

 <b>Academy of Engineering</b> (An Autonomous Institute Affiliated to SPPU)	<b>COURSE SYLLABI</b> <b>(2019 – 2023)</b>	
<b>SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY</b>	<b>W.E.F</b>	2020- 2021
<b>SECOND YEAR BACHELOR OF TECHNOLOGY COMPUTER ENGINEERING</b>	<b>COURSE NAME</b>	Programming Lab
	<b>COURSE CODE</b>	CS224
	<b>COURSE CREDITS</b>	2
<b>RELEASED DATE : 01/07/2020</b>	<b>REVISION NO</b>	1.0

TEACHING SCHEME  (HOURS/WEEK)		EXAMINATION SCHEME & MARKS						
		THEORY			PRACTICAL			TOTAL
LECTURE	PRACTICAL	MSE	ESE	IA	T/P	DM	IA	
NIL	4	NIL	NIL	NIL	50	NIL	25	75

**PRE-REQUISITE :** 1. CS101 Logic Development-C Programming

#### **COURSE OBJECTIVES :**

- CS221.CEO.1: To illustrate fundamental data structures and their applications in programming and problem solving.
- CS221.CEO.2: To understand abstract data representation methods.
- CS221.CEO.3: To build the ability to synthesize and analyze algorithms.
- CS221.CEO.4: To identify appropriate data structure for the specified problem.
- CS221.CEO.5: To understand the various techniques of searching and sorting.
- CS221.CEO.6: To analyze different sorting and searching algorithms.

#### **COURSE OUTCOMES:**

- Students successfully completing the course will be able to,
- CS221.CO.1: Explain the concept of data structure.
- CS221.CO.2: Develop efficient algorithm for a given problem.
- CS221.CO.3: Analyze appropriate algorithm for solving the real world problem.
- CS221.CO.4: Demonstrate advantages and disadvantages of data structures for variety of problems.
- CS221.CO.5: Choose effective data structures in approaching a problem solution.
- CS221.CO.6: Make use of appropriate sorting and searching algorithm for a given application.

<b>PRACTICAL:</b>		
<b>PRACTICAL NO.01</b>		<b>4 HOURS</b>
Design and implement a program to read, display, insert, update and delete operations on data objects for customer information supply chain management system using array.		
<b>PRACTICAL NO.02</b>		<b>4 HOURS</b>
Design and implement a program for sparse matrix operations of addition, multiplication and transpose of sparse matrix for climate prediction data stored in 2D array.		
<b>PRACTICAL NO.03</b>		<b>4 HOURS</b>
Design and develop program for insertion, up-dating, searching, sorting, listing and deletion operations using singly linked list for placement information system.		
<b>PRACTICAL NO.04</b>		<b>4 HOURS</b>
Design and develop program for polynomial addition, multiplication operations for disease information using circular linked list.		
<b>PRACTICAL NO.05</b>		<b>4 HOURS</b>
Design and implement a program for sorting two given lists and merging these two sorted lists of marks scored for technical skill examination of recruitment cell using doubly linked list.		
<b>PRACTICAL NO.06</b>		<b>4 HOURS</b>
Design and implement a menu driven program for expression conversion from infix to postfix, postfix to prefix expression and evaluation of postfix expression using stack.		
<b>PRACTICAL NO.07</b>		<b>2 HOURS</b>
Design and implement a program for poker hand royal flush game using recursion.		
<b>PRACTICAL NO.08</b>		<b>4 HOURS</b>
Design and implement a menu driven program for linear and circular queue for food ordering using array and linked list.		

<b>PRACTICAL NO.09</b>		<b>4 HOURS</b>
Design and implement a program for double ended queue and its operations for a shopping mall.		
<b>PRACTICAL NO.10</b>		<b>4 HOURS</b>
Design and implement a menu driven program for implementing insertion sort and quick sort for population of a town.		
<b>PRACTICAL NO.11</b>		<b>4 HOURS</b>
Design and implement a menu driven program for implementing Fibonacci, binary and sentinel searching for students marks scored in an examination.		
<b>PRACTICAL NO.12</b>		<b>2 HOURS</b>
Design and implement a program for survey information of sports using principle of inclusion and exclusion.		
<b>PRACTICAL NO.13</b>		<b>2 HOURS</b>
Design and implement a program for generating all possible combinations of given string using recursion.		
<b>PRACTICAL NO.14</b>		<b>2 HOURS</b>
Design and develop a program using linear recurrence relations for various loan schemes of a bank.		
<b>PRACTICAL NO.15</b>		<b>2 HOURS</b>
Design and implement program for parity checker of ASCII equivalence of given word.		

#### **TEXT BOOK**

1. E. Horowitz S. Sahani, D. Mehta, "Fundamentals of Data Structures in C++" , Seventh Edition, Universities Press ,2008, IS BN-13: 978-8173716065.
2. T. Cormen, C Leiserson, R. Rivest, C Stein, "Introduction to Algorithms", MIT press,2009, ISBN-13: 978-0262533058
3. Michael T. Goodrich, Roberto Tamassia, David M. Mount, "Data Structures and Algorithms in C++", John Wiley Sons, ISBN-13: 978-0470383278

#### **REFERENCE BOOK**

1. Richard F. Gilberg, Behrouz A Forouzan, " Data structures- A pseudocode Approach with C++" Second edition , Cengage l earning, 2004, 9780534390808.
2. E. Horowitzs S. Sahani, S. Rajashekharan, "Fundametals of Computer Algorithm s", Universities Press, 2008,ISBN-13: 978-8 173716126
3. Debasis Samanta, " Classic Data Structures", Second Edition, TMH, 2009, ISBN-13: 978-8120337312