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|  | **ITER, SIKSHA ‘O’ ANUSANDHAN (Deemed to be University)** | | | | | | | | | **LESSON PLAN** | | | |
| Programme | **BTech in Computer Science & Engineering** | | | | Academic Year | | | | | **2023-24** | | | |
| Department | **Computer Science & Engineering** | | | | Semester | | | | | **III** | | | |
| Instructor | **Rasmiranjan Mohakud** | | | | Year/Period | | | | | **2023/Even** | | | |
| Course  Code | Course Name | Credit Structure | | | | | Marks Distribution | | | | | | |
| L | T | P | | C | Q/A | MID | END | | Att. | LAB | Total |
| **CSE 2141** | **Computer Science Workshop 2** |  |  | **8** | | **4** | **20** | **15** | **60** | | **5** |  | **100** |
| **Date** | Lessons/Topics Covered | | | | | Mapping with COs | | | | | | | |
| Lab1 | INTRODUCTION, ASYMPTOTIC ANALYSIS, BIG-O NOTATION, OMEGA-ω NOTATION, THETA-θ NOTATION | | | | | **All COs, POs, PSOs** | | | | | | | |
| Lab2 | COMPLEXITY ANALYSIS OF ALGORITHMS, TIME COMPLEXITY ORDER, DERIVING THE RUNTIME FUNCTION OF AN ALGORITHM, TIME COMPLEXITY EXAMPLES | | | | | **CO1, CO2, CO3, CO4, CO5,CO6** | | | | | | | |
| Lab3 | MASTER THEOREM, ARRAY BASED QUESTIONS, RECURSIVE FUNCTION | | | | | **CO1** | | | | | | | |
| Lab4 | INTRODUCTION TO APPROACH TO SOLVE ALGORITHM DESIGN PROBLEM, CONSTRAINTS, IDEA GENERATION, COMPLEXITIES, CODING, TESTING, | | | | | **CO1** | | | | | | | |
| Lab5 | ABSTRACT DATA TYPE (ADT),DATA STRUCTURE, JAVA COLLECTION FRAMEWORK, ARRAY, LINKED LIST, STACK, QUEUE | | | | | **CO2** | | | | | | | |
| Lab6 | TREE, BINARY TREE, BINARY SEARCH TREES (BST), PRIORITY QUEUE (HEAP), HASH-TABLE | | | | | **CO2** | | | | | | | |
| Lab7 | DICTIONARY / SYMBOL TABLE, GRAPHS, GRAPH ALGORITHMS, SORTING ALGORITHMS, COUNTING SORT | | | | | **CO2** | | | | | | | |
| Lab8 | TYPE OF SORTING, BUBBLE-SORT, MODIFIED (IMPROVED) BUBBLE-SORT, INSERTION-SORT, SELECTION-SORT, MERGE-SORT | | | | | **CO2** | | | | | | | |
| Lab9 | QUICK-SORT, QUICK SELECT, BUCKET SORT, GENERALIZED BUCKET SORT, HEAP-SORT | | | | | **CO2** | | | | | | | |
| Lab10 | TREE SORTING, EXTERNAL SORT (EXTERNAL MERGE-SORT), STABLE SORTING, COMPARISONS OF THE VARIOUS SORTING ALGORITHMS.SELECTION OF BEST SORTING ALGORITHM. PROBLEMS BASED ON SORTING | | | | | **CO2** | | | | | | | |
| Lab11 | WHY SEARCHING? DIFFERENT SEARCHING ALGORITHMS, LINEAR SEARCH – UNSORTED INPUT, LINEAR SEARCH – SORTED, BINARY SEARCH | | | | | **CO2** | | | | | | | |
| Lab12 | STRING SEARCHING ALGORITHMS, HASHING AND SYMBOL TABLES, HOW SORTING IS USEFUL IN SELECTION ALGORITHM?, PROBLEMS IN SEARCHING | | | | | **CO2** | | | | | | | |
| Lab13 | LINKED LIST, TYPES OF LINKED LIST, SINGLY LINKED LIST, DOUBLY LINKED LIST, CIRCULAR LINKED LIST, DOUBLY CIRCULAR LIST | | | | | **CO3** | | | | | | | |
| Lab14 | THE STACK ABSTRACT DATA TYPE, STACK USING ARRAY, STACK USING ARRAY WITH MEMORY MANAGEMENT, STACK USING LINKED LIST, SYSTEM STACK AND METHOD CALLS, PROBLEMS IN STACK, USES OF STACK | | | | | **CO3** | | | | | | | |
| Lab15 | THE QUEUE ABSTRACT DATA TYPE, QUEUE USING ARRAY, QUEUE USING LINKED LIST, PROBLEMS IN QUEUE | | | | | **CO3** | | | | | | | |
| Lab16 | INTRODUCTION, TERMINOLOGY IN TREE, BINARY TREE, TYPES OF BINARY TREES, PROBLEMS IN BINARY TREE, BINARY SEARCH TREE (BST) | | | | | **CO3** | | | | | | | |
| Lab17 | PROBLEMS IN BINARY SEARCH TREE (BST), SEGMENT TREE, AVL TREES | | | | | **CO3** | | | | | | | |
| Lab18 | RED-BLACK TREE, SPLAY TREE, B-TREE, B+ TREE, B\* TREE | | | | | **CO3** | | | | | | | |
| Lab19 | INTRODUCTION, TYPES OF HEAP, HEAP ADT OPERATIONS, OPERATION ON HEAP, | | | | | **CO1, CO2, CO3** | | | | | | | |
| Lab20 | HEAP-SORT, USES OF HEAP, PROBLEMS IN HEAP | | | | | **CO1, CO2, CO3** | | | | | | | |
| Lab21 | INTRODUCTION, HASH-TABLE, HASHING WITH SEPARATE CHAININGPROBLEMS IN HASHING | | | | | **CO1, CO2, CO3** | | | | | | | |
| Lab22 | INTRODUCTION, GRAPH TERMINOLOGY, GRAPH REPRESENTATION, GRAPH TRAVERSALS, DEPTH FIRST TRAVERSAL, BREADTH FIRST TRAVERSAL | | | | | **CO4** | | | | | | | |
| Lab23 | USES OF BFS AND DFS, DFS & BFS BASED PROBLEMS | | | | | **CO4** | | | | | | | |
| Lab24 | MINIMUM SPANNING TREES (MST), | | | | | **CO4** | | | | | | | |
| Lab25 | SHORTEST PATH ALGORITHMS IN GRAPH, HAMILTONIAN PATH AND HAMILTONIAN CIRCUIT | | | | | **CO4** | | | | | | | |
| Lab26 | EULER PATH AND EULER CIRCUIT | | | | | **CO4** | | | | | | | |
| Lab27 | TRAVELLING SALESMAN PROBLEM (TSP) STRING MATCHING | | | | | **CO4** | | | | | | | |
| Lab28 | DICTIONARY / SYMBOL TABLE, PROBLEMS IN STRING | | | | | **CO4** | | | | | | | |
| Lab29 | PROBLEMS IN STRING | | | | | **CO5** | | | | | | | |
| Lab30 | BRUTE FORCE ALGORITHM, GREEDY ALGORITHM, | | | | | **CO5** | | | | | | | |
| Lab31 | DIVIDE-AND-CONQUER, DECREASE-AND CONQUER | | | | | **CO5** | | | | | | | |
| Lab32 | DYNAMIC PROGRAMMING, REDUCTION / TRANSFORM-AND-CONQUER, | | | | | **CO5** | | | | | | | |
| Lab33 | BACKTRACKING, BRANCH-AND-BOUND, A\* ALGORITH | | | | | **CO5** | | | | | | | |
| Lab34 | PROBLEMS IN BRUTE FORCE ALGORITHM | | | | | **CO5** | | | | | | | |
| Lab35 | PROBLEMS IN BRUTE FORCE ALGORITHM | | | | | **CO5** | | | | | | | |
| Lab36 | PROBLEMS ON GREEDY ALGORITHM | | | | | **CO5** | | | | | | | |
| Lab37 | GENERAL DIVIDE-AND-CONQUER RECURRENCE, PROBLEMS ON DIVIDE-AND-CONQUER ALGORITHM | | | | | **CO5** | | | | | | | |
| Lab38 | PROBLEMS ON DYNAMIC PROGRAMMING ALGORITHM | | | | | **CO5** | | | | | | | |
| Lab39 | PROBLEMS ON BACKTRACKING ALGORITHM | | | | | **CO5** | | | | | | | |
| Lab40 | DECISION PROBLEM, COMPLEXITY CLASSES, CLASS P PROBLEMS, CLASS NP PROBLEMS, CLASS CO-NP, NP–HARD, NP–COMPLETE PROBLEMS | | | | | **CO6** | | | | | | | |
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