.				10	
Unit III	JavaScript: Object orientation and JavaScript; General syntactic characteristics; Primitives, operations, and expressions; Screen output and keyboard input; Control statements; Object creation and modification; Arrays; Functions; Constructor; Pattern matching using regular expressions; Errorsin scripts; Examples.				10	
Unit IV	Introduction to XML, Syntax of XML , XML document structure, Displaying raw XML documents, Displaying XML documents with CSS,XSLT Stylesheets and Displaying XML documents with XSLT. Web Design: Concepts of effective web design, Web design issues including Browser, Bandwidth and Cache, Display resolution, Look and Feel of the Website, Page Layout and linking, User centric design, Sitemap, Planning and publishing website, Designing effective navigation				10	

Recommended Learning Resources	
Print Resources	<p>Text Books:</p> <ol style="list-style-type: none"> 1. Robert W. Sebestra, "Programming the World Wide Web", 7th Edition /4th edition Addison Wesley Publication, 2013. <p>References:</p> <ol style="list-style-type: none"> 1. Developing Web Applications, Ralph Moseley and M. T. Savaliya, Wiley-India 2. Web Technologies, Black Book, dreamtech Press 3. HTML 5, Black Book, dreamtech Press 4. Web Design, Joel Sklar, Cengage Learning 5. Developing Web Applications in PHP and AJAX, Harwani, McGrawHill 6. Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel, Pearson