



# Vivekanand Education Society's Institute of Technology

An Autonomous Institute Affiliated to University of Mumbai

## Department of Computer Engineering

Academic Year 2024-25

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**Name of the Course : Design and Analysis of Algorithms Laboratory**

**Year/Sem/Class : S.E.(Comp) / Sem IV / D7-A      Code: NCMPCCL41**

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**Faculty Incharge : Mrs. Lifna C S**

**Lab Incharge : Mrs. Lifna C S**

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**A) List of PO's are as follows**

PO	Description
PO1 (a)	<b>Basic Engineering knowledge:</b> An ability to apply the fundamental knowledge in mathematics, science, and engineering to solve problems in Computer engineering.
PO2 (b)	<b>Problem Analysis:</b> Identify, formulate, research literature and analyze computer engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and computer engineering and sciences.
PO3 (c)	<b>Design/ Development of Solutions:</b> Design solutions for complex computer engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
PO4 (d)	<b>Conduct investigations of complex engineering problems</b> using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
PO5 (e)	<b>Modern Tool Usage:</b> Create, select, and apply appropriate techniques, resources, and modern computer engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6 (f)	<b>The Engineer and Society:</b> Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to computer engineering practice.
PO6 (g)	<b>Environment and Sustainability:</b> Understand the impact of professional computer engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.
PO8 (h)	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of computer engineering practice.



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<b>PO9</b> <b>(i)</b>	<b>Individual and Team Work:</b> Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.
<b>PO10</b> <b>(j)</b>	<b>Communication:</b> Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
<b>PO11</b> <b>(k)</b>	<b>Project Management and Finance:</b> Demonstrate knowledge and understanding of computer engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
<b>PO12</b> <b>(l)</b>	<b>Life-long Learning:</b> Recognize the need for and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

**B) List of PSO's are as Follows:**

<b>PSO1</b>	Professional Skills - The ability to develop programs for computer based systems of varying complexity and domains using standard practices.
<b>PSO2</b>	Successful Career – The ability to adopt skills, languages, environment and platforms for creating innovative career paths, being successful entrepreneurs or for pursuing higher studies.

**C) Lab Outcomes**

1	To introduce the methods of designing and analyzing algorithms
2	Design and implement efficient algorithms for a specified application
3	Strengthen the ability to identify and apply a suitable algorithm for the given real-world problem.
4	Analyze the worst-case running time of algorithms and understand fundamental algorithmic problems.



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**D) LO-PO Mapping**

LO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CSL 503.1	3	3	3	3	2	-	-	-	-	-	-	3	3	3
CSL 503.2	3	3	3	3	2	-	-	-	-	-	-	3	3	3
CSL 503.3	2	2	3	2	3	-	-	-	-	-	-	3	3	3
CSL 503.4	2	2	2	3	2	-	-	-	-	-	-	2	3	3

**E) List of Experiments**

No	Name of the Experiment	LO	Grade
1	<ul style="list-style-type: none"><li>Implement and analyze Selection Sort</li><li>Implement and analyze Insertion Sort</li></ul>	LO1	/ 10
2	Implement and analyze Merge sort <b>(DAC)</b>	LO2	/ 10
3	Implement and analyze Quick sort <b>(DAC)</b>	LO2	/ 10
4	Implement and analyze Fractional Knapsack Problem <b>(Greedy)</b>	LO3	/ 10
5	Implement and analyze MST using Kruskal algorithm <b>(Greedy Method)</b>	LO3	/ 10
6	Implement and analyze Longest common subsequence <b>(Dynamic)</b>	LO4	/ 10
7	Implement and analyze N-queen problem <b>(Backtracking)</b>	LO5	/ 10
8	Implement and analyze 15 Puzzle Problem <b>(BB)</b>	LO5	/ 10
9	Implement <b>String Matching Algorithms</b> a. Rabin Karp b. Knuth-Morris-Pratt algorithm	LO6	/ 10
10	Write a case study on Complexity Classes: P, NP, NP-Hard, NP-Complete	LO1	/ 10



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	Assignments	LO1, LO2, LO3, LO4	
1	Assignment: 01 (Modules 1 - 3)		/ 5
2	Assignment: 02 (Modules 4 - 6)		/ 5
	OVERALL GRADE		
	Continuous Assessment		
1	HackerRank	LO1, LO2, LO3, LO4	/ 10
2	Virtual Lab		/ 10
3.	Gate based Quiz		/ 10
	Total CA		/ 20

### F) Grading for Choice Based Credit and Grading System (CBCGS)

Sr. No.	Range	Grade	Grade Point
1	80 and above	Outstanding (O)	15
2	75.00 – 79.99	Excellent (A)	14
3	70.00 – 74.99	Very Good (B)	13
4	60.00 – 69.99	Good (C)	12
5	50.00 – 59.99	Fair (D)	11
6	45.00 – 49.99	Average (E)	10
7	40.00 – 44.99	Pass (P)	9
8	Less than 40.00	Fail (F)	8

(SIGNATURE OF FACULTY)